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Impact of Corporate Board and Audit Committee Characteristics on Voluntary Disclosures: A Case Study of Listed Manufacturing Companies in Sri Lanka

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Abstract: The main purpose of this study is to investigate the impact of corporate board and audit committee characteristics on voluntary disclosures of listed manufacturing companies in Sri Lanka. In order to achieve the objective of the study, data were collected from annual reports of listed manufacturing companies, which were published by Colombo stock exchange in Sri Lanka for the period of 2012 to 2017. Descriptive and inferential statistics were used for this purpose for the study. Based on content analysis of disclosure, the empirical results of multiple regressions revealed that significant positive impact of board size on voluntary disclosures. Further CEO duality has significant negative impact on voluntary disclosures. Conversely board independence and audit committee size do not have any impact on voluntary disclosure of manufacturing companies in Sri Lanka. The outcome of the study offer evidence to policy makers, investors and accounting professionals on corporate reporting processes of listed manufacturing companies in Sri Lanka.

Keywords: Audit Committee Size, Board Size, Board Independence, Voluntary Disclosures

Introduction

In recent years, the corporate governance and published corporate disclosure of companies have increasingly attracted the attention and demand of scholars, regulatory bodies, policy makers and investors around the world (Rouf, 2011; Yuen, Liu, & Zhang, 2009). Corporate disclosure is very much essential for growth and development of a firm in particular equity market as well as for all stakeholders because it provide them necessary information to reduce the uncertainty and help them to make proper economic and financial decisions (Akhtaruddin & Haron, 2010; Alhazaimh, Palaniappan, & Almsafir, 2014).

Under this corporate disclosure the annual reports are the main avenue to communicate both financial and non-financial information to stakeholders and other interest parties (Barako, 2007; Khan, Chand, & Patel, 2013). Thus the corporate disclosure within the financial report can be categorized in to two ways ; mandatory and voluntary (non- mandatory) disclosure (Alhazaimh, Palaniappan, & Almsafir, 2014). Mandatory disclosures are the items that companies must disclose due to the statutes, regulatory and professional pronouncements (Ousama & Fatima, 2010; Kurawa & Kabara., 2014). Mandatory disclosure rules provide equal access to basic information (Ramadhan, 2014), therefore minimum level of information to be disclosed in the annual reports (Ousama & Fatima, 2010). Because of inadequacy of traditional compulsory information has led to demand for voluntary information that supports investors to make sustainable economic and financial decision (Alsaed, 2006; Jeewantha, Bandara, & Ajward, 2015). Meanwhile voluntary disclosures means making public the information regarding the firm's operation additional to statutory requirement.

Voluntary disclosures described as “information primarily outside of the financial statements that are not explicitly required by accounting rules or standards” (Financial Accounting Standard Board, 2001). Basically voluntary disclosures items may be classified in to historical, current and forecasts items, depending on the past, present and predicted on performance (Rouf, 2011). Numerous studies have investigated on the drivers on corporate disclosures and governance on voluntary disclosure in developed countries like Malaysia, China, Bahrain, Hong Kong, France (Akhtaruddin & Haron, 2010; Huafang & Jianguo, 2007; Ramadhan, 2014; Ho & Wong, 2001; Barros, Boubaker, & Hamrouni, 2013). Noticeably some researchers have conducted in emerging countries like Kuwait, Jordan, Bangladesh (Rouf, 2011; Alfraih & Almutawa, 2017; Albitar, 2015).

However there only few researches have conducted in Sri Lanka based on voluntary disclosures. They are regarding drivers to voluntary disclosures (Jeewantha et al., 2015; Abeywardana & Panditharathna, 2016), relationship between corporate governance levels of the board and company’s voluntary disclosures level (De Silva & Sujewa, 2015). Moreover that there are several studies have conducted on individual voluntary disclosures items like CSR, environmental reporting in Sri Lanka. Considerably no attempt has been made up to now to study the impact of corporate board and audit committee characteristics on voluntary disclosures level of manufacturing firms in Sri Lanka as a single research. Accordingly it is necessary to undertake this matter to boom the search light on this gap.

Objectives

The main objective of the study is to investigate the impact of corporate board, audit committee characteristics on corporate voluntary disclosures levels of listed Manufacturing companies. To achieve the main objective, the following specific objectives were taken for the study purpose:

- To identify the relationship between corporate board characteristics and corporate voluntary disclosures levels of listed Manufacturing companies.
- To assess the relationship between audit committee characteristics and corporate voluntary disclosures levels of listed Manufacturing companies.

Literature review and hypothesis development

Board Size

Cheng, (2008) argued that boards with more than seven or eight members are unlikely to be effective. Larger board size results in less effective coordination, communication and decision making. In addition, the agency problems associated with larger boards are higher than smaller ones. In this regard, Byard, Li, and Weintrop, (2006) found that voluntary disclosures decreases with board size. Thus, the smaller the board is, the higher the disclosures score of corporate information. On the other hand Albitar, (2015) argues that larger board size are more efficient for corporate performance since they have wide range of collective experience and expertise that may assist in market better decision. Paradoxically prior literature in the advance countries, Al-Janadi, et al., (2013), Allegrini and Greco, (2011) found that board size has a significant contribution in providing quality voluntary disclosures. Similarly within developing countries’ empirical corporate governance and accounting literature, board size has been found to have a significant effect on voluntary disclosure (Barako, Hancock, and Izan, 2006) while, Albitar, (2015) founds board size has a significant positive relationship with the level of voluntary disclosures.

Board Independence

Previous empirical literature find evidence that independent directors act to alleviate conflicts between controlling shareholders and outside shareholders (Anderson, Mansi, & Reeb, 2004). Previous empirical studies on this issue yield mixed results. Adams and Hossain, (1998), Chen and Jaggi, (2000) and Li, Pike, and Haniffa, (2008) found significant positive association between voluntary disclosures and the proportion of independent non-executive directors on the board. Similarly, Al-Janadi, et al., (2013) examined the impact of corporate governance mechanisms on voluntary disclosures in Saudi Arabia. They found that non-executive directors have a significant contribution in providing quality voluntary disclosures. On the other hand, Haniffa and Cooke, (2002), Eng and Mak, (2003), Gul and Leung, (2004), and Barako, (2007) found a negative relationship. In this case, non-executive directors are also argued to play limited role, as advisors than active decision makers (Ramadhan, 2014). Moreover, Ho and Wong, (2001), Cheng, Courtenay, and Stephen, (2006) and did not find a significant relationship between board independence and voluntary disclosures.

CEO Duality

Board independence can be examined by considering role duality, occurring when the same person undertakes both the roles of chief executive officer and chairman (Li et al., 2008). The person who occupies both roles would tend to withhold unfavorable information to outsiders (Ho and Wong, 2001). Hence, separation of both roles should positively influence disclosure quality. Previous studies documented inconclusive results about the relationship between voluntary disclosure when the chief executive officer role. Some studies indicate that voluntary disclosure decreases with CEO duality (Gul and Leung, 2004), but others advocate the absence of a relationship between CEO duality and voluntary disclosure (Ho and Wong, 2001; Haniffa and Cooke, 2002; Barako et al., 2006; Cheng, Courtenay, an Stephen, 2006).

Audit Committee Size

Resource dependency theory argues that larger audit committees are willing to devote greater resources and authority to effectively carry out their responsibilities (Allegriani and Greco, 2011). More directors on audit committee are more likely to bring diversity of views, expertise, experiences and skills to ensure effective monitoring (Bedard & Gendron, 2010). Hence, a higher number of audit committee members is likely to help such committee to uncover and resolve potential issues in corporate reporting process (Li et al., 2012). This indicates that, audit committee size is an integral factor for audit committee to adequately oversee corporate disclosure practices (Persons, 2009). Persons (2009) has found empirical evidence that many directors on audit committee appear to enhance the level of voluntary disclosure. In developing country perspective Albitar, (2015) audit committee size have a significant positive relationship with the level of voluntary disclosure.

From the literature review the following hypotheses are developed for the study purpose

H₁: There is a significant impact of corporate board characteristics on voluntary disclosure

H₂: There is a significant impact of audit committee characteristics on voluntary disclosure

H₃: There is a relationship between corporate board characteristics on voluntary disclosure

H₄: There is a relationship between audit committee characteristics on voluntary disclosure

Conceptual frame work

Based on the literatures, the following conceptual frame work is formulated.

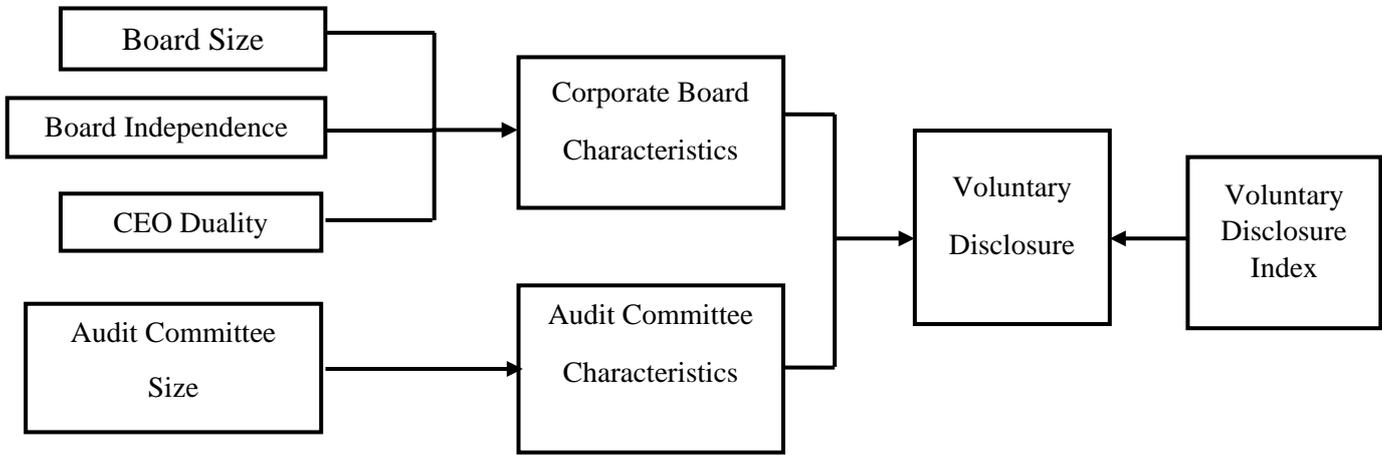


Figure 1 Conceptual Framework

Methods

A discussed by mouton (2001) research methodology focuses on the research process a kind of tools and procedures to be used. It describes research design, research approach, sampling procedure, data sources, instrumentation, reliability, validity and mode of analysis.

Research Design

This research will be an explanatory studies. The emphasis here is on studying a situation or a problem in order to explain the relationship between variables (i.e., Corporate Board Characteristics, Audit committee Characteristics and Voluntary Disclosures).

Reliability and validity of the data

Secondary data for the study were drawn from audit accounts (i.e., income statement and balance sheet) of the concerned companies; therefore, these data may be considered reliable for the purpose of the study. Necessary checking and cross checking were done while scanning information and data from the secondary sources. All these efforts were made in order to generate validity data for the present study. Hence researcher satisfied content validity.

Mode of Analysis

The following corporate board and audit committee characteristics and voluntary disclosure index are taken into accounts which are given below.

Table 1: Calculations of corporate board, audit committee characteristics and voluntary disclosure

Board Characteristics	
Board Size	Number of Directors

Board Independence	Total Number of Independent Directors / Total Number of Directors
CEO Duality	Code 1 if CEO also saving as chairman, otherwise 0
Audit Committee Characteristics	
Audit Committee Size	Number of Members in the Audit Committee
Voluntary Disclosures	
Voluntary Disclosure	$VD = \frac{\text{Total Score of Individual Company}}{\text{Maximum Possible Score Obtainable}}$ Score = 1 if the item is disclosed Score = 0 if the item is not disclosed

Multiple regression analysis was used to investigate the impact of corporate board and audit committee characteristics on voluntary disclosures which the model used for the study is given below. Voluntary disclosures = f (VD) It is important to note that the voluntary disclosures depend upon board size (BS), board independence (IBD), CEO Duality (CEOD), Audit Committee Size (ACS). The following model is formulated to measure the impact of corporate board and audit committee characteristics on voluntary disclosures is as follows.

$$VDS = \alpha + \beta_1 INE + \beta_2 BSIZ + \beta_3 CEOD + \beta_4 ACSIZ + \epsilon$$

- VDS it : voluntary disclosure score for firm i in year t
- INE it : independent non-executive directors for firm i in year t
- BSIZ it : number of board members for firm i in year t
- CEOD it: CEO duality i in year t
- ACSIZ it : number of members in audit committee for firm i in year t
- ϵ : Error

Findings

Correlation

Table 2 Correlation Matrix

	BS	IBD	CEOD	ACS	VD
BS	1.00				
IBD	-.184** (0.029)	1.000			
CEOD	-.163 (0.053)	-0.204** (0.015)	1.000		
ACS	0.364*** (0.000)	0.167*** (0.047)	-0.194*** (0.021)	1.000	
VD	0.259*** (0.002)	-0.122 (0.148)	-0.330*** 0.000	-0.032 (0.701)	1.000

**Correlation is significant at the 0.05 level (2-tailed)

***Correlation is significant at the 0.01 level (2-tailed)

(Where BS: board size, IBD: board independence, CEOD: CEO duality, ACS: audit committee size, VD: voluntary disclosures)

Table 2 presents the Pearson Correlation Coefficients of the independent variables (corporate board and audit committee characteristics) as well as the dependent variable (Voluntary disclosures index).

The above table indicates that there is a significant positive relationship between voluntary disclosures index and board size during the study period. The correlation of the board size and voluntary disclosures is 0.259 and p value is 0.002. P value is lower than the 0.01. Further, study revealed that there is significant negative relationship between CEO duality and voluntary disclosures. The correlation of the CEO duality is -0.330 and p value is 0.000 which is less than 0.01. As well, as study illustrates some negative relationships between independent variables, which are not significant. Board independence and audit committee size has insignificant relationship with voluntary disclosures. Because the p value of these two variables are greater than 5% significant level. Then a multiple regression analysis was performed to identify the impact of corporate board and audit committee characteristics on voluntary disclosures as conceptualized in the models. A step wise variable selection was used in the regression analysis and Table 3 provides the summary measure of the models.

Table 3: Regression Model Summary

Details	VD
BS	0.642 (0.006)
IBD	-0.365 (0.146)
CEOD	-24.950 0.000
ACS	-5.988 0.053
Cons	58.382 t = 9.16 p = 000
R - squared	0.197
Adj R- squared	0.174
Prob > f	0.000
F Value	8.33

Source; Developed by researcher

According to Table -3 denotes that the impact of corporate board, audit committee characteristics on voluntary disclosures is fully significant because the p value is 0.000. The F value is 8.33 and the R- squared is 19.7% which means that there is a 19.7% impact of corporate board, audit committee characteristics on voluntary disclosures. It represents a lower impact. As well as it is revealed that there are other factors which are 80.3% impact on voluntary disclosures. Further, adjusted R-squared indicate that there is a 17.4% impact of corporate board, audit committee characteristics on voluntary disclosures.

Hypothesis Testing

Serial No	Hypothesis	Tools	Accepted/Rejected
H ₁	There is a significant impact of corporate board characteristics on voluntary disclosures	Regression	Partially Accepted
H ₂	There is a significant impact of audit committee characteristics on voluntary disclosures	Regression	Rejected
H ₃	There is a significant relationship between corporate board characteristics and voluntary disclosures	Correlation	Partially Accepted
H ₄	There is a significant relationship between of audit committee characteristics and voluntary disclosures	Correlation	Rejected

Conclusion, Limitations and Future Researches

Study found that a minimum level impact of corporate board and audit committee characteristics on voluntary disclosure. Considerably the result of the study found a significant positive impact of board size on the voluntary disclosures. The CEO was found to have negative significant influence on the voluntary disclosures in this study. Unfortunately, it was unable to find a significant relationship between board independence and level of disclosures in Sri Lankan listed companies and also it was unable to find an impact of board independence on voluntary disclosures. As well as of the study was unable to find a significant impact on audit committee size on voluntary disclosures. Based on the outcome of the study, it is recommended that to introduce a basic format of voluntary disclosures for all manufacturing companies because some of manufacturing companies are referring international voluntary disclosure guide lines (GRI guidelines) for publish their annual report but some are not. Common format will help to encourage the voluntary disclosure level and it will help to attract the investors. Further the results of the board independence contradict with the previous finding (Cheng, Courtenay, & Stephen, 2006; Akhtaruddin & Haron, 2010) which means that the independent directors of the listed manufacturing companies do not have influence on the disclosure level so it better to recommend guidelines regarding the duties of independent directors. Audit committee (AC) is considered as one of the crucial and influential participants of corporate governance as it assists the board of directors in discharging its responsibilities in overseeing corporate management (Bedard and Gendron, 2010) In this respect, it is argued that AC plays a key role in monitoring management disclosure practices' and internal control (Persons, 2009). Hence the result of the study revealed the auditors should pay more attention on the quality of the reporting of the annual reports. This study focused on one avenue of company disclosure, namely corporate annual reports and the extent to which companies voluntarily release information through other means such as the media, represents a limitation of this study. The study used secondary data gathered from listed manufacturing companies in CSE. So this research is covered only one sector only. It is not enough to take decision regarding on one sector. If study can expand to other sectors also, even more accurate conclusion would be given.

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Analysis of Nigeria's Crime Data: A Principal Component Approach using correlation matrix

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Abstract

This paper analyses Nigeria's crime data consisting of eight major crimes reported to the police in 2017. The crimes consist of robbery, theft, house breakings, grievous harm and wounding, murder, rape, and assault. Principal component analysis (PCA) was employed to explain the correlation between the crimes. The result shows a significant correlation between armed robbery, theft and grievous harm and wounding. While Kebbi state has the lowest crime rate, Lagos state has the highest overall crime rate in the state. Theft, house breakings, grievous hurt and wounding, murder, rape is more prevalent in Lagos state, armed robbery in Rivers state, while kidnapping and assault are prevalent in Abia state. The PCA has suggested retaining two components that explain about 85.166 percent of the total variability of the data set and giving the correlation between them the study concludes that some of the crime data can be used to predict each other and an interesting fact that kidnapping is only positively correlated with murder.

Keywords: Crime rate, Principal component analysis, Crimes in Nigeria, Crime data, Kidnapping.

1.0 Introduction

Crime as we know has no universal definition. It can be linked to changes in social, political, psychological and economic conditions. An act may be a crime in one society, but not in another [1]. Activities like prostitution, adultery and homosexuality between consenting adults have been wholly or partially removed from state criminal law in America [2] but are considered as crimes in place such as Saudi Arabia and Nigeria etc. The constant changes in time also change the perception of society on crime. Today, Child marriage is a crime in most countries which was not always so and in some countries right now polluting the air or water can be considered a crime. Pollution causes few problems and receives little attention in colonial days [3]. Therefore, the perception of an "act" to be a crime varies with time and space. In addition, many scholars have defined crime in different views, mostly bordering on ethical and ideological orientation.

One of the fundamental techniques to combat criminal activities is the better understanding of the dynamics of crime. Crime is often thought of as a moral threat and injurious to the society. It afflicts the personality of individual and his property and lessens trust among members of the society [4]. The causes of crime are multiple and could be traced to bio-genetic factors, such as genetic mutation and heredity, psychological factors, such as personality disorders and sociological factors, such as learning and environment [5]. The diverse differences in geographical areas in terms of population density, demographic characteristics, natural vegetation, location and socio-economic characteristics has rendered crime rate unevenly distributed globally. However, it has been observed that the entire world is experiencing high criminal rate.

Over the years the rate of crime in Nigeria has been on the increase and these crimes are being carried out with perfection and sophistication. This has led to the formation of various vigilante groups, to combat crimes in some parts of the country [6].

Crime is one of the continuous problems that bedevil the existence of mankind. Since the early days, crime had been a disturbing threat to mankind's personality, property and lawful authority [4]. Today, in the modern complex world, the situation is highly disturbing. Crime started in the primitive days as a simple and less organized issue, and ended today as very complex and organized. Therefore, the existence of crime and its problems have spanned the history of mankind.

Nigeria has one of the most alarming crime rates in the world [7]. In April of 2018, armed robbers killed at least 30 people and possibly more in attacks on a bank and police station in Kwara state, Nigeria [8]. It was [9] who said that as is the case with the rest of the world, image is merely an exaggeration. And also, added that, Nigeria’s metropolitan areas have more problems with crime than the rural areas. Most crimes are however, purely as a result of poverty.

Despite the fact that, crime is inevitable in a society [10], various controlling and preventive measures had been taken, and are still being taken to reduce the menace with the introduction of modern scientific and technical methods in crime prevention and control proving to be effective.

In the 1980s, serious crime grew to nearly epidemic proportions, particularly in Lagos and other urbanized areas characterized by rapid growth and change, stark economic inequality and deprivation, social disorganization, inadequate government service and lower law enforcement capabilities which subsequently lead the government to deploy but the military and Police with orders in some states to “shoot on sight” violent criminals [11].

Methodology

Data collection

The data used in this study was obtained from the Nigerian bureau of statistics as reported by the Nigerian Police for 2017.

Principal Component Analysis

Principal component analysis will be used as a statistical procedure to transform a set of observations of correlated variables to a set of a linearity uncorrelated variables by orthogonal transformation. We can explain the variance covariance structure of these variables by some of these linear combinations of the original variables.

PCA calculates an uncorrelated set of variables (principal components), These factors are ordered so that the first few retain most of the variation present in all of the original variables. Unlike its cousin Factor Analysis, PCA always yields the same solution from the same data (apart from arbitrary differences in the sign).

Let X be a vector of p random variables, the idea of principal component transformation is to look for few variables less than p derived variables that preserved most of the information given by the variance of the p random variables [12].

Let the random vector $X' = X_1, X_2, X_3, \dots, X_p$ have the covariance matrix Σ with eigenvalues $\lambda_1 \geq \lambda_2 \geq \dots \lambda_p \geq 0$. consider the linear combinations:

$$Y_j = a'_j X = a_{j1}X_1 + a_{j2}X_2 + a_{j3}X_3 + \dots + a_{jp}X_p = \sum_{k=1}^p a_{jk}X_k \tag{1.1}$$

Such that $j = 1, 2, \dots, p$ are the elements of X and $a_{j1}, a_{j2}, a_{j3}, \dots, a_{jp}$ are the components of a_j vector of p^{th} term.

$$\text{Then, } \text{Var}(Y_j) = a'_j \Sigma a_j \quad j = 1, 2, \dots, p \tag{1.2}$$

$$\text{Cov}(Y_j, Y_k) = a'_j \Sigma a_k \quad j = 1, 2, \dots, p \tag{1.3}$$

Principal Component Procedure

The principal components are those uncorrelated linear combinations $Y_1, Y_2, Y_3, \dots, Y_p$ whose variances in (1.2) are as large as possible [12]. In finding the PCs we concentrate on the variances. The first step is to look for a linear combination $a'X$ with maximum variance, so that

$$a'_1 X = a_{11}X_1 + a_{12}X_2 + a_{13}X_3 + \dots + a_{1p}X_p = \sum_{k=1}^p a_{1k}X_k \tag{1.4}$$

Then, we look for the linear combination $a'_2 X$ uncorrelated with $a'_1 X$ having maximum variance and so on, hence at the k^{th} stage a linear combination $a'_k X$ is found that has maximum variance subject to being uncorrelated with $a'_1 X, a'_2 X, a'_3 X, \dots, a'_{k-1} X$. The k^{th}

derived variable $a'_k X$ is the k^{th} principal component. Up to p principal components can be found, but we would hope to stop after the q^{th} stage for ($q \leq p$), i.e. when most of the variation in X would have been accounted for by q PCs.

Note:

- The variance of a principal component is equal to the eigenvalue corresponding to that principal component,

$$Var(Y_j) = a'_j \sum a_j = \lambda_j \quad j = 1,2,3, \dots, p$$

- The total variance in data set is equal to the total variance of principal components $\sigma_{11} + \sigma_{22} + \sigma_{33} + \dots + \sigma_{pp} = \sum_{j=1}^p Var(X_j) = \lambda_1 + \lambda_2 + \lambda_3 + \dots + \lambda_p = \sum_{j=1}^p Var(Y_j)$

From [13], the data would be standardized for the variables to be of similar scale using a common standardization method of transforming all the data to have zero mean and unit standard deviation. For a random vector $X' = [X_1, X_2, X_3, \dots, X_p]$ the corresponding standardized variables are $Z = \left[z_j = \frac{(X_j - \mu_j)}{\sqrt{\sigma_{jj}}} \right]$ for $j = 1,2,3, \dots, p$ in matrix notation, $Z = (\theta^{1/2})^{-1} (X - \mu)$, Where $\theta^{1/2}$ is the diagonal standard deviation matrix and it's a unit.

Thus, $E(Z) = 0$ and $Cov(Z) = \rho$.

The PCs of Z can be obtained from eigenvectors of the correlation matrix ρ of X . All our previous properties for X are applied for the Z , so that the notation Y_j refers to the j^{th} PC and (λ_j, a_j) refers to the eigenvalue – eigenvector pair. However, the quantities derived from Σ are not the same from those derived from ρ (Richard and Dean, 2001).

The j^{th} PC of the standard variables $Z' = [z_1, z_2, z_3, \dots, z_p]$ with $cov(Z) = \rho$, is given by

$$Y_j = a'_j Z = a'_j (\theta^{1/2})^{-1} (X - \mu) \tag{1.5}$$

So that $\sum_{j=1}^p Var(Y_j) = \sum_{j=1}^p (Z_j) = \rho$ for $j = 1,2,3, \dots, p$

In this case, $(\lambda_1, a_1), (\lambda_2, a_2), (\lambda_3, a_3), \dots, (\lambda_p, a_p)$ are the eigenvalue - eigenvector pairs for ρ with $\lambda_1 \geq \lambda_2 \geq \lambda_3 \geq \dots \geq \lambda_p \geq 0$.

Interpretation of the Principal Components:

The loading or the eigenvector $a_j = a_{j1}, a_{j2}, a_{j3}, \dots, a_{jp}$, is the measure of the importance of a measured variable for a given PC. When all elements of a_1 are positive, the first component is a weighted average of the variables and is sometimes referred to as measure of overall crime rate. Likewise, the positive and negative coefficients in subsequent components may be regarded as type of crime components [14]. The plot of the first two or three loadings against each other enhances visual interpretation [15].

The score is a measure of the importance of a PC for an observation. The new PC observations Y_{ij} are obtained simply by substituting the original variables X_{ij} into the set of the first q PCs. This gives

$$Y_{ij} = a'_{j1} X_{i1} + a'_{j2} X_{i2} + a'_{j3} X_{i3} + \dots + a'_{jp} X_{ip} \quad i = 1, 2, 3, \dots, n, \quad j = 1, 2, 3, \dots, p$$

The plot of the first two or three PCs against each other enhances visual interpretation [15].

The proportion of variance will be used to tell us the PC that best explained the original variables and the measure of how well the first q PCs of Z explain the variation is given by:

$$\phi_q = \frac{\sum_{j=1}^q \lambda_j}{p} = \frac{\sum_{j=1}^q Var(Z_j)}{p} \tag{1.6}$$

A cumulative proportion of explained variance is a useful criterion for determining the number of components to be retained in the analysis. A Scree plot provides a good graphical representation of the ability of the PCs to explain the variation in the data [16].

Results and Analysis

The major types of crime in the analysis are: crime against person which includes: murder, grievous harm and wounding (GHW), assault, kidnapping, rape and crime against property which include armed robbery, theft and house breaking.

Table 1: Correlation of Crime Types (per 10,000 population)

	Armed Robbery	Theft	Kidnapping	Rape	House Breaking	Murder	Grievous harm & wounding	Assault
Armed Robbery	1.000	.689	-.129	.535	.612	.523	.702	.632
Theft		1.000	-.109	.866	.960	.506	.992	.981
Kidnapping			1.000	-.111	-.149	.347	-.127	-.182
Rape				1.000	.869	.480	.862	.854
House Breaking					1.000	.469	.948	.954
Murder						1.000	.533	.460
Grievous harm wounding							1.000	.970
Assault								1.000

The correlation matrix above displayed different levels of correlation between the crimes. There is strong positive relationship between armed robbery, theft, rape, house breaking-in, murder and grievous harm and wound (GHW). The relationships were also significant at $p=.05$ significance level, which means that their variables can be used to predict (explain) one another. Similarly, it was observed that the correlations between kidnapping and armed robbery, theft, rape, house breaking-in, grievous harm & wounding (GHW) and assault were negative. Kidnapping was only positively correlated with Murder.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
	Approx. Chi-Square	332.558
Bartlett's Test of Sphericity	Df	28
	Sig.	.000

The null hypothesis that the correlation matrix is an identity matrix was rejected at 5% level of significance (Bartlett's test of Sphericity; $\chi^2 = 332.558$, p -value = .000), this implies that the correlation in the dataset are appropriate for factor analysis. Also, the Kaiser-Meyer-Olkin statistic = 0.789 revealed that adequate sampling is being used for this analysis.

Table 3: Eigen values

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.523	69.032	69.032	5.523	69.032	69.032
2	1.291	16.134	85.166	1.291	16.134	85.166
3	.605	7.566	92.732	.605	7.566	92.732
4	.325	4.059	96.792	.325	4.059	96.792
5	.175	2.188	98.980	.175	2.188	98.980

6	.054	.675	99.655	.054	.675	99.655
7	.023	.293	99.949	.023	.293	99.949
8	.004	.051	100.000	.004	.051	100.000

Extraction Method: Principal Component Analysis.

The eigenvalues, proportion and the cumulative proportions of the explained variance are displayed in Table

3. Considering the eigenvalues and the Scree plot below in figure 1 and according to [17], the rule of thumb is usually applied to retain those factors whose eigenvalues are greater than one. Hence, it would be reasonable to retain the first two PCs i.e. Armed robbery and Theft. So the first 2 PCs can be retained to explain up to 85.166 percent of the total variability.

Figure

1:

Scree

plot

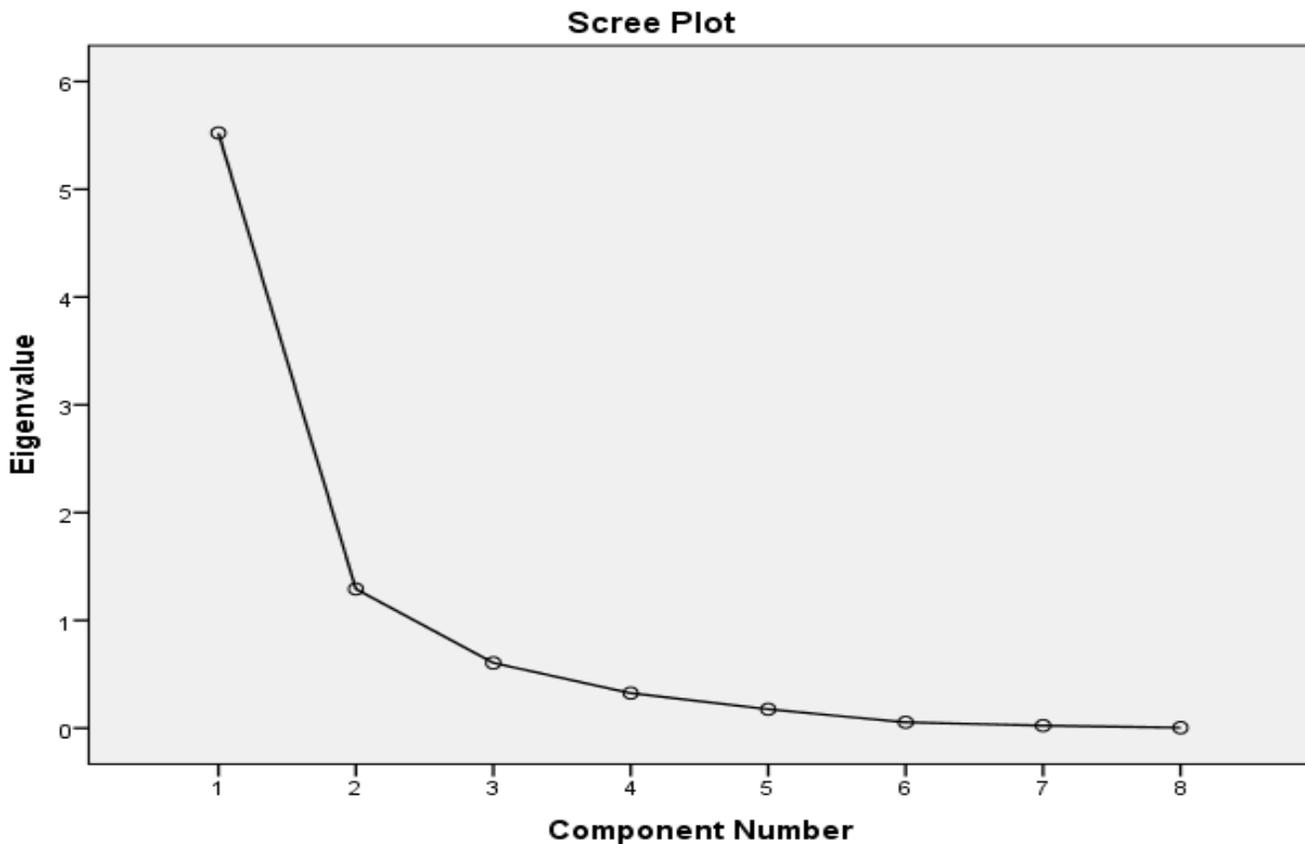


Table 4: Eigen vector

	Component	
	1	2
Armed Robbery	.746	.050
Theft	.984	-.041
Kidnapping	-.119	.918
Rape	.897	-.040
House Breaking	.959	-.089
Murder	.596	.647

Grievous harm wounding	.985	-.038
Assault	.966	-.118

Extraction Method: Principal Component Analysis.

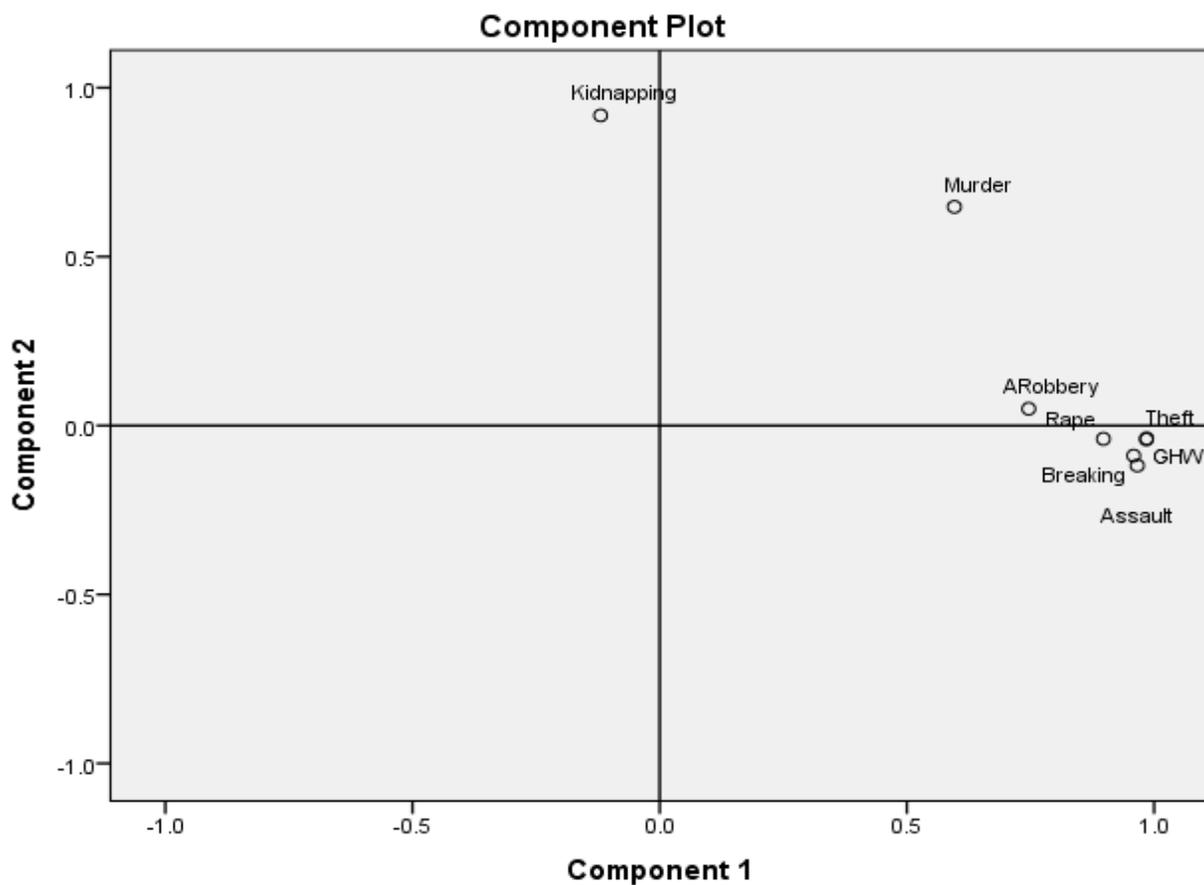
a. 8 components extracted.

From table 4 above, we retained two PCs that explain 85.166 per cent of the total variability of the data set.

Component One: has both positive and negative relationship with all the crimes recorded but majorly it identified; Armed robbery, Theft, Rape, House breaking-in, Grievous harm wounding and Assault.

Component Two: Also has a positive relationship with majorly kidnapping and murder. It has a negative relationship (decrease) with House breaking-in and Assault.

Figure 2: Loading plot of Components



The loading plot in figure 2 above shows the concentration of the selected crimes with theft, assault, etc. been the most committed offence while kidnapping and murder been the less occurring crimes.

CONCLUSION

In this study, Principal Component Analysis was applied to explore the number of principal components to be retained on the eight variables obtained from the criminal data as obtained from Nigeria bureau of statistics which was reported by the Nigeria Police Force in 2017. The results of the statistical analysis proved that two components explain up to 85.17% (Table 3) of the total variability of the data set. The following are the conclusions deduced from the analysis. There is strong positive relationship between armed robbery and rape, grievous hurt and wound (GHW), theft, assault and murder, the relationship were also significant, which means that their variables can be used to predict (explain) one another at $p=.05$ and at the p-value Kidnapping can be used to predict murder. It was also observed that the correlations in between robbery and burglary, breach of public peace and broken store were negative and

insignificant. The state with the highest crime rate is Lagos, while Kebbi state has the lowest crime rate in Nigeria according results obtain from the eight types of crime examined. Two PCs (Armed robbery and Theft) that explains about 85.17 percent of the total variability of the data set are suggested to be retained. The score plot has classified the crimes into two, namely, One: concentrated offences: Armed robbery, Theft, Rape, House breaking-in, Grievous harm wounding and Assault. Two: less concentrated: Kidnapping and Murder. The study also found that Abia state in the south eastern part of Nigeria had the highest number kidnapping cases and that there was no correlation between kidnapping and the selected crime types except murder which from observation was as a result of those perpetrating the crime of kidnapping not intending to harm, rape, etc. but generally, are after ransoms but if ransom is not paid can result in the murder of victims.

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The Analysis of Brand Equity and Promotion to the Buying Decision Process of Suzuki Motorcycle

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ABSTRACT

This research was conducted to analyze the effect of promotion and brand equity on consumer buying decision process on Suzuki motorcycle. The number of respondents in this research was 40 respondents. Data collection method was using questionnaires and data analysis method was using qualitative analysis and structural equation model (SEM) with Partial Least Squares software (PLS). The result of the research shows that there is significant influence of promotion and brand equity on the process of purchasing decisions Suzuki motorcycle. Besides, it found that Brand Awareness is the most powerful indicator in shaping the Brand Equity and consumer buying decisions is the most powerful indicator in explaining the buying decision process.

Keywords : Brand Equity , Promotion , Decision Purchase , Buying Decision

INTRODUCTION

Background of Study

Pertaining to the technology advancement at this time, especially internet, prospective customers are as if converged and simplified by the websites and social media applications. In this disruption era, everyone has at least one single social media account, or that everyone surely understands how to empower the internet since most of people have altered their real activities in the beginning to the cyberspace activities at recent. This circumstance attracts many companies' attention to compete providing an online business platform. According to Aaker (1997) Brand Equity is a set of brand asset and liabilities linked to a brand, its name and symbol that add to or subtract from the value provided by a product or service to a firm and/or to that firm's customers. In accordance with Kotler and Armstrong (2014:77) promotion is the activities that communicate the merits of product and persuade target customers to buy it. This reasons determine that the consumers must identify and understand a brand of product before execute buying.

Brand becomes the most important thing of consumers because it gives choice, eases making decision, guarantees the quality, avoids risk and shows self-expression (Temporal and Lee, 2002:44). Product which has Brand Equity will meet consumers' expectation and they will make decision in procurement. Promotion is one of important marketing action for corporation in continuity preservation effort as well as improving sales. Promotion is observed as an activity of communication between seller and buyer and that is an activity which helps making decision in procurement as well as directing and bring all

parties superiorly to act better. (Swasta, 2001, page 153). In making a decision to buy something, a consumer will face a series of stage commonly called a process of buying decision. In conformity with Kotler (2003, page 200), he exclaims that the process of making decision consists of recognizing needs, searching information, evaluating alternatives, buying decision, behavior after buying. One of strategies to deal with the competition is improving brand equity because it is going to be obvious differentiator so that will reduce consumers' decision to change over other brands. This study entitled The Analysis of Brand Equity and Promotion to Buying Decision Process of Suzuki Motorcycle.

Problem Formulation

Based on the explanation stated above, so the problem formulated of this study is:

“Does the brand equity and promotion take effect to buying decision of Suzuki Motorcycle?”

Objective of Study

Based on the problem formulation, the objective of study is identified as:

“To particularize the effect of brand equity and promotion to buying decision of Suzuki Motorcycle”

LITERATURE REVIEWS

1. Brand Equity

In the view of Kotler and Keller (2009:263) is the added value endowed on product and services. It may be reflected in the way costumers think, feel, and act with respect to the brand, as well as in the prices, market shares, and profitability the brand commands for the firms. Brand equity is a power of brand. Through a potent brand, company can manage their assets well, increase cash-flow, expand the market share, assign premium price, improve sales, maintain stability and upgrade excellent competitive. In marketing a product, company does not solely hold a brand, but also contend its brand in order to obtain equity because brand equity is a thing which will be the main asset of the company. Brand equity consists of four variables (Quan Tran and Carmen Cox, 2009, according to Isoebianto, 2014:19) that:

1. Brand Awareness

As stated by Aaker (1997) brand awareness is the ability of a potential buyer to recognize or recall that a brand is a member of certain product category.

2. Perceived Quality

In agreement with Aaker (1991:85) perceived quality is a customer's view against the overall quality and excellence of products or services which appropriate with the customers' expectation.

3. Brand Association

According to Aaker (1997:29) brand association is giving impression of certain brand to customer related to particular things based on their point of view.

4. Brand Loyalty

In line with Aaker (1991:39) he exclaims that brand loyalty is a measure of attachment and involvement that customer has to a brand. Brand loyalty definitely affects to the susceptibility of customers from competitor incursion.

2. Promotion

Promotion is one of elements in marketing mix. It belongs to all actions intended to targeted customers, which aims to facilitate the relationship process with customers for reaching formulation of the importance of commodity to get the highest customers' satisfaction and their needs for comparing with competitor's commodity (Mahmud I. Nour et al.).

Promotion becomes one of key factors in marketing mix and has important role in succeeding the market. Promotion is used to ensure that customers know the product offered by the company. Marketing Mix is the combination of several channels that are used to communicate the message of promotion to customers. The channels which are commonly used are; advertisement, direct promotion, public relation and publicity, personal sales, sponsor and sales promotion. One of the most important is sales promotion.

According to Kotler and Armstrong (*Komunikasi Bisnis* 2008), they define the dimensions of promotion as follow:

1. Advertising is a form of communications executed by marketer to inform and persuade market and targeted market. In conformity with the low cost, advertisement can reach out many buyers who are spread in different place (target market).
2. Sales Promotion is a long-term incentive offered to customers or society and broker to stimulate the buying desire to product.
3. Public Relations is the effort to attract the positive attention from the society toward the company as well as its products with hot news, press conference in certain events, implement the actions which attract society's attention.
4. Direct Marketing is a form of promotions directly by promoting products or goods to acquire real-time reaction from customers.

3. The Process of Buying Decision

Buying decision is a decision of someone in opting one of several alternative choices. (Schiffman and Kanuk, 2000:437). In making decision to buy something, the customer faces several stage or process. The stage of buying decision according to Schiffman and Kanuk is:

1. Problem Recognition

Problem recognition is a situation where the difference appears between expected situation and the situation happens (Sumarwan, 2004:234).

2. Gathering Information

The information gathering begins done when customers assume that the decision can be fulfilled by buying and consuming a product (Sumarwan, 2004:294).

3. Alternative Evaluation

Alternative evaluation is an evaluation process against either opted product or brand which corresponds with customers' desire (Sumarwan, 2004:294)

4. Buying Decision

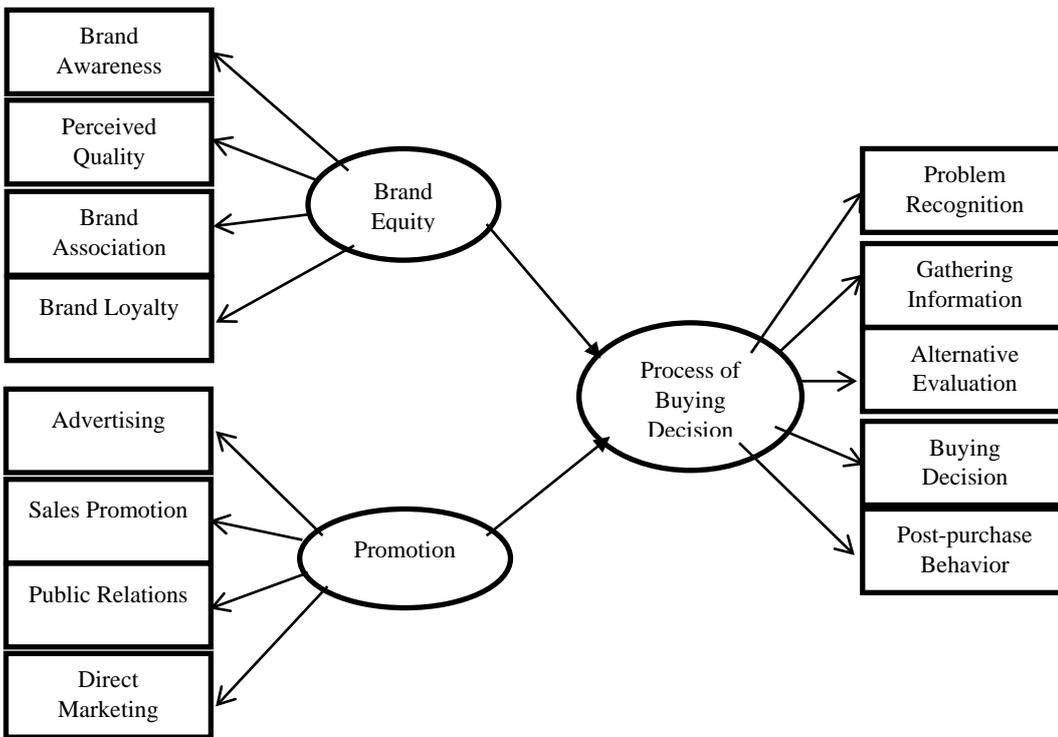
The firm confidence of customers or consumers is the assurance that buying decision which has been taken is right (Astuti and Cahyadi, 2007 through Tria Hanin, 2011)

5. Post-purchase Behavior

Customers will evaluate whether the product has been bought can bring satisfaction or not. If it is satisfied and meet the customers' expectation, so there will be possible for them to do repurchase.

Research Model

According to the explanation stated above, so the conceptual framework will be discussed in this study can be explained in the following figure:



RESEARCH METHOD

Definition of Operational Variable

1. Brand Equity

According to Aaker and Humdiana (2005) Brand equity is a set of brand asset and liabilities linked to a brand, its name and symbol that add to or subtract from the value provided by product or service to a firm and/or to that firm's customers.

Based on Aaker (1991) brand equity variable is measured by:

1. Brand Awareness

According to Aaker (1997) brand awareness is the ability for a customer to recognize or recall that a brand is a member of certain product category. It is in line with Fadli and Inneke (2008) this indicator can be measured by three sub-indicators. They are introduction to brand, advertisement that is used and promotion.

2. Perceived Quality

As stated by Aaker within Rangkyu (2002:41) perceived quality is the customers' perceived toward overall quality and excellence of product and service is same with the expected purpose.

3. Brand Association

In accordant with Aaker (1997) brand association is everything related both directly and indirectly with the customer's memory about certain brand. Referring to Fadli and Inneke (2008) the indicator of brand association can be measure by three sub-indicators. They are price of product, safety of product and point of sales.

4. Brand Loyalty

According to Rangkyu (2002:60) in Oon Boy & Endang S (2011), brand loyalty is one standard customers' loyalty to a brand. As stated by Fadli and Inneke (2008) this indicator can be measured by three sub-indicators. They are brand priority, desire of repurchase and switchover other brands.

2. Promotion

According to Kotler and Armstrong (2014:27) Promotion is the activity that communicate the merits of product and persuade the target customer to buy it. By reference to Kotler and Armstrong (*Komunikasi Bisnis*, 2008), they define the dimensions of promotion as follow:

1. Advertising

Corresponding to Kotler and Armstong (2008:150), advertising is all forms of non-private presentation and promotion of ideas, goods, or services which are paid by particular sponsor. To measure advertising variable, it is used the following indicators: 1. the information discoverability of product from various media tends to be easy, 2. the used media design is interesting, 3. The conveyed information from media are clear, 4. The content from media is trustworthy.

2. Sales Promotion

Sales Promotion is a long-term incentive offered to customers or society and broker to stimulate the buying desire to product. In regards with Kotler and Armstrong (2008:204), to measure sales promotion variable, this uses

several indicators as follow: 1. the amount of incentive offered belongs to interesting, 2. the offered incentive is various, 3. the requirement to get offered incentive is clear, 4. the execution time of incentive is done promptly.

3. Public Relation

Public relation is the effort to attract the positive attention from the society toward the company as well as its products with hot news, press conference in certain events, implement the actions which attract society's attention. According to Kotler (2009) the indicators of public relations are as follow: 1. the news, it contains the good-image company information, 2. society service activity, it relates the service which has important role to the image of company, 3. identity, the unique identity must be different from others. Identity characterize the good image of company to customers.

4. Direct Marketing

Based on Fandy (2008:232), direct marketing is the interactive marketing which empowers one or several advertisement media in appearing measurable response and/or transaction in any place. According to Repiyanti (2013) the direct marketing indicators can be classified as follow: 1. e-mail, 2. telemarketing, 3. face-to-face selling.

Buying Decision Process

In keeping with Kotler (2009) buying decision is several stages which committed by customers prior to make buying decision of certain product. It has five stages where each stage contains the indicators that can affect customer's action. According the data from Kotler (2007:200) those five stages are as follow:

1. Problem Recognizing

The initial stage of buying decision is the customers recognize presence of necessity matter about the product which will be bought. Customers feel there is a difference between real circumstance and expected circumstance. The necessity is definitely triggered by internal stimulation (needs) and external stimulation (influence similar product user based on needs).

2. Gathering Information

The stage of buying decision which can stimulate customer to gather more information. Customers are probably improving the attention or gathering information actively.

3. Alternative Evaluation

Process which is done by customers for using the obtained information for evaluating existing alternative, the process of selecting products that are going to buy.

4. Post-purchase Behavior

This is a following-up action after buying based on customers' satisfaction about the product used.

POPULATION, SAMPLING, SAMPLING TECHNIQUE, AND

DATA ANALYSIS TECHNIQUE OF POPULATION AND SAMPLING

Population in this study involves the employees who work in industrial area. The sample of this study is 40 people which are not the Suzuki motorcycle customer. The reason of taking 40 samples is for fulfilling the requirement with method of Structural Equation Modelling (SEM).

Sampling Technique

Sampling technique used for this study is Purposive Sampling, where the researcher opts the samples based on assessment of the sample characteristic which correspond with the purpose of study. The criteria of sampling are as following:

1. Male
2. Worker with minimum 25 years old
3. Have never used Suzuki motorcycle.

Data Analysis Technique

Analysis technique that is used for processing data in this study is Structural Equation Model (SEM). Further, this study will use three testing procedures. They are Validity and Reliability Testing, Regression Analysis and Hypothesis Testing.

Validity and Reliability Testing

Validity is t-value with loading factor is bigger than critical value (>1.96 or practically >2). Reliability is closely related to the consistency of manifested variable in measuring its latent construct. So that, it is said a good construct reliability if its value is >0.7 .

Composite Reliability and Cronbach's Alpha

The result of *composite reliability* test shows the good values because the overall latent variable values have *composite reliability* value ≥ 0.70 . At the same time, *cronbach's alpha* test shows the good values because the overall latent variable values are ≥ 0.70 too.

	Composite Reliability
Buying Decision	0.855
Brand Equity	0.829
Promotion	0.833

The other method to test *discriminant validity* is examining the value of square root of *average variance extracted* (AVE) of each construct with correlation between one construct and another construct in model, so it has a good value. It can be concluded that the square root of *Average Variance Extracted* (AVE) for each construct is higher than the correlation between one construct and another construct in model. Referring to that AVE value, so the construct in the estimated model meet the criteria of *discriminant validity*.

The Result of AVE Testing

Buying Decision	0.501
Brand Equity	0.545
Promotion	0.503

Composite Reliability and Cronbach’s Alpha

The purpose of *composite reliability* and *cronbach’s alpha* test is designated for testing the instrument reliability in a research mmodel or measure the internal consistency where the value must be above 0.60. If the overall latent variable values have composite reliability or cronbach’s alpha ≥ 0.70 . That means, the construct has good reliability or the questionnaire which was used in this research has already been reliable and consistent.

	<i>Cronbach’s Alpha</i>	Remark
Buying Decision	0.767	Reliable
Brand Equity	0.792	Reliable
Promotion	0.758	Reliable

Structural Model Testing/Hypothesis Thesis (*Inner Model*)

This inner model testing is a development of the conceptual base model and theory in order to analyze correlation between exogenous and endogenous variable, it has been explained in conceptual framework. The testing stages against structural model (*inner model*) are done with the following steps.

R-square Value

R-square is a goodness fit model testing.

R² Endogenous Variable Value, Buying Decision’s R Square = 0.376

Structural model identifies that the model of buying decision variable tends to be LOW, because it has value under 0.67. The independent latent variable effect model (promotion and brand equity) against buying decision results R-Square value as 0.376 which can be interpreted that the promotion and brand equity construct variability is 37.7% whereas the rest 63.3% can be explained with the other variables beyond this research.

Hypothesis	Testing Result
Table	
	Standard
	Original Sample
	Deviation
	T Statistics
	Remarks
	(O)
	(STDEV)
BE -> KP	0.155
	0.213
	0.730
	Does not affect - significantly
Refer to the	above table, it is
explained that:	P -> KP
	0.508
	0.170
	2.991
	Affects - significantly
	Source : Output PLS 2018

1. According to hypothesis testing of this research, it is obtained T-static value 0.730 and the original sample value 0.155. T-static value is smaller than T-table value 2.02 and the original sample point out positive value. This result shows that Brand Equity does not positively and significantly to the buying decision of Suzuki motorcycle.
2. According to hypothesis testing of this research, it is obtained T-static value 2.991 and the original sample 0.508. T-static value is more than T-table 2.02 and the original sample shows positive value. This result shows that promotion affects positively and significantly to the buying decision of Suzuki motorcycle.

DISCUSSION

The effect of brand equity to the process of buying decision shows that t_{count} is 6.71 much bigger than t_{table} worth 1.96 which means the effects are positive, strong and significant. So, this study hypothesis asserts that brand equity affects to the process of customer's buying decision of Suzuki motorcycle in Cikarang, Bekasi is accepted. The result of this study supports the previous research done by Humdiana (2005), brand equity gives self-confidence to customer in making a buying decision from the previous experience which can increase customers' satisfaction with using experience. This result of study also supports the previous research done by Arianis Chan (2010) even though it has different background of sample.

Furthermore, it is find that four indicators which form brand equity, sequentially the most contributing indicators to brand equity is *brand loyalty* ($R^2=97\%$), *brand awareness* ($R^2=70\%$), *perceived quality* ($R^2=53\%$) and *brand association* ($R^2=53\%$). From the data result, it explains that brand loyalty becomes most dominant indicator in forming brand equity of Suzuki Motorcycle for customers in Cikarang, Bekasi. That explains also that brand loyalty is a measurement of customer's fidelity

(Aaker:1997) which is the essence of brand equity that has been central idea in marketing. It is because brand equity is a measurement of customer's linkage to specific brand.

Whereas, the process of buying decision, the sequence indicators which can explain process of customers decision in buying is *buying decision* ($R^2=91\%$), *alternative evaluation* ($R^2=83\%$), *gathering information* ($R^2=76\%$), *problem recognition* ($R^2=63\%$), and *post-purchase behavior* ($R^2=41\%$). This study result does not support the research done by Arianis Chan (2010) because it has different background of sample and the post-purchase behavior becomes most dominant indicator in revealing buying decision process.

CONCLUSIONS AND SUGGESTIONS

Conclusions

From the result of hypothesis testing and discussion, so the conclusion that can be explained of this study are as follow:

1. Hypothesis shows that brand equity variables doesn't affect positively and significantly to the process of buying decision of Suzuki motorcycle is accepted.
2. Hypothesis shows that promotion variables affect positively and significantly to the process of buying decision of Suzuki motorcycle is accepted.
3. According to data analysis researched, it is known that brand loyalty becomes the most dominant indicator in forming brand equity of Suzuki motorcycle.
4. That according to data analysis researched, it is known that the indicator of buying decision becomes the most dominant indicator in explaining buying decision of Suzuki motorcycle for customers.

Suggestions

Academic Suggestion

For future researchers who are going to execute the same or further research, it is expected that they can develop the research variables because there are other variables which have not been inserted to this study, such as: image and brand attitude which can evaluate the overall brand to analyze the quality and satisfaction of certain product so that can increase brand equity and buying decision.

Practical Suggestions

Based on the research result, the researcher gives the practical suggestions are as follow:

1. The company needs to pay attention to dimensions which form brand equity so the company can periodically discover customers' attitude to Suzuki motorcycle in order to keep up the customers not to switchover another brand.
2. The company needs to increase brand equity in association and perceived quality for fulfilling customers desire in order to bring up the brand awareness in customer's mind.

3. The company needs to pay attention to the quality of product because Suzuki motorcycle's customers tend to compare to the other brands at first. So, the better quality will impact better perceived to Suzuki motorcycle. In this case, it will determine the customers' satisfaction level and customers' post-purchase behavior.

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Understanding Fake News

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Abstract: The rise in fake news or the deliberate dissemination of false information mainly through social and traditional media raises serious concerns as to the kind of information the public is receiving. There exists confusion as to what fake news is all about, sources, and how to identify fake news. This paper attempts to demystify fake news, looks at the common media platforms used to share fake news, and highlights the reasons why people disseminate fake news. In addition, the paper analysis the structural and environmental dynamics that have led traditional mainstream media contribute to the rise of fake news. Research indicates that this phenomena has solicited global initiatives and resources for verification of news to address fake news highlighted herein. In conclusion, fake news pose a challenge to news as defined under journalism and mass media studies and practices and it is important that research continues

Key Words: Disinformation, Fake news, Media,

Introduction

What is “Fake News”?

Fake news is any false information that is deliberately meant to be wholly or largely false or misleading, spread through online social media, but occasionally finding its way to mainstream traditional print and broadcast news media. The term may also be used to cast doubt upon legitimate news from an opposing political standpoint, a tactic known as lying press. The false information is often sensational, dishonest and outright fabricated, which is then reverberated through social media. A broader definition of fake news could be false or misleading information published as authentic news, generally understood to be deliberate, however possibly accidental. Fake news has no basis, but is presented as being factual. These stories are not only found in politics, but also in vaccination, stock values, nutrition and other areas of human interest. In summary, fake news embraces everything that is false, erroneous, dubious, and media driven tales that circulate widely and serve to corrupt or warp popular discourse.

Other names

It has been noted that the use of the term ‘fake news’ may not be sufficient to capture the complexity of the corruption of an entire information ecosystem in terms of the different types of misinformation (the inadvertent sharing of false information) and disinformation (the deliberate creation and sharing of information known to be false). Other common names for fake news include: post-truth, misinformation, disinformation and “alternative facts”.

Social Media and Fake news

The upsurge in the use of internet, websites and social media platforms, such as Facebook, WhatsApp and Twitter, as channels of information, is associated with the increase in fake news. The cycle of fake news includes inventors, consumers, spreaders and channels. Inventors of fake news concoct stories to misinform, sway opinions, spread propaganda, incite hate, alter perceptions, etc., through opinions, predictions and blatant fabricated narratives. They go to great lengths to give the impression that they are authoritative sources of news, by stamping their content with the distinctiveness - logos, signatures and stamps - of legitimate news sources. This manipulates the public who then disseminate and share it widely on social media platforms.

Table 1: Facts and myths about fake news

Myths and misconceptions	Truth
It is a new phenomena	Fake news is as old as the history of man
Only found in the social media	Also finds its way into the traditional and mainstream media
Fake news is a myth and exaggerated	It is a reality and a big problem

The effects of fake news are not that serious	Fake news have far reaching such as murders, reputation damage, election loss consequences
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Why do people create false news?

Motivation for creating and spreading fake news vary, and can be summarised under the following 'Ps' - Poor journalism, Parody, to Provoke, Passion, Partisanship, Profit, Political influence or Power, and Propaganda¹. In general, the reasons why people create fake news can be explained as follows:

- Intent to mislead in order to damage an agency, entity, or person;
- Financial gains by getting people to click on sites so that they are exposed to advertising;
- To persuade others to take action to support or oppose a cause or political candidate;
- To deceive or prank people;
- Increased popularity of social media such as the Facebook News Feed;
- To increase readership and improve rates because 'eye-popping' headlines in social media feeds make it easier for users to share content without evaluating or reading it. This creates a viral storm of sound bites without substance because the vulnerable recipients unknowingly are enlisted as amplifiers and multipliers;
- Confirmation bias-people are more likely to accept information that confirms their beliefs and dismiss information that does not;
- Increased political polarisation and hostile government actors who generate and propagate fake news, particularly during elections.

Consequences of fake news

Fake news is a bigger problem than previously thought, with potentially far-reaching consequences. The effects of fake news can be evaluated in the light of:

- On journalism as a profession***
 - Salient danger associated with "fake news" is that it devalues and delegitimises voices of expertise, authoritative institutions, and the concept of objective data—all of which undermine society's ability to engage in rational discourse based upon shared facts.
 - The promotion of "safe news" at the expense of difficult or challenging news stories.
 - The need for credible sources to allocate ever-diminishing resources to debunking inaccurate information (which poses both financial and reputational costs).
- On the public in general***
 - Causes moral panic or mass hysteria.
 - Damages public trust.
 - Increasingly polarised along ideological lines, and this affective polarisation tends to trigger motivated reasoning—an unconscious, biased way of processing information which makes even smart people believe in falsehoods that support their ideological and partisan predispositions.
 - Fake news entrenches stereotypes, generalisations and inequality in society.
 - People have been killed when false rumors have spread through digital media about child abductions.²

How has mainstream media contributed to the flourishing of fake news?

Some of the media's own failures and challenges that have contributed to the rise of fake news include:

- ✓ Media that itself is occasionally part of the establishment elite, and unable to properly connect with the frustration and anger of people and communities has given room for people to seek alternative sources of unverified information.
- ✓ News in its traditional format has become unfashionable - communications revolution provides people with different ways to access information and they create their own filters for information they like or don't like.
- ✓ The media business no longer makes money out of news - display and classified advertising have moved online and so far no convincing solution has been found to the problem of filling the ever-widening gaps in editorial budgets. A few newspapers have created online paywalls.
- ✓ There is less money being spent on investigative journalism and investment in human resources – decent jobs, training and quality – is falling.
- ✓ As a result, media increasingly follow the agenda of political and corporate elites and there is a dearth of public interest journalism that holds power to account. This may explain in part why some mainstream media have become disconnected from their audience.

¹Wardle, Claire (February 16, 2017). "[Fake news. It's complicated](http://www.firstdraftnews.org/)". Firstdraftnews.org.

²Vidhi Doshi, "India's Millions of New Internet Users are Falling for Fake News – Sometimes with Deadly Consequences," *Washington Post*, October 1, 2017.

Structural factors contributing to the rise of fake news

- The democratisation of information exchange, thanks to social media platforms and digital content production technologies (like Photoshop). Anyone is now able to produce credible “noise” that is difficult to distinguish from high-quality information.
- The demand for “fake news” as a natural byproduct of faster news cycles and increasing consumer demand for shorter-form content.
- The widespread disagreement over what comprises “fake news.” Merely labeling something as “fake news” can itself be considered propaganda, making it all the more important that journalists cite sources and “show their work.”
- Press-branding campaigns that attempt to distinguish between traditional journalism or respectable new sources of media and propaganda or outright lies have not been an effective means of reestablishing the authority of the press. This is primarily due to social reasons to prioritize peer-determined “truth” over previously authoritative voices, the psychological realities of tribalism, the power of confirmation bias, and the dopamine surges associated with outrage.
- Traditional gatekeepers are less effective or visible. For example, traditional news organisations lack the institutional authority they once enjoyed. (This is also true for many other historically influential and authoritative voices, including medical professionals, scientists, religious leaders, and academic institutions.)
- Current gatekeepers are more likely to view news production and dissemination as a business enterprise than as providing a public service. Additionally, the public perception of mass media as a corporate, profit-driven entity has further diminished its authority.
- Ownership of news distribution has shifted from traditional content creators to digital distributors. Digital distribution allows for highly efficient micro-targeting and limited exposure of users to challenging content. In contrast, when content creators were also responsible for distribution, diverse content was often bundled together for a mass audience, fostering the development (either voluntarily or serendipitously) of a common set of shared facts. Digital distribution also tends to favour popularity, engagement, and “shares” over expertise and accuracy.

Types of Fake News

There are different types of fake news as follows:

1. Satire or parody - no intention to cause harm but has potential to fool.
2. False connection - when headlines, visuals or captions don't support the content.
3. Misleading content - misleading use of information to frame an issue or an individual.
4. False context - when genuine content is shared with false contextual information.
5. Impostor content - when genuine sources are “impersonated” with false, made-up sources.
6. Manipulated content - when genuine information or imagery is manipulated to deceive”, as with a “doctored” photo.
7. Fabricated content - news content is 100% false, designed to deceive and do harm.

Below is a summary showing the relationship between types of fake news and the reasons why people generate fake news.

Misinformation Matrix

FIRSTDRAFT		MISINFORMATION MATRIX					
	 SATIRE OR PARODY	 FALSE CONNECTION	 MISLEADING CONTENT	 FALSE CONTEXT	 IMPOSTER CONTENT	 MANIPULATED CONTENT	 FABRICATED CONTENT
POOR JOURNALISM		✓	✓	✓			
TO PARODY	✓				✓		✓
TO PROVOKE OR TO 'PUNK'					✓	✓	✓
PASSION				✓			
PARTISANSHIP			✓	✓			
PROFIT		✓			✓		✓
POLITICAL INFLUENCE			✓	✓		✓	✓
PROPAGANDA			✓	✓	✓	✓	✓

Figure 1: Claire Walde, First Draft 2017

Sources of fake news

The key venue of fake news is social media. This is because social media is not held to account the same way that mainstream media is, when it comes to upholding and sharing accurate, reliable information. The challenge is for readers to interrogate what they're reading rather than simply believing anything that aligns with their values. Some popular sites of fake news include "The Onion", a satirical publication with a readership of 4.3 trillion, Facebook, and Monticello. Several other fake news sites try to pass themselves off as real, either by never disclosing their satirical nature or hiding the disclosure deep within their websites.

So how do you tell it is fake news?

The International Federation of Library Associations and Institutions (IFLA) has developed the following guidelines to assist in recognising fake news³:

1. Consider the source- to understand its mission and purpose.
2. Read beyond the headline - to understand the whole story.
3. Check the authors - to see if they are real and credible.
4. Assess the supporting sources - to ensure they support the claims.
5. Check the date of publication -to see if the story is relevant and up to date.
6. Ask if it is a joke - to determine if it is meant to be satire.
7. Review your own biases - to see if they are affecting your judgment.
8. Ask experts -to get confirmation from independent people with knowledge.

Other tips include:

9. If other stories from this source are incredulous – the headlines may be factual but the rest of the stories sound sensational.
10. If it predicts a future disaster or reveals cure for a major illness - for example that the world's water is running out, etc.
11. If the website carries a disclaimer, as legitimate sites do not need disclaimers.
12. If the story is a little too funny, interesting or makes you angry. Many false news stories purposely play on our fears and anxieties, knowing that to do so will make people follow their emotions and not their brains.
13. If a poll is featured – polls form the basis of many a news article, and very often they are totally legitimate. However, polls can also be misleading depending upon how the questions are phrased, number of people surveyed and how they were selected, who conducted the poll or results taken out of context.
14. Be wary of stories that rely on anonymous sources.

What do you do to stop the spread of fake news?

- Post or share stories you know to be true, from sources you know to be responsible.

³ "How to Spot Fake News". IFLA blogs. January 27, 2017.

<http://dx.doi.org/10.29322/IJSRP.9.01.2019.p8505>

- Help shape the media you want - pay for journalism you value. Support for fake news sites will produce and lead to the proliferation of that kind of information and journalism.
- Appreciate the role of the community, businesses and organisations wield “enormous power” to channel advertising or sponsorship money to platforms they trust and respect, and not to sites that attract views by promoting hate or divisiveness.
- Appropriate legislation- by passing laws that strike a balance between weeding out fake news that is deliberately misleading, malicious and used to profit off others, while allowing journalists get on with their jobs.

How can journalists address the challenge of fake news?

As already mentioned, fake news poses a serious challenge to journalism as a profession. The rise of fake news only reaffirms the future of reliable journalism and calls for journalists to be the beacons of accurate and reliable information, to maintain legitimacy in the digital age. The following tips can help journalists to do so:

- ✓ Observe and stick more closely to professional standards and ethics, to avoid publishing of unchecked information.
- ✓ Avoid relying on anonymous sources; cultivate viewpoint diversity.
- ✓ Take a distance from information which may interest some of the public but which is not in the public interest.
- ✓ The media should be careful that external post-publication corrections do not become a substitute for internal processes of quality control. Journalists have to do better and “get it right” in the first place, or forfeit the possibility of a society to have believable media⁴.
- ✓ Media houses should embark on educational and informative sessions to engage readers and help them make sense of news, by for example, hosting experts to discuss the issue in question.
- ✓ Individual media houses should work with other media organisations to see how to flag stories that could be misleading, as has been done in other countries, such as France.

A Summary of Research findings on the prevalence of fake news globally

The reliance of news consumers upon social media fuels fake news⁵. Whilst developed countries record 87 percent digital access, significant improvement has been recorded in developing countries around the world from 45 percent in 2013 to 54 percent in 2015.

Further, social media sites are very popular as news and information sources in the developing world. Eighty six percent of Middle Eastern Internet users rely upon social networks, compared to 82 percent in Latin America, 76 percent in Africa, 71 percent in the United States, 66 percent in Asia and the Pacific, and 65 percent in Europe.

A Forbes survey conducted in April 2018 found that more people in Turkey (49%) than anywhere in the world, were most likely having experienced it. Mexico (43%) and Brazil (35%) came ahead of the US at 31 percent, while Germany at 9 percent was the lowest, performing slightly better than the United Kingdom at 15 percent.⁶

In 2017, up to 51 percent of all Americans and 62 percent of adults were found to rely upon social media sites, in contrast to 22 percent relying upon print news. It was also found that the most popular fake news stories were more widely shared on Facebook than the most popular mainstream news stories, and that many people who saw the fake news stories believed them.

Organisations such as Cambridge Analytica are believed to have used data-mining and image-manipulation techniques to influence more than 200 elections around the world, including Kenya's elections in 2013 and 2017.

⁴ 2018 UNESCO: Journalism, “Fake News and Misinformation”: A handbook for Journalism Education and Training.

⁵ How to combat fake news and disinformation, Darrell M. West Monday, December 18, 2017

<https://www.brookings.edu/research/how-to-combat-fake-news-and-disinformation/> Retrieved November 5, 2018

⁶ Where Exposure To Fake News Is Highest [Infographic] – Niall McCarthy, Contributor- Data journalist covering technological, societal and media topics – (2018) <https://www.forbes.com/sites/niallmccarthy/2018/06/14/where-exposure-to-fake-news-is-highest-infographic/#32bb043f4a4d>

<http://dx.doi.org/10.29322/IJSRP.9.01.2019.p8505>

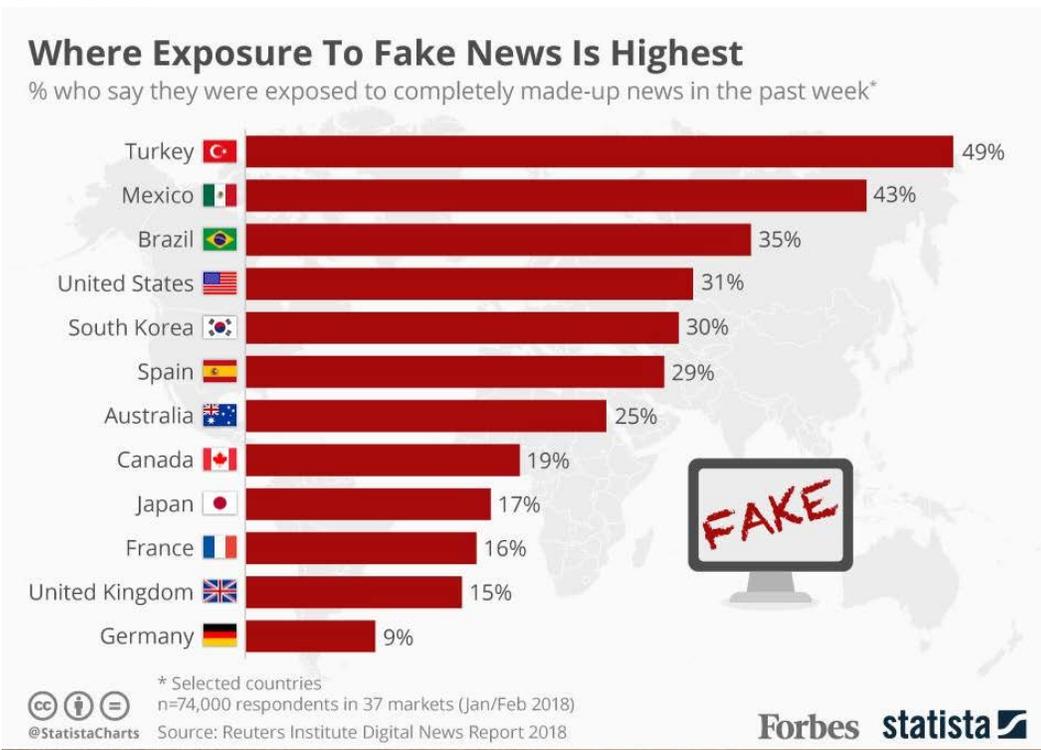


Figure 3: Exposure to Fake News Infographic - Source Forbes (2018)

Fake news in Kenya

The issue of fake news shot into the limelight in Kenya in April 2017⁷. In the run up to the 2017 election, a lot of fake news and misinformation spread in Kenya to the extent that the Communications Authority of Kenya and the National Cohesion and Integration Commission issued guidelines to regulate the content shared.

A study conducted by Portland and Geopollin Kenya during the election period of 2017 found that 49 percent of Kenyans received news about the general election through social media, but that the levels of trust in the accuracy of the information was very low compared to more traditional news sources such as TV, radio and newspapers.

The research found that fake news was a problem in the Kenyan elections, with 90 percent of respondents having seen false or inaccurate information and 87 percent of them having perceived the information as being deliberately false. Portland concluded that the false news was so widespread that it was limiting people's ability to make an informed voting decision.

In Kenya, the number of mobile subscriptions by January 2018 was at 41.0 million. Similarly, mobile phone penetration in Kenya is at 90%.⁸ Between 2016 and 2018, the 10 most downloaded apps in Kenya were found to be Uber, Instagram, Facebook, Branch, Facebook Messenger, True caller, Tala, Facebook Lite, WhatsApp and Opera Mini.⁹ This points to the increasing number of persons accessing unsolicited and solicited information from the Internet, as opposed to traditional mainstream news sources.

A study of websites by the Media Council of Kenya showed that "websites emerged as the biggest sources of fake news at 35 per cent compared to Facebook and Twitter at 31 and 19 per cent respectively, and bloggers at 10 per cent."¹⁰ Some of the notorious websites active in fake news dissemination during the period of this electoral campaigns and identified by the journalism industry regulator in Kenya MCK, included, Spotonews. Info, ConnectKenyans.com, Boseautoservice.com, Moneytechnews.com, Eazymoneytips.com, Hivisasa.com and kenyacrazymedias.com.¹¹

⁷GeoPoll: The Reality of Fake News in Kenya

⁸State of the Internet in Kenya 2017 Report Published by the Bloggers Association of Kenya (BAKE). February 2018.

⁹ www.nendo.co.ke

¹⁰ <http://mediaobserver.co.ke/index.php/2018/06/11/cyberspace-and-proliferation-of-fake-news/>

¹¹ <http://mediaobserver.co.ke/index.php/2018/06/11/cyberspace-and-proliferation-of-fake-news/>

Fake news and women

A study done¹² in 2017 in the US found that whilst women were found to spend more time than men, on social media, the probability of sharing political fake news was higher in males than in females. According to the research, in the US, democrat-female voters were less likely to share political fake news than male independent voters.

For women in politics and those in the media, fake news rides on the fact that “women sell” content, whether in photos or as subjects or objects of juicy stories, hence profit drivers for fake news generators. It rides on societal misogyny and gender stereotypes.

Conclusions

Fake news is still a burning issue and thus offers fertile ground for further research given the dynamic nature of media, especially new media and the digitization on traditional media houses. Few studies have focused on effects of fake news on women in politics and media and this paper recommends attention to such gender perspectives.

¹²Sociology of Fake News: Factors affecting the probability of sharing political fake news online - Manuel Goyanes & Ana Lavín - Media@LSE Working Paper #55

<http://dx.doi.org/10.29322/IJSRP.9.01.2019.p8505>

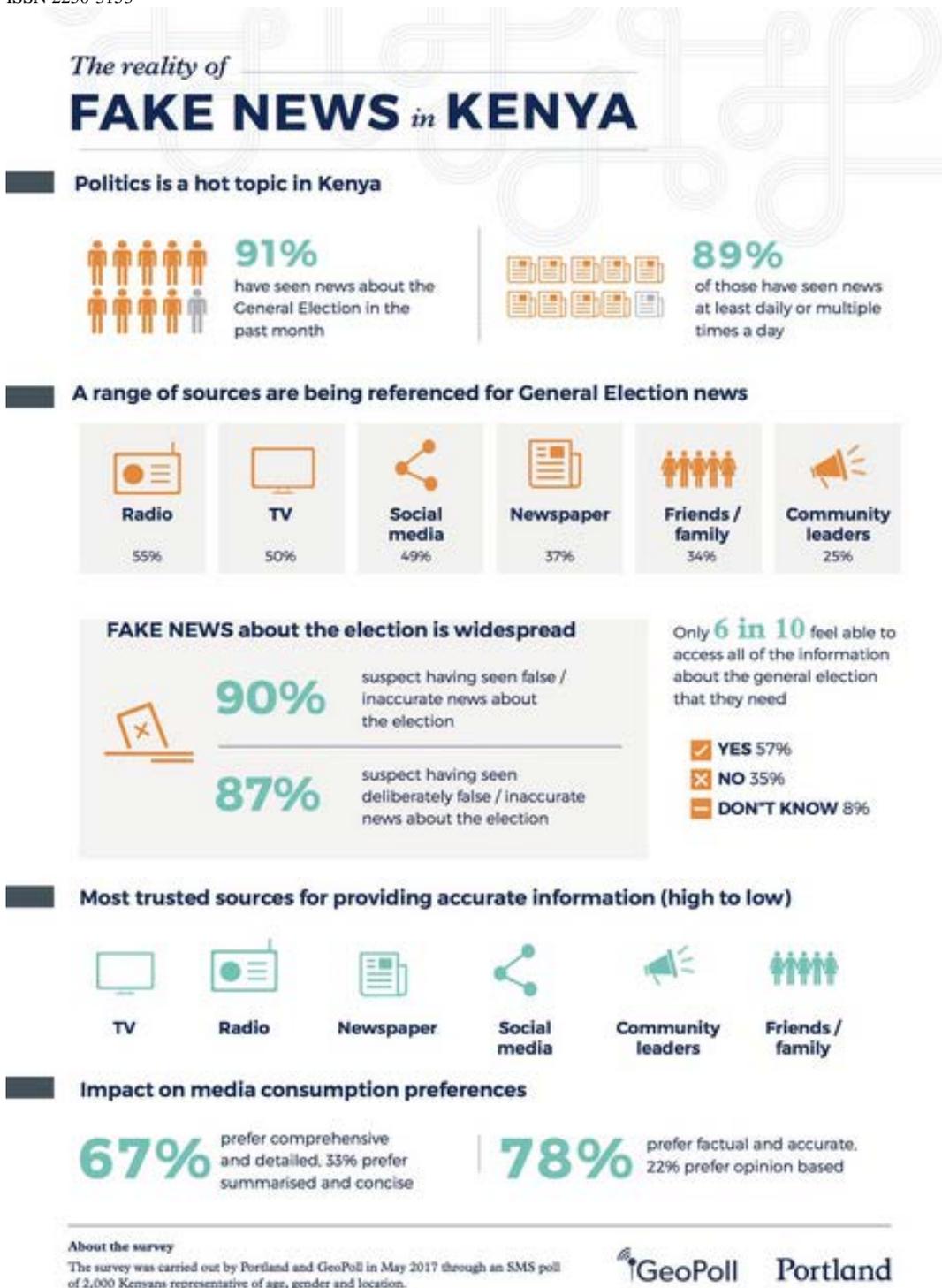


Figure 2: Fake News stats in Kenya - Source: Portland & Geopoll

One leading media establishment in the country, The Standard Media Group, has in the recent past been compelled to set up news updates verification alternatives for audiences to know if news is factual and true by texting a short message service code 22840 on their mobile phones. A number of media houses are also rapidly adopting the trend. Facebook also intervened by warnings of the spread of fake news and a tool designed to help the public spot it.

Table 2: Most Common Sources of Fake news

Politics	The most widely shared fake news stories in the US in 2016 were political, touching on the
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	persons of the top presidential candidates Donald Trump and Hillary Clinton. London-based propaganda think tank, <i>Cambridge Analytica</i> , admitted to playing a role in the upsurge of fake news during that period. ¹³
Public Offices	Public offices have also been targeted by fake news, ranging from corruption, to controversial court rulings in judgments, amongst others. For example, the Judiciary of Kenya has fallen victim of this with fake communiqués and statements emerging in public, some purportedly signed in the name of the Chief Justice, David Maraga, complete with a legitimate looking letterhead and stamp. ¹⁴
Contemporary Social Issues	Fake news has a negative impact on public beliefs about various social issues, which include health and vaccines; environment and climate change; culture and religion, among many others.
Prominent Persons	Fake news targets prominent personalities, politicians, senior civil servants and celebrities, among others, spreading falsehoods revolving around monetary scandals, personal integrity, and sometimes death of such persons. South African retired cleric, Desmond Tutu, Kenyan comedian, Churchill Ndambuki, and former president, Daniel Moi, are a few examples of this form of falsehood.
Mainstream Media	Fake news penetrating the digital space have impacted the way mainstream media operates, mainstream media themselves having been the target and purveyors of false information. ¹⁵ Besides, governments, sections of the public or rivaling groups have also at times mobilised ‘digital hate squads’ to quiet non-conforming, or critical media (persons and houses) by disseminating fake news about them.

Global Efforts to Combat Fake News

Numerous efforts are now underway to limit the prevalence and potential disruptiveness of online misinformation by helping the public to critically evaluate news sources. Since early 2016, Facebook has launched a number of efforts to address false news, click bait, and sensationalism, including a partnership with fact-checking organisations and a network of researchers called the News Integrity Initiative.¹⁶

Google announced in November 2016 that it would restrict its AdSense ads on sites that “misrepresent, misstate, or conceal information about the publisher, the publisher’s content, or the primary purpose of the web property.”¹⁷

Twitter is in the process of launching “Advertising Transparency Center” and coming up with new policies that will provide details about all ads carried on its platform, place clear visual markers on political advertisements, disclose how political ads are targeted, and strengthen policies regarding political advertising.¹⁸

In June 2017, Germany enacted a law against posting on social media of hate speech, child pornography, terror-related items and false information, and which makes it possible to punish social media platforms like Facebook and Twitter with fines of up to 50 million euros (\$58 million) if they fail to remove such illegal content.

The Malaysian Parliament, in April 2018 approved a law punishing the propagation of partially or totally false information with prison sentences of up to six years and fines of \$130,000.

In France, two controversial draft laws are under discussion with the aim to guard against manipulation of information during an electoral period.

¹³ <https://www.youtube.com/watch?v=cy-9iciNF1A> , <https://www.youtube.com/watch?v=mpbeOCKZFfQ>, <https://www.youtube.com/watch?v=qRuUX6fsPVg> ,

¹⁴ <http://mediaobserver.co.ke/index.php/2018/06/11/cyberspace-and-proliferation-of-fake-news/>

¹⁵ <http://mediaobserver.co.ke/index.php/2018/06/11/cyberspace-and-proliferation-of-fake-news/>

¹⁶ Silverman, C. 2016. “Facebook is Turning to Fact-Checking to Fight Fake News”. BuzzFeed News.

¹⁷ Love, J. and K. Cook. 2016. “ Google, Facebook, Move to Restrict Ads on Fake News Sites”. Reuters

¹⁸ Falck, B. 2007. “New Transparency for Ads on Twitter”. Twitter Blog.

Brazil is examining some 14 draft laws related to fake news, which provide for, among other things, jail sentences of up to three years for the diffusion on the Internet of false information related to “health, security, the national economy, the electoral process or all other subjects of public interest”.¹⁹

In May 2018, Kenya enacted the *Computer Misuse and Cybercrimes Act (2018)*²⁰ to check cybercrimes and computer related offences, and enable timely and effective detection, prohibition, prevention, response, investigation and prosecution of computer and cybercrime. One of the major areas that the new law targets is the publishing and dissemination of fake news, which if proven, attracts a hefty fine of Kshs.5 million or/and ten years in jail. This section of the law is however one of those being contested in court as unconstitutional, and is temporarily suspended.

Some resources for verification of news

- ✓ Journalists’ Resource website
- ✓ First Draft Partner Network
- ✓ Poynter Institute
- ✓ Ethical Journalism Network
- ✓ International Federation of Library Associations and Institutions
- ✓ UNESCO
- ✓ The Floyd Abrahams Institute for Freedom of Expression
- ✓ International Media Organizations such as AFP and BBC
- ✓ Freedom House
- ✓ Facebook - News Feed
- ✓ Africa Check
- ✓ Pesacheck
- ✓ Communication Authority of Kenya
- ✓ Media Council of Kenya

¹⁹<http://www.capitalfm.co.ke/news/2018/07/fighting-fake-news-with-the-law/> (Accessed on 20.9.18)

²⁰ Kenya Computer Misuse and Cybercrimes Act (2018)

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Effectiveness of Facilitated Tucking on Pain Among Infants Undergoing DPT Vaccination.

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Abstract- Routine immunization injections are the most common painful procedure of childhood. Most of these injections are administered early in a child's life. With the continued introduction of new vaccines, children may now receive up to 20 injections by their second birthday. Thus investigator would like to take up the present study to evaluate the effectiveness of facilitated tucking on pain among infants undergoing DPT vaccination. Facilitated Tucking improves the emotional security and reduces the pain perception. The research approach adopted for study was evaluative survey approach, research design was Quasi experimental post test only control group design. By using non-probability purposive sampling technique 100 infants were selected for the study. Modified Neonatal Infant Pain Scale was used to assess the pain scores of the infants during and after receiving DPT vaccination. The calculated unpaired 't' value ($t_{cal} = 9.52$) was greater than tabulated 't' value ($t_{tab} = 1.27$) after vaccination. Therefore it can be inferred that facilitated tucking is effective in reducing pain during and after 2 minutes of DPT vaccination among infants. The calculated chi square values were higher than tabulated values at 0.05 level of significance. The results of the study revealed that there was significant association between posttest pain scores and selected socio-demographic variables. i.e age in months, [$\chi^2_{cal} = 20.81$, $\chi^2_{tab} = 12.59$].

The present study revealed that majority of subjects in experimental group 38(76 %) had mild pain while minimum number 12 (24%) were had moderate pain whereas in control group majority of subjects 31 (62%) had moderate pain while 9 (18%) had mild pain. therefore it was concluded that facilitated tucking helped to decrease the pain among infants during and after DPT vaccination.

Index Terms- Infants, Facilitated tucking, DPT vaccination, Pain.

I. INTRODUCTION

Globally, pain is an issue in neonatal intensive care. Infants are unable to verbalize pain causing it to sometimes go unnoticed. In the past, it was ostensibly believed that neonates did not feel pain or that a painful experience would be forgotten as rapidly as it had occurred. Injections of vaccinations are the most common source of iatrogenic pain in childhood. They are administered repeatedly to almost all children throughout infancy, childhood and adolescence. The pain associated with such injections is a source of distress for children, their parents and those administering the injections. If not addressed, this pain can lead to pre-procedural anxiety in the future, needle fears and health care avoidance behaviors, including non-adherence with vaccination schedules. It is estimated that up to 25% of adults have a fear of needles, with most fears developing in childhood. About 10% of the population avoids vaccination and other needle procedures because of needle fears.² Vaccinations are first administered when babies are very young

III. DISSUCUSSION

The present study was designed to evaluate the effectiveness of facilitated tucking as a non-pharmacological pain management technique on pain during and after DPT vaccination among subjects at

Studies have shown that uncontrolled pain experienced during the early stages of life has negative and long-term side effects, such as distress, and that such pain negatively affects the development of the central nervous system.³

Facilitated tucking is one of the simplest non-pharmacological and cost effective techniques simulating the condition of being in uterus. This makes the infant comfortable, more secure with controlled response. It facilitates self-regulation by decreasing the physiologic response like prolonged heart rate elevation that contributes to the disequilibrium associated with pain and stress. Facilitated tucking improves the emotional security and reduces the pain perception.⁷

Facilitated tucking improves the emotional security and reduces the pain perception.⁷ There is lack of awareness among health care professionals regarding pain perception, assessment and management in infants. Facilitated Tucking improves the emotional security and reduces the pain perception. The nurse or care givers can effectively implement facilitative tucking for reduction of pain in any setting as it is a very simple technique.

II. METHODS AND DATA COLLECTION

Data was collected from different research studies and through journals, newspapers, and government reports on vaccination and census reports. After an extensive review of literature referring the books and journals as well as discussion with the guide and experts, the tool that is socio-demographic variables and modified neonatal infant pain scale were developed to assess the effectiveness of facilitated tucking on pain among infants undergoing DPT vaccination. Selected Socio-demographic variables. It consisted of six items for obtaining information about the selected background factors of samples such as age in months, gender, birth weight, present weight, gestational age, dose DPT vaccination etc. Research study was conducted at well baby clinics of Kolhapur. Permission was obtained from the concerned authorities of the selected hospitals, Kolhapur. 100 subjects were randomly selected according to inclusion criteria, by Non-probability purposive sampling method for experimental (50) and control group (50). The investigator introduced herself to the mothers of infants. Written consent was taken by explaining the purpose and objectives of the study from mothers of infants. Facilitated tucking, that is fetal position was provided to the infants by the investigator, in experimental group, one minute prior to DPT vaccination. Routine position (extension of leg) was provided to infants in control group. DPT vaccination is administered by the staff nurses. Pain perception was assessed in both group by using modified NIPS scale during injecting vaccination and after 2 minutes of the DPT vaccination by non-participant trained observer. The collected data was analyzed and tabulated.

selected well baby clinics. The collected data was coded, organized, analyzed and interpreted, by using both descriptive and inferential statistics. The descriptive statistics used were frequency and percentage distribution of sample characteristics and computation of mean, median, mode, range and standard deviation of posttest pain scores. Inferential

statistics used was unpaired “t” test to evaluate the effectiveness of facilitated tucking.

Analysis and interpretation of information collected with the help of selected socio-demographic variables and Modified Neonatal Infant Pain Scale from 100 subjects who had underwent vaccination procedures at selected well baby clinics. Majority of the infants 53 (53%) were males and 47 (47%) were female. In the present study, Majority of infants 33 (33%), belonged to the age group of 1.5 to 2.5 months, while minimum number 15 (15%) belonged to the age group of 4.6 to 5.5 months. Majority of the infants 53 (53%) were males and 47 (47%) were female. Birth weight of majority of infants 55(55%) were between 2.6 to 3 kg, while minimum number 03(3%) had 1.5 to 2 kg. Present weight of majority of infants 39 (39%) were between 5.1 to 6 kg, while minimum number 09 (9%) had 7.1 to 8 kg . majority of infants 39 (39%) were receiving second dose of DPT vaccination while 23 (23%) infants were receiving first dose. Gestational age of majority of infants 74 (74%) were term while minimum number of infants 06 (6%) were post-term.

In the present study, while conducting assessment of pain scores during vaccination, out of 100 infants in experimental and control group, majority of infants in experimental group 28 (56%) had moderate pain while minimum number of infants 22(44%) showed severe pain whereas in control group majority of infants 42 (84%) had severe pain while minimum number 8 (16%) had moderate pain. While doing assessment of pain scores after two minutes of vaccination, out of 100 infants in experimental and control group, majority of infants in experimental group 38(76 %) had mild pain while minimum number 12 (24%) were having moderate pain whereas in control group majority of infants 31 (62%) had moderate pain while 9 (18%) had mild pain

In this present study, the overall pain score of subjects in the experimental group was less than the control group by mean difference 1.86 units and median was 0.5 units where mode was 3 units during injecting DPT vaccination the overall pain score of subjects in the experimental group was less than the control group by mean difference 2 units and median was 2 units where mode was 1 units, after the 2 mins DPT vaccination.

In this present study, there was significant association between posttest pain scores with their selected socio-demographic variables like Age in months [$\chi^2_{cal} = 20.81$, $\chi^2_{tab} = 12.59$]. This indicated that there was significant association between post test pain scores and selected socio-demographic variables, that is age of infant can interfere with pain score during invasive procedures. In the present study, the calculated unpaired ‘t’ value ($t_{cal} = 9.52$) is greater than tabulated ‘t’ value ($t_{tab} = 1.27$) after vaccination.. This indicated that there was statistically significant difference between the mean posttest pain score value of experimental and the control groups. ($p < 0.05$)Therefore it can be inferred that facilitated tucking is effective in reducing pain during and after 2 minutes vaccination among infants.

Similar finding were reported in the study done by Olive Lopez et.al on the effect of facilitated tucking on procedural pain control among premature babies, In this study, the variable age had significant association with pain scores among infants another Similar findings were shown by Ms. Rubin Selvarani.G on effectiveness of facilitated tucking on level of pain among preterm infants undergoing painful procedure at selected hospitals regarding post test pain score.

Figure 1: facilitated tucking position



Figure 2: classical holding position



IMPLICATIONS

The investigator has put forward the following implications from the study which is of crucial concern for nursing practice, nursing education, nursing administration and nursing research. The child health nursing practitioners can formulate a separate protocol for practicing facilitated tucking in their daily routine as procedural pain control measure. The nurse administrator should enforce in organizing Continuing Nursing Education (CNE), conferences and workshop on facilitated tucking on level of procedural pain in preterm infants and other potential benefits and more research studies can be done by nurses to evaluate other non-pharmacological interventions like oral sucrose, Music to reduce pain among children.

RECOMMENDATIONS

The researcher presents strong recommendation to the neonatal nurses, to involve actively in on prevention of the long-term consequences of repeated painful stimuli through the simple cost-effective nursing measure, facilitated tucking during the routine painful procedures.

The study recommends the following for further research.

- 1.The researcher will recommend for implementing the facilitated tucking in preterm and term infants undergoing painful procedure in the clinical area by the staff nurses
2. A comparative study can be conducted to compare the effectiveness of facilitated tucking with other non-pharmacological pain relief measures.
3. The same study can be replicated with large samples in various other settings for reinforcement.
4. A prospective study can be conducted to assess the effectiveness of facilitated tucking on various other behavioral parameters among preterm infants.
5. A comparative study can be done by using facilitated tucking with oral sucrose / swaddling and facilitated tucking without oral sucrose / swaddling on reducing pain

CONCLUSION

Based on the findings of the study, the following conclusions were drawn. The study revealed that facilitated tucking is effective in reducing pain in infants during and after DPT vaccination.

The calculated unpaired 't' value ($t_{cal} = 9.52$) is greater than tabulated 't' value ($t_{tab} = 1.27$) after 2 mins of DPT vaccination Hence H_1 is accepted. This indicates that there was statistically significant difference between the mean posttest pain score value of experimental and the control groups. ($p < 0.05$). Hence, it is proved that facilitated tucking is an effective non-pharmacological pain management technique in reducing pain among infants during and after vaccination.

The association revealed that the age in months is statistically associated [$\chi^2_{cal} = 20.81$, $\chi^2_{tab} = 12.59$] with posttest pain scores at 0.05 level of significance. Hence, it is recommended that awareness on use of facilitated tucking should be promoted among staff nurses by continuing nursing education and develops immunization practice protocol in use of such non-pharmacological techniques like facilitated tucking during immunization to reduce pain among children.

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Evaluation of Contrast Sensitivity in Diabetic Patients

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ABSTRACT

Background

Diabetes mellitus is a series of chronic metabolic disorders due to the pancreas does not produce enough insulin resulting from defects in insulin secretion, insulin action, or both leading to the increase of glucose concentration in blood. Diabetic retinopathy is a retinal disorder found in diabetic patients. It is a cause of blindness found throughout the world. As diabetes increases and glycemic control worsens, these diabetic patients have a decrease in contrast sensitivity. Clinically, it can be used as a tool in assessing retinal function in diabetic patients. Contrast sensitivity test has a strong indication and is a prediction of a real picture of vision that affects the quality of life of someone.

Method

This study was observational analytic with a cross sectional study method. The subjects were control patients without diabetes mellitus, people with diabetes mellitus less than 5 years and people with diabetes mellitus for more than 5 years at the Sumatera Utara University Hospital.

Results

Of the 45 subjects (90 eyes), 15 subjects (30 eyes) experiencing a decrease in the value of contrast sensitivity, namely people with diabetes mellitus more than 5 years.

Conclusion

There was no relationship between age and group characteristics of the subjects (p value > 0.05). There was no relationship between age and contrast sensitivity values (p value > 0.05). There was a relationship between the characteristics of the patient group in the study subject to contrast sensitivity values (p value < 0.05). There was a significant difference in the value of contrast sensitivity between groups of control patients without diabetes mellitus with a group of diabetic patients < 5 years, a group of control patients without diabetes mellitus with group of diabetic patients > 5 years and between group of diabetic patients < 5 years with diabetic patients > 5 years (p value < 0.05).

Keywords: Diabetes Mellitus, Diabetic Retinopathy, Contrast Sensitivity, Pelli Robson Chart

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases with characteristics of hyperglycemia that occur due to abnormal insulin secretion, insulin performance or both. Diabetes mellitus cannot be cured but blood sugar levels can be controlled through diet, exercise, and medication. To be able to prevent the occurrence of chronic complications, good DM control is needed.¹

Diabetic retinopathy is a retinal disorder found in people with diabetes mellitus. The abnormalities found in the examination of diabetic retinopathy due to prolonged diabetes mellitus can be aneurysms, dilated veins, bleeding and fat exudates.^{3,4,5} Sensitivity of contrast is the value of the amount of contrast between light and dark (monochrome or color), which is needed to detect or recognize a visual target. This value shows information about visual functions that are not detected by Snellen chart or field of view tests.⁶

II. METHOD

This study is an analytic observational with cross sectional design study with control was approved by the ethics committee of Medical Faculty of Sumatera Utara University. The research subjects were all patients in the Neuro Ophthalmology Division and Endocrine Metabolic Diabetes Division of Sumatera Utara University Hospital with control patients without diabetes mellitus, patients with diabetes mellitus less than 5 years and diabetic patients for more than 5 years from September to October 2018. The samples for 45 patients over 40 years were tested firstly for the acuity of vision, and followed by examination of the anterior segment using a Slit Lamp, then examination of intraocular pressure by using the Schiøtz Tonometer to assess eyeball pressure, then examination of posterior segment using Funduscopy Direct then, contrast sensitivity testing was carried out using Pelli Robson Chart so that contrast sensitivity of patients without evaluation of diabetes mellitus could be evaluated, patients with diabetes mellitus less than 5 years and people with diabetes mellitus were more from 5 years. The data is entered with SPSS (IBM SPSS Statistic for Windows, Version 19.0). Anova One Way Test (relationship between age and contrast sensitivity values) p value > 0.05 is considered not significant. Chi-Square Test (relationship between characteristics of patient groups in research subjects against contrast sensitivity values) p value < 0.05 is considered significant. In the multiple comparisons test, the LSD method (the difference between the variables of contrast sensitivity values) showed that there were significant differences in contrast sensitivity values between the control patients without diabetes mellitus and those with diabetes mellitus less than 5 years, the group of patients without diabetes mellitus with groups people with diabetes mellitus more than 5 years and between groups of people with diabetes mellitus less than 5 years with a group of people with diabetes mellitus more than 5 years ($p < 0.05$).

III. RESULTS

Of the 45 subjects (90 eyes), there were 15 subjects (30 eyes) experiencing a decrease in the value of contrast sensitivity, namely people with diabetes mellitus more than 5 years.

Table 1. Distribution of subjects based on the characteristics of demography

Characteristics	n	%
Age		
• 46 - 55 years	14	31.1
• 56 - 65 years	16	35.6
• > 65 years	15	33.3
Sex		
• Female	21	46.7
• Male	24	53.3
Patient Group		
• Control	15	33.3
• DM < 5 year	15	33.3
• DM > 5 year	15	33.3
Total	45	100

In table 1 it shows that the distribution of research subjects based on demographic data. From the table, it can be concluded that the number of research subjects is 45 people based on the age according to The Ministry of Health, Republic of Indonesia in 2009, subjects aged 46-55 years were 14 people (31.1%), subjects aged 56-65 years were 16 people (35.6%) and subjects with age > 65 years as many as 15 people (33.3%) with a total subject of 45 people (100%). Female were 21 people (46.7%), while male were 24 people (53.3%), with a total subject of 45 people (100%). From table 4.1, it also shows that subjects with control patients as many as 15 people (33.3%), subjects with patients with diabetes mellitus <5 years as many as 15 people and subjects with patients with diabetes mellitus > 5 years as many as 15 people (33.3%) with a total subjects of 45 people (100%).

Table 2. Distribution of Age Correlation Againsts Characteristics of Patients Group

Age (Years)	Patient Group						Total	<i>p value</i>
	Control		DM < 5 years		DM > 5 years			
	n	%	n	%	n	%		
46 – 55	7	46.7	4	26.7	3	20.0	14	0.599

56 – 65	4	26.7	6	40.0	6	40.0	16
> 65	4	26.7	5	33.3	6	40.0	15
Total	15	100	15	100	15	100	45

From table 2 above, it explains that the characteristics of research subjects aged 46-55 years with control patients as many as 7 people (46.7%), subjects with < 5 years diabetes mellitus as many as 4 people (26.7%), subjects with diabetes mellitus > 5 years as many as 3 people (20.0%) with a total subject of 14 people (100%). Research subjects aged 56-65 years with control patients as many as 4 people (26.7%), subjects with <5 years diabetes mellitus as many as 6 people (40.0%), subjects with diabetes mellitus > 5 years as many as 6 people (40.0%) with total subjects 16 people (100%). Research subjects aged > 65 years with control patients as many as 4 people (26.7%), subjects with < 5 years diabetes mellitus as many as 5 people (33.3%), subjects with diabetes mellitus > 5 years as many as 6 people (40.0%) with a total subject 15 people (100%). The results of the Chi-Square Test obtained p value 0.599 meaning there was no relationship between age on the characteristics of the group of study subjects (p value > 0.05).

Table 3. Distribution of Age Correlation to Contrast Sensitivity Value

Patient Group	Age (Years)	Contrast Sensitivity Value		p value
		n	$\bar{x} \pm SD$	
Control	46-55	7	1.9500 ± 0.001	0.269
	56-65	4	1.9475 ± 0.005	
	> 65	4	1.9493 ± 0.001	
DM < 5 year	46-55	4	1.9000 ± 0.001	0.299
	56-65	6	1.9017 ± 0.040	
	> 65	5	1.8960 ± 0.089	
DM > 5 year	46-55	3	1.5500 ± 0.001	0.507
	56-65	6	1.5500 ± 0.001	
	> 65	6	1.5750 ± 0.612	

Results of Anova one way test in table 3 above explains the absence of a relationship between age and contrast sensitivity values in control patients with a value of 0.269. In patients with diabetes mellitus < 5 years, there was also no relationship between age and sensitivity value contrast with p value 0.299 and in patients with diabetes mellitus > 5 years there is also no relationship between age and contrast sensitivity values with p value 0.507. In this study the relationship between the value of contrast sensitivity and increasing age did not have a significant value, namely p value > 0.05.

Table 4. Distribution of Characteristics of Groups of Research Subjects with Contrast Sensitivity Value

Patient Group	Contrast Sensitivity Value				Total		p value
	Decrease		Normal				
	n	%	n	%	n	%	
Control	0	0	15	100	15	100	0.0001
DM < 5 year	0	0	15	100	15	100	
DM > 5 year	15	100	0	0	15	100	

From table 4 it illustrates the relationship between the characteristics of the group of study subjects with contrast sensitivity values with p value 0.0001 according to the Chi-Square Test. From the above data, it can be concluded that there is a relationship between the characteristics of the group of patients in the study subject to contrast sensitivity values (p value <0.05).

Table 5. Distribution of Contrast Sensitivity Value

Patient Group	n	Contrast Sensitivity Value	p value
		$\bar{x} \pm SD$	
Control	15	1.949 ± 0.003	0.0001

DM < 5 year	15	1.899 ± 0.006
DM > 5 year	15	1.560 ± 0.387

Anova one way test results in table 5 above explains the difference in Contrast Sensitivity Value which is significant with p value 0.001 (p value < 0.05). To see the average Sensitivity Value Different contrasts, it can be seen by the multiple comparisons LSD method, namely:

Table 6. Distribution of the difference between Variable of Contrast Sensitivity Value

The difference between Variable of Contrast Sensivity Value	p value
Control with DM < 5 year	0.0001
Control with DM > 5 year	0.0001
DM < 5 year with DM > 5 year	0.0001

In table 6 it can be seen that there is a significant difference in the value of contrast sensitivity between groups of control patients without suffering from diabetes mellitus with a group of patients with diabetes mellitus < 5 years (p value 0.0001). Significant differences in contrast sensitivity values were also obtained between groups of control patients without suffering from diabetes mellitus with a group of patients with diabetes mellitus > 5 years (p value 0.0001) and between groups of patients with diabetes mellitus < 5 years with groups of diabetes mellitus > 5 years (p value 0.0001).

IV. DISCUSSION

Diabetes mellitus is a series of chronic metabolic disorders due to the pancreas does not produce enough insulin, causing insulin deficiency as a result of there is an increase in glucose concentration in the blood.^{1,5} World Health Organization (WHO) predicts an increase in the number of people with diabetes 8.4 million in 2000 to around 21.3 million in 2030. Contrast sensitivity is the value of the amount of contrast between light and dark (monochrome or color), which is needed to detect or recognize a visual target. This value shows information about visual functions that are not detected by Snellen charts or field tests. Sensitivity can be measured in various spatial frequencies to detect functional defects in less sensitive parts of retinal ganglion cells (RGCs) or in the higher visual pathway.^{7,8,11,12} In normal subjects, contrast sensitivity and visual acuity are interconnected. Decreased vision due to refractive abnormalities is said to have an effect on contrast sensitivity. However, various types of visual dysfunction including cerebral lesions, optic neuritis, glaucoma, diabetes neuropathy, cataracts can reduce contrast sensitivity even though the vision is near normal, so contrast sensitivity testing is recommended as a means of differential diagnosis and screening.^{14,15,16}

In table 1, it shows that the distribution of research subjects is based on demographic data. From the table it was concluded that the number of research subjects was 45 people based on age according to Ministry of Health, Republic of Indonesia in 2009, subjects aged 46-55 years were 14 people (31.1%), subjects aged 56-65 years were 16 people (35.6%) and subjects with age > 65 years as many as 15 people (33.3%) with a total subject of 45 people (100%). Female subjects were 21 people (46.7%), while male subjects were 24 people (53.3%), with a total subject of 45 people (100%). From table 4.1 it shows that subjects with control patients as many as 15 people (33.3%), subjects with DM patients < 5 years as many as 15 people and subjects with DM patients > 5 years as many as 15 people (33.3%) with a total subject of 45 people (100%).

From table 2, it explains that the characteristics of research subjects aged 46-55 years with control patients as many as 7 people (46.7%), subjects with < 5 years diabetes mellitus as many as 4 people (26.7%), subjects with diabetes mellitus > 5 years as many as 3 people (20.0%) with a total subject of 14 people (100%). Research subjects aged 56-65 years with control patients as many as 4 people (26.7%), subjects with <5 years diabetes mellitus as many as 6 people (40.0%), subjects with diabetes mellitus > 5 years as many as 6 people (40.0%) with total subjects 16 people (100%). Research subjects aged > 65 years with control patients as many as 4 people (26.7%), subjects with < 5 years diabetes mellitus as many as 5 people (33.3%), subjects with diabetes mellitus > 5 years as many as 6 people (40.0%) with a total subject 15 people (100%). The Chi-Square Test results obtained p value 0.599 which showed no relationship between age and characteristics of the research subjects (p value > 0.05). This study is in line with the study of Abbas Azimi (2010) et al. That there were no statistically significant differences between age in the control group, < 5 years of diabetes mellitus patients and > 5 years of mellitus patients.⁹

Anova One Way test results in table 3 above explains the absence of an association between age and contrast sensitivity values in control patients with a value of 0.269. In patients with diabetes mellitus <5 years there is also no relationship between age and sensitivity value contrast with p value 0.299 and in patients with diabetes mellitus > 5 years there is also no relationship between age and contrast sensitivity values with p value 0.507. In this study, the relationship between the value of contrast

sensitivity and aging did not have a significant value, namely p value > 0.05. This study is in line with Naser Shoeibi (2010) research et al. That there was no statistically significant difference between age and contrast sensitivity values.⁹

From table 4, it shows the relationship between the characteristics of the group of study subjects with contrast sensitivity values that are worth p value 0.0001 according to the Chi-Square Test. From these data it can be concluded that there is a relationship between the characteristics of the group of patients in the study subject to contrast sensitivity values (p value < 0.05). This study was in line with the research of Shayesteh Yasini, MSc (2010) that found a statistically significant difference between groups of patients on contrast sensitivity values.¹⁰ This study was not in line with Mayasari Nasrul (2015) study that there was no statistically significant relationship between concomitant sensitivity binoculars with long-standing type 2 diabetes without diabetic retinopathy.⁸

Anova One Way test results in table 5 explains the difference in contrast sensitivity values that are significantly p value 0.001 (p value < 0.05). In table 6 the multiple comparisons test of the LSD method shows that there are significant differences in the value of contrast sensitivity between groups of control patients without diabetes mellitus with a group of < 5 years of diabetes mellitus (p value 0.0001). Significant differences in contrast sensitivity values were also obtained between groups of control patients without suffering from diabetes mellitus with groups of people with diabetes mellitus > 5 years (p value 0.0001) and between groups of patients with diabetes mellitus < 5 years with groups of people with diabetes mellitus > 5 years (p value 0.0001)) This research is also in line with Javad Heravian, Phd (2010) et al that there is significant differences in the value of contrast sensitivity between groups of control patients with < 5 years of diabetes mellitus and people with diabetes mellitus > 5 years.⁹

V. CONCLUSION

Of the 45 subjects (90 eyes), 15 subjects (30 eyes) experienced a decrease in the value of contrast sensitivity, namely diabetic patients for more than 5 years. There was no relationship between age and group characteristics of the study subjects (p value > 0.05). There was no relationship between age and contrast sensitivity values (p value > 0.05). It was found that there was a relationship between the characteristics of the patient group in the study subject to contrast sensitivity values (p value < 0.05). There was a significant difference in the value of contrast sensitivity between groups of patients without diabetes mellitus with a group of patients with diabetes mellitus < 5 years, a group of control patients without diabetes mellitus with a group of patients with diabetes mellitus > 5 years and between groups of patients with diabetes mellitus < 5 years with groups of patients diabetes mellitus > 5 years (p value < 0.05).

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A Study to Assess the Impact of Electronic Media On Health Among Adolescents in Selected Degree Colleges at Mangaluru

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Abstract- Electronic devices are an integral part of adolescent's lives in the twenty-first century. Adolescents, in particular, spend a significant amount of time viewing and interacting with electronic devices in the form of TV, mobile phones and computer. It can have a positive and negative influence on the adolescent health, behaviour; social development and educational outcomes. In addition, symptoms associated with using mobile phones most commonly include headaches, earache, and warmth sensations and sometimes perceived concentration difficulties as well as fatigue. **Aim:** To determine the impact of electronic media on health of the adolescents. **Settings and design:** Yenepoya Degree College, Mangaluru and a descriptive study design. **Method &Material:** Purposive sampling technique was used to select the samples for the study. A scale to assess impact of electronic media on health of adolescents was used to collect data. **Statistical analysis:** Collected data was analysed using descriptive statistics.

Result: Majority (71%) percentage of the adolescents had impact on mental health, 68% of them had impact on environmental health, 66% of them had impact on physical health and least (14%) percentage of them had impact on social health. The impact of electronic media on health of adolescents mean and standard deviation was 115.2±1.21
Conclusion: In this study majority of the samples had impact of electronic media on health. Study concluded that there is significance impact of electronic media on health.

Index Terms- Electronic media; adolescents;

I. INTRODUCTION

The electronic media like television, mobile phones, computer and videogames are the daily sources of communication and amusement for a majority of adolescents. Children and adolescents average over 21 hours of television viewing per week, adding estimates of video game and other media to this figure increase this to 35-55 hours per week¹. Pre-school children spend between 2 and 2.5 hours per day watching television while older children in primary school watch between 2 and 4.5 hours per day². The concern over the extent of media use by children and adolescents has made the American Academy of Paediatrics (AAP) issue a policy statement in February 2001 recommending that parents discourage television viewing for children less than 2 years old and limit children's media time to 1-2 hours per day for older children³. Media can have an impact on eating behaviour as there is increased risk of obesity for every hour spent daily using electronic media. Teenagers who use mobile phones or any of the electronic media will have less sleep. Children who watch violent programs or play violent videogames tend to be more aggressive, engage in fights with peers, confront with teachers and parents and also have decreased scholastic performances. A mixed research methodology was done in Dublin, Ireland by Keating (2011), on the effects of electronic media. The study revealed that electronic media is reducing the children to play traditional games and interact with other. The electronic media has both good and bad effects and it depends on the individual how to use or misuse it. Parental awareness and children education is an important measure in reducing ill effects on child's development⁴.

Tech devices and gaming may have positive effects on investigating skills, strategic thinking and creativity potential of the individuals. The digital behaviour of the youth makes them sit at one place for a long period of time and the eye, hand and mental co-ordination is maintained during that period. Furthermore, feelings of loneliness, isolation or boredom can be replaced with the pleasure of free flow of electronic delights. Internet use for online communication can, however, be helpful for maintaining existing relationships, particularly friendships⁵.

II. MATERIAL AND METHODS

Study design and sample

A Descriptive research design was selected for the study. Purposive sampling technique was used to select the students from Yenepoya Degree College, Mangaluru. The Screening test was administered for all the students (219) of the selected college by the investigator. 115 students were using electronic media for 10 hour or more per week, among them 100 students who were available on the day of data collection were selected.

Data collection and Study tools

Before data collection the investigators introduced themselves and about the purpose of the study. The confidentiality of their identity and responses was assured in order to ensure their co-operation.

Instruments used are 1. Screening test 2: Demographic proforma 3: A scale to assess impact of electronic media on health of adolescents. The screening test consisted of items to assess the total hours spent by using different types of electronic media. The variables measured by the demographic proforma were age, gender, class of study, type of family, place of stay, type of electronic media used, monthly pocket money received (in rupees), are the gadgets placed in bedroom, access to internet. The scale to assess the impact of electronic media on health of the adolescents had 53 items. The Items were categorized under physical health, mental health, social health and environmental health. Each items had ratings like always, usually, rarely and never. There were both positive and negative items.

III. RESULTS

Majority 20.54% of the sample were using computer more than 10 hours and majority 17.3% of the samples were watching television more than 10 hours and majority 52.51% of the samples were using mobile phones more than 10 hours. Around 115 were using electronic media more than 10 hours among them 100 were selected because the others were absent.

Majority (71%) percentage of them had impact on mental health, 68% of them had impact on environmental health, 66% of them had impact on physical health and least (14%) percentage of them had impact on social health. The impact of electronic media on health of adolescents mean and standard deviation was 115.2±1.21 so study concluded that majority of the samples had impact of electronic media on health.

N=100

Table	Variable	Items	f	%
1:	Age	a. 18-19	70	70
		b. 20-21	30	30
Demographic	Gender	a. Male	29	29
		b. Female	71	71
Data	Class of study	a. 1 st year degree	41	41
		b. 2 nd year degree	29	29
		c. 3 rd year degree	30	30
		d. Type of family		
T	Type of family	a. Nuclear family	71	71
		b. Joint family	12	12
		c. Extended family	0	0
		d. Single parent family	17	17
he study revealed that there is a negative impact of electronic media on the health of the adolescents. So study concluded	Place of stay	a. Home	77	77
		b. Hostel	21	21
		c. Relatives home	1	1
		d. Others	1	1
T	Type of electronic media used	a. Television	10	10
		b. Mobile phone	100	100
		c. Computer	3	3

ed that in future the adolescents are at greater risk of developing health problems.

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Instructional Influences on the Implementation of the Curriculum for Physics for Secondary Schools in Kenya

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Abstract- Implementation of the curriculum is a critical stage in the curriculum development cycle. Yet over the years 2011 to 2015 students' achievement in Physics at Kenya Certificate of Secondary Education (KCSE) has been low coupled with low students' enrollment. This study sought to determine the influence of teaching methods and learners' motivation on implementation of Physics curriculum. This study was guided by cognitive constructivism theory of learning. This study targeted 224 teachers of Physics and 4140 Form three Physics students in 283 public secondary schools in Bungoma County. Stratified and simple random techniques were used to select 22 schools. The sample size was 22 teachers and 393 students making a total of 415 respondents. Data was using Teacher Questionnaire (TQ), Student Questionnaire (SQ), Lesson Observation Schedule (LOS) and Observation Checklists (OC). Data was presented using frequency tables, figures and analyzed using both descriptive and inferential statistics. Descriptive statistics used to analyze quantitative data include; percentages and means while the inferential statistics used include; Chi-square and Pearson product moment correlation coefficient. Qualitative data was analyzed thematically. Statistical Package for Social Sciences (SPSS) version 20 was used to compute the analysis at $\alpha = 0.05$ level of significance. Both quantitative and qualitative results showed that non-use of student-centered teaching methods and lack of learners' motivation influenced the implementation of the curriculum for Physics. The study concluded that for effective implementation of the curriculum; students-centered teaching methods should be employed and learners' be motivated. The study recommended that the teachers of Physic should be in-serviced on learner-centered methods and they should focus more on arousing learner's motivation. Further, the findings provide a guide to the government on enhancing the implementation of the curriculum for Physics for improved performance.

Index Terms- Instructional influences, implementation of curriculum, teaching methods, learners' motivation, Kenya

I. INTRODUCTION

In this era of globalization and technological revolution, Education is considered as a first step for every activity. The world leaders' summit held in New York in September, 2015 set new goals for social and economic development that countries

(Kenya included), should pursue in the next 15 years (Sustainable Development Goals [SDGs], 2015). The Sustainable Development Goals are aimed at transforming our world by the year 2030 (SDGs, 2015). The summit identified 17 goals out of which five goals are related to this study and states as follow: (a) end poverty in all its' forms everywhere, (b) ensure inclusive and equitable education; promote lifelong learning opportunities for all, (c) build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, (d) make cities and human settlements inclusive, safe, resilient and sustainable; and (e) take urgent action to combat climate change and its' impact (SDGs, 2015).

The SDGs' main aim is to achieve three main objectives namely; end extreme poverty, fighting inequality and injustice, and fixing climate change by the year 2030 (SDGs, 2015). The new goals take over from the previous Millennium Development Goals (MDGs) that had been set up at the turn of the Century. It was acknowledged by the SDGs summit that; sadly most African Countries had not met a number of the MDGs; education included.

Human development is one of the strategic objectives according to Kenya vision 2030 (Republic of Kenya, 2010) in the vision; Kenya endeavor to expand her development, industrially and infrastructure which is to lead to urbanization. If the Kenyan government is to meet her goal of industrialization by the year 2030 then she must expand her Education in science and technology and improve efficacy in curriculum implementation in order to produce the required human resource.

Although Physics is essential for industrialization, there has been a decline in academic achievement as well as low enrolments in the subject (Kenya National Examination Council [KNEC], 2014). The Kenya vision 2030 recognizes that social and economic development ultimately depends on the quality of education offered. People with quality basic education are more productive and more likely to play an active role in development. It is universally recognized that investment in human development through Education is an essential component of any development plan (The Common Wealth of Learning & Asian Development Bank, 2009). Within the education sector, it has been understood that quality and access are perhaps the two most critical issues.

An evaluation of the Kenyan education system by UNESCO (2010) noted that the secondary school curriculum objectives have not been fully achieved as envisaged in 2002 syllabus. With regard to aspects that relate to innovation and application of technology,

curriculum implementation is visibly deficient as the majority of its products do not exhibit those attributes after school.

Physics Curriculum implementation challenges range from methodological issues, lack of personnel, political, economic and cultural factors (Okere, 2000). This affects delivery of Physics syllabus content and in turn leads to negative attitudes among learners and hence poor performance in national examinations and low enrollment in the subject.

The government of Kenya has invested a lot of resources in the curriculum implementation process through free secondary Education and Strengthening Mathematics and Sciences in Secondary Education (SMASSE) project. Yet students' achievement and enrolment in Physics KCSE remains alarmingly low at 39.0 and 26.6 percent respectively over the years 2011 to 2015. Enrollment in Physics does not match the overall candidature growth; instead it has been declining from 39.15% to 24.83% within the same period.

This is a worrying trend since much effort has been put in by the stakeholders through a number of initiatives and programs. A typical example is the SMASSE programme that was a joint agreement between the government of Kenya and Japan through the support of the Japanese International Cooperation Agency (JICA). The programme was piloted in 1998 and implemented in 2002 and has made significant steps in advocating for learner-centered approaches in teaching of sciences and mathematics in secondary schools and learners' motivation.

Curriculum implementation is influenced by several factors. For example, teaching methods are capable to enhance and improve content delivery (Njoroge, Changeiywo & Ndirangu, 2014; Muriithi, Odundo, Origa & Gatumu, 2013), and motivation is needed for enthusiasm to take Physics in secondary school (Semela, 2010; Amunga, Amadalo & Musere, 2011). UNESCO (2010) noted that many factors play a role in effective curriculum implementation.

Thus, this study sought to establish the influence of teaching methods on implementation of the curriculum for Physics and determine the influence of learners' motivating on implementation of the curriculum for Physics for secondary schools.

II. OBJECTIVES OF THE STUDY

The objectives of this study were to:

1. Establish the influence of teaching methods on the implementation of the curriculum for Physics for secondary schools in Kenya.
2. Determine the influence of learners' motivation on the implementation of the curriculum for Physics for secondary schools in Kenya.

III. RESEARCH HYPOTHESES

The following were research hypotheses:

H0₁: Teaching methods do not influence the implementation of the curriculum for Physics for secondary schools in Kenya.

H0₂: Learners' motivation does not influence the implementation of the curriculum for Physics for secondary schools in Kenya.

IV. THEORETICAL FRAMEWORK

This study was guided by the cognitive constructivism theory of learning developed by Jean piaget (1967). Constructivism theory emerged in the late 1980s, although its roots are much older. The basic belief of constructivism is that knowledge is actively constructed by learners rather than transmitted by the teacher (Hirumi, 2002). Nevertheless, there are minor distinctions between cognitive constructivism and social constructivism, which are two representative types of constructivism (Liaw, 2004).

Cognitive constructivists believe learners construct knowledge individually based on their prior experience and new information. Therefore, learning is considered as an internal cognitive activity. Social constructivists, however, argue that knowledge is the outcome of collaborative construction in a social context through interactive processes of information sharing, negotiation and discussion (Qiyun, 2008). Therefore the social constructivist views learning as knowledge constructed through social interaction and discourse (Liaw, 2004) . Although varying constructivist theories exist, there is agreement between the theories "that learning is a process of constructing meaning, it is how people make sense of their experience"(Hirumi, 2002).

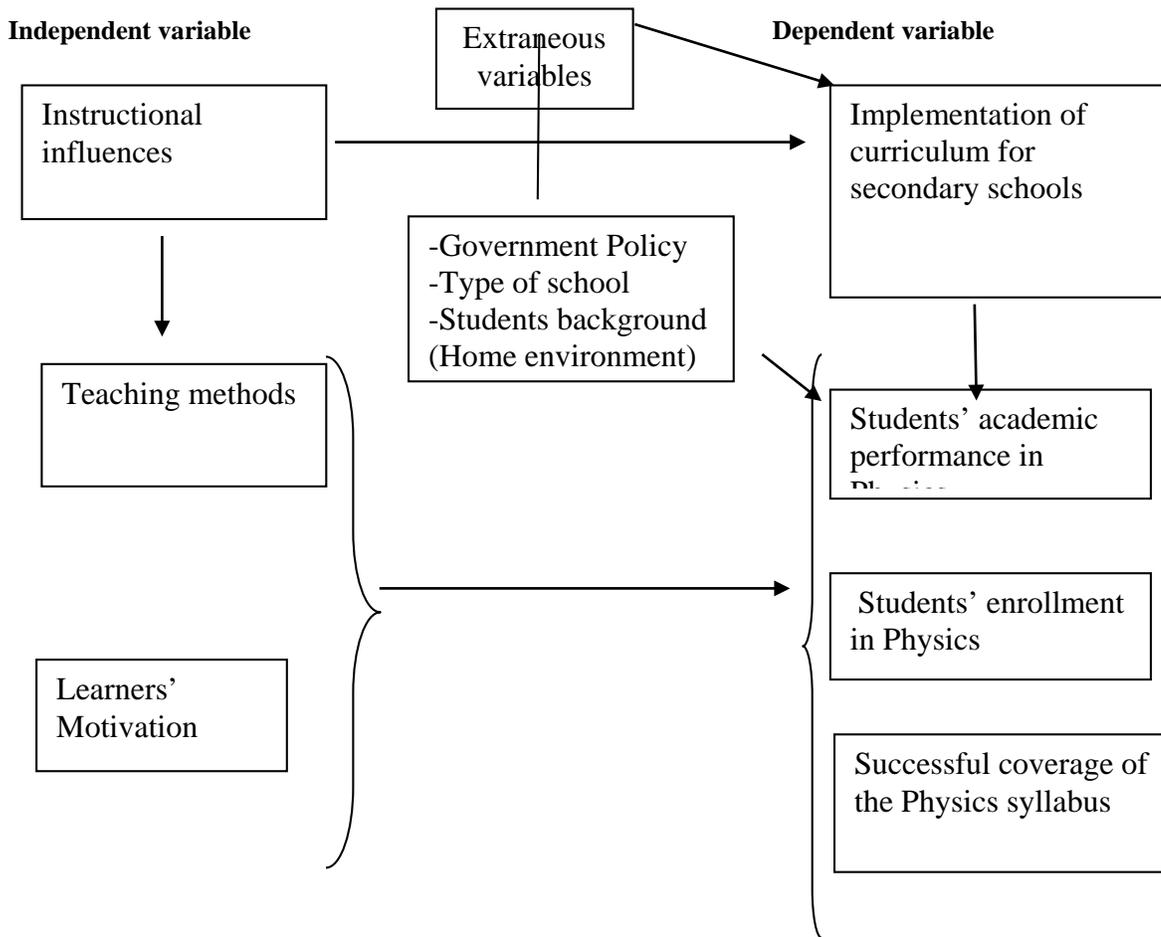
This study was inclined to cognitive constructivism in which Physics as a science subject require learner centered activities using learning materials for effective learning and curriculum implementation. Cognitive constructivists believe learner centric instructional methods in the classroom will strengthen the commitment and involvement of self-motivated learners because of their high level of interaction. In adapting this theory, this study views teaching methods like; Inquiry-Based Teaching, laboratory method, Project method, Discovery method, Mastery Learning Approach and ICT integration as methods that allow Knowledge construction in the teaching and learning process. This theory is related to this study in that the study sought to establish the influence of teaching methods on the implementation of the curriculum for Physics for secondary schools in Kenya.

The cognitive constructivist learning theory relates to this study by reminding teachers to look for different ways to engage and motivate an individual learner by preparing coherent problem sets and challenges that focus the model building effort and interpretations (Qiyun, 2008). In line with cognitive constructivists theory this study sought to determine the influence of learners' motivation on the implementation of the curriculum for Physics for secondary schools in Kenya.

V. CONCEPTUAL FRAMEWORK

This study was guided by a schematic model. In this model research variables and the relationship between them is shown diagrammatically. Independent variables (IVs) are placed on the left and dependent variables (DVs) on the right separated by the intervening variables at the middle. The conceptual framework is shown in figure 1.

Figure 1. A Conceptual Framework for the Relationship between Instructional influences and Implementation of the curriculum for Physics.



Source: Researcher (2015)

In the conceptual framework in Figure1, instructional influences are hypothesized to influence implementation of the curriculum for Physics. The framework postulates that teaching methods and learners' motivation directly influenced students' academic performance, students' enrollment in Physics and successful coverage of the syllabus. However, this relationship may be modified by government policy, type of school and family background from which the student comes.

VI. RESEARCH METHODOLOGY

Research design

This study adopted a descriptive survey design, which involved the use of questionnaire and observation methods for data collection. Descriptive survey design provided numeric descriptions of some part of the population (Miles & Huberman, 1994). In this design the study described and explains events as they are, as they were or as they will be. This design enabled the researcher to have a rapid data collection and ability to understand a population from a part of it (Creswell, 2009). Descriptive survey

design was deemed appropriate for this study since this study sought to develop relevant true statements, ones that can serve to explain the situation that is of concern or that describe the casual relationship of interest (Neuendorf, 2002).

Population and Sample

The study population comprised all students in 283 public secondary schools in Bungoma County. The sample consisted of Form 3 students of Physics in the sampled schools, assumed to represent the student population because they had selected the subject, as well as accurately report on the matter under study. The schools were categorized as mixed and single gender schools. Out of 283 public secondary schools in the County, a stratified random sample of 22(10%) schools participated. Stratified sampling technique was used to ensure that three categories of schools (boys, girls, and mixed) were represented in the sample in the proportion in which they appear in the population. The use of this technique was to improve representativeness and to bring on board any differences that could exist between the school categories (Tuckman, 1978). Thus, the sample comprised seven boys'

schools, seven girls' schools and eight mixed schools. One teacher for Physics was selected from each sampled school. A simple random sample of 10, 15 or 20 respondent from each single streamed, double streamed or a three and more streamed schools respectively participated in the study. In total, the study involved 415 respondents, 22 teachers (16 male and 6 female) and 393 students (236 boys and 157 girls).

Research instruments

The instruments used in this study were questionnaires, lesson observation guide and observation checklist. The selection of these tools was guided by the nature of data to be collected, the time available as well as the objectives of the study (Bergman, 2008). This study was mainly concerned with teachers' and students' views, opinions, and attitudes about implementation of the curriculum for Physics for secondary schools in Kenya. Such data could best be collected through the use of questionnaire, lesson observation and observation checklist (Kothari, 2009).

Questionnaires

In this study two sets of questionnaires were used: one for Physics teachers and another for Physics students. Both the Teachers' Questionnaire (TQ) and students' Questionnaires (SQ) were structured to incorporate both closed-ended and open-ended questions. This was to enable the study balance between the quality and quantity of data collected (Bergman, 2008). But on the other hand, provide more information.

The investigator adapted some items on curriculum implementation from standardized and validated item from Fiske and Taylor (2008). Some of the items were modified to fit the present study. The respondent was asked "How often do you use the following teaching methods in teaching and learning Physics?" The response was on likert scale having four degree of agreement such as; Very often = 4; Often = 3; Rarely = 2; Never = 1. On motivation, the respondent was asked "Rate the following statements to indicate learners' motivation in Physics" The response was on likert scale having five degree of agreement such as; Strongly agree = 5; Agree = 4; Undecided = 3; Disagree = 2; Strongly disagree = 1.

Finally, there were two open-end questions. The first asked respondents "What do you think are the major influences on the implementation of the curriculum for Physics in your school?" and the second question was "What do you think should be done in order to manage these influences in your school?" Open-ended questions gave respondents complete freedom of response in their own words but the amount of space provided desired a brief answer.

Lesson Observations Schedule (LOS)

This study employed Lesson Observation Schedule (LOS) meant to assess the extent to which the teaching methods used were student-centered, as well as find out the degree to which

learners are motivated in classrooms. LOS was used to obtain primary data during classroom lessons or laboratory lessons. In the first part of the schedule the observer filled in data on: name of the school, class, time, subject and roll of boys and girls in the class. The Second, third and fourth sections of the schedule were the introduction, lesson development and the conclusion of the lesson. In each of these sections the observer filled in data on teaching methods and learners' motivation during the lesson.

Some photographs and video tapes were also taken during lesson observation with the consent from the school principal to show the situation in Physics classrooms in Kenyan secondary schools.

Data analysis

Data collected was analyzed using both descriptive and inferential statistics. The descriptive statistics used were percentages and means, whereas, the inferential statistics used were chi-square and Pearson product moment correlation. Data was analyzed by using Statistical Package for Social Sciences (SPSS) version 20 at $\alpha = 0.05$ level of significance. Qualitative data was organized in narrative format and analyzed in themes. Chi-square was employed to establish relationship between instructional influences and implementation of the curriculum for Physics for secondary schools. If the probability of the computed Chi-square value was less than the level of significance set, the null hypothesis was rejected and concluded that the two variables were not independent of each other and vice versa (Kothari, 2009). Pearson product moment correlation coefficient was used to measure the relationship between instructional influences and implementation of the curriculum for Physics. For all statistical tests conducted in this study, the alpha level was set at .05.

VII. RESULTS

Influence of teaching methods on the implementation of the curriculum for Physics for secondary schools

The first objective of this study was to investigate the influence of teaching methods on the implementation of the curriculum for Physics for secondary schools in Kenya. To achieve this objective, the respondents were asked to indicate how often the listed methods are used in implementing Physics curriculum in their respective schools. The responses were recorded on a four-point likert scale ranging from: Very often = 4 to Never = 1. Data on this objective was analyzed under the hypothesis "teaching methods do not influence implementation of the curriculum for Physics for secondary schools."

Data from Teachers' and Students' closed-ended Questions

Data from Teachers' and Students' questionnaire are presented on Table 1.

Table 1. Influence of teaching methods on the implementation of the curriculum for Physics for secondary schools

Teaching method	Response							
	Very often		Often		Rarely		Never	
	N	%	N	%	N	%	N	%
B1. Inquiry-based	159	38.3	160	38.6	59	14.2	36	8.7
B2. Laboratory	117	28.2	192	47.5	92	22.2	9	2.2
B3. Project	28	6.7	71	17.1	147	35.4	169	40.7
B4. Discovery	62	14.9	99	23.9	123	29.6	131	31.6
B5. ICT integrated	31	7.6	67	16.1	110	26.5	207	49.9
B6. Mastery learning	117	28.2	155	37.3	76	18.3	67	16.1
B7. Lecture	227	54.7	119	28.7	45	10.8	22	5.5
B8. Discussion	167	40.2	168	40.5	67	16.1	12	2.9
B9. Question-answer	234	56.4	142	34.2	29	7.0	9	2.2
B10. Problem solving	209	50.4	160	38.6	33	8.0	10	2.4
B11. Demonstration	172	41.4	169	40.7	53	12.8	19	4.6
Mean	138	33.3	137	33.0	76	18.3	63	15.1

As can be discerned from Table 1, a majority 275 (66.3%) of the respondents indicated that teaching methods influenced implementation of the curriculum for Physics. These results suggest relationship between teaching methods and implementation of the curriculum for Physics. Although more than half of the respondents indicated that teaching methods influenced the implementation of the curriculum for Physics, a significant proportion 139(33.4%) indicated opposite; that teaching methods have no influence on implementation of the curriculum for Physics.

Data from Teaches’ and Students’ open-ended Questions

The narrative report from open-ended questions concurred with the questionnaire finding in which one student had written:

In class teachers don’t allow students to participate or give their ideas. Teachers prefer to give the answer and move to the next concept without the understanding of the students. This causes confusion among the students and they end up dropping the subject when it becomes optional at form Three. Some students in my school choose to take Physics but fail in examination due to poor implementation of the curriculum.

Data from lesson observation

Classroom and laboratory lesson observation revealed that the teaching methods used in Physics are predominantly

theoretical with traditional lecture, question-answer, teacher demonstration and problem solving methods being widely used. Traditional methods of teaching were observed in seven (63.6%) out of the eleven lessons observations made while student-centered teaching methods like: IBT, laboratory practical, project, discovery and ICT integration were observed in only four (36.4%) out of eleven observations. Hence, it clearly emerged from lesson observations that student-centered teaching is lacking in Physics classrooms in Kenyan schools.

The laboratory lesson observation further revealed how lack of students’ direct interaction with equipments impacted negatively on their practical skills in curriculum implementation (. In this connection observer II reported:

Physics curriculum implementation is negatively impacted by theoretical approaches to the teaching of practical skills instead of using student-centered approaches. This is due to the limited time for the lesson and inadequate apparatus for doing practical. This as a result de-motivates students and low academic achievement is observed in the subject in KCSE examinations.

Based on the questionnaire and lesson observation findings, data analyzed using chi-square to test the null hypothesis that, “Teaching methods do not significantly influence implementation of the curriculum for Physics for secondary schools.” The results of chi-square are summarized in Table 2.

Table 2. Chi-square test results on influence of teaching methods on implementation of the curriculum for Physics

	Chi-square	observed frequency (O)	Expected frequency (E)	sig.
	254.296	5	16	0.01
df	25			

0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 16.0

The results on Table 2, shows computed chi-square value; $F(5,254) = 16.0$; $df = 25$; $p < .05$). This gave a significant value of 0.01 which is below the P value = 0.05, hence the researcher

rejected the null hypothesis that stated that “There is no significant influence of teaching methods on implementation of the curriculum for Physics for secondary schools.” Therefore the alternative hypothesis which states that there is significant influence of teaching methods on implementation of the curriculum for Physics for secondary schools was accepted.

Influence of learners’ motivation on the implementation of the curriculum for Physics for secondary schools

The second objective posed in this study was to determine the influence of learners’ motivation on the implementation of the curriculum for Physics for secondary schools in Kenya. To achieve this objective, the respondents were asked to rate statements to indicate motivation in Physics. The responses were recorded on a five-point likert scale ranging from: Strongly agree = 5 to Strongly disagree = 1. Data on this objective was analyzed

under the hypothesis “learners’ motivation does not influence the implementation of the curriculum for Physics for secondary schools in Kenya.”

Data from Teachers’ and Students’ closed-ended Questions

Data from Teachers’ and Students’ questionnaire are presented on Table 3.

Table 3. Influence of learners’ motivation on the implementation of the curriculum for Physics for secondary schools

Response Learners’ motivational	SA		A		U		D		SD	
	N	%	N	%	N	%	N	%	N	%
C1. Excellent performance	254	60.7	10	2.4	84	20.2	61	14.7	8	1.9
C2. Rewarding good performance	204	49.1	6	1.4	33	7.9	89	21.4	83	20.0
C3. Enjoy Physics lessons	232	55.9	26	6.3	46	11.0	7	1.7	4	1.0
C4. Love revising Physics at free time	259	62.1	62	14.9	73	17.5	19	4.6	2	0.5
Mean	237	57.1	26	6.2	59	14.7	44	10.6	24	5.7

Key:SA= strongly agree; A= Agree; U= Undecided; D= Disagree; SD= Stronglydisagree

The findings in Table 3, indicate that a majority of the respondents 263 (63.3%), of the respondents generally held that motivation influences implementation of the curriculum for Physics for secondary schools.

Data from Teaches’ and Students’ open-ended Questions

The finding from teachers’ and students’ open-ended questions seemed to support the data reported in the closed-ended questions. For instance, one of the teachers wrote that:

Motivation is an important drive for learning and achievement in KCSE examination. Teachers cultivate a learning habit and self-responsibility within their students. This is through rewards and positive reinforcement in classroom by encouraging each and every student to be part of the learning process. Therefore, motivation is an important factor that affect implementation of the curriculum.

One of the student was also in agreed with the teachers’ sentments by reporting that teachers gave them moral support and confidence to revise well for the examinations through rewards and career guidance. This became a driving force for academic excellence. The respondent clearly explained this as follows:

My teacher motivates me by rewarding me through comments he makes in class when I answer a question correctly. One day the teacher said, “ that is good, your future career is very bright”. I feel this influences my interest in the subject. But when teachers make negative comments to the students in class, students gets scared and discouraged from learning.

Lesson observation results showed that learners’ motivation greatly influenced curriculum imlementation for Physics. It was revealed that a teacher who reinforce and reward learners through positive comments, makes them make more efforts in class hence raising their interest to learn. Rewards and reinforcement cultivate extrinsic motivation and interest in students to learn by themselves.

Regarding this observer I briefly describes the scenario as follows:

In class learners who had answered a question correctly and were positively reinforced tended to lifted up their hands to make another attempt, unlike those who had previously answered wrongly or had not made any attempted. It was only in two classes that the teacher encouraged other students to also try. But in most cases the teachers kept on giving chance to the same students to answer questions which impacted negatively on implementation of the curriculum.

Based on questionnaire and lesson observation findings, data analyzed using chi-square to test the null hypothesis that, “Learners’ motivation does not significantly influence the implementation of the curriculum for Physics for secondary schools. The results of chi-square are summarized in Table 4.

Data from lesson observation

Table 4. Chi-square results on influence of learners’ motivation on the implementation of the curriculum for Physics

	Chi-square	observed frequency (O)	Expected frequency (E)	sig.
df	129.337	5	34.6	0.021
	11			

0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 34.6

The results on Table 4, shows computed chi-square values; $F(5,129) = 34.6$; $df = 11$; $p < .05$). This gave a significant value of 0.021 which is below the P value = 0.05, hence the researcher rejected the null hypothesis that stated that “*There is no significant influence of learners’ motivation on the implementation of the curriculum for Physics for secondary schools.*” Therefore the alternative hypothesis which states that there is significant

influence of learners’ motivation on the implementation of the curriculum for Physics for secondary schools was accepted.

Furthermore, Pearson product moment correlation coefficient was used to establish the degree of relationship between instructional influences and implementation of the curriculum for Physics for secondary schools. The findings are shown in Table 5.

Table 5. Pearson product moment correlations coefficient on instructional influences on the implementation of the curriculum for Physics for secondary schools

Variable	r	r ²
Teaching method	0.277**	0.076
Learners’ motivation	0.321**	0.103

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Results presented in Table 5, shows that there was a significant positive correlation between instructional influences and the implementation of the curriculum for Physics. Teaching methods were found to have a significant influence on the implementation of the curriculum for Physics ($r = 0.277$, $p < 0.05$). The results indicated r^2 to be 0.076 this imply that 7.6 percent implementation of the curriculum for Physics was predicted by teaching methods.

Similarly, learners’ motivation was found to have a significant influence on the implementation of the curriculum for Physics as show on Table 5, ($r = 0.321$, $p < 0.05$). The results shows r^2 to be 0.103 implying that 10.3 percent implementation of the curriculum for Physics was predicted by learners’ motivation.

VIII. DISCUSSION OF THE STUDY FINDINGS

The first objective for this study was to establish the influence of teaching methods on the implementation of the curriculum for Physics for secondary schools in Kenya. Results obtained in Table 1, showed that nearly 66.3 percent of teachers and students in secondary schools held that teaching methods influenced the implementation of the curriculum for Physics for secondary schools. The results of the Chi-square test obtained in Table 2, reveals that p value = 0.01 less than the alpha value level of significance of 0.05, therefore there is strong relationship between teaching methods and implementation of the curriculum for Physics. The Pearson product moment correlation coefficient

on Table 5, showed that teaching methods influenced up to 7.6 percent implementation of the curriculum. These findings are in agreement with the findings reported by Muriithi et al., (2013); Uside et al., (2013), and Njoroge et al., (2014) who noted that teaching methods influenced curriculum implementation for Physics hence students’ achievement in the subject.

Muriithi et al., (2013, p.8) in the study on project method and learner achievement in Physics in Kenyan secondary schools documented that project method improved Physics performance by 7.6 percent. Uside et al., (2013) studied effect of discovery method on secondary school students’ achievement in physics in secondary schools in Kenya and established that discovery method has the potential to improve learners’ achievement mean from 53.0% to 62.9% for the high achievers while for the low achievers the mean improved from 15.0% to 25.0%. The study reported an average performance gain of 10.0% which agrees with this study which has found out a close average percentage gain of 7.6percent. Njoroge et al., (2014) studied the effect of Inquiry Based Teaching (IBT) and found a mean performance gain of 12.6% when IBT is used instead of traditional teaching methods like lecture and question answer methods. The researcher argued that IBT enhances the achievement of learners. This study is consistent with the findings by Njoroge et al., (2014).

Secondly, this study sought to determine the influence of learners’ motivation on the implementation of the curriculum for Physics for secondary schools in Kenya. A majority 63.3 percent of the respondents as shown on Table 3, indicated that learners’ motivation influenced the implementation of the curriculum for Physics for secondary schools. The Chi-square results in Table 4,

showed that p value = 0.021 less than the alpha value level of significance of 0.05, therefore there is strong relationship between learners' motivation and implementation of the curriculum for Physics. The Pearson product moment correlation coefficient shown on Table 5, indicated that learners' motivation influence the implementation of the curriculum for Physics by 10.3percent.

These study findings are consistent with findings by the study by Changeiywo et al., (2010) who found out that MLA boosts learners' motivation towards learning Physics in secondary schools, which in turn improved performance in the mean score for Physics by between 18.71% and 23.3%.

Lastly, the Pearson product moment correlation coefficient showed a significant positive relationship between instructional influences and implementation of the curriculum for physics. It can therefore be argued that schools could improve implementation of the curriculum by using student-centered teaching methods and boosting learners' motivation. The challenge posed to educators is to identify ways through which the instructional influences can be managed for better implementation of the curriculum.

IX. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The following conclusions were made on the basis of the research findings:

1. Teaching methods influenced the implementation of the curriculum for Physics for secondary schools. The use of student-centered teaching methods enhanced curriculum implementation. Students taught through this approaches had better academic achievements than those taught through regular methods. Therefore for effective implementation of the curriculum for Physics teachers should continue to embrace learner-centered approaches.
2. Learners' motivation influenced the implementation of the curriculum for Physics for secondary schools. Rewards motivated learners and made them work had hence achieved superior grades in examinations. Motivation also made students interested to learn more especially at free time which resulted in better academic achievement. Teachers should therefore ensure they work on students' intrinsic and extrinsic motivation for effective curriculum implementation.

X. RECOMMENDATIONS

In view of the findings and conclusions, the study made the following recommends:

1. Teachers should be provided with in-service education on modern learner-centered teaching methods like; IBT, ICT integration and discovery.
2. Teachers should focus more on arousing learner's motivation (intrinsic and extrinsic) in Physics by reinforcing and rewarding students. Career guidance should also be provided.

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Value Chain and Evaluation of Milk Quality in Smallholder Dairy Farms Around Addis Ababa, Ethiopia.

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Abstract- Evaluation of milk value chain and quality of milk were assessed in selected districts of surrounding Addis Ababa from September 2016 to April 2017. A total of 180 randomly selected market-oriented smallholder dairy farmers were involved in a cross-sectional study that was carried out by way of questionnaire survey, rapid market appraisal, farm inspection and group discussion. The overall mean family size of respondents in this study was 5.63 ± 1.926 persons with average livestock holding per household of 23.93 ± 11.755 animals. Cattle were the predominant species representing 84.3% of the total TLU. The average number of lactating cows owned by the respondent farmers was 1.76 ± 0.920 local and 2.79 ± 3.445 cross bred animals. Average daily milk yield of crossbred and local milking cows were 9.11 ± 2.902 and 1.889 ± 0.6707 liters respectively. Overall mean lactation lengths of crossbred and local milking cows were 9.7 ± 0.46 and 6.26 ± 0.6624 months. Sixty milk samples were collected and the analysis of microbiological and physicochemical were carried out. The overall mean chemical compositions of milk for fat (%), protein (%) and solids not fat (%) contents were 3.5693 ± 0.10892, 2.9646 ± 0.04621 and 6.9632 ± 0.12175 in bulk Tank milk samples. The overall mean microbiological count of log (TBC cfu/ml), log (CC cfu/ml) and log (SCC/ml) of raw milk was 8.2285 ± 0.10041, 3.3363 ± 0.10010 and 5.1622 ± 0.07382, respectively. The proportion of raw milk used for household consumption was relatively small (5%). The major part (86%) of milk produced by smallholders is destined to market. The main outlets for raw milk identified were cooperatives (55.6%), processors (20.0%), vendor (20.0%), directly to consumer (2.8%) and hotels/restaurants (1.7%). Price variations (cited by 87% of the respondents), lack of fair market (72.2%), lack of demand during fasting (49.4%), lack of preserving facilities, and absence of quality based payment and no/less say in deciding milk price by producers were the major problems of raw milk marketing.

Index Terms- Coliform, Milk, Physicochemical, Total bacteria, Value-chain.

I. INTRODUCTION

Ethiopia has a huge potential to be one of the key countries in dairy production for various reasons [1]. These include a large

population of milk cows in the country estimated at 9.9 million [2] a conducive and relatively disease free agro-ecology, particularly the mixed crop–livestock systems in the highlands that can support crossbred and pure dairy breeds of cows [3], a huge potential for production of high quality feeds under rain fed and irrigated conditions, existence of a relatively large human population with a long tradition of consumption of milk and milk products and hence a potentially large domestic market [4].

A number of fundamental constraints underlie these outcomes, including traditional technologies, limited supply of inputs (feed, breeding stock, artificial insemination and water), poor or non-existent extension service, high disease prevalence, poor marketing infrastructure, lack of marketing support services and market information, limited credit services, absence of effective producers' organizations at the grass roots levels, and natural resources degradation [5]. In addition, policy decision on milk and milk product marketing are taken in the absence of vital information on how they affect dairy producers, traders, exporters, and consumers. Similarly, current knowledge on dairy product market structure, performance and prices is poor for designing policies and institutions to overcome the perceived problems in the marketing system [6].

Traditional farmers sell their raw milk informally due to absence of organized marketing network that has made the produced milk unable to reach the consumer. Further losses incurred are quality losses by storing in unclean storage utensil, which is prone to high microbial contamination. Losses in spillage and contamination occur where handling during and after milking are traditional and care is not satisfactory. Additionally the trade in the sub-sector is constrained by various structural, production, information exchange, and promotional problems, as well as financial constraints.

Therefore, this study is conducted to evaluate value chain and quality of milk around Addis Ababa.

II. MATERIALS AND METHODS

This study is conducted in purposively selected districts around capital city of Addis Ababa namely Welmera and Sululta which are known for smallholder dairies are practiced for distribution of milk and milk products to the nearby city Addis Ababa. Welmera district is located 28 km west of Addis Ababa at

09°02 North latitude and 38°34 East longitudes with its altitude ranging from 2060-3380 m.a.s.l. whereas Sululta district lies between 39°30' N Latitude and 38° 30' and 39° 00 E longitude. It is located 40 km north west of Addis Ababa.

Study population

Smallholder farmers in Sululta and Welmera districts owning crossbred and indigenous cattle for milk production constituted the study population.

Study design

A cross-sectional study by way of questionnaire survey, rapid market appraisal, farm inspection, group discussion, interviewing key respondents and laboratory analysis of raw milk samples was carried out from September 2016 to April 2017. Marketing actors and smallholder dairy farmers in the selected study area were study participants.

Sample size determinations

The sample size was determined by using mathematical model of [7]. The sample size, N, can then be expressed as largest integer less than or equal to $0.25/SE^2$.

$$N=0.25/SE^2$$

Where, confidence level of 95% and confidence interval of 5%, were considered.

Based on the above formula the computed sample size was 180.

Sampling procedure

To select a representative sample, the potential of the two districts were identified. Sululta district has 23 peasant associations (PAs), of which eight have potential in dairy production. From the list of these eight PAs, three were selected randomly. These included Moye-Gajo, Chanco-Buba, and Warrarso-Malima PAs. Then ninety households owning dairy cattle were selected randomly from three PA's (thirty from each PA). Welmera District has also 24 PAs, of which six have potential in dairy production. From the list of these six, three of them namely Geggelikuyu, Bekeka na kore-oddo and Gebarobi PAs were selected. Then ninety households owning dairy cattle were selected randomly from the three PA's.

Data collection

Questionnaire survey

The questionnaire that was structured and closed type for its major part was pre-tested before its full administration. The questionnaire was focusing on demographic characteristics of the study participants, husbandry practices, milk production, processing, and marketing and utilization situations. Furthermore, marketing constraints of raw milk was investigated.

Rapid Market Appraisal (RMA)

Rapid Market Appraisal (RMA) using checklists and observation was implemented to understand how a product or commodity flows to reach the end users.

Farm inspection

Farms were inspected once at the same time with the questionnaire survey. Activities observed during the farm visit

encompassed kinds of utensils used, milking practices, milk handling and storage conditions.

Group discussions

Group discussions at three different PA'S of Sululta and three PA'S of Welmera were undertaken, in order to understand the overall community situations and get insight about milk marketing, milk handling, limitations and strength milk marketing. Groups were composed of 10 to 12 members constituted by different age and social groups. Discussion participants were identified in consultation with the wereda development agents. A sample checklist, which served as a guide and consisting of the main points for the group discussion was prepared.

Interviewing key respondents

Chairmen of PA'S, representatives of the sub PA'S and extension workers were interviewed. The agricultural office workers at PA'S levels were also participants in the process.

Collection of raw milk samples

Raw milk samples were collected at farm and milk collections centers by following strict aseptic procedures. Physicochemical test of raw milk was performed and the presence of bacteriological agents was assessed; standard plate count, coliform and somatic cell count tests were done. Before sampling, milk was thoroughly mixed after which 25 ml of milk was transferred into sterile sampling bottles. The milk sample bottles were capped, labeled with a permanent marker and stored in an ice packed cool box and transported to the Ethiopian Meat and Dairy Technology Institute, Debre-zeit where the different analysis were conducted.

Bacteriological quality tests

Tests employed to determine the quality of milk were Standard plate count, Coliform count, and Somatic cell count. Detailed description of the steps followed in each of the methodologies is presented in the following sections.

Standard plate count (SPC)

The standard plate count of raw milk samples was performed by putting one ml of milk sample into a sterile test tube having 9 ml peptone water. After mixing, the sample was serially diluted up to 1: 10^{-7} and duplicate samples of 1 ml of diluted milk samples were streaked on 15-20 ml standard plate count agar media and then incubated for 48 hours at 37°C to encourage bacterial growth. Finally, colony counts were made using colony counter. Single bacteria species or clusters grow to become visible colonies that were then counted. All plate counts were expressed as the number of colony forming units (cfu) per milliliter. Results from plates, which contained 10 to 300 colonies per plate were recorded. If plates from two consultative decimal dilutions yield colony counts of 10 to 300, the counts for each dilution were computed by the following formula [8]

$$N = \frac{\sum \text{colonies}}{[(1 \cdot n_1) + (0.1 \cdot n_2)] \cdot d}$$

Where: N = number of colonies per milliliter of milk,

$\sum C$ = sum of colonies on plates counted,
 n_1 = number of plates on lower dilution counted,
 n_2 = number of plates in next higher dilution counted and
 d = dilution from which the first counts are obtained.

Coliform count (CC)

One ml of milk sample was added into sterile test tube having 9 ml peptone water. After mixing, the sample was serially diluted up to 1: 10⁻⁴ and duplicate samples (1 ml) were pour plated using 15-20 ml Violet Red Bile Agar solution (VRBA). After thoroughly mixing, the plated sample was allowed to solidify and laying over by Violet Red bile Agar solution (VRBA) then incubated at 37°C for 24 hours. Finally, colony counts were made using colony counter. Typical dark red colonies were considered as coliform colonies.

Somatic cell count (SCC)

For counting somatic cells, the microscopic method was used. Milk film preparation, staining and counting were done according to the standards set by International Dairy Federation [9]. To obtain a uniform distribution of cells, milk samples were mixed by moving upside down gently 25 times and letting it to stand for 2 minutes to permit air bubbles and foam disappear. Microscopic slides were degreased with alcohol before milk film preparation. A 0.01ml of milk was taken with a 50µl micropipette calibrated at 10 and spread evenly over one cm² area on a microscopic slide and allowed to dry at room temperature on a leveled table. One cm² area was delineated by a template prepared from a cap board. Dried films were fixed with ethanol for 15 minutes. Stained with toluidine blue for 5 minutes and washed with tap water gently and allowed to dry in a dust free area. Stained slides were stored in slide box until counted. Using oil immersion objective those cell nuclei clearly recognizable and those at the periphery with more than 50% of the cell body in view were counted. Twenty fields were counted from given sampled milk. The number of cells per ml of milk was calculated by multiplying the average number of cells per field with Magnifications filed (Laboratory manual).

$$\text{Somatic cell per ml of milk} = \frac{\sum SCOperfield * 10,000}{0.0346 * 20}$$

Where $\sum SCOperfield$ = the summations somatic cell counted per each field

0.0346 = oil immersion calibrated
 20 = Total number of field counted

Physicochemical test

The chemical compositions of milk (fat, protein, and solid not fat) and physical characteristics (density and freezing point), of the milk samples were determined by Ekomilk analyzer (Bulgaria), according to manufacturer’s instructions. Milk samples were mixed gently 4-5 times to avoid any air enclosure in the milk. Then 25 ml samples were taken in the sample-tube and put in the sample- holder one at a time with the analyzer in the recess position. Then when the starting button activated, the analyzer sucks the milk, makes the measurements, and returns the milk in the sample-tube and the digital indicator (IED display) shows the specified results.

Data analysis

The data collected from the study area were entered into Micro-soft-Excel spreadsheet for managing the data and analyzed using SPSS version 20. Descriptive statistics like means, standard deviation and frequency distribution were used to describe the farming system characteristics in the study area. One-way ANOVA statistical analysis was used for comparison of the performance variation. The correlation statistical analysis was used to study the interaction between the farming system characteristics and the interaction between physicochemical and microbiology of raw milk sample.

III. RESULTS

The overall mean family size for all respondents was 5.63 ± 1.926 persons. The family size ranged from 2 to 12 people. Fifty two percent of the family members were male and the rest (48%) were female. The overall average livestock holding per household was 23.93± 11.755. The average family and herd size of the two districts namely Sululta and Wolmera pointed out by the respondents (Table 4).

Table 1. Average family size and herd in smallholder dairy farms in the study district.

Variable s	Sululta(N=90)	Wolmera(N=90)	Overall(N=180)
	Mean ±S. D	Mean ±S. D	Mean ±S. D
Family size	5.49±1.819	5.77±2.028	5.63±1.926
Male	2.88±1.211	3.04±1.469	2.96±1.346
Female	2.68±1.198	2.76±1.248	2.72±1.220
Livestoc k	25.22±12.382	22.63±11.009	23.93±11.755
Cattle	14.69±11.619	11.37±3.905	13.03±8.802
Lactating cows	4.57±4.316	3.38±1.427	3.97±3.260
Local cows	2.18±0.384	2.08±.278	2.13±0.336
Cross bred cow	4.28±0.450	4.32±.470	4.30±0.459
Sheep	5.92±4.238	6.66±4.490	6.26±4.356
Equines	1.80±0.924	2.16±1.256	1.97±1.105

S.D=standard deviations N=number of respondents

Cattle composition

Table 2 shows the size and composition of cattle owned by the smallholders in the study areas. All the surveyed smallholders owned on average 13.03 ± 8.802 (12.29 TLU) cattle. The average number of Lactating cows owned by the respondent farmers was 1.76±0.920 local or 1.76 TLU and 2.79±3.445 crossbred animals or 4.185 TLU. Cattle were the predominant species representing 84.3% of the total TLU. The smallholders prefer to have crossbred cows because of their greater milk production, even though they require high management and susceptible to disease than local breeds.

Table 2. Cattle herd size and composition in TLU in smallholder farms.

Variables	Sululta(N=90)		Wolmera(N=90)		Overall(N=180)	
	Mean ±S. D	TL U	Mean ±S. D	TL U	Mean ±S. D	TL U
Cattle	14.69±1.619	13.006	11.37±3.903	11.391	13.03±8.802	12.29
L.M. cows	1.68±0.837	1.68	1.83±0.993	1.83	1.76±0.920	1.76
C.M. cows	3.30±4.511	4.95	2.21±1.252	3.315	2.79±3.445	4.185
Calves	3.23±3.083	0.646	2.76±1.126	0.552	3.01±2.357	0.602
Heifers	2.78±3.131	1.668	2.16±1.094	1.296	2.47±2.359	1.482
Bulls	1.56±0.940	1.872	1.39±0.549	1.668	1.48±0.777	1.776
Oxen	2.19±0.518	2.19	2.73±1.166	2.73	2.48±0.956	2.48

S.D =standard deviation TLU= tropical livestock units N= number of respondents 1TLU=250kg of live weight of livestock, L.M. cows=local milking cows C.M. cows= crossbred milking cows

Milking and milk handling practices

Ninety four percent of the respondents of the study area were using plastic pail for milking and milk handling. Nearly 6% were using Stainless steel pail. Difficulties of using these utensils were difficult for cleaning (1.1%), accessibility in local markets (5%) and no problem of using these utensils (93.9%) were indicated by the respondents of the study area. Through group discussions with the participant of the study areas it was pointed out that all the respondents practice washing the utensils used for milking and milk handling. Commonly they were washing the milking utensils with warm water by using soap and finally allow drying till milking. In the study area cows are hand milked and calves are allowed to suckle their dams prior to as well as after milking. About 100% of the respondents in Sululta and Wolemera area pointed out that they milk their cows two times a day at morning and evening. They milked their cows at barn, where the animals are sheltered. As illustrates on Table 3, all respondents were washing their hands and vessels before milking. Seventy two percent of respondents were also washing udder before milking. Nearly 19% of the smallholders were using individual towels for cleaning udder of milking cows in 52.2% of the cases collective towels were used while in the rest (28.9%) no towel use was practiced.

Table 3. Observed milking practices in the study areas (N=180)

Variable	Frequency Yes		Frequency NO	
	Frequency	Percent	Frequency	Percent
Wash milkier hands and vessels	180	100.0		
Wash udder before milking	129	71.7	51	28.3
Wash udder before and after milking			180	100.0
Use of individual towels	34	18.9	145	80.6
Use of collective towels	94	52.2	86	47.8
No towel	52	28.9	128	71.1

Milk production and use aspects

Mean of Lactation length of crossbred and local milking cows were 9.72 ± 0.45 and 6.353 ± 0.7681 in Sululta, 9.68 ± 0.47 and 6.167 ± 0.5567 in Wolmera district respectively and overall mean of lactation length of crossbred and local milking cows were 9.7 ± 0.46 and 6.26 ± 0.6624 months respectively. Average daily milk yield of cross bred and local cows in Sululta were 9.56 ± 3.010 and 1.809 ± 0.4574 Liter/day respectively. Moreover, crossbred and local cows in Wolmera areas were 8.60 ± 2.703 and 1.96± 0.8193 liters/day respectively. Overall mean summery of daily milk yield at the study areas of crossbred milking cows (9.11 ± 2.902) and local milking cows (1.889 ± 0.6707) liters as shows on table 4.

Table 4. Average lactation length and daily milk yield of local and cross bred milking cow of small holder farmers.

Variables	Sululta(N=90)	Wolmera(N=90)	Overall(N=180)
	Mean ± S.D	Mean ± S.D	Mean ± S. D
Lactation length of local cattle in month	6.353± 0.7681	6.167 ± 0.5567	6.26 ± 0.6624
Lactation length of cross bred cows in month	9.72 ± 0.45	9.68 ± 0.47	9.7 ± 0.46
Average daily milk yield of local cows(/liter/day)	1.809± 0.4574	1.96± 0.8193	1.889 ± 0.6707
Average daily milk yield of	9.56 ± 3.010	8.60 ± 2.703	9.11 ± 2.902

cross bred cows(/lit/day)

S.D= standard deviations, N=number of respondents

Overall mean of milk producing, Processing, consuming and selling per day per household was 26.88±4.76, 1.23±1.603, 1.29±1.176 and 23.32±5.22 liters respectively (Table 5). The proportion of raw milk used for household consumption was

relatively small. As figure 1 illustrates, the major part of milk produced by smallholders is destined to market. Smallholders also process milk to butter and cheese. Milk was soured for 2-3 days before processing it in to butter and cheese. The one way of ANOVA analysis showed significance difference at (P<0.01) and (P<0.05) among the District from which the milk sample for milk produced and milk sold per day/liter.

Table 5. Milk production and partition in to different use categories at smallholder farm level.

Category/area of study	Mean ± S. D	95% CI	Df	F	P
Milk produced at Sululta farm/lit/day	28.01±3.135	27.35-28.67	1	10.762	0.001**
	Wolmera	25.74±5.756	178		
	Overall	26.88±4.76	179		
Milk processed/lit/day	Sululta	1.29±1.493	1	0.215	0.643
	Wolmera	1.18±1.713	178		
	Overall	1.23±1.603	179		
Milk consumed at home/lit/day	Sululta	1.43±1.272	1	2.534	0.113
	Wolmera	1.16±1.059	178		
	Overall	1.29±1.176	179		
Milk sold/lit/day	Sululta	24.11±4.67	1	4.245	0.041*
	Wolmera	22.52±5.631	178		
	Overall	23.32±5.22	179		

**P-value is significant at 0.01 levels S.D= standard deviation and CI = confidence interval df= degree of freedom F=F ratios P= P value

Milk marketing

Table 6 shows distance between production and market place. Nearly 54.9% of the households were nearby to the market center for their raw milk marketing while about 4% of the households travel more than 10 km.

Table 6. Distance of market center for milk in smallholder dairy farmer of study areas (N=175 households).

Distance of marketing place	Frequency	Percent
Less than 1 km (nearby)	96	54.9
Between 1 – 5 km (proximity)	70	39.9
Between 5 – 10 km (intermediate)	2	1.1
More than 10 km(far)	4	2.3

Milk sales outlet

The main outlets for raw milk identified as shows in (Table7) were Cooperatives, Processors, Vendor, Directly to Consumer and Hotels/restaurants 55.6%, 20.0%, 20.0%, 2.8% and 1.7% respectively.

Table 7 .Marketing channel of smallholder farmer of the study area.

Milk out let	Frequency	Percent
Cooperatives	100	55.6
Hotels/restaurants	3	1.7
Vendor	36	20.0
Processors	36	20.0
Directly to Consumer,	5	2.8

Raw Milk marketing constraints

Table 8 illustrates raw milk marketing constraints at specific study area. The respondent farmers indicated that, price variations (87.2%), lack of fair market (72.2%) and lack of demand (49.4%) during fastening were the major problem of raw milk marketing in descending order of importance.

Table 8. Descriptions of marketing problems of small holder at the study area

Constraints	Frequency Yes	Percent	Frequency No	Percent
price variations	157	87.2	23	12.8

Lack of fair market	130	72.2	50	27.8
Lack of demand during fastening	89	49.4	91	50.6

As shows on table 9 milk price decided by producer, processor and collector were 6.1%, 25%, and 68.9% respectively as ascending order. Additionally through group discussion almost the entire group member pointed out they have less /no power to decided milk price at the study area.

Table 9 Power of decisions in milk price

Decisions of milk price	Frequency	Percent
Producer	11	6.1
Processor	45	25
Collector	124	68.9

Quality based payment was also another raw milk marketing constraints of the study area. They indicated quality based payment was enhanced quality of milk supplied to processors at the same time as encouraging them to produce more and quality milk. Through group discussions of respondents in the sturdy areas pointed out they possessed less preserving facilities for surplus milk produced and demand especially during fasting were great influence on raw milk marketing. Additionally, they showed that less adopted technologies for enhancing shelf life of raw milk in the study areas.

Factors influencing milk production, consumption and marketing

Milk production was positively and significantly correlated with experience of raising cattle for milk productions, raw milk sold (P<0.01) and significantly correlated with distance of milk marketing (P<0.05). Milk sold was positively and significantly correlated with experience of raising cattle, milk productions and distance of milk sold (P<0.01). Milk consumption was negatively and significantly correlated with cattle herd size (P<0.01) (Table 10).

Table 10. Correlations among different characteristics of small holder dairy farmers

Variable	Family size	ERCMP	Cattle	MPF/day	MS/day	MC/day	DMP
Family size	1						
ERCMP	.149*	1					
Cattle	.124	.012	1				
MPF/day	.121	.375**	-.119	1			
MS/day	.085	.342**	-.146	.908**	1		
MC/day	-.006	-.160	-0.613**	.103	.091	1	
DMP	-.155*	.232**	.235	.175*	.284**	-.080	1

*correlation is significant at the 0.05 level and **highly significant at the 0.01 level ERCMP=experience of raising cattle for milk productions, MPF= milk produced at farm, MS= milk sold, MC= milk consumed and DMP= distance of marketing place.

Physicochemical and microbiological quality of milk

The average chemical compositions of milk for fat (%), protein (%) and solids not fat (%) content were 3.6043 ± 0.12200 , 2.9749 ± 0.05147 and 6.9992 ± 0.13452 in raw milk samples mixture from producer respectively. Additionally, the mean of milk chemical compositions for fat (%), protein (%) and solids not fat (%) content were 3.3243 ± 0.15814 , 2.8929 ± 0.08510 and

6.7114 ± 0.24844 in raw milk samples mixture from collector respectively. The average physical properties of milk sample indicates on (Table 11) with density, freezing point 1.02721 ± 0.000477 and -0.47143 ± 0.00774 in raw milk sample from producer; 1.02623 ± 0.000874 and -0.45788 ± 0.016510 in raw milk sample from collector respectively.

Table 11. Physicochemical properties of milk at farm and collection points in study area.

Variables and category		N	Mean ± Std. Error	95% CI
Fat (%)	Producer	49	3.6043 ± 0.12200	3.3590 - 3.8496
	Collector	7	3.3243 ± 0.15814	2.9373 - 3.7112
	Overall	56	3.5693 ± 0.10892	3.3510 - 3.7876
Protein (%)	Producer	49	2.9749 ± 0.05147	2.8714 - 3.0784
	Collector	7	2.8929 ± 0.08510	2.6846 - 3.1011
	Overall	56	2.9646 ± 0.04621	2.8720 - 3.0572
SNF (%)	Producer	49	6.9992 ± 0.13452	6.7287 - 7.2696
	Collector	7	6.7114 ± 0.24844	6.1035 - 7.3193
	Overall	56	6.9632 ± 0.12175	6.7192 - 7.2072
Density	Producer	49	1.02721 ± 0.000477	1.02625 - 1.02817
	Collector	7	1.02623 ± 0.000874	1.02410 - 1.02837
	Overall	56	1.02709 ± 0.000432	1.02622 - 1.02795
Added water (%)	Producer	40	14.4087 ± 1.45661	11.4625 - 17.3550
	Collector	7	14.2700 ± 3.05519	6.7942 - 21.7458
	Overall	47	14.3881 ± 1.30856	11.7541 - 17.0221
Freezing point	Producer	49	-0.47143 ± 0.00774	-0.4870 - (-0.4559)
	Collector	7	-0.45788 ± 0.016510	-0.4983 - (-0.4175)
	Overall	56	-0.46974 ± 0.007066	-0.4839 - (-0.4556)

S.E = Standard error, C.I = confidence interval N= number of sample

The overall Average of microbiological count of log (TBC cfu/ml), log (CC cfu/ml) and log (SCC/ml) of raw milk was 8.2577 ± 0.10499, 3.3210 ± 0.11295 and 5.0806 ± 0.08484 for milk sample from the producer; 8.2577 ± 0.10499, 3.3400 ± 0.10352 and 5.1205 ± 0.07533 for milk sample from collector respectively (Table 12).

Table 12. Microbiological quality of milk at farm and collection points in study area.

Variables and category		N	Mean ± Std. Error	95% CI
log(CC/cfu/ml)	Producer	49	3.3210 ± 0.11295	3.0939 - 3.5480
	Collector	8	3.4569 ± 0.26971	2.8191 - 4.0946
	Overall	57	3.3400 ± 0.10352	3.1327 - 3.5474
log(TBC/cfu/ml)	Producer	44	8.2572 ± 0.11195	8.0314 - 8.4830
	Collector	8	8.2601 ± 0.31391	7.5179 - 9.0024
	Overall	52	8.2577 ± 0.10499	8.0469 - 8.4684
log(SCC)	Producer	47	5.0806 ± 0.08484	4.9098 - 5.2513
	Collector	8	5.3548 ± 0.11766	5.0766 - 5.6331

Overall	55	5.1205 ± 0.07533	4.9694 - 5.2715
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Log=logarithm in base ten (normal logarithm), CC=coli form count, SCC=somatic cell count, TBC= total bacterial count, cfu=colony forming unit per ml of milk sample, S.E = standard error, C.I = confidence interval

The overall mean of chemical compositions of milk for fat (%), protein (%) and solids not fat (%) contents were 3.5693 ± 0.10892, 2.9646 ± 0.04621 and 6.9632 ± 0.12175 in raw milk sample mixture from the two districts respectively. Additionally the overall mean of physical properties of milk sample indicates on (Table 13) with density, freezing point 1.02665 ± 0.00061 and -0.47088 ± 0.0070 in raw milk sample from the two districts. The ANOVA showed significance difference (P< 0.05) due to the source area of raw milk samples for fat, protein and freezing point. Moreover, ANOVA showed highly significance difference at (P<0.01) due to the source area of raw milk samples for solid not fat.

Table 13. Physicochemical properties of milk for the two districts.

Variable		N	Mean ±Std. Error	95% CI	Df	F	P
Fat (%)	Sululta	27	3.3185 ±0.13027	3.0507 - 3.5863	1	5.32	0.025*
	Wolmera	29	3.8028 ±0.16215	3.4706 - 4.1349	54		
	Overall	56	3.5693 ±0.10892	3.3510 - 3.7876	55		
Protein (%)	Sululta	27	2.8485 ±0.05218	2.7413 - 2.9558	1	6.46	0.014*
	Wolmera	29	3.0728 ±0.06985	2.9297 - 3.2158	54		
	Overall	56	2.9646 ±0.04621	2.8720 - 3.0572	55		
SNF (%)	Sululta	27	6.6307 ±0.14321	6.3364 - 6.9251	1	7.80	0.007* *
	Wolmera	29	7.2728 ±0.17720	6.9098 - 7.6357	54		
	Overall	56	6.9632 ±0.12175	6.7192 - 7.2072	55		
Density	Sululta	27	1.02593 ±0.00051	1.02488 - 1.02698	1	1.27	0.266
	Wolmera	30	1.02730 ±0.00105	1.02514 - 1.02945	55		
	Overall	57	1.02665 ±0.00061	1.02544 - 1.02787	56		
Added water	Sululta	26	15.4562 ±1.80236	11.7441 - 19.1682	1	0.82	0.37
	Wolmera	21	13.0657 ±1.90496	9.0920 - 17.0394	45		
	Overall	47	14.3881 ±1.30856	11.7541 - 17.0221	46		
Freezing point	Sululta	27	-0.45456 ±0.00987	-0.47485 - (-0.43428)	1	5.21	0.026*
	Wolmera	30	-0.48557 ±0.00934	-0.50468 - (-0.46647)	55		
	Overall	57	-0.47088 ±0.0070	-0.48498 - (-0.45679)	56		

** highly significant at the (P<0.01) and* is significant at the (P<0.05) level.
S.E = standard error, C.I = confidence interval, Df= degree of freedom p= p value

The overall mean of microbiological count of log (TBC cfu/ml), log (CC cfu/ml) and log (SCC/ml) of raw milk was 8.2285 ±0.10041, 3.3363 ±0.10010 and 5.1622 ±0.07382 for milk sample from the two districts respectively (Table 14). The ANOVA

showed significance difference at (P<0.01) due to the source area for log (TBC cfu/ml)

Table 14. Microbiological quality of milk for the two districts of study area

Variable	N	Mean ±Std. Error	95% CI	Df	F	P
log(CC/cfu/ml)						
Sululta	30	3.3925 ±0.14411	3.0978 - 3.6873	1	.302	0.585
Wolmera	31	3.2819 ±0.14074	2.9944 - 3.5693	59		
Overall	61	3.3363 ±0.10010	3.1361 - 3.5365	60		
log(TBC/cfu/ml)						
Sululta	27	7.9548 ±0.12902	7.6896 - 8.2200	1	7.774	0.007**
Wolmera	29	8.4834 ±0.13799	8.2008 - 8.7661	54		
Overall	56	8.2285 ±0.10041	8.0273 - 8.4298	55		
log(SCC)						
Sululta	28	5.2643 ±0.10299	5.0530 - 5.4757	1	1.753	0.191
Wolmera	31	5.0699 ±0.10406	4.8573 - 5.2824	57		
Overall	59	5.1622 ±0.07382	5.0144 - 5.3099	58		

** Highly significant at the (P<0.01).

Log=logarithm in base ten (normal logarithm), CC=coli form count, SCC=somatic cell count, TBC= total bacterial count, cfu=colony forming unit per ml of milk sample, S.E = standard error, C.I = confidence interval

Relationship among and between physicochemical and microbiological test of Milk

Milk protein was positively and significantly correlated with fat, solid not fat and density of milk (P<0.01) and significantly correlated with each other (P<0.01). Milk protein was

negatively and significantly correlated with added water and freezing point. Fat, solid not fat (SNF) and density of milk were also negatively and significantly correlated with added water and freezing point (P<0.01) (Table 15).

Table15. Correlations among different characteristics of physicochemical and microbiological test of milk from selected area of small holder dairy farmers

Milk	Fat (%)	Prot. (%)	SNF	Density	AW	Fp	log(CC)	log(TBc)	log(SCC)
Fat (%)	1								
Prot. (%)	.671**	1							
SNF	.624**	.977**	1						
Density	.565**	.969**	.997**	1					
AW	-.562**	-.951**	-.984**	-.976**	1				
Fp	-.634**	-.918**	-.942**	-.529**	1.000**	1			
log(CC)	-.148	-.062	-.068	-.141	.089	.053	1		
log(TBC)	.138	.075	.070	.030	-.066	-.081	-.075	1	
log(SCC)	.068	.075	.074	.001	-.228	-.127	-.097	.005	1

** . Correlation is significant at the (P< 0.01) level.

SNF= solid not fat, AW= added water, Fp= freezing point, log (CC) = logarithms of Coli form count, log (TBC) =logarithms of total bacterial count and log (SCC) = logarithms of somatic cell count.

IV. DISCUSSION

The overall mean family size obtained in the present study for all respondents was 5.69 ± 1.87 person's less than those reported by [10] for Girar Jarso (5.77 persons) and by [11], 6.12 persons per house hold at kuyu wored. The family size ranged from 2 to 12 persons at the study area which is comparable with the report of [12] that family size ranged from 1 to 13 persons in Addis Ababa. About 78.9% of the households were basic educations and above in this study. This value is by far higher than the report of [13] for Gondar area (38.5%). This is mainly indicate that the education coverage between the study areas were different.

The cattle herd size of the study area was 12.27 TLU. The work of [14] indicated that the cattle herd size at Bilalo and Lemmu areas are 8.57 TLU and 10.38 TLU respectively .In the present study area the cattle herd was dominated by crossbreds that results in larger TLU cattle herd size as compared with Bilalo and Lemmu of Arsi area.

The present study also showed that milk production was positively and significantly correlated with experience of raising cattle for milk productions, raw milk sold ($p < 0.01$) and significantly correlated with distance of milk marketing ($p < 0.05$). Whereas the family sizes were not correlated with cattle herd size. On contrast finding reported by [12] and [14] indicated that family size and cattle herd size were positively and significantly correlated. This variations may be due to hired labor was means of overcoming family labor resource.

The average milk yield of cross bred cows in the study area was 9.11 ± 2.902 litres per day, which was comparable with average milk yield of 10 liters reported by [15- 17] Moreover, the average milk yield of local cows was 1.889 ± 0.6707 which was comparable with reported by [18] indicated that the overall average daily milk yield of local cows in the first and second lactations in North Gonder Zone was 1.69 and 1.86 liters, respectively.

The overall average lactation length of local and crossbred cows was 6.26 ± 0.6624 and 9.7 ± 0.46 months, respectively in the study area. The lactation length of the indigenous cows observed

in this study is comparable with the national average of 7 months [19]. The lactation length in crossbred cows observed in this study is shorter than the lactation length of 11.7 months reported for crossbred cows in the central highlands of Ethiopia [20]. The variation in lactation length in the present study may be credited to feed shortage and poor genetic potential of the sample population.

Overall mean of milk producing, Processing, consuming and selling per day per household was 26.88 ± 4.76 , 1.23 ± 1.603 , 1.29 ± 1.176 and 23.32 ± 5.22 liters respectively. Eighty six point seven percent (86.77%) of the milk produced in the area was sold by the producer through different channels. Amount of milk processed, consumed and used for calves was 4.6%, 4.8% and 3.84% respectively. This study is inconsistent with study conducted around Addis Ababa indicated that from total milk production 73% is sold, 10% is left for household consumption, 9.4% goes to calves and 7.6% is processed into butter [21].

Marketing channels are routes through which products pass as they are moved from the farm to the consumer. From this study the main outlets for raw milk identified were cooperatives, processors, vendor, directly to consumer and hotels/restaurants. These are consistent with the result in any marketing system various actors participate in marketing of commodities and process of transactions made. These include itinerate /mobile traders, semi-whole sellers, retailers, cooperatives and consumers as reported by [22]. Collectors collect the milk from the small holder and commercial dairy producers, they sale it to retailers, hotels, restaurants and processors. There exist two types of collectors in the milk value chain. Cooperative collection centers are a formal collectors organized by the bureau of agriculture in their respective districts. They have members of small holder dairy producers which supply daily produce of milk in order to supply to the larger processors in Addis Ababa markets. In addition to collecting from cooperative and individual collectors, larger processors are also collect milk from smallholder farmers giving them additional cents over a liter of milk than other collectors. This condition had negative effect on cooperative collection centers and mutual agreement and win-win approach should be followed among all the actors involving milk supply chain.

Among constraints of milk marketing, price variations, Lack of fair market and Lack of demand during fastening were the most indicated ones. The current study agreed with the report by [23] for Kenyan highlands inaccessibility of fresh milk marketing. Through group discussion almost the entire group member pointed out they have less /no power to decided milk price at the study area. Quality based payment was also another raw milk marketing constraints of the study area. They indicated quality based payment was enhanced quality of milk supplied to processors at the same time as encouraging them to produce more and quality milk. Finally, milk marketing constraints were possessing less preserving facilities for surplus milk produced and demand especially during fasting were great influence on raw milk marketing.

Nearly 19% of the smallholders were using individual towels for cleaning udder of milking cows in 52.2% collective towels were used while in the rest (28.9%) no towel use practiced. It was reported by [24] that pre-milking udder preparations play an important part in the contamination of milk during milking. Most of the dairy owners did not use towel and a few dairy owners used a single towel for all cows commonly to dry the udders. The reuse of towel for cleaning and sanitizing may result in recontamination of the udder. Since drying was not or in sufficiently practiced, contamination level of milk was becoming higher.

The overall mean fat percentage (3.5693 ± 0.10892) of whole milk collected from the smallholder farmers in the current study is less than the fat content of whole milk collected from smallholder farmers reported by [25] for eastern Wollega (6.05%) and also slightly less than reported by [23] for Bahir Dar Zuria (4.14%). The variation in fat percentage observed in the present study may probably due to variation in stage of lactation, feeding regime and parity. The overall mean protein (2.9646 ± 0.04621) content from bulk milk obtained in the current study is lower than those reported by O'Connor (1994) for local cows' milk and also lower than [26] for whole milk in the central highlands of Ethiopia (3.1%). The average SNF (6.9632 ± 0.12175) content of milk obtained in the current study is slightly lower than reported by [22] for eastern Wollega (8.22%).

The overall mean total bacterial count of cows' milk produced in the study area was $8.2285 \log_{10} \text{cfu/ml}$. The total bacterial count obtained in this study is generally high as compared to the acceptable level of 1×10^5 bacteria per ml of raw milk [27] The current study is consistent with [28] reported that the minimum and maximum total bacterial count of raw cows' milk produced in southern region to be 6 to $8.8 \log_{10} \text{cfu/ml}$. Commonly, lack of knowledge about clean milk production and use of unclean milking equipment would be some of the factors which contributed to the poor hygienic quality of milk produced in the study area.

The overall mean coliform count of milk produced in the area was $3.3363 \log_{10} \text{cfu/ml}$. The coliform count of cows' milk obtained in the current study is smaller than with reported by [26] for districts of southern region ($3.8 \log_{10} \text{cfu/ml}$). The current result is also inconsistent with the reported by [29] for cows' milk collected from different producers in the central highland of Ethiopia ($6.57 \log_{10} \text{cfu/ml}$). The higher coliform count obtained in this study may be due to the initial contamination of the milk samples either from the cows, the milkers, milk containers and the

milking environment. The overall mean of somatic cell count in log (SCC/ml) of raw milk was 5.1622 ± 0.07382 for milk sample from the two districts.

V. CONCLUSIONS

Dairy production became a crucial element of the farming activities and income generating for household in "Sululta" and "Wolmera" district of Oromia special zone surrounding Addis Ababa.

The proportion of raw milk used for household consumption was relatively small and the major part of milk produced by smallholders is destined to market. Smallholders also process milk to butter and cheese. Milk was soured for 2-3 days before processing it in to butter and cheese. The main outlets for raw milk identified were cooperatives, processors, vendor, directly to consumer and Hotels/restaurants. Price variations, lack of fair market, lack of demand during fastening, lack of quality based payment and lack of preserving facilities were the major problem of raw milk marketing in the study areas.

Hygienic conditions of milking and storage processes, transferring of milk into different containers and sieves, unclean milk equipment were basic determinants of milk quality. Majority of raw milk samples from producer and collector bulk milk sample had higher TAPC and coliform counts, which was higher than the international acceptable limits.

VI. CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

VII. ACKNOWLEDGMENT

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Research Methodologies: Increasing Understanding of the World

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Abstract: *Though there are similarities concerning qualitative and quantitative research methodologies, both have distinguishing fundamental ontological and epistemological perspectives that are unique to their respective research design. When contemplating a methodological approach in order to answer a research question, qualitative and quantitative methodologies are not mutually exclusive. Though the characteristics of each methodology are distinct, their corresponding qualities add to their rigor, and both methodologies have the capacity to inform one another in order to generate, test, and confirm theory. To illustrate this, a qualitative collective case study and a quantitative survey research method are examined. The application of each design is considered to the extent of their usefulness in attaining a comprehensive understanding of complex phenomena. Finally, implications for future research are also offered.*

Keywords List: *Research Methods, Qualitative Research, Quantitative Research, Research Design, Collective Case Study, Survey Research*

Goodness of Fit in Research Design

A standard research design is not a reality and would not produce accurate results. The variation in research design facilitates the determination concerning which methodology best suits the research situation. The investigator must decide which methodology best addresses the research question under investigation. There are clear and defined operations for both qualitative and quantitative research by which the researcher must adhere in an effort to employ a rigorous investigation which enables accurate findings and produces authentic results grounded in the data (Breakwell, Hammond, Fife-Schaw, & Smith, 2010; Leedy & Ormrod, 2010; Trochim, 2001). This article describes the key characteristics distinguishing qualitative and quantitative research design, considers the application of each design with a representative methodology, and evaluates the representations for their usefulness to gain a comprehensive understanding of phenomena.

A Synopsis of Two Grand Camps

Investigating Reality

Qualitative and quantitative methodologies use diverse approaches when investigating phenomena and addressing research problems. In scientific investigation, the researcher determines whether the research problem and the resulting research question will focus on a description, an explanation, or increase understanding of an experience. When this is the case, the investigator might choose a qualitative inquiry. If the investigation necessitates objective statistical measures, characterizes operationally defined variables, and likely utilizes a structured environment, then a quantitative inquiry might be more fitting. A question to consider when deciding the best methodological fit for an investigation is: Will the focus necessitate an emergent technique discovering the salient variables revealed through data interpretation? Will it require a flexible strategy or one which is measured or controlled? This decision will help identify which methodology might be the best fit to answer the research question (Trochim, 2001).

Qualitative and quantitative studies have many corresponding qualities which enhance the field through rigorous research design. First, the researcher begins with the identification of a research problem or an area of concern in practice, theory, or scholarly literature (Sacred Heart University Library, 2018). Then, the researcher develops a research question in order to address the research problem and guide the investigation. Next, the researcher states the purpose of the study and identifies the data to be examined in an effort to answer the research question. Regardless of the methodology utilized, the researcher investigates phenomena, collects, analyzes, and interprets data, and meets rigorous scientific standards of inquiry. The researcher shows how each investigation is applicable to the field and how the findings might advance scientific knowledge. Though there are many similarities between qualitative and quantitative methodologies, the selection of an appropriate research design depends upon the research question, the goal of the research, and the way in which the research will be carried out. The identification of an appropriate strategy to answer the

research question will depend on a rigorous design in order to yield credible results (Breakwell, Hammond, Fife-Schaw, & Smith, 2010).

Though there are many similarities between methodologies, each is concerned with different procedures and results. Qualitative research is naturalistic and data collection culminates with a large amount of raw data text for the identification of similar elements concerning the phenomena within each data set, and commonalities of elements across data sets leading to theoretical saturation. This process highlights data for interpretation, and then data analysis is employed to generate assertions (Gavin, 2008). Quantitative inquiry is often controlled and amenable to a well-defined context. It attempts to generate raw data scores and employs statistical analysis to identify a numerically average experience. Quantitative research is concerned with generalizability and reliability. Generalizability implies that the results are relevant concerning the larger population and reliability refers to the generation of the same results across multiple inquiries. Qualitative research is concerned with transferability and credibility. Transferability considers the context of the research and the capacity of the results to apply beyond the conditions in which the study conducted. Qualitative research looks at the individual experience and identifies the idiosyncratic perception of the experience within its context in an effort to induce transferability to diverse contexts (Gavin, 2008). One who attempts transferability of qualitative results must evaluate the context of the research and determine if the results are transferable to another context (Yin, 2012). Credibility concerns the substantiation of the results from the perspective of the participant with the exception of research that does not utilize participants. In such instances a hermeneutic perspective might be employed. This perspective is one in which the interpretation of the text is agreed upon within a community of interpreters. The meaning of the interpretation is negotiated and accepted through consensus of a knowledgeable research community (Schutt, 2018). Gaining in-depth insight from the perspective of the participant is vital regarding credibility, except in the absence of study participants. In this circumstance community validation is essential and it is through this lens that the credibility of the investigation is determined. Though many similarities and differences exist between qualitative and quantitative inquiry, the differences between the methodologies allows for one methodology to inform the other which is conducive to a more thorough understanding of phenomena (Patton, 2002; Trochim, 2006).

The utilization of diverse methods to address the research problem employ varied approaches (Patton, 2015). Common data collection procedures in qualitative inquiry typically employ (a) interviews with a sample of participants related to the research topic, (b) direct observations of human actions or an environment, (c) archival records of primary sources that have been collected and stored prior to the investigation, (d) documents illuminating social organization, (e) artifacts depicting physical culture, and (f) participant-observation wherein the researcher becomes a participant in the group of study in order to make observations from the "inside" (Atkinson & Coffey, 2004; Kawulich, 2005; Sadana & Omasta, 2018; Yin, 2012). Qualitative inquiry produces raw data texts and when participants are utilized, the researcher records the perspective of each and closely examines the setting in which data were collected (Schutt, 2018). The researcher identifies impressions from the data and ascertains the meaning of the experience. The investigation relies on the insight of the researcher to analyze and interpret the extensive data collected through which they will answer the research question. Quantitative inquiry employs researcher detachment when administering research measurement tools and objectivity when analyzing research data producing research results. Quantitative research looks at the representative sample as a whole and identifies norms and ranks of observations by which to predict, explain, or understand phenomena concerning the deduction of generalizability to individuals within the larger population. The ontological (what is reality?) and epistemological (how do we know reality?) debate need not influence the choice of methodology for an investigation. Patton (2002) advocates for a pragmatic view concerning research methodologies, asserting that the researcher be sensitive to the research situation, giving rise to the approach which best answers the research question. The researcher need not be influenced by any orientation, prejudice, or comfort level when choosing a methodology for an investigation (Patton, 2015; Trochim, 2001).

Qualitative and quantitative methods employ scientific standards to advance the scientific knowledge base. The qualitative research design adds to the scientific knowledge base by describing, understanding, and explaining phenomena and may identify elements that are pertinent for statistical testing in subsequent research (Tellis, 1997). The qualitative research design emphasizes the discovery of salient information, allows the participant a voice, and acknowledges the variation of perspectives. The qualitative research design focuses on the context of experience, builds outward towards general patterns, discovers the multiple perspectives of reality, and discovers emerging topics of importance which might be utilized for further investigation. Qualitative approaches assume that actions cannot be separated from context because action cannot be understood outside of the setting (Casey & Houghton, 2010). Qualitative inquiry utilizes fewer participants and collects more data (Schutt, 2018) in the natural setting to execute an in-depth investigation into subjective reality. Quantitative research designs are typically controlled, use measures to define reality, investigate the many to make predictions regarding the individual, and seek to identify the overall reality concerning experience. The selection of a large representative sample allows the proposed statistical analysis to detect the relationships and effects which the investigation might seek. Quantitative inquiry assumes that a larger sample size will better generalize the results of the inquiry to the broader population (Leedy & Ormrod, 2010).

The instruments utilized in both types of approaches have assumptions associated with administration. Quantitative inquiry customarily starts with a hypothesis and employs measures to focus on testing established theory with confirmatory or predictive research questions. It focuses on detached and objective processes by which to gain an understanding of phenomena under investigation. The setting might be controlled and separate from the participant context, such as a laboratory that is utilized for testing and controlling external influential factors in consideration of answering the research question. It assumes that an attachment of the researcher with the investigation or the participants might bias the outcomes and yield invalid results. The qualitative research design relies upon the researcher's subjective perspective concerning the research problem. The investigation unfolds in the natural setting in

which the researcher interacts with the study elements and might employ interviews to gain insight into the participant perspective of intricate phenomena. The investigator is the tool of measure within qualitative investigation, and the outcomes rely on skill and insight looking through the lens of subjective reality. Qualitative investigation assumes that objectivity is a barrier to understanding the phenomena under investigation and the only way one can truly know the experience is through a subjective awareness and an empathic view of the context concerning the experience. Though each methodology is useful when investigating phenomena, the sequential arrangement of approaches in which one methodology follows the other in a cycle of administration utilizing diverse assumptions allowing researchers to gain increased insight concerning entangled phenomena might be optimal (Gavin, 2008).

Thus far, the discussion has focused on qualitative and quantitative research; however the use of the one does not exclude the use of the other. One may decide that a mixed methods design offers a more inclusive approach to understanding phenomena under investigation by utilizing both of the methodologies in a single study. For example, a qualitative researcher might count the number of times a particular category is identified within the investigation. This strategy utilizes a quantitative approach within a qualitative design. Conversely, a quantitative researcher may want to collect data concerning the perception of participants to the treatment in the experiment. This strategy utilizes a qualitative approach within a quantitative design. The mixed methods design facilitates a more comprehensive understanding of phenomena under investigation by employing both a qualitative and a quantitative strategy within a single inquiry. This paper does not focus on any particular approach, but emphasizes a sequential, or cyclical, methodological approach to research in general, where one investigation informs another, whether it is a qualitative methodology or a quantitative methodology or a combination of the two in a mixed methods design. This work advocates for further investigation concerning accepted or established research results in the scientific literature, in an effort to gain added insight concerning complex phenomena in a progressive climate. No investigation, no matter what methodology is employed, will offer comprehensive, on-going understanding concerning the research problem and its evolution. Investigating the intricacies of experience relies on various approaches to develop and refine theory without bias to any particular methodology in an effort to elaborate upon initial findings.

Representative Methodologies

Qualitative Collective Case Study

According to Saldana (2013), qualitative investigation begins with the formulation of either an epistemological research question that allows the investigator to increase understanding of phenomena (What does it mean to be a parent?) or an ontological research question that captures the idiographic reality of the participant (What is the lived experience of adults with depression?). Through the course of the investigation, the researcher collects data from multiple sources and seeks interpretation of reality through data texts. The qualitative methodologies are naturalistic and emergent utilizing the data collected to discover the salient information in the investigation. The investigator does not determine the variables of importance before data collection. When utilizing interviews, the participants reveal their subjective salient variables in the natural setting which allows the research to unfold using the investigator as the research instrument. No matter which type of research question the investigator examines, the researcher must rely on personal skill and creativity, while employing *epoche*, for data analysis and the interpretation of the data. The process of qualitative inquiry is subjective and relies on the experience and orientation of the investigator in pursuit of crafting a narrative in which artistic ability meets scientific rigor (Trochim, 2001).

A qualitative case study is concerned with exploring a bounded system within a defined period of time (Stake, 1995). The case is easily recognized and separated from other cases by the boundaries established, either as a single case or as a collective case for study. The researcher utilizing the collective case study approach identifies a research problem and forms a research question. The research problem and the research question identify the key phenomena under investigation. The research question guiding the case study is concerned with “What is the experience of...?” and identifies an activity, event, or program which is poorly understood or investigates changes in the case over time. The researcher acquires a purposive sample of participants that have the information sought by the inquiry within the bounded system. The recommended number of sample participants for a single case study is one, and eight to 12 for a collective case study (Patton, 2002). However, there is evidence for either more or fewer participants in a collective case study because the number of participants in a collective case study is not prescriptive and sampling continues until data saturation is reached and theme identification and within- and across-case analysis can be employed (Yin, 2009). The weakness of utilizing a small number of participants in any study has limitations for generalizability to the larger population. The case study is not concerned with generalizability and must be viewed as exploratory and in light of confirming or conflicting results from other investigations (Baxter & Jack, 2008).

The case study investigation might utilize multiple forms of data collection, depending on the case for study. Data collection in collective case study may include observations, which include field notes; interviews, which are audio-taped and transcribed; written documents, such as diaries or journals of study participants; and audiovisual material such as video diaries of study participants. The case determines the types of data necessary for the investigation to answer the research question. The researcher interacts with the participant in the natural setting and dedicates an extended period of time recording the rich description of the setting and factors surrounding the case. The detailed description of the social environment and cultural climate, extracted from multiple sources of data collection, allows the audience to determine the similarities in study conditions and judge the degree of transferability to diverse situations (Creswell, 2007; CSU, 2018; Patton, 2002; Stake, 2010).

The data analysis portion of collective case study research is guided by a strategic process yielding credible results. Stake's (1995) formulation of the case study in his work *The Art of Case Study Research* outlines the data analysis phase of the case study investigation in which data analysis starts with a detailed description of the case as a whole. Then, the researcher employs direct interpretation, drawing meaning from single instances, without comparisons with other cases. After that, meaning-rich instances aggregate into categories of meaning. Following that, within-case analysis identifies themes by analyzing the categories. In a collective case study, data analysis begins with each case as an analysis unto itself. Then, the researcher engages across-case analysis, identifies similarities in the cases, and then makes assertions about the integrated meaning of all of the cases examined. The culmination of case study research depends on data convergence, answers the research question, and offers lessons learned through the process of the investigation. The data analysis phase of case study research is subjective and dependent on the experience and skill of the researcher, and facilitates a dependable and credible inclusive understanding of the elaborate phenomena under investigation (Baxter & Jack, 2008).

Case study investigation is a qualitative approach allowing the investigator to discover salient information about interwoven phenomena within the context of the experience from the perspective of the participant (Tellis, 1997). The case study concerns itself with experience, identifying emerging themes, utilizing researcher interpretation of the data, engaging dependable and credible data analysis, and ultimately asserting the lessons learned from the case. The rich in-depth description of the case context allows the consumer of the research to determine the transferability of the case study outside of the setting in which it was conducted (Stake, 2006). As previously noted, qualitative and quantitative research may cooperate to facilitate the investigation of phenomena. For example, a qualitative inquiry might be used to identify the salient variables as elements of phenomena, and then might inform a quantitative investigation in an effort to test the variables for saliency, and generalize the findings to the larger population. As an illustration, survey research has the capacity to inform the case study in the cycle of understanding in regard to generating, confirming, and testing theory. The use of both methodologies in sequential, or cyclical, investigation may reveal a broader understanding of phenomena over any single inquiry (Creswell, 2007; Leedy & Ormrod, 2010; Patton, 2002; Trochim, 2001).

Quantitative Survey Research

There is a diversity of approaches in which to generate, confirm, and test theory. Within quantitative research there are multiple approaches to choose how best to address the research problem and answer the research question. When choosing a quantitative approach some points to consider are: Will the research method address participant attitudes or experience? Will the research need to compare groups? Will the research measure a change over time? Does the research seek to identify relationships between variables? These questions will help the researcher identify the quantitative design most appropriate to answer the research question. The survey research design is examined because of its focus on description and the normative participant experience. When utilized following a collective case study design the qualitative inquiry informs the quantitative investigation in an effort to develop and refine theory. Collective case study investigation identifies the idiosyncratic reality pertaining to experience and survey research identifies the collective reality proceeding from experience. Both approaches are useful in scientific investigation and inform the scientific knowledge base (Breakwell et al., 2010).

Survey research is a conventional quantitative approach investigating opinions, attitudes, or experiences of one or more groups of people. A survey might be administered to describe how safe people feel when using social media. The characteristics of the inquiry are pre-determined and the participants respond to the categories for testing in an interview or on a questionnaire. The responses are then tabulated. The survey research approach utilizes a large representative sample of participants to learn about the broader population. The researcher chooses the administration method of meticulously constructed survey questions and gathers responses from the selected sample of volunteers, and through statistical indexes draws inferences about the relevant wider population. The survey research design is a fairly straightforward structure; however, carrying out the process is rigorous and painstaking in an effort to reduce bias and increase accuracy of the results (Gavin, 2008).

There are multiple domains which classify survey research: descriptive, analytical, and evaluative. When choosing a survey research design one must consider the purpose of the research. Descriptive survey research seeks to draw conclusions about features in the wider population. Analytical survey research highlights the trajectory of detected effects of one variable on another. Evaluative survey research determines the influences of factors for change. Survey research is a non-experimental method and does not separate participants into control and treatment groups for comparisons or manipulate applications. Survey research is focused on learning about and describing the larger population. This is accomplished by the researcher administering a survey for the collection of responses from the representative sample and drawing inferences about the broader population (Kelley, Clark, Brown, & Sitzia, 2003).

Though the defined process of conducting survey research is rigorous and allows for reliability and validity, the researcher must be cognizant of the limitations of this design. Limitations associated with this research include: the previous identification of categories, participants must respond with the best fit from available response items, statistical analysis constrains and defines the types of inferences which can be drawn, focusing on particular categories of inquiry may result in simultaneous categories being missed, and a large sample is necessary for distinguishing relationships and effects through statistical analysis. This approach looks at one moment in time from which to collect data and extrapolate the findings to the larger population. It assumes that the results are generalizable over longer periods of time concerning ongoing activities. Survey research allows the researcher to generalize the results to the larger population and offers supposition from which to conduct further research for more accurate results, over longer

periods of time, with on-going activity, and within a changing world. There are limitations to consider when employing a quantitative methodology including survey research regarding the expectation of generalizability and the findings (Leedy & Ormrod, 2010).

The limitations of any research project must be addressed in an effort to reduce bias and determine the accuracy of the research findings. For example, the recent use of conventional large-scale, on-line surveys are not amenable to exhaustive assessment concerning participant inclusion and exclusion criteria in the acquisition of a representative sample (Ausderau, Furlong, Sideris, Bulluck, Little, Watson, Boyd, Belger, Dickie, & Baranek, 2014). This depicts limitations regarding fraudulent surveys wherein survey takers might take several surveys under different identifiers for whatever reason. Survey research conducted online does not offer the most secure setting for the collection of data. Another limitation of survey research is the *self-report* tool for data collection. The challenge of self-reports present as response bias; each participant may answer the survey questions in a way that they think the researcher wants them to answer, the participant may not remember accurately, or their responses may be hasty due to never having thought about the questions before the survey. Whatever the reason, self-reports are not the most valid measure however, the use of online surveys and self-reports offers the researcher a point at which to start and move forward with further investigation. There are limitations that exist regarding all research methods and with reference to survey research specifically. However, survey research allows investigators the opportunity to increase understanding of phenomena, examine a premise, build the knowledge base, and develop a trajectory for further inquiry concerning theory (Breakwell et al., 2010).

Qualitative and quantitative methodologies have similarities and differences with respect to conducting research. The collective case study allows the experience of the participant to be heard, identifies variations in reality, utilizes the subjective skill and creativity of the researcher, identifies emergent themes and patterns of salient information, and develops or refines theory (Crowe, Cresswell, Robertson, Huby, Avery, & Sheikh, 2011). Survey research starts with the identification of the characteristics of the investigation, employs statistical analysis, identifies the salient data in the investigation, and is utilized for description, exploration, explanation, or testing hypotheses. Both collective case study and survey research inform one another in the research process. Utilizing both of these representations of qualitative and quantitative investigation informing one another, offers a more expansive view of phenomena and the impact on the individual, which highlights implications for practice (Creswell, 2007; Kelley, Clark, Brown, & Sitzia, 2003; Leedy & Ormrod, 2010; Patton, 2002; Trochim, 2001).

Usefulness of Case Study and Survey Research to Develop Theory

A Sequential Approach

Both survey research and case study are relevant concerning theory development. The collective case study identifies themes and patterns of essential information from the perspective of the participant, and is influenced by the contextual setting of the bounded system. Collective case studies allow the researcher to confirm characteristics identified in the survey research, and survey research allows investigators to confirm characteristics identified in the collective case study. The collective case study and survey research approaches can inform one another and establish the evolution and precision of gathering evidence for theory. When used consecutively, they have the potential to augment a broader understanding of the impact of phenomena relative to the study participants.

The collective case study is contributory regarding detailed insight relevant to the impact of the phenomena regarding study participants. The use of the collective case study seeks the identification of key themes from emerging categories, through the perspective of the participant in context. Then, the use of survey research strengthens the broad understanding of the impact of the phenomena regarding the study participants by investigating the key themes in the emergent categories which were identified by the participants in the collective case study. The collective case study utilizes a smaller sample of participants and informs the survey research, and survey research utilizes a larger sample for statistical indexes associated with the categories through which to detect norms and ranks of information, enabling the researcher to make predictions and describe the larger population. Once the survey research describes the larger population, further investigation might be utilized in an experiment to continue the sequence of inquiry. For example, successive inquiry might test predictions about the relationship of cause-and-effect between the identified variables (i.e. a study of the effect of an employee exercise program on work satisfaction). The execution of diverse approaches by various researchers facilitates a broader perspective to sufficiently answer the research question beyond any one investigation. No matter the approach, utilizing one methodological procedure will not advance a comprehensive understanding of the impact of phenomena concerning a population. It is optimal to utilize both qualitative and quantitative methodologies in a sequential manner to generate, test, and confirm theory in an effort to gain increased insight with respect to obscure phenomena.

Both qualitative and quantitative methodologies can be integrated by utilizing a mixed methods design. However, the approaches might be optimally applied through a process of sequentially or cyclically utilizing each methodology concerning ongoing investigation in an effort to address a research problem, design inquiry, study a representative sample, interpret results, and implement consecutive investigations in an effort to develop, test, confirm, and refine theory. Qualitative research is founded upon the natural setting of the inquiry, the subjective perspective of the researcher concerning the research problem and the investigation, and the analysis is carried out with strict attention to managing researcher bias through *epoche*. Quantitative research might control the setting of the investigation which is consistent with an experimental design, or utilize the natural setting of the participants which is compatible with survey research. Moreover quantitative inquiry utilizes previously identified characteristics for investigation, focuses on researcher detachment, and decreases the opportunity for researcher bias through the use of statistical operations. The sequential or cyclical methodological design concerning these diverse approaches adds to the broad understanding of phenomena regarding each

study, where one investigation informs the other and allows for increased understanding of the phenomena and advances scientific knowledge (Breakwell et al., 2010; Creswell, 2007; Leedy & Ormrod, 2010; Patton, 2002; Trochim, 2001).

Conclusion

The similarities and differences between qualitative and quantitative research adds to the understanding of complex phenomena. Each methodology has its own ontology and epistemology, allowing the researcher an option for the generation, confirmation, and testing of theory from different vantage points. Employing diverse methodologies across various inquiries enhances scientific investigation and informs the scientific knowledge base. The insight that has been gained from previous research might benefit from a continued sequence or cycle of inquiry in order to develop and refine theory from various ontological and epistemological perspectives in an effort to increase the scientific knowledge base in an evolving world.

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Analysis and Simulation of Hyper Text Transfer Protocol at the Application Layer of the Internet

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Abstract- The Internet and computer networks make extensive use of protocols. This paper is mainly focused on HTTP which is one of the most important piece of application layer protocol. Application layer is the topmost layer in OSI and TCP/IP model. The general format of HTTP request and response messages in real world are analyzed and captured by Wireshark. The actions taken by the Web client and server as these messages are sent and received are simulated and monitored using Packet Tracer.

Index Terms- Analysis, Simulation, HTTP, Packet Tracer, Wireshark

I. INTRODUCTION

The Internet is a computer network that interconnects hundreds of millions of computing devices throughout the world. Standards come into play to create systems and products that can interoperate. Internet standards are developed by the Internet Engineering Task Force (IETF). The IETF standards documents are called requests for comments (RFCs). RFCs started out as general requests for comments to resolve network and protocol design problems that faced the precursor to the Internet. Different protocols are used to accomplish different communication tasks. A protocol defines the format and the order of messages exchanged between two or more communicating entities, as well as the actions taken on the transmission and/or receipt of a message or other event.

It is important to distinguish between network applications and application-layer protocols. An application-layer protocol is a very important piece of a network application. The Web is a client-server application that allows users to obtain documents from Web servers on demand. The Web application consists of many components, including a standard for document formats such as Hypertext Markup Language (HTML), Web browsers (Firefox and Microsoft Internet Explorer), Web servers (Apache, Python and Microsoft servers), and an application-layer protocol. A Web page consists of objects. An object is simply a file—such as an HTML file, a JPEG image, a Java applet, or a video clip—that is addressable by a single URL (Universal Resource Locator). Most Web pages consist of a base HTML file and The Web's application-layer protocol, HTTP, defines the format and sequence of messages exchanged between browser and Web server [4].

This paper is organized as follows. Section I is introduction about the Internet. The difference between OSI reference model and TCP/IP model is illustrated in section II and III. In section IV, overview of HTTP is explained with the request and response format. Programming with sockets in client/server interaction is

presented in section V. Web pages are created by using Hypertext Markup Language is involved in section VI. Capture the format and sequence of messages exchanged by using Wireshark is described in section VII. Then, the simulation of HTTP on Packet Tracer software is introduced in section VIII and finally, discussion and conclusion are included in section IX.

II. OSI REFERENCE MODEL

Open System Interconnection Reference Model (OSI RM) promotes the development of network technology. Launched by ISO (International Organization for Standardization) in the 1980s, OSI is a seven-layer function/protocol model. Looking at the OSI model, data transmitted from a computer will be transferred from the highest layer (Layer 7) to the lowest layer (Layer 1). Figure 1 shows how data is transferred from one layer to the next in a simple network consisting of only two computers (Computer A and Computer B) connected by a network cable.

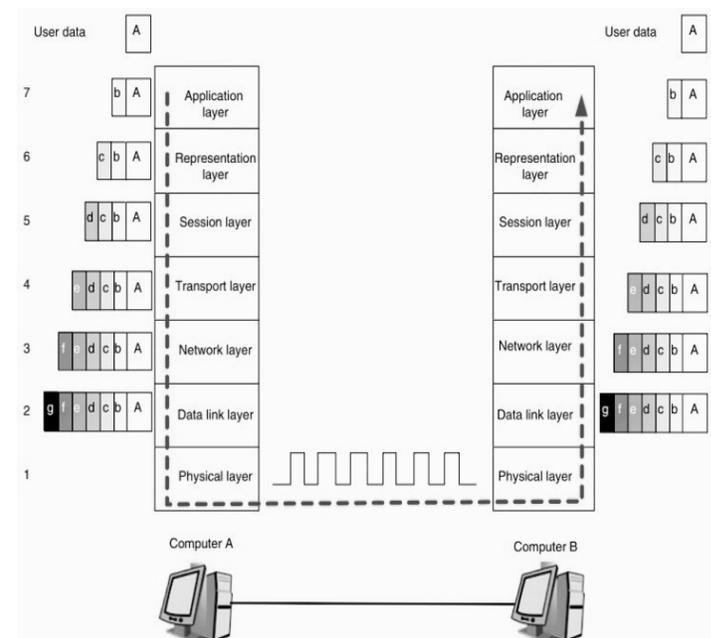


Figure 1: Data encapsulation and decapsulation process on communication terminals in the OSI model

The data is encapsulated during the transfer process until it is converted to optical/electrical signals and sent out from the physical layer. Conversely, data received by a computer will be transferred from the lowest layer to the highest layer and be

decapsulated. Figure 2 shows the hierarchical structure of the OSI model which is used in Packet Tracer [2].

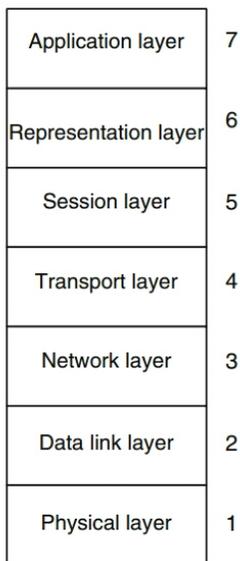


Figure 2: Hierarchical structure of the OSI model

III. TCP/IP MODEL

Originating from ARPANET (Advanced Research Projects Agency Network) and enhanced by the IETF, the TCP/IP model is formed from two important protocols, the Transmission Control Protocol (TCP) and Internet Protocol (IP). To download a 2000 byte song on the Internet, the user's Web browser first sends a request. Before the song is sent, it will be encapsulated through the layers on the Web server. The application layer will add an HTTP header to the original song data to form an HTTP datagram.

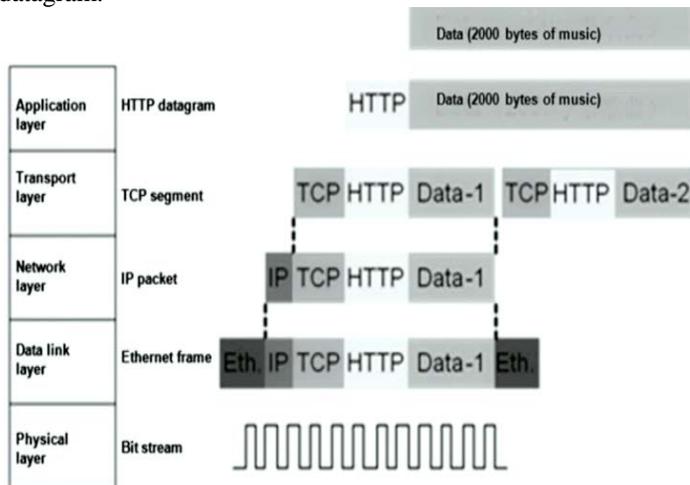


Figure 3: Data encapsulation process in the TCP/IP model

Because the HTTP datagram is too long it will be segmented into two parts in the transport layer, with a TCP header added to the front of each part to form two TCP segments. At the network layer an IP header will be added to each TCP segment to form an IP packet. When the IP packet reaches the data link layer, assuming the layer is using Ethernet technology,

it will add an Ethernet frame header and trailer to the IP packet, forming an Ethernet frame. Finally, the physical layer will convert these Ethernet frames into a bit stream as shown in Figure 3. Figure 4 shows the hierarchical structure of the TCP/IP model which is used in Wireshark [2].

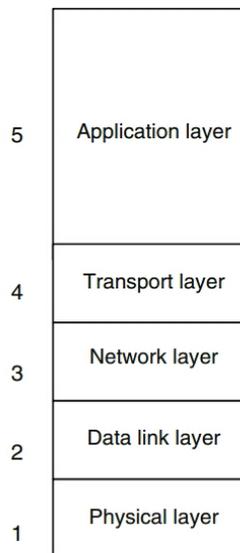


Figure 4: Hierarchical structure of the TCP/IP model

IV. OVERVIEW OF HTTP

The Hyper Text Transfer Protocol (HTTP) is the main protocol used by World Wide Web for communication. HTTP, the Web's application-layer protocol, is at the heart of the Web. HTTP is implemented in two programs: a client program and a server program. The client program and server program, executing on different end systems, talk to each other by exchanging HTTP messages. HTTP defines the structure of these messages and how the client and server exchange the messages. HTTP defines how Web clients request Web pages from Web servers and how servers transfer Web pages to clients. When a user requests a Web page (for example, clicks on a hyperlink), the browser sends HTTP request messages for the objects in the page to the server. The server receives the requests and responds with HTTP response messages that contain the objects. The general idea of the interaction between client and server is illustrated in Figure 5 [4].

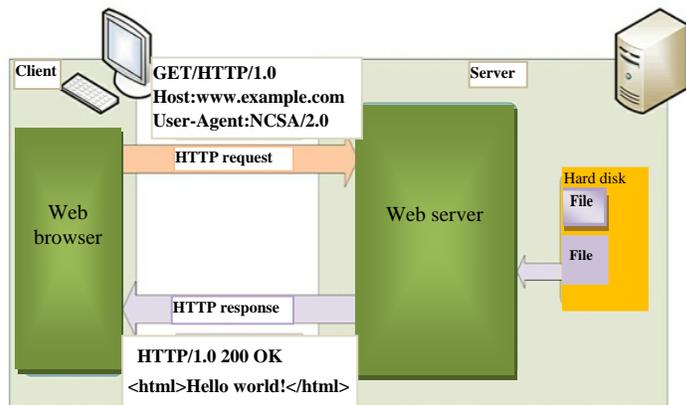


Figure 5: HTTP request response behavior

HTTP communication usually takes place over TCP/IP connections. HTTP is a clear text protocol and it is not secure. The default port is TCP 80. HTTPS is a similar protocol that enables encryption for added security. The default port is TCP 443. This allows for a more secure form of data transfer [2]. HTTPS is HTTP using a Secure Socket Layer (SSL) [10].

The HTTP specifications include the definitions of the HTTP message formats. There are two types of HTTP messages, request messages and response messages, both of which are discussed below. First, a typical HTTP request message is provided:

```
GET /somedir/page.html HTTP/1.1
Host: www.someschool.edu
Connection: close
User-agent: Mozilla/5.0
Accept-language: fr
```

The general format of a request message is shown in Figure 6 and response message is shown in Figure 7.

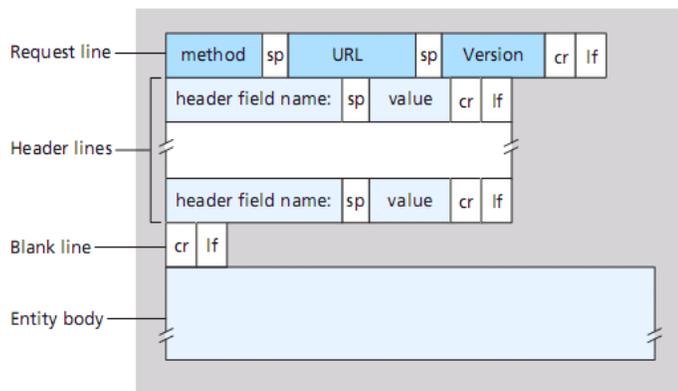


Figure 6: General Format of HTTP Request Message

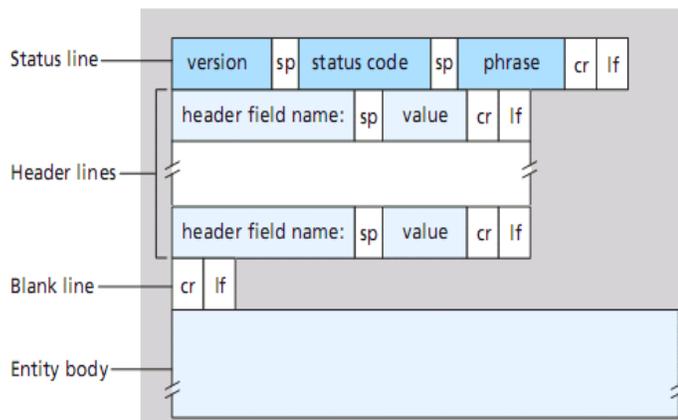


Figure 7: General format of HTTP response message

After that, a typical HTTP response message is provided as follows:[4]

```
HTTP/1.1 200 OK
Connection: close
Date: Tue, 09 Aug 2011 15:44:04 GMT
Server: Apache/2.2.3 (CentOS)
Last-Modified: Tue, 09 Aug 2011 15:11:03GMT
Content-Length: 6821
Content-Type: text/html
(data data data data data ...)
```

V. PROGRAMMING WITH SOCKETS

Network programming in any programming language can begin with sockets. A network socket is a virtual end point where entities can perform inter-process communication. For example, one process sitting in a computer, exchanges data with another process sitting on the same or another computer. The first process which initiates the communication is the client and the latter one is the server. Python has quite an easy way to start with the socket interface.

A flow of client/server interaction is shown in Figure 8. This will give the usage of socket API (Application Programming Interface). In the interaction between a typical client and a server, the server process has to work a bit more. After creating a socket object, the server process binds that socket to a particular IP address and port. After the successful binding, the server process will start listening for a new client connection.

For a valid client session, the server process can accept the request of the client process. At this point, the connection between the server and the client has been established. Then the client/server enters into the request/response loop. The client process sends data to the server process, and the server process processes the data and returns a response to the client. When the client process finishes, it exits by closing down the connection. At that moment, the server process probably goes back to the listening state [3].

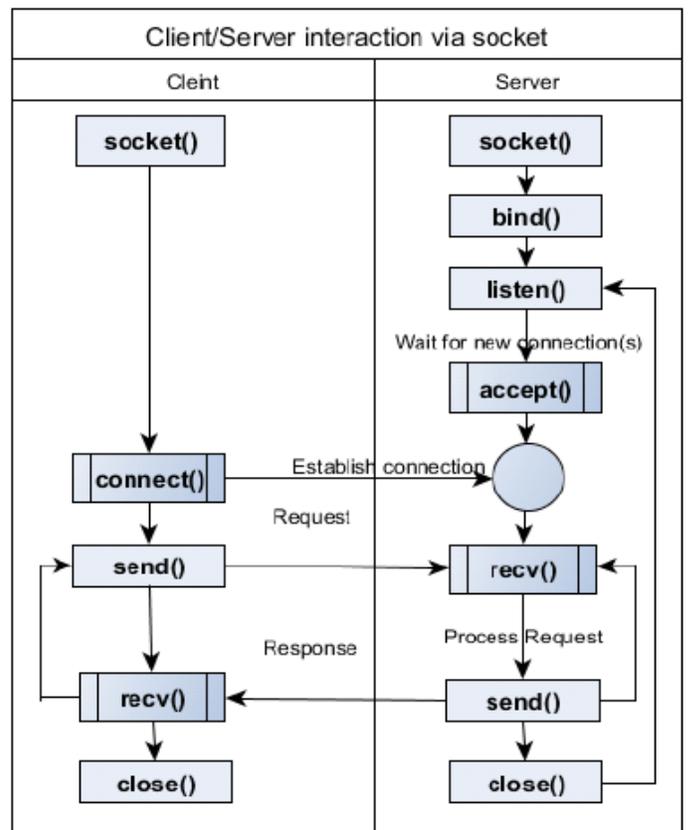


Figure 8: Client/Server interaction through socket

VI. HTML

HTML or Hypertext Markup Language is a formatting language that programmers and developers use to create documents on the Web. HTML5 is being developed as the next

major revision of HTML. This can now be used for new functions that can benefit developers and Internet users.

The latest edition HTML5 has enhanced features for programmers such as <video>, <audio> and <canvas> elements. The users view a Web page written in HTML in a Web browser such as Internet Explorer, Mozilla Firefox or Google Chrome. The HTML5 language has specific rules that allow placement and format of text, graphics, video and audio on a Web page.

Programmers use these programming tags or elements to produce web pages in unique and creative ways. Tags such as <section>, <article>, <header> enable the creator to make a more efficient and intelligent Web page [9].

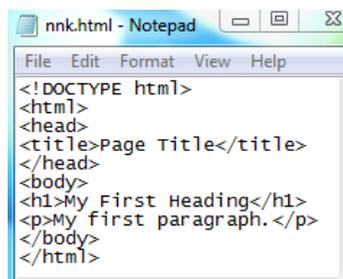
```

<html>
<head>
  <title>Page title</title>
</head>
<body>
  <h1>This is a heading</h1>
  <p>This is a paragraph.</p>
  <p>This is another paragraph.</p>
</body>
</html>

```

Figure 9: HTML page structure

Browsers do not display the HTML tags, but use them to render the content of the page. A visualization of a HTML page structure is shown in Figure 9.



```

File Edit Format View Help
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>
<h1>My First Heading</h1>
<p>My first paragraph.</p>
</body>
</html>

```

Figure10: HTML code example

Figure10 shows a small HTML code for a simple page. The code may be explained as follows:

- The <! DOCTYPE html> declaration defines the document type to be HTML5
- The <html> element is the root element of an HTML page
- The <head> element contains meta information about the document
- The <title> element specifies a title for the document
- The <body> element contains the visible page content
- The <h1> element defines a large heading
- The <p> element defines a paragraph

The code may be written in any editor such as notepad or word pad. The document should be saved as .html and then opened from any Web browser such as Internet Explorer, Google Chrome or Firefox. Figure 11 shows the result of applying the previous code [1].



Figure 11: HTML code result on Web browser

VII. WIRESHARK

Wireshark is a network packet analyzer. A network packet analyzer will try to capture network packets and tries to display that packet data as detailed as possible. A network packet analyzer can be thought of as a measuring device used to examine what's going on inside a network cable [8].

Wireshark is one of the best open source packet analyzers available today. Some intended purposes of Wireshark are as follows:

- Network administrators use it to troubleshoot network problems
- Network security engineers use it to examine security problems
- QA (Quality Assurance) engineers use it to verify network applications
- Developers use it to debug protocol implementations
- People use it to learn network protocol internals

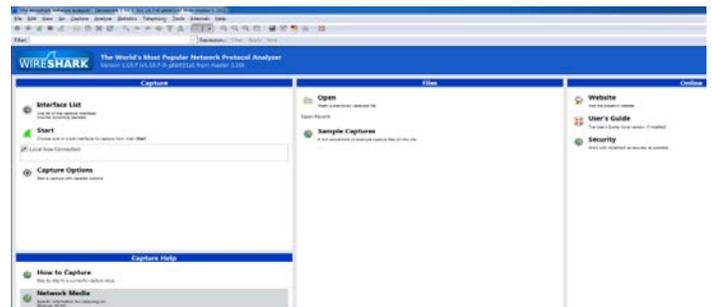


Figure 12: Wireshark network protocol analyzer

When Wireshark software is running, the home page screen is depicted as shown in Figure12.

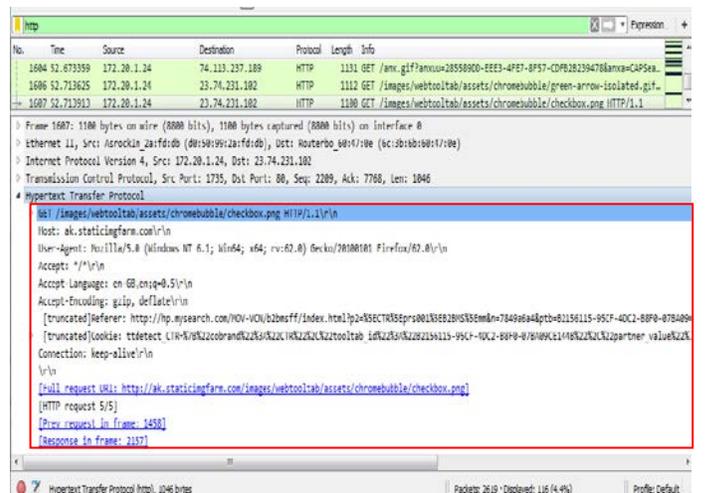


Figure13: HTTP request

As shown in Figure 13, when 172.20.1.24 send a request to 23.74.231.102 , the request is sent over transport layer, network layer and data link layer of the client and it can be seen above the red box. Inside the box represents the HTTP request message format in real world environment. So Wireshark is based on the TCP/IP model. The transport layer use Transmission Control Protocol with source port 1735 and destination port 80. Port 80 is the default port for HTTP protocol. In network layer Internet Protocol Version 4 with source address 172.20.1.24 and destination address 23.74.231.102 are also included.

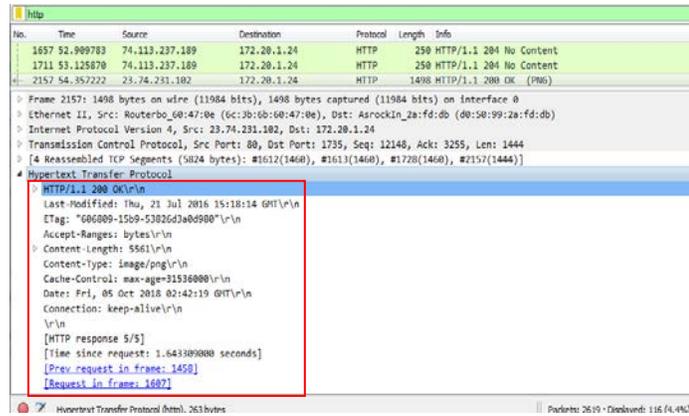


Figure 14: HTTP response

When 23.74.231.102 send a response to 172.20.1.24, this response is sent over transport layer, network layer and data link layer of the server and it can be seen above the red box. Inside the box represents the HTTP response message format in real world environment. Again the transport layer use Transmission Control Protocol but this time source port is 80 and destination port is 1735. Similarly, in network layer Internet Protocol Version 4 with source address 23.74.231.102 and destination address 172.20.1.24 are included as shown in the above Figure 14.

VIII. PACKET TRACER

Packet Tracer is a protocol simulator developed by Dennis Frezzo and his team at Cisco Systems. Packet Tracer (PT) is a powerful and dynamic tool that displays the various protocols used in networking. Cisco Packet Tracer provides two operating modes to visualize the behavior of a network, real-time mode and simulation mode.

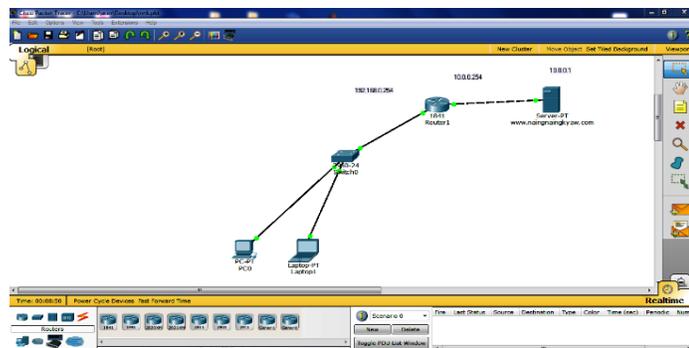


Figure 15: Real time mode

In real-time mode as shown in Figure 15, the network behaves as real devices do, with immediate real-time response for all network activities. The real-time mode gives students a viable alternative to real equipment and allows them to gain configuration practice before working with real equipment.

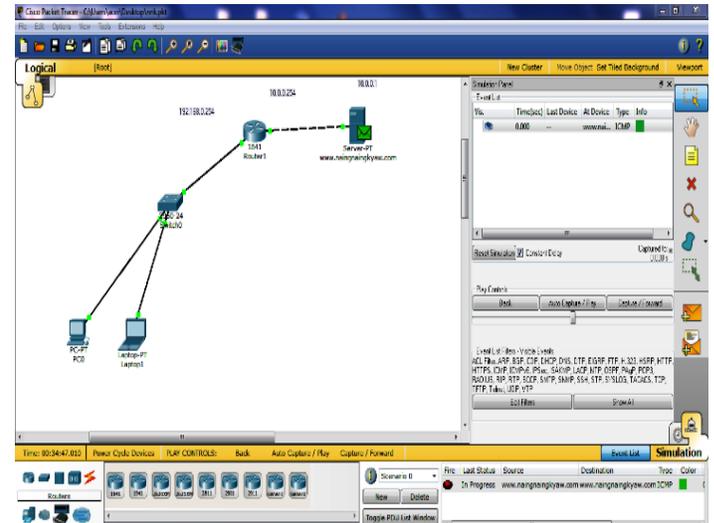


Figure 16: Pinging to Web server

In simulation mode as shown in Figure16, the user can see and control time intervals, the inner workings of data transfer, and the propagation of data across a network. Students can visually analyze a packet and its' details from the simulation mode. This helps students understand the fundamental concepts behind network operations [4].

Cisco Packet Tracer has two workspaces: logical and physical. The logical allows users to build logical network topologies by placing, connecting, and clustering virtual network devices. The physical workspace provides a graphical physical dimension of the logical network, giving a sense of scale and placement in how network devices such as routers, switches, and hosts would look in a real environment.

The physical view also provides geographic representations of networks, including multiple cities, buildings, and wiring closets [7]. The physical view of main wiring and wiring closets are depicted in Figure 17 and 18 respectively.

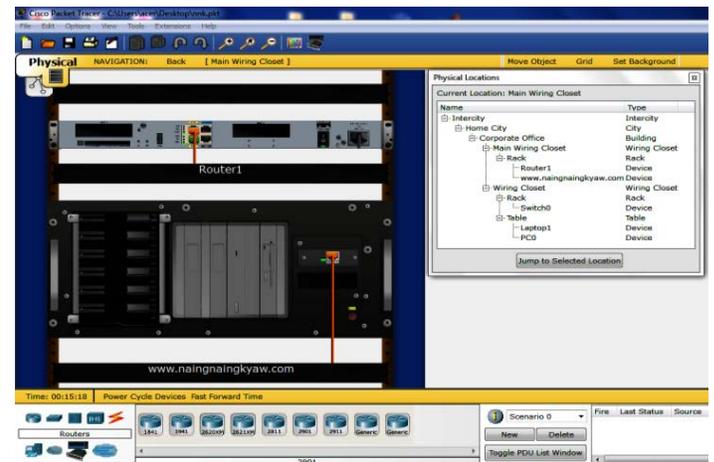


Figure 17: Physical view of main wiring closet

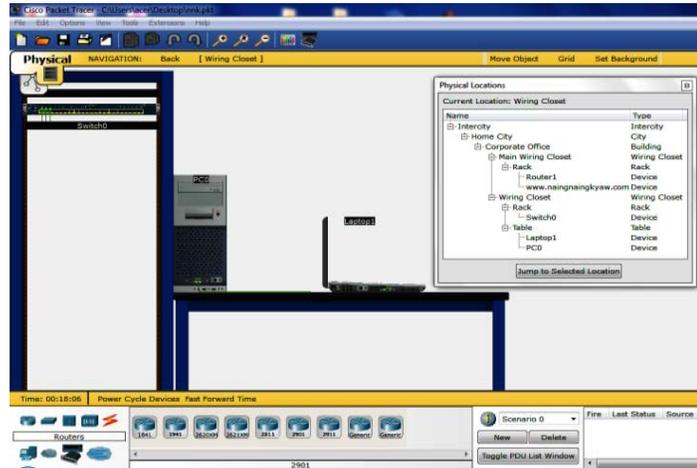


Figure 18: Physical view of wiring closet

In the above Figures, the real devices such as router, server, switch, desktop and laptop can be seen in physical nature.

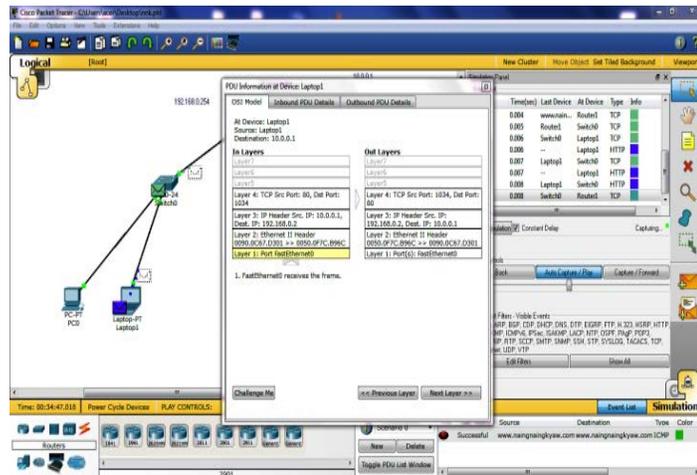


Figure 19: Logical view of TCP connection establish

In the logical environment, one router, one switch, one web server, one desktop and one laptop computers are used to investigate the working principles of HTTP over TCP or UDP. When a Web browser request Web page from the Web server the TCP connection is established as shown in Figure 19.

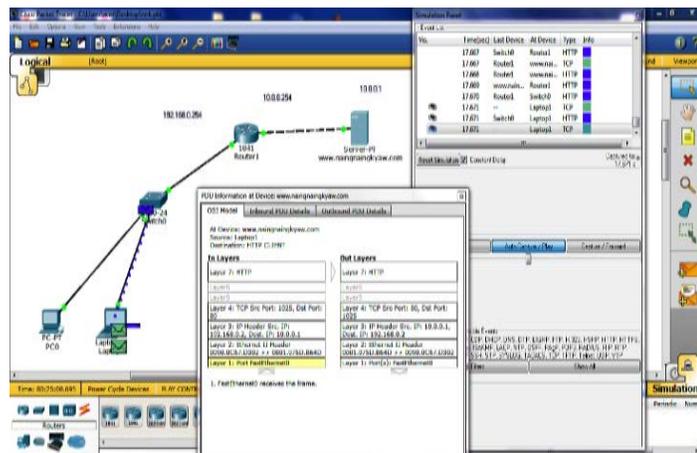


Figure 20: HTTP request and response in OSI model

Packet tracer uses the OSI seven layer protocol model and HTTP works on the application layer. Functions of HTTP request and response made on TCP are illustrated in Figure 20.

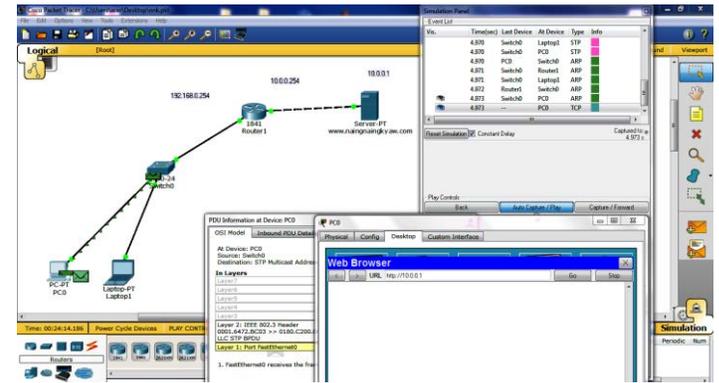


Figure 21: Web browser browse a Web page

When the user requests a Web page from the PC, it start works on OSI model as shown in Figure 21.

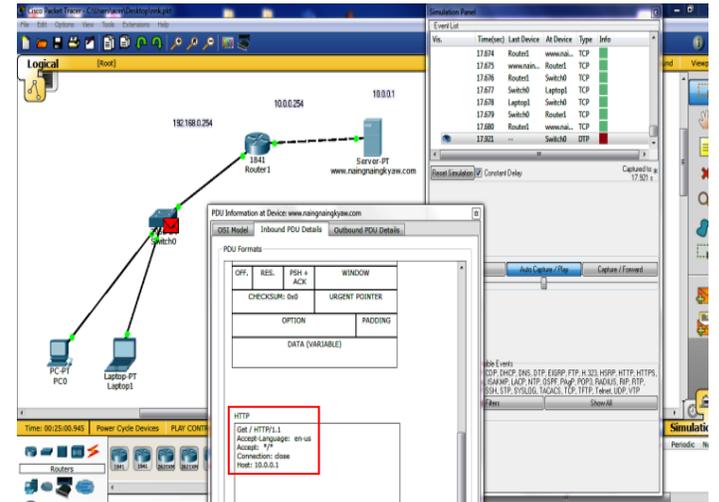


Figure 22: HTTP request format

Figure 22 shows the HTTP request format in the red box when the laptop sent a request to the Web server.

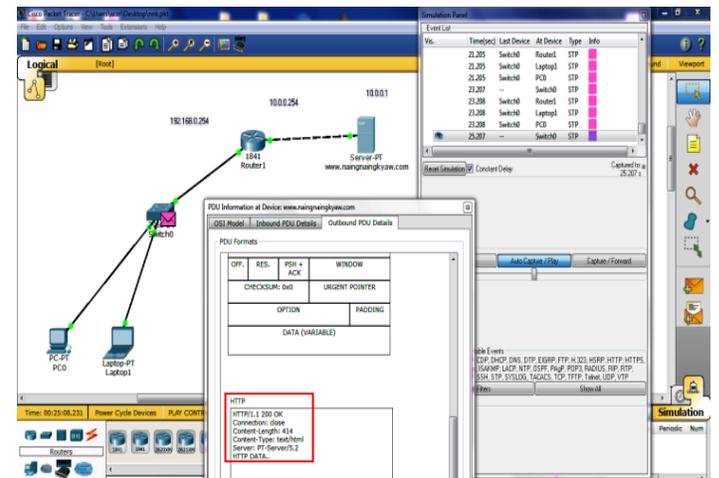


Figure 23: HTTP response format

Figure 23 shows the HTTP response format in the red box when the Web server sent a response to the laptop.

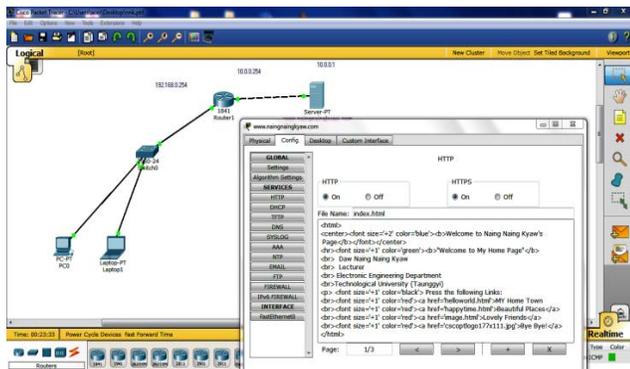


Figure 24: Programming with HTML

Figure 24 shows how the Web page is created with HTML language and the result of Web page can be monitored in the following simulation process of the Packet Tracer as in Figure 25.

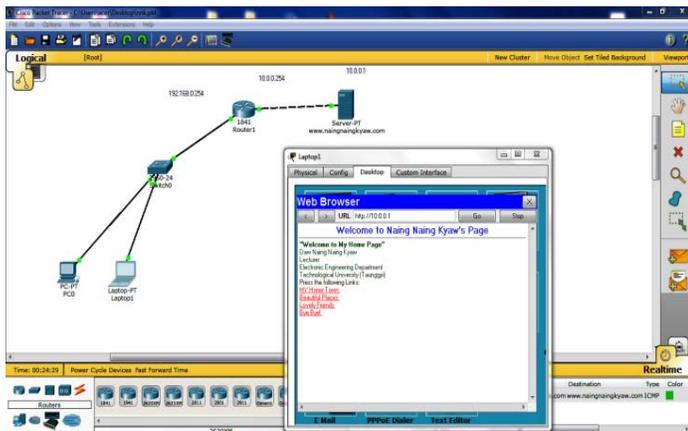


Figure 25: Web page result

IX. DISCUSSION AND CONCLUSION

HTTP functions as a request-response protocol in the client-server computing model. The client submits an HTTP request message to the server. The server which provides resources such as HTML files and other content, returns a response message to the client. Socket programming is also introduced because most of the application layer protocols like HTTP, FTP, SMTP and POP3 make use of sockets to establish connection between client and server and then for exchanging data. In this paper, analysis of HTTP request and response protocol message formats is captured with Wireshark. The simulation of this protocol is done via Packet Tracer.

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Modeling, Application and Economic Feasibility Analysis of SOFC Combined Heat and Power System for Apartment in Wuhan Area

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Abstract- Abstract: Solid fuel cells combined heat and power is one of the most promising technologies for reducing energy consumption in stationary area (commercial building and residential environmental). This paper is aim to studies the model, applications and economic feasibility of an model of Solid Oxide Fuel Cell micro combined Heat and Power (SOFC mCHP) for single-family apartment in Wuhan area. A model of Solid Oxide Fuel Cell micro combined Heat and Power (SOFC mCHP) system is presented to estimate the energy required to meet the average of electricity and heating demand of a 120 m² of single-family apartment in Wuhan area. Several simulation are conducted in Matlab-Simulink® environment in order to archive the aim of this paper. The model can be modified for any SOFC micro-CHP system. SOFC micro-CHP for stationary area has a higher potential to becoming cost-competitive in the worldwide. Based on the economic feasibility analyzes presented, the results indicated that it is feasible to introduce the SOFC micro-CHP system in Wuhan area from the economic viewpoint. However, fuel cell are still a non-mature technology aiming to reach the market in the coming years. Due to the constant development of fuel cell technology and recent commercial production, the available information about its performance in real applications is currently limited to date, and the cost information is not well established.

Index Terms- Model, application, economic analyze, SOFC, co-generation Heat and Power, Wuhan area.

I. INTRODUCTION

In many reaching Solid oxide fuel cells (SOFC) has defined as Energy technology conversation system, that in recent years shown many advantages friendly for the environmental, such as low emission.

Stationary fuel cells applications have been successfully spreaded at a number of commercial buildings including supermarkets [1]. A typical apartment has a relatively low-level of energy consumptions during the day/month/year when high power devices are operated and higher heating loads when is required, [2].

The size of a SOFC micro-CHP system is dependent on climate conditions, which directly determine the thermal and

electrical demands of the residents. It is therefore, important to evaluate the performance of the SOFC micro-CHP system to ensure that it matches well with the local area heat-to-power load ratio, [3]. For the performance assessment of building integrated SOFC micro-CHP system, the interaction between the cogenerations system and building loads is considered using dynamic building simulations tools.

This study aims to create a model of SOFC combining Heat-Power generations system, applications, using gas methane (CH₄) as a fuel, for a single-family apartment located in Wuhan area, and economic feasible analyze. The system created is to cover the heat and electricity demand of a 120 m² [4], of single-family apartment with an average of two (2) occupant. The proposed methodology have been conducted in different researching for different residence with different load profiles. Alternatively, the model parameters could also be derived using a detailed fuel cell system model including a detailed cell and stack fuel cell model



Figure.1- Map of climate zone in Wuhan area (by Corel photo)

II. CLIMATE REGION AND ENERGY DEMAND PROFILE IN WUHAN AREA

In the present study Wuhan area have been chosen for the analysis and applications of the SOFC micro-CHP system, as

shown in figure 1. According to the Annual Weather Averages [1985-2015], Wuhan climate is humid subtropical with abundant rainfall and four (4) distinctive seasons. The summer it's oppressively humid, and the dew-points can reach 26 °C (79°F) or more. While the winter is cool with occasional snow, spring and autumn are generally mild. The monthly 24 hour average

temperature ranges 4 °C (39.2°F) in January to 29.1°C (84.4 °F) in July, with 1320 mm of annual precipitation (majority of which falls from April to July). Based on the Microsoft Excel Database [5], the annual temperature of Wuhan area are plotted, as shown in figure 2.

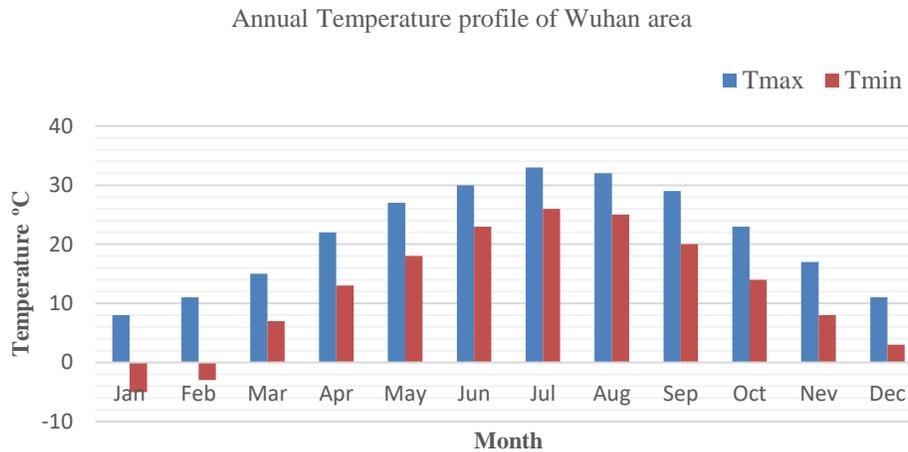


Figure.2-Annual Temperature profile of Wuhan area

In the present study the energy demand for space heating of a single-family apartment with 120 m², and with an average of two (2) occupant are plotted according with the equations bellows. The energy demand is shown in figure 3, [6].

2.1 Heating demand

$$Q_{Demand} = c_p \Delta T - (Q_r + Q_{in}) \quad (1)$$

Where:

- C_p - Heat capacity;
- Q_r - Solar energy gains through windows;
- Q_{in} - Internal energy.

Where:

$$Q_r = T_s w_c w_f S_w I_{sol} * 0.65 \quad (2)$$

Where:

- T_s - Coefficient of solar transmission of the windows;
- w_c - shading coefficient of the windows;
- S_w - Total surface of the windows of the building (m²); and
- I_{sol} - Global irradiation on horizontal surface (w/m²).

$$Q_{in} = Q_{lig} + Q_{app} + Q_{occ} \quad (3)$$

Where:

- Q_{lig} - Heat generate by light sources (w);
 - Q_{app} - Heat generate by appliances (w); and
 - Q_{occ} - Heat generate by occupants.
- $$Q_{lig} = L_c A \quad (4)$$
- $$Q_{app} = A_c A \quad (5)$$
- $$Q_{occ} = O_c A \quad (6)$$

Where:

- L_c - Average specific heat gain due the light in the building (w/m²);
- A_c - Average specific heat gain due to domestic appliances in the building; and
- O_c - Average specific heat gain due to people in the building (w/m²)

2.2. Hot water demand

$$Q_{Hotw} = m H_w \Delta T \quad (7)$$

Where H_w is the average specific heat demand for hot water production (w/m²).

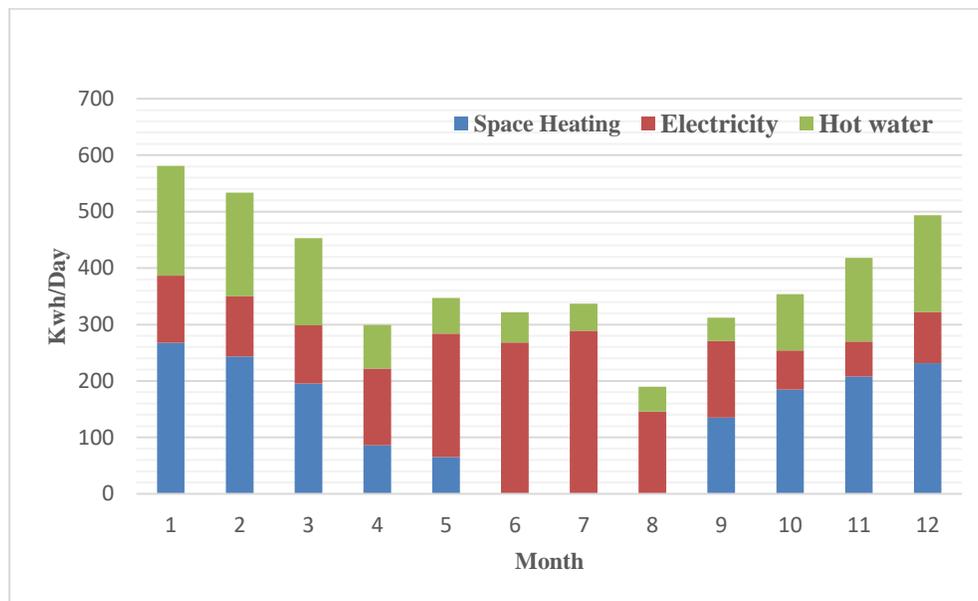


Figure.3-Energy demand for a 120 m² of Single-family apartment in Wuhan Area

III. SYSTEM CONFIGURATION AND MODEL ASSUMPTIONS

A dynamic SOFC micro-CHP system has been developed in a Matlab-Simulink® environment, considering mass balance, energy balance, chemical and electrochemical reactions, electrochemical losses and heat transfer. Several assumptions and simplifications were made when developing the model of electrochemical and thermodynamic of the SOFC micro-CHP system:

- a) The fuel cell reactions are assumed to be in equilibrium;
- b) The fuel cell is assumed to be operated under the steady-state conditions;
- c) The air that enter the fuel cell consists of 79% of N₂ and 21% of O₂;
- d) All gases behave as ideal gases; and
- e) The cathode and anode exit temperature of the fuel cell are assumed to be equal;

Each of the components are modelled individually and integrated to form the overall SOFC micro-CHP system.

3.1 Modelling of SOFC micro-CHP system

A process flowsheet for a natural gas (CH₄) fueled SOFC is shown in Figure 4, the dashed lines indicate process flow diagrams for the system. In the system the fuel (natural gas- CH₄) enter a fuel heat exchanger (state 2), where the cleaned natural gas is mixed with super-heating steam provided by gas exhaust (state 11) to archive the necessary steam-to-carbon without carbon deposition. The mixture of the fuel gas (state 3) is then passed through an external pre-reformer before entering to the anode cell-stack (state 4), where it is pre-reformed and converted to hydrogen and carbon monoxide. The air from the ambient enter to the system by compressor (state 7) to cool the SOFC, and a portion of airflow is preheated by the burner exhaust gas in the air heat exchange (state 8), and then enter to the stack (state 9). After the electrochemical oxidation process on the anode, the residual combustible are mixed with excess air from the cathode exhaust and catalytically oxidized in the tail-gas burner. The highest temperature (850-1000 °C) on the system is verified in the burner exhaust (state 11), that are used for downstream process gas reactors and heat exchange. The SOFC stack produce only direct current (DC) power that must be converted into alternating current (AC) power (single or three phase, 50 or 60 Hz) for use by building power demands or for export to the electric grid.

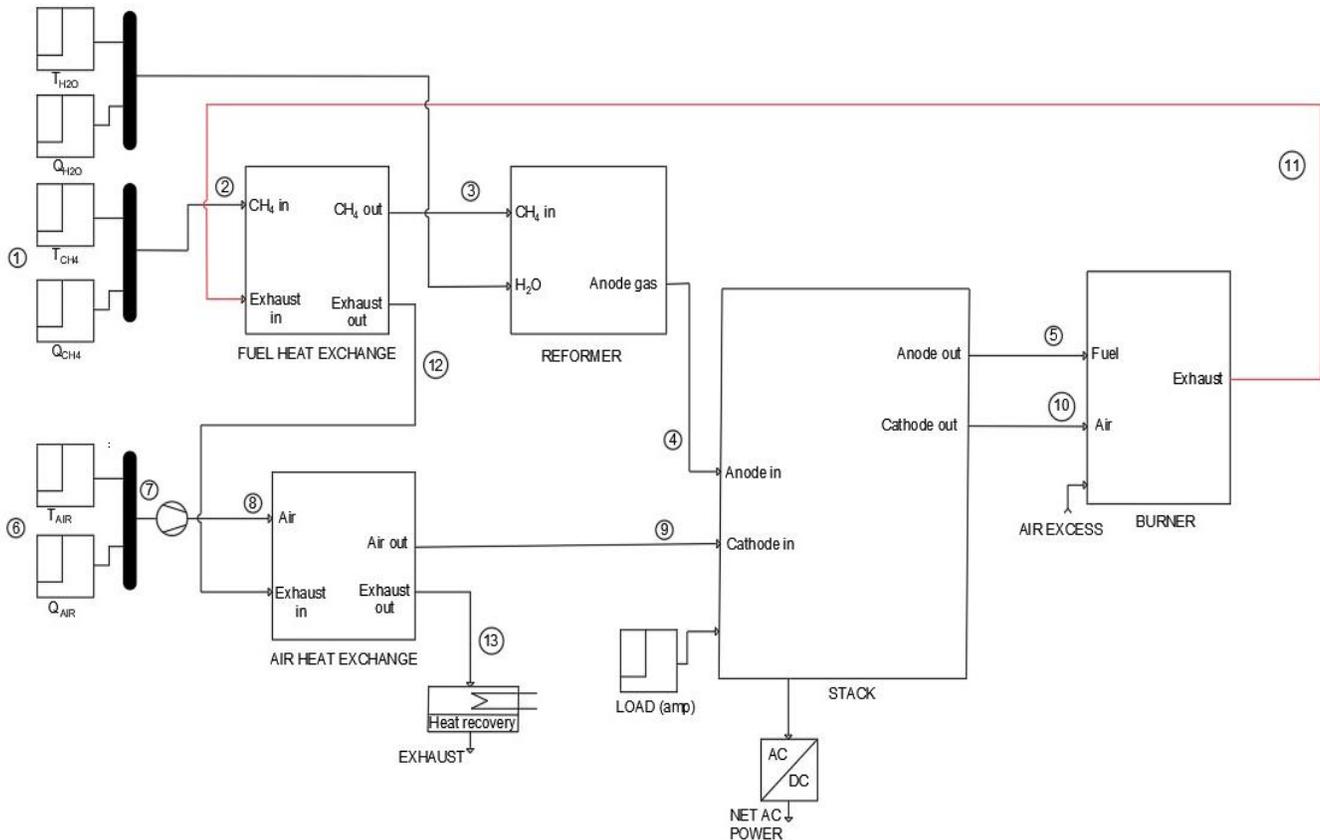


Figure.4- Flowsheet for SOFC micro-CHP System

The mathematical description of the system is formulated in terms of governing equations that are established from:

- a) Conservations laws;
- b) Interface and boundary conditions;
- c) Performance characteristics of the components.

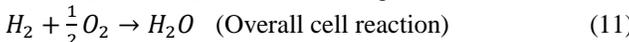
The mass balance and energy balances written for each component in the system, [7].

3.1.1 SOFC stack

Mass

$$\frac{dm_{cv}}{dt} = \sum_i \dot{m}_i - \sum_e \dot{m}_e \quad (8)$$

3.1.2 Reforming process



3.1.3 Energy conservation

$$k_{sofc} \frac{dT_{sofc,out}}{dt} = \dot{E}_{sofc,in} T_{sofc,in} - \dot{E}_{sofc,out} T_{sofc,out} - iAV_{sofc} \quad (12)$$

$\dot{E}_{sofc,in}$ and $\dot{E}_{sofc,out}$ are the energy flows in and out of the stack, respectively, and V_{sofc} is the SOFC voltage evaluated through the following black box.

$$V_{sofc} = 26.66 - 12.28 * U_f - 185.28 * J + 0.6204 * \lambda \frac{T_{sofc,out}}{1000} + 128.91 * J \frac{T_{sofc,out}}{1000} + 107.3 \frac{T_{sofc,in}}{1000} \quad (13)$$

3.1.4 Air compressor

The air compression system has an important role in the design and control of SOFC systems. The parasitic required by the air compressor, which serve to supplying the total amount of air needed for electrooxidation reaction and stack cooling requirements, is calculated by the following equations, [7]:

$$P_{cp} = \dot{m} \frac{C_p T_a}{\eta_{EM} \eta_{cp}} [\beta^{(k-1)/k} - 1] \quad (14)$$

$$P_{gross} = V * J * I \quad (15)$$

$$P_{net} = P_{gross} - P_{cp} \quad (16)$$

Where:

- P_{cp} Compressor power (kW)
- P_{net} Net SOFC power (kW)
- P_{gross} Gross SOFC power (kW)
- \dot{m} Compressor air flow (kgs⁻¹)
- J Current density (A/cm²)
- η_{cp} Compressor efficiency
- β Compressor ratio
- C_p Specific heat at constant pressure (Jk⁻¹k⁻¹)
- T_a Temperature ambient

3.1.5 Post-burner

This sub-model is aim to evaluate exist post-burner temperature after combustion of residual H₂ and CO molecules held by the anodic exhaust stream. Another important function of the post-burner is in recovery, although in a thermal form, which is the chemical energy held by the residual hydrogen existing the SOFC. The T_{pb} is estimated solving the following energy balance, [7]:

$$\dot{E}_{pb,in}(T_{sofc, out}) = \dot{E}_{pb,out}(T_{sofc,out}) \quad (17)$$

3.1.6 Air pre-heater and pre-reformer

The heat exchange is required to pre-heat the feed gases before entering cell stack, because the SOFC system runs at relatively high temperature. The dynamic equations of hot and cold fluid temperatures in the pre-heater and reformer is presented below, [8]:

a) Hot fluid:

$$(K + C_h) \frac{dT_h}{dt} = \dot{E}_{h,in}T_{h,in} - \dot{E}_{h,out}T_{h,out} - UA(T_h - T_c) \quad (18)$$

b) Cold fluid:

$$C_c \frac{dT_c}{dt} = \dot{E}_{c,in}T_{h,in} - \dot{E}_{c,out}T_{h,out} + UA(T_h - T_c) \quad (19)$$

Where

k Heat capacity (J/K);
 C_h Heat capacity of hot fluid ;
 $T_{h,in}, T_{h,out}$ Hot and cold fluid mean temperature (K), respectively;

$\dot{E}_{h,in}, \dot{E}_{h,out}$ Energy rate flow in and flow out (W), respectively ;

U Lumped heat coefficient transfer (W/m²/K);

A Heat area transfer (m²);

C_c Heat capacity of cold fluid (JK⁻¹);

3.1.7 Electric stack power

The activation polarization is described as the energy barrier that should be overcome by the reacting species. Is calculated by using the Butler-Volmer equation, [8]:

$$I = I_o \left[\exp\left(\alpha_a n_e \frac{FU_{act}}{RT}\right) - \exp\left(-\alpha_c n_e \frac{FU_{act}}{RT}\right) \right] \quad (20)$$

$$I_o = K_{O_2} \exp\left(-\frac{E_{O_2}}{RT}\right) \frac{\left(\frac{P_{O_2}}{P_{O_2^*}}\right)^{1/4}}{1 + \left(\frac{P_{O_2}}{P_{O_2^*}}\right)^{1/2}} \quad (21)$$

Where

$$P_{O_2}^* = A_{O_2} \exp\left(-\frac{E_{O_2}}{RT}\right) \quad (22)$$

The electric stack power P_{sofc} is defined by the equations bellow, [9]:

$$P_{sofc} = I * U_t = A_{vecel} * N * I \quad (23)$$

Where $A_{vecel} = \frac{U_{stack}}{N}$ in the average single cell voltage.

IV. SIMULATIONS AND RESULT

The dynamic and detailed model presented in this paper can be useful to simulating fuel cell behavior under different operating conditions. The model was implemented in Matlab-Simulink environment, where in order to speed up computation time, the parameters of the balance of plant components was estimated and assumed based on the averages gas species of specific heat. Table 1 shown the parameters and operating conditions for the system.

Table 1-Parameter and operating conditions [2, 8]

Parameter	Symbol	Value
Configurations		Planar
Electroactive area		100
Anode thickness (μm)	L_a	500
Cathode thickness (μm)	L_c	50
Electrolyte conductivity constants	$C_{1e}; C_{2e}$	$3.34 \times 10^4; -10,300$
Anode exchange current density (Am ⁻²)	$i_{0,a}$	6500
Cathode exchange current density (Am ⁻²)	$i_{0,c}$	2500
Heat capacity	C_p	4186
Pressure	P_0	1
Ambient Temperature (k)	T_0	298
Number of cells	n	5
Fuel utilization	U_f	0.025
Air utilization	U_a	0.023
Fuel composition, reformat		$x_{H_2}=0.273$ $x_{H_2O}=0.483$ $x_{CH_4}=0.171$ $x_{CO}=0.019$ $x_N=0.28$
Heat area	A_h	0.5
Air blower power consumption factor	η_{ab}	10%

Based on the equations (8 to 30) and the parameter presented in table 1, the SOFC micro-CHP system fueled by 0.025 kg/h of methane (CH₄), 298 k as initial temperature, was simulated and produce around 1.67 kw of power output and an exhaust of 602.7 k. Figure 5 shown the plant schematic of SOFC with description of energy and mass flows at the nominal operating point.

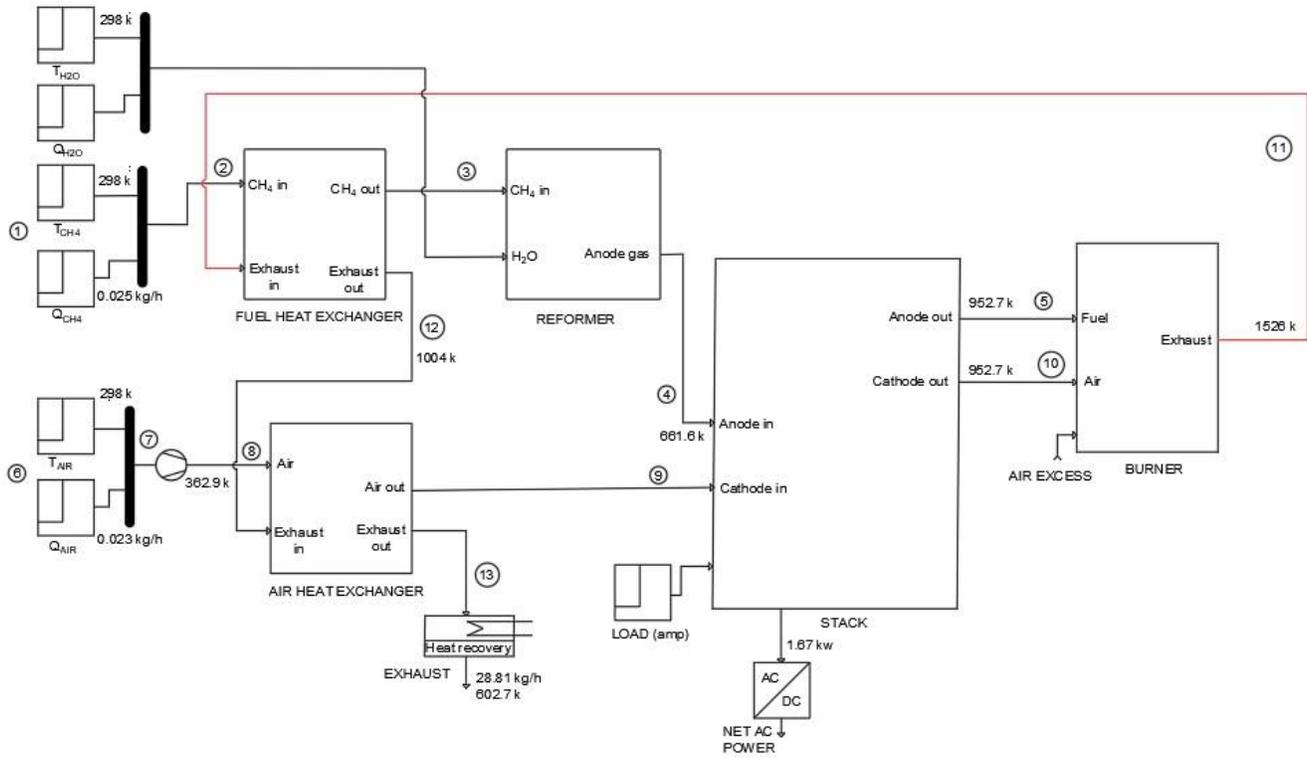


Figure.5- SOFC micro-CHP system with description of energy and mass flows

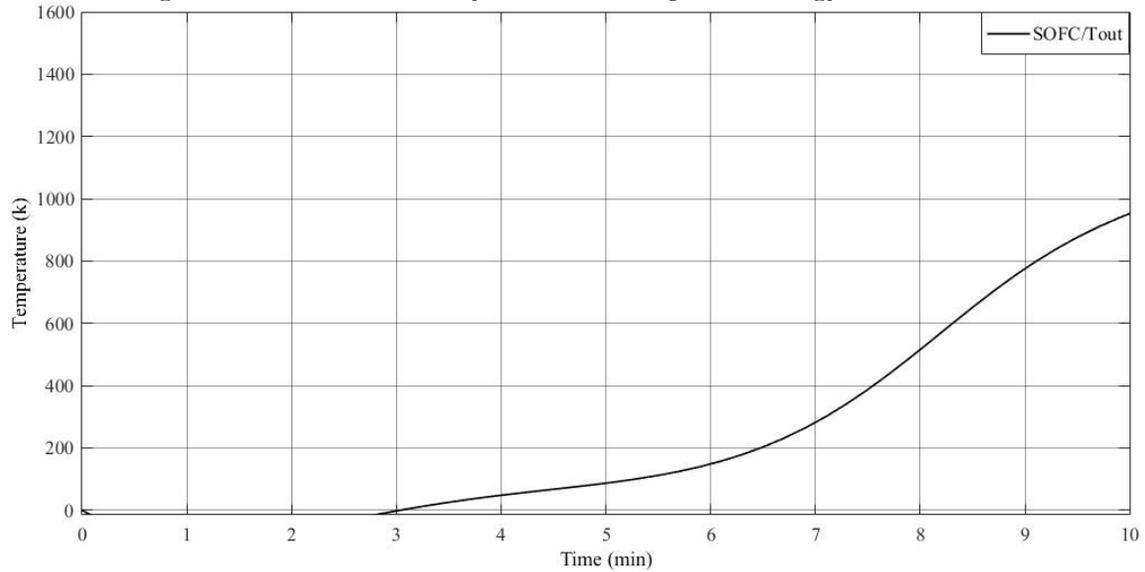


Figure.6- SOFC micro-CHP Tout

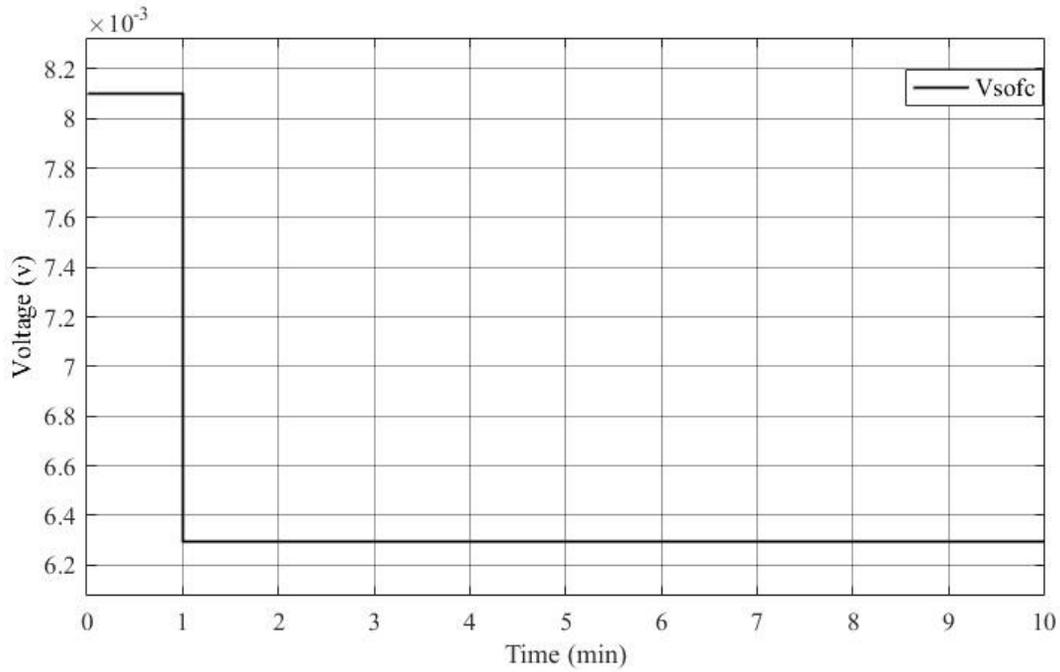


Figure.7- SOFC micro-CHP voltage

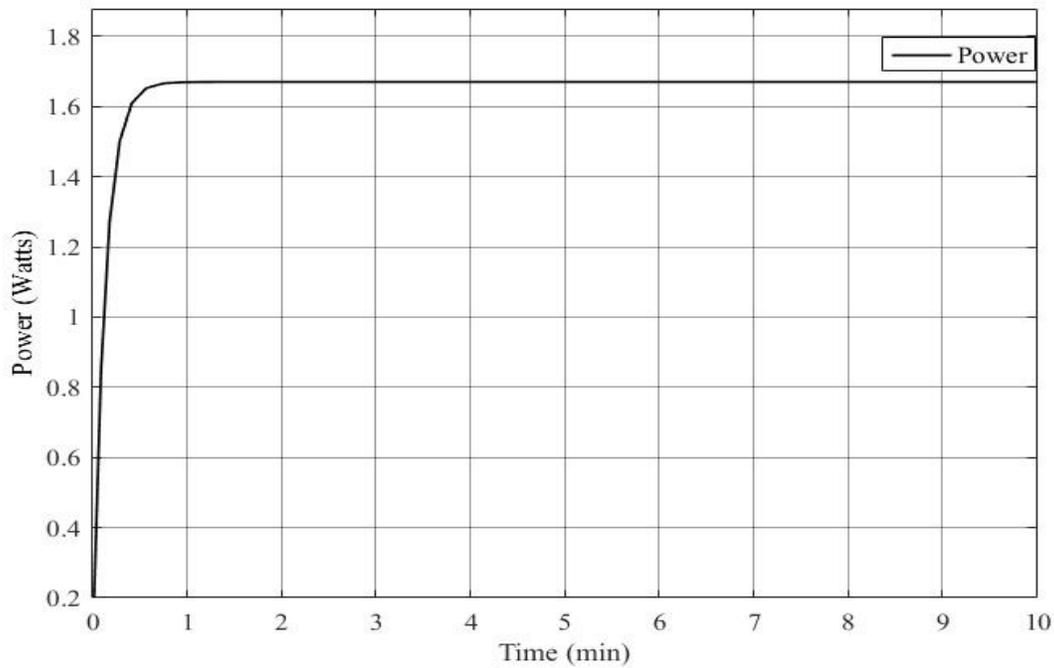


Figure.8- SOFC micro-CHP power output

V. APPLICATIONS OF SOFC MCHP SYSTEM

Fuel cells can be applied for transport, portable and stationary energy generations. Stationary fuel cell systems is the most used finding applications in all scales: micro-scale CHP for residential use, to off-grid back-up power system, to power prime power for buildings and even to megawatt-scale power stations, (Fuel Cell Today, 2013).

5.1 Economic feasibility Analysis

Energy crisis has become an undeniable global issue. The energy reform is also an important part of the Chinese government's plan to go green because the reform will bring out a more efficient power network and allow more interactive matching of supply and demand through intelligent energy networks.

Fuel cells are still relatively immature in commercial markets, however, there are two major markets where fuel cells have moved from the laboratory to the company:

- a) Portable units;
- b) Large stationary combined heat and power (CHP); and
- c) Domestic micro-CHP.

SOFC technology is currently at the stage of development, thus its cost information is not well established and very little data are available from the open literature. According to (U.S. Department of Energy -DOE, 2017), [10], the current capital cost of a SOFC is estimated about \$335.89-\$1385.69/kW for 1-5 kW CHP System, and for 10-25 kW CHP System is about \$516.58-\$1109.42 kW. To calculate the cost and the maintenance cost for the system proposed has to be defined, due the fuel cost is variable. For this reason in this paper, it has been calculated the operating of the system, based on the prices of fuel (CH₄- natural gas) and the electricity. The following value have been assumed (based on the Key China Energy Statistics, 2016):

- a) Natural gas = \$0.41/m³
- b) Electricity = \$0.09/kWh

Based on the model created, it has been simulated 0.025 kg of fuel and 1.67 kW as result, which was not enough to evaluate the electricity demand from the single-family apartment. To evaluate the electricity demand, the quantity of fuel necessary to supply the electricity demand for each month, has been calculated as shown in table 2:

Table 2-Annual electricity demand

Electricity consumption (kw/Month)	Fuel (kg/Month)	Electricity cost (\$/Month)	Fuel cost (\$/Month)
119.188	1.781052002	10.72692	1.0178859
106.238	1.587537358	9.56142	0.9072907
103.122	1.540974298	9.28098	0.8806795
136.203	2.035310819	12.25827	1.1631969
219.132	3.27453676	19.72188	1.8714247
268.108	4.006395696	24.12972	2.2896881
289.324	4.323430962	26.03916	2.4708764
146.134	2.183711895	13.15206	1.2480093
136.142	2.034399283	12.25278	1.1626759
69.241	1.034683204	6.23169	0.59133
62.208	0.929587567	5.59872	0.5312669
90.698	1.355319785	8.16282	0.7745764

According with the result in table 2 the electricity and fuel cost has plotted

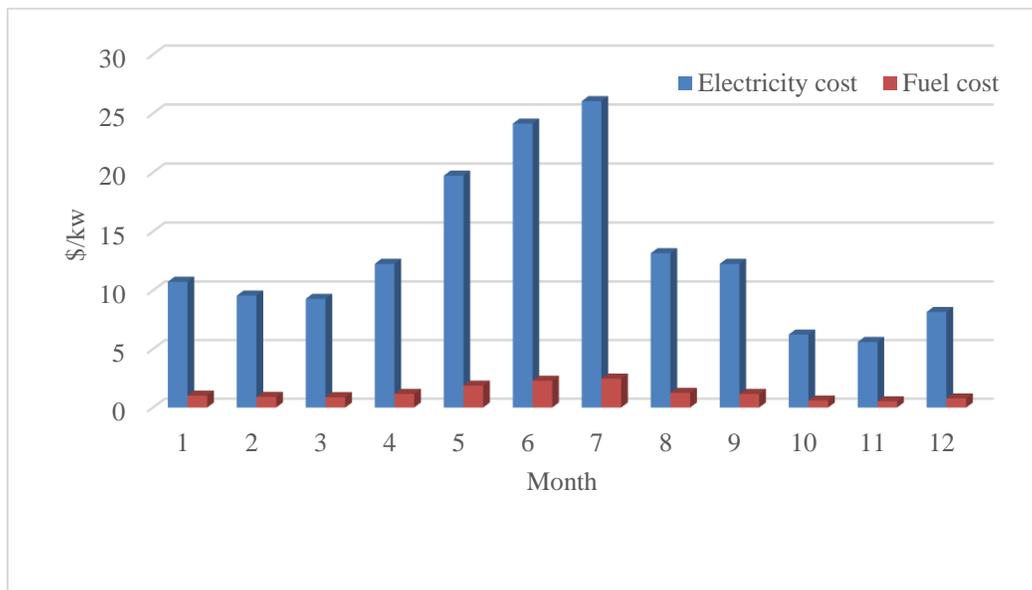


Figure.9- Electricity and fuel cost

According with the graphic, the cost variable during the year, according with the variation of demand from the apartment.

VI. DISCUSSION

The model SOFC mCHP system has been designed based on the Wuhan area weather conditions and Energy demand from a

120 m² of Single-family apartment, as shown in figures 3 and 4. Based on the model created in Matlab-Simulink environmental, it has been simulated 0.025 kg/h of methane (CH₄) as fuel, 298 k as initial temperature and produced around 1.67 kW of power output and an exhaust of 602.7 k. It has noted that, the power output was not enough to evaluate the electricity demand from the single-family apartment. Therefore, in order to evaluate the electricity

demand, the quantity of fuel necessary to supply the electricity demand for each month, has been recalculated as shown in table 2. An economic analysis has been conducted in this paper considering the costs values of electricity and fuel in order to have an economic viewpoint to introduce this system in our study area.

VII. CONCLUSION

In the present work was aim to investigated a model of SOFC micro-CHP system to cover the heat and electricity demand of an 120 m² of single-family apartment with an average number of two (2) occupants, located in Wuhan area. In order to understand the system operating limits, a dynamic model of SOFC micro-CHP system has been developed and analyzed. Numerical simulation are conducted in Matlab-Simulink® environment, to determine the optimal match between the energy demand from the apartment and the energy supply from the SOFC micro-CHP during the whole year. Finally, the cost operating are calculated. From these results, it's possible to see that the total cost variable during the year according with the variation of the demand of electricity, and the analysis result indicate that it is feasible to introduce the SOFC micro-CHP system in Wuhan area from the economic viewpoint. An economic analysis including the installation and the maintenance cost of the fuel has to be made in order to calculate the total savings that can be achieved installing a fuel cell micro-CHP system. Promising applications were looked into during this work to find the applications that will give fuel cells the opportunity of market penetration.

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Bullying, Interests and Skills of Senior High School Students

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Abstract- Bullying is a habitual act wherein a certain bully hurts the victim physically or emotionally. Bullying is a serious topic that needs awareness for it is having a long-lasting consequences. This study focuses on the bullying, interests and skills of senior high school students among bullying. This study aims to examine the degree of understanding of students towards bullying based on the level of interests and skills. For the purpose of this study, all grade 11 and 12 students are required to answer the questionnaires in rating scale form. Results indicate that bullying is correlated with the level of interests and skills of the students. It can be inferred that verbal bullying is one of the student's interest and skills. On the contrary, there is a similarity between physical and cyber bullying. It has been found out that both are one of the student's interest and skills.

Index Terms- Bullying, Physical, Verbal, Cyber Bullying, Interests and Skills

I. INTRODUCTION

Bullying is a habitual act wherein a certain bully hurts the victim physically or emotionally. Bullying is a serious topic that needs awareness for it is having a long-lasting consequences.

Bullying is understood to be some what different that the whole group or gang attacking one person and seen as having different roles in the process driven by diverse emotions, attitudes and motivations (Salmivalli, 2010). Bullying is a systematic problem at the entire school context (Schneider, Richard & Mallet, 2012). Bullying is a serious and visible problem in many schools and also specific types of aggression of behavior is intended to harm that occurs repeatedly over time (Seixas, Coelho & Fischer, 2013). Bullying is prevalent among children in selected schools in the Philippines in which more boys than girls experience bullying both as a perpetrator and victim particularly verbal bullying (Sanapo, 2017). Bullying tend to create depression to the victims which may lead to suicidal cases. In order to lessen the cases of bullying, the students should know the law about bullying. Republic Act 10627, or the Anti- Bullying Act, aims to protect children from being bullied. It requires schools to adopt policies to address the existence of bullying in their respective institution.

II. IDENTIFY, RESEARCH AND COLLECT DATA

Bullying is a persistent form of negative actions with abuse interactions (Sandvick, Tracy, and Alberts, 2007). It is also considered as the intentionally of causing harm between victim and aggressor without prior provocation (Benitez and Justicia, 2006) and involves repeated form of aggressive behavior (Gendron, Williams, and Guerra, 2011).

According to Raven and Jurkiewicz (2014), is a significant problem in school which impacts a large number of students. Bullying mat almost occur in school setting where people gather and interact (Merrell, Gueldner, Ross and Isava, 2008) which become a serious and visible problem in many schools (Seixas, Coelho and Fischer, 2013) in which it traumatizes many students

(Hendershot, Dake, Price and Lartey, 2006). the term bullying is an unjustified physical and verbal aggression with an ongoing set of behavior of an individual (Espelage and Napolitano, 2003).

According to Gini, Pozzoli, Borgi and Franzoni (2008), bullying is a negative behavior and becomes a public health concern that receives attention from the media and policymakers (Waasdrop, Pas, Zablotzky and Bradshaw, 2017) which requires deeper reflection on the cultured diversity (Koifman and Botelho da Costa, 2016). bullying is also a problem in the peer relations by the imbalance power between the parties (De Oliveira, Silva, Braga, Romualdo, Caravita and Silva, 2016) which is associated with physical, mental, and social detriments (Dake, Price, and Telljohan, 2003) and is usually form of derogatory remarks or insults hurled at the target (Sanapo, 2017).

On one hand, bullying is also termed as harassment that has history in civil rights (Cornell and Limber, 2015) which remains difficult to define (Journal of Adolescent Health, 2008) and is associated with several health issues (Fekkes, Pijpers and Verloove-Vanhorick, 2005). bullying has been proven by numerous studies which is a serious problem nationwide (Hoover and Stenbjem, 2003) and emerges from a complex intersection of children’s personality and disposition (Espelage and Napolitano, 2003) that interacts environmental factors such as classroom norms and have hurtful outcomes for the targeted individuals (Salmivalli, 2010).

Thus, bullying conjures the traditional schoolyard bully and subordinate victim (South African Journal of Education, 2015). Bullying is a type of violence that threatens a young person’s well-being both in schools and neighborhoods (Limo, 2015) which becomes a systematic problem to the entire school concept (Schneider, Richard and Mallet, 2011). Bullying is common among adolescents and associated with numerous negative health issues (Moreno, 2016) and becomes a significant public health problem (Journal of Adolescent Health, 2013). Bullying is also defined as repeated negative actions (Laftman, Alm, Sandahl and Modin, 2018) and is a serious concerns for students (Hong and Espelage, 2012). Bullying can be carried out by group (Smith, 2013) which becomes an issue that continues to receive attention (Turkmen, Dokgoz, Akgoz, Eren, Vural and Polat, 2013).

Generally, bullying is a common activity of a certain person specially students that commonly happened in the school settings. Bullying is considered as a problem though it has solutions. Therefore, bullying is an attitude of the students for they bully based on what they think and they saw especially on the environment they belong.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

This chapter presents the findings, analysis, and discussion and interpretation of data gathered wherein the object is to know the Bullying, Interests and Skills of Senior High School Student towards Bullying.

Table 1

Level of Understanding on the concept of bullying of high school students

PHYSICAL BULLYING	Weighted Mean	Interpretation
1. I forced my classmate to write assignment.	2.33	Very Low Expectation
2. I slap my classmate’s face when I am not in the mood.	2.26	Very Low Expectation
3. I kick my classmate’s foot whenever I wanted to.	2.58	Very Low Expectation
4. I pushes my classmate when I am irritated.	3.09	Very Low Expectation
5. I punches my classmate when he/she sit beside me.	2.54	Very Low Expectation
Over- all Weighted Mean	2.53	Very Low Expectation

Legend: 1.00- 2.60(Very Low Expectation); 2.61-4.20(Low Expectation); 4.21- 5.80(Neutral); 5.81- 7.40(High Expectation); 7.41-10.00(Very High Expectation)

The table above shows the Weighted Mean of the Level of Understanding on the bullying, interest and skills of senior high school students in terms of Physical Bullying. The statements “I forced my classmate to write assignment”, “I slap my classmate’s face when I am not in the mood”, “I kick my classmate’s foot whenever I wanted to”, “I pushes my classmate when I am irritated”, and “I punches my classmate when he/she sit beside me” have an overall Weighted Mean of 2.53 and interpreted as very low expectation implies that Physical Bullying is not actually common to Senior High School Students.

Table 2
Level of Understanding on the concept of bullying of high school students

VERBAL BULLYING	Weighted Mean	Interpretation
1. I insulted someone about his/her physical appearance.	2.73	Very Low Expectation
2. I use harsh words on someone for no reason.	2.55	Very Low Expectation
3. I shouted someone when I am bored.	2.57	Very Low Expectation
4. I discriminate someone in front of others.	2.38	Very Low Expectation
5. I am easily tell someone of his/her body built.	2.96	Low Expectation
Over- all Weighted Mean	2.64	Low Expectation

Legend: 1.00- 2.60(Very Low Expectation); 2.61-4.20(Low Expectation); 4.21- 5.80(Neutral); 5.81- 7.40(High Expectation); 7.41-10.00(Very High Expectation)

N=215

The table above shows the Weighted Mean of the Level of Understanding on the bullying, interest and skills of senior high school students in terms Verbal Bullying. The statements “I insulted someone about his/her physical appearance”, “I use harsh words on someone for no reason”, “I shouted someone when I am bored”, “I discriminate someone in front of others”, and “I am easily tell someone of his/her body built”, have an overall Weighted Mean of 2.64 and interpreted as low expectation implies that Verbal Bullying is not actually common to Senior High School Students.

Table 3
Level of Understanding on the concept of bullying of high school students

CYBER BULLYING	Weighted Mean	Interpretation
1. I intentionally commented on someone's profile in social media by stating a word that he/she is ugly.	2.39	Very Low Expectation
2. I posted some harmful words on his/her timeline.	2.11	Very Low Expectation
3. I've tried messaging someone in social media by telling him/her some harmful words.	2.27	Very Low Expectation
4. I upload some nude picture of someone in social media.	2.20	Very Low Expectation
5. I upload someone's embarrassing video in Facebook.	2.65	Low Expectation
Over- all Weighted Mean	2.32	Very Low Expectation

Legend: 1.00- 2.60(Very Low Expectation); 2.61-4.20(Low Expectation); 4.21- 5.80(Neutral); 5.81- 7.40(High Expectation); 7.41-10.00(Very High Expectation)

The table above shows the weighted mean of the level of understanding on the bullying, interest and skills of senior high school high school students in terms Cyber bullying. The statements “I intentionally commented on someone's profile in social media by stating a word that he/she is ugly”, “I posted some harmful words on his/her timeline”, “I've tried messaging someone in social media by telling him/her some harmful words”, “I upload some nude picture of someone in social media”, “I upload someone's embarrassing video in Facebook”, have an overall Weighted Mean of 2.64 and interpreted as very low expectation implies that Cyber bullying is not actually common to Senior High School Students.

Table 4
Level of student’s Attitude towards their interest and skills

LEVEL OF STUDENT’S ATTITUDE	Weighted Mean	Interpretation
1. I like watching action suspense, thriller and war movies.	7.04	High Expectation
2. I can feel the intense emotions of a dramatic scenes.	7.62	Very High Expectation
3. I enjoy the fight scenes of the movies.	7.42	Very High Expectation
4. I like the ridiculous in comedy movies.	7.64	Very High Expectation
5. I can satisfied watching the lead actor avenging the enemy.	7.38	High Expectation
6. I can still remember the conflict of a movie after watching it.	7.18	High Expectation
7. I believe that conflicts in movie scenes are normal in real life.	7.52	Very High Expectation
8. I like to see the antagonist in a movie suffering the consequence of his actions.	7.74	Very High Expectation
Over-all Weighted Mean	7.44	Very High Expectation

Legend: 1.00- 2.60(Very Low Expectation); 2.61-4.20(Low Expectation); 4.21- 5.80(Neutral); 5.81- 7.40(High Expectation); 7.41-10.00(Very High Expectation)

N=215

The table above shows the weighted mean of the level of student’s attitude towards their interest and skills in terms of Level of Student’s Attitude. The statements “I like watching action suspense, thriller and war movies”, “I can feel the intense emotions of a dramatic scenes”, “I enjoy the fight scenes of the movies”, “I like the ridiculous in comedy movies”, “I am satisfied watching the lead actor avenging the enemy”, “I can still remember the conflict of a movie after watching it”, “I believe that conflicts in movie scenes are normal in real life”, “I like to see the antagonist in a movie suffering the consequence of his actions”, have an overall Weighted Mean of 7.44 and interpreted as very high expectation implies that level of student’s attitude is based what they’ve seen on movies according to their interest.

Table 5
Physical Bullying vs. Interests and Skills

VARIABLE	X ²	df	X ² _(.05,4)	Decision	Interpretation
Physical Bullying vs. Interests & Skills	3.670	4	9.488	Failed to Reject H ^o	Not Significant

The table above shows that the computed value of physical bullying vs. interest and skills is 3.670, this is less than the critical value 9.488. Hence, the null hypothesis is accepted. Thus, there is no significant relationship between physical bullying and interests and skills. This can also be inferred that students did refer physical bullying as one of their interest and skills due to

the movies they've watched and the environment they belong. According to Schneider, Richard and Mallet (2012), students reporting greater social and academic anxiety, impulsivity, and friendship conflict also reported being victims of physical and verbal/relational bullying to a larger extent than other participants.

Table 6

Verbal bullying vs. Interests and Skills

VARIABLE	X ²	df	X ² _(.05,4)	Decision	Interpretation
Verbal Bullying vs. Interests & Skills	9.490	4	9.488	Reject H ^o	Significant

The table above shows that the computed value of verbal bullying vs. Interests and skills is 9.490, this is greater than the critical value 9.488. Hence, the null hypothesis is rejected. Thus, there is a significant relationship between verbal bullying as one of their interests and skills. This can also be inferred that students did not refer verbal bullying and interests and skills due to the movies they've watched and the environment they belong. According to Sanapo (2017), the study also revealed that verbal bullying and victimization was the common from experienced by the children.

Table 7

Cyber bullying vs. Interests and Skills

VARIABLE	X ²	df	X ² _(.05,4)	Decision	Interpretation
Cyber bullying vs. Interests & Skills	4.32	4	9.488	Failed to Reject H ^o	Not Significant

The table above shows that the computed value of cyber bullying vs. Interests and skills is 4.32, this is less than the critical value 9.488. Hence, the null hypothesis is accepted. Thus, there is no significant relationship between cyber bullying and interests and skills. This can also be inferred that students did refer cyber bullying as one of their interests and skills due to the movies they've watched and the environment they belong. According to Moreno (2016), Bullying behavior which take place online or using technology, which can include verbal or relational bullying or threats of physical harm. Cyber bullying includes similar tactics as other bullying behavior as well unique approaches such as viral repetition or widespread sharing of message. However, an important finding from our study is the need to integrated cyber bullying as part of a shared, understood and uniform definition of bullying as a whole.

IV. CONCLUSION

This study examined the Bullying, Interests and Skills of Senior High School Students. This includes physical, verbal, and cyber which are the three categories of bullying. The student's capacity over the three categories of bullying based on their interests and skills and towards the influential scenes extracted upon watching television Based on the results, students view about verbal bullying is not related to their interests and skills. On one hand, physical and cyber are both related to their skills and interests. Meanwhile, the three categories of bullying are experienced and conceptualized by students based on their interests and skills. More so, bullying is a problem to the victims but the happiness of the bully which is not fair. Basically, bullying can be done based on what the environment where the student belongs. On the contrary, the students should be knowledgeable on what he or she seen on movies. A student also should be sensitive on the feelings of others especially to the victims of bullying.

APPENDIX

RESEARCH INSTRUMENT - A

Bullying, Interests and Skills of Senior High School Students

Personal Information:

Name: _____ Grade Level: _____
 Gender: _____ Family Background: _____

Instruction: Read each item carefully and rate according to your reference.

1-2 VERY LOW EXPECTATION 3-4 LOW EXPECTATION 5-6 NUETRAL 7-8 HIGH EXPECTATION 9-10 VERY HIGH EXPECTATION

PHYSICAL BULLYING	1-2	3-4	5-6	7-8	9-10
1. I force my classmate to write my assignment.					
2. I slap my classmate's face when I am not in the mood.					
3. I kick my classmate's foot whenever I wanted to.					
4. I pushes my classmate when I am irritated.					
5. I punches my classmate when he/she sit beside me.					
VERBAL BULLYING					
1. I insulted someone about his/her physical appearance.					
2. I use harsh words on someone for no reason.					
3. I shouted someone when I am bored.					
4. I discriminate someone in front of others.					
5. I am easily tell someone of his/her body built.					
CYBERBULLYING					
1. I intentionally commented on someone's profile in social media by stating a word that he/she is ugly.					
2. I posted some harmful words on his/her timeline.					
3. I've tried messaging someone in social media by telling him/her some harmful words.					

4. I upload some nude picture of someone in social media.					
5. I upload someone's embarrassing video in Facebook.					
LEVEL OF ATTITUDE					
1. I like watching action suspense, thriller and war movies.					
2. I can feel the intense emotions of a dramatic scenes.					
3. I enjoy the fight scenes of the movies.					
4. I like the ridiculous in comedy movies.					
5. I can satisfied watching the lead actor avenging the enemy.					
6. I can still remember the conflict of a movie after watching it.					
7. I believe that conflicts in movie scenes are normal in real life.					
8. I like to see the antagonist in a movie suffering the consequence of his actions.					

TALLY SHEET, TABLE OF OBSERVATION, TABLE OF EXPECTED FREQUENCY AND COMPUTATION OF CHI-SQUARE

TALLY SHEET:

PHYSICAL BULLYING vs. LEVEL OF ATTITUDE

PHYSICAL BULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	IIII-IIII-III-13	III-3	III-3
2.61-4.20	IIII-IIII-IIII-IIII-IIII-IIII-IIII-II III-IIII-IIII-III-53	IIII-IIII-IIII-IIII-I-21	IIII-III-8
4.21-5.80	IIII-IIII-IIII-IIII-IIII-IIII-IIII-II III-IIII-IIII-IIII-III-64	IIII-IIII-IIII-IIII-IIII-III-29	IIII-IIII-IIII-I-III-I-21

VERBAL BULLYING vs. LEVEL OF ATTITUDE

VERBALL BULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	IIII-IIII-IIII-15	IIII-I-6	I-1
2.61-4.20	IIII-IIII-IIII-IIII-IIII-IIII-IIII-III II-IIII-IIII-III-54	IIII-IIII-IIII-III-1 8	IIII-III-8

4.21-5.80	IIII-IIII-IIII-IIII-IIII-IIII-IIII-III II-IIII-IIII-IIII-IIII-65	IIII-IIII-IIII-IIII- II-22	IIII-IIII-IIII-I III-IIII-I26
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CYBERBULLYING vs. LEVEL OF ATTITUDE

CYBERBULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	IIII-IIII-IIII-15	IIII-I-6	III-3
2.61-4.20	IIII-IIII-IIII-IIII-IIII-IIII-IIII-III II-IIII-IIII-49	IIII-IIII-IIII-IIII- IIII-25	II-2
4.21-5.80	IIII-IIII-IIII-IIII-IIII-IIII-IIII-III II-IIII-IIII-IIII-IIII-IIII-IIII- 74	IIII-IIII-IIII-IIII- IIII-IIII-IIII-I-36	IIII-5

TABLE OF OBSERVATION:

PHYSICAL BULLYING vs. LEVEL OF ATTITUDE

PHYSICAL BULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	13	3	3
2.61-4.20	53	21	8
4.21-5.80	64	29	21

VERBAL BULLYING vs. LEVEL OF ATTITUDE

VERBALL BULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	15	6	1
2.61-4.20	54	18	8
4.21-5.80	65	22	26

CYBERBULLYING vs. LEVEL OF ATTITUDE

CYBERBULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	15	6	3
2.61-4.20	49	25	2
4.21-5.80	74	36	5

TABLE OF EXPECTED FREQUENCY AND COMPUTATION OF CHI-SQUARE:

PHYSICAL BULLYING vs. LEVEL OF ATTITUDE

PHYSICAL BULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	13	3	3
2.61-4.20	53	21	8
4.21-5.80	64	29	21

$$X^2 = \sum \frac{(O-E)^2}{E} = \sum \frac{(13-11.49)^2}{11.49} + \sum \frac{(53-49.58)^2}{49.58} + \sum \frac{(64-68.93)^2}{68.93} +$$

$$E \quad 11.49 \quad 49.58 \quad 68.93$$

$$\sum \frac{(3-4.68)^2}{4.68} + \sum \frac{(21-20.21)^2}{20.21} + \sum \frac{(29-28.1)^2}{28.1} + \sum \frac{(3-2.83)^2}{2.83} + \sum \frac{(8-12.71)^2}{12.71} +$$

$$4.68 \quad 20.21 \quad 28.1 \quad 2.83 \quad 12.71$$

$$\sum \frac{(21-16.97)^2}{16.97} = \mathbf{215}$$

$$16.97$$

VERBAL BULLYING vs. LEVEL OF ATTITUDE

VERBALL BULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	15	6	1
2.61-4.20	54	18	8
4.21-5.80	65	22	26

$$X^2 = \sum \frac{(O-E)^2}{E} = \sum \frac{(15-13.71)^2}{13.71} + \sum \frac{(54-49.86)^2}{49.86} + \sum \frac{(65-70.43)^2}{70.43} +$$

$$E \quad 13.71 \quad 49.86 \quad 70.43$$

$$\sum \frac{(6-5.01)^2}{5.01} + \sum \frac{(18-18.23)^2}{18.23} + \sum \frac{(22-25.75)^2}{25.75} + \sum \frac{(1-3.58)^2}{3.58} + \sum \frac{(8-13.02)^2}{13.02} +$$

$$5.01 \quad 18.23 \quad 25.75 \quad 3.58 \quad 13.02$$

$$\sum \frac{(26-18.39)^2}{18.39} = \mathbf{217.98}$$

$$18.39$$

CYBERBULLYING vs. LEVEL OF ATTITUDE

CYBERBULLYING	1.00-2.60	2.61-4.20	4.21-5.80
1.00-2.60	15	6	3
2.61-4.20	49	25	2
4.21-5.80	74	36	5

$$X^2 = \sum \frac{(O-E)^2}{E} = \sum \frac{(15-15.4-.5)^2}{15.4} + \sum \frac{(49-48.07-.5)^2}{48.07} + \sum \frac{(74-73.81-.5)^2}{73.81} +$$
$$\sum \frac{(6-7.48-.5)^2}{7.48} + \sum \frac{(25-23.68-.5)^2}{23.68} + \sum \frac{(36-34.84-.5)^2}{34.84} + \sum \frac{(3-0.97-.5)^2}{0.97} + \sum \frac{(2-3.53-.5)^2}{3.53} +$$
$$\sum \frac{(5-5.35-.5)^2}{5.35} = \mathbf{214.13}$$

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A Comparative Evaluation of Fracture Resistance of Simulated Immature Teeth Using Different Obturating Material: An In-Vitro Study.

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Abstract- Aim –To compare and also evaluate the fracture resistance of immature teeth using different obturating materials like MTA Angelus and Biodentine

Materials and Method: Fifty freshly extracted single rooted human mandibular premolar teeth were used for the study which were decoronated at cemento-enamel junction and divided into five groups ($n = 10$ per group). Group 1: Samples served as negative control. Group 2: MTA Angelus apical plug and then backfilling by gutta-percha. Group 3: Filling of root canal system entirely by MTA Angelus. Group 4: Apical plug of Biodentine and backfilling with gutta-percha. Group 5: Root canals completely filled with Biodentine. In four experimental group samples were shaped, cleaned and prepared using ProTaper rotary files. For simulation of immature roots, a #5 Peeso reamer was stepped out from the apex so that apices were enlarged to a diameter of 1.5mm. Group 2 and Group 4 samples were then filled with 5 mm of MTA Angelus or Biodentine apical plug and backfilling with gutta-percha using AH Plus sealer. Group 3 and Group 5 root canal system samples were completely obturated with MTA Angelus and Biodentine, respectively. All the samples were loaded vertically until root samples fractured with the help of universal testing machine. Statistical Analysis: SPSS 23.0 version software was used for statistical analysis of forces at which fracture of the roots occurred and the results were analyzed with the one-way analysis of variance and *post hoc tukey* test.

Results: In our study, root canal obturation which was done completely with MTA Angelus or Biodentine showed significantly higher fracture resistance ($P < 0.05$) when compared to apexification done with MTA or Biodentine. **Conclusion:** Obturation of the root canals with bioactive materials showed highest fracture resistance when compared to apexification groups.

Index Terms- Apexification, Biodentine, mineral trioxide aggregate Angelus, universal testing machine, vertical root fracture.

I. INTRODUCTION

Thickness of dentin is one of the most vital aspects determining the resistance of teeth to fracture. The tissue loss of tooth reduces the fracture resistance toward occlusal or traumatic forces.¹ The most common site of dental impact injuries in the

developing dentition is the maxillary anterior teeth.²⁻⁴ These injuries many times lead to pulpal necrosis, which might cause the termination of root formation in developing teeth.⁴⁻⁶ It has been stated that the immature teeth which have been endodontically treated have a relatively high incidence ($>60\%$) of cervical root fracture, either spontaneously or even due to minor impacts.⁷

The endodontic treatment of teeth with immature root formation has been a challenge due to wide, open apices and thin dentinal walls.^{4,8} Various procedures and materials have been recommended to induce apexification in teeth with immature apices.⁹ Management of open apices in immature teeth has been accomplished using long-term CH therapy, with success rates ranging from 79% to 96%.^{10,11} However, these teeth showed a 50% reduction in strength vs the controls over 1 year⁸ and were compromised by cervical root fractures^{7,12} because of changes in the organic matrix of the dentin.

Calcium hydroxide applied to the root canal system to promote the formation of an apical barrier is the conventional treatment in these clinical situations.^{8,13,14} However, drawbacks of the long-term calcium hydroxide treatment requires multiple visits, patient adaptation problem, microleakage between the visits and an enhanced risk of root fractures. Hence, other alternatives to $\text{Ca}(\text{OH})_2$ have been proposed, of which, the most promising are calcium silicate-based materials, such as mineral trioxide aggregate (MTA) and Biodentine. These root-end repair materials have been claimed to be biocompatible, capable of stimulating biomineralization, and also offer a superior seal with better bond strength.¹⁵

MTA has ingredients like tricalcium oxide and other mineral oxides such as tricalcium silicate, silicate oxide, and tricalcium oxide.¹⁶ MTA is biocompatible, less cytotoxic, possess antimicrobial properties, offers low microleakage and can set in presence of blood and moisture.^{17,18} Although MTA is a suitable material for clinical use, it shows some disadvantages such as a prolonged time for setting, difficulty in handling, and the probability of discoloration.¹⁹

Biodentine is a silicate-based biologically active cement that has dentin-like mechanical properties and designed as a “dentin replacement” material. This is formulated using MTA-based cement machinery, also improving its physical and mechanical properties.²⁰

Establishment of a proper fracture resistance to the root dentin when obturated with various obturating materials, is an important key point for clinical success. Based on these

observations, the aim of this *in vitro* study was to compare and evaluate the influence of MTA angelus and Biodentine as obturating materials on the fracture resistance of immature teeth.

II. MATERIALS AND METHOD

Fifty noncarious, human single-rooted mandibular premolar teeth were selected for the study. Then, each experimental tooth was decoronated from the cemento-enamel junction (CEJ) using a flexible diamond disk (Novo Dental Products, Mumbai, India) in a slow-speed handpiece under a copious amount of water. The root of each tooth was standardized. The length of each root was 12 mm as measured from the apex to facial CEJ.

The fifty root samples were randomly divided into five groups:

Group 1 ($n = 10$): Sound roots with no root canal treatment (negative control)

Group 2 ($n = 10$): MTA Angelus apical plug and backfilling by gutta-percha

Group 3 ($n = 10$): Filling of root canal system entirely by MTA Angelus

Group 4 ($n = 10$): Biodentine apical plug, and backfilling by gutta-percha

Group 5 ($n = 10$): Root canals completely filled with Biodentine

For all the test root samples, coronal access was prepared using #245 bur in a high-speed handpiece and the canal patency was checked by probing with endodontic explorer DG-16 and #10 K-file (DentsplyMaillefer, Switzerland). The working length was determined followed by cleaning and shaping of the root canals which was completed with ProTaper rotary Ni-Ti files (Dentsply Maillefer, Switzerland) upto F3(#30/09) at a speed of 300 rpm using an X smart plus endomotor (DentsplyMaillefer, Switzerland). The canals were irrigated with 2 ml of 3% NaOCl after every instrumentation using 27-gauge side vented needle and syringe. #1-5 Peeso reamers were used for simulation of immature roots with open apices. Then, a #5 Peeso reamer was passed beyond the apex so that apices were enlarged to a diameter of 1.5 mm. Following cleaning and shaping, all the root canals were irrigated with 5 ml of normal saline. Before the obturation, the root canals in all the root samples were irrigated with 17% ethylenediamine tetraacetic acid (EDTA)(Canalarge, Ammdent, Mohali, India) for 1 min to remove the smear layer. Final flush was done with 5 ml of normal saline and excess moisture from the canals was removed with sterile absorbent points.

In Group 2 root samples, MTA angelus (Angelus, Londrina, Brazil) mix was placed into the canal with MTA messung gun and advanced apically with endodontic pluggers of different sizes 9/11, 5/7, 1/3(Dentsply Maillefer, Germany) and 5 mm thickness of the apical plug was maintained. After 24 hour, remaining part of the root canals was obturated with F3 master gutta-percha point and AH Plus sealer.

In samples of Group 3, 5 mm of MTA apical barrier was placed and then the remaining canal was filled with MTA up to 1 mm short of CEJ. In root samples of Group 4, an apical plug of 5 mm with Biodentine and backfilling with gutta-percha and AH Plus sealer was done. In Group 5, Biodentine apical plug was prepared, and then immediately, remainder of coronal part of the canal was filled with Biodentine. For all the experimental root

samples, post obturation radiographs were taken in both labiolingual and mesiodistal directions to ensure homogeneous and adequate root filling without voids. The filled roots were stored in an incubator for 1 month at 37°C and 100% relative humidity for allowing obturating materials to set completely. Acrylic resin blocks with 10 mm height and 20 mm width were prepared. All the roots were embedded in a vertical direction in these blocks with a distance of 2 mm between the top of the acrylic and the cement – enamel junction.

III. FRACTURE RESISTANCE EVALUATION

Fracture resistance was measured by universal testing machine. A cylindrical ball indenter of 2.2mm diameter with a sharpened conical tip was attached to the upper part of universal testing machine to apply force to the root causing vertical root fracture. The root was placed under the plunger on the lower platen, and the plunger was driven downward exactly along the long axis of the root. A vertical load was applied at a crosshead speed of 0.5 mm/min until the root fractured. The maximum load at the time of fracture recorded in Newtons was then converted into Megapascals

(MPa) using the formula:

$$MPa = \frac{\text{Maximum load in Newtons (N)}}{\pi/4 (\text{Area of cross-section of ball indenter})^2}$$

Where $\pi = 3.14$ (constant value)

IV. STATISTICAL ANALYSIS

All the collected data about forces at which fracture of teeth occurred in MPa were tested to statistical analysis using SPSS 23.0 version IBM (USA). A one-way analysis of variance was used to compare the values of forces at which the fracture of roots obturated with different materials occurred. Post Hoc Tukey's HSD test was carried out to assess whether the mean difference between a pair of group is significant or not. A p value of <0.05 was considered as statistically significant where as a p value <0.001 was considered as highly significant.

V. RESULTS

The mean fracture resistance value and standard deviation were obtained. Significant variations ($p < 0.05$) between the groups were observed in ANOVA test and also Post hoc Tukey analysis which were used to determine significant differences among experimental and control groups. The mean fracture resistance value was higher in Group 1 (control group, without instrumentation) when compared to experimental groups with statistically significant difference ($P < 0.05$) [Table 1]. When experimental Group 2 compared to Group 3, Group 4 and Group 5 show significant difference while Group 3 when compared to Group 5 show not significant results. (Table 2)

TABLE 1

Comparison of -Mean, Standard Deviation and P-value of fracture resistance values in MPa for experimental and control groups

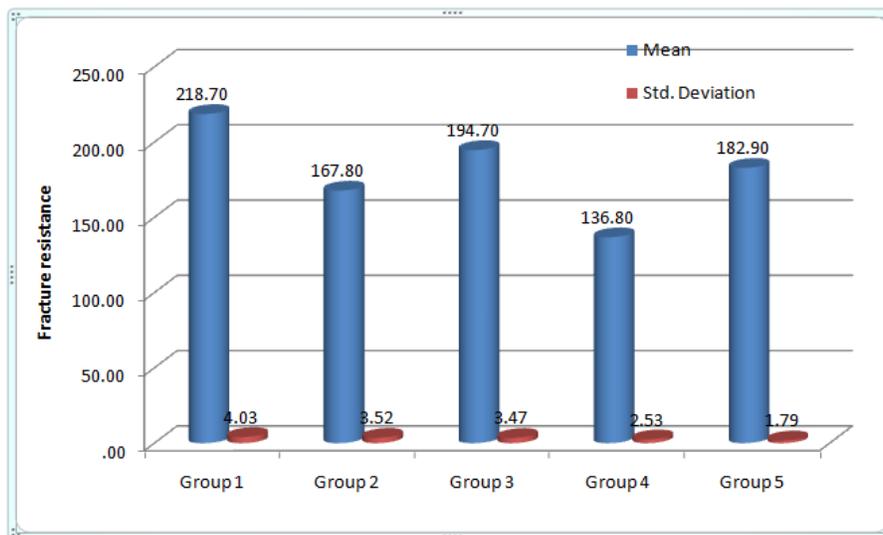
	N	Mean	Std. Deviation	F	Df	P	Inference
Group 1	10	218.70	4.03	929.52	4	0.0001 (<0.001)	Highly significant
Group 2	10	167.80	3.52				
Group 3	10	194.70	3.47				
Group 4	10	136.80	2.53				
Group 5	10	182.90	1.79				
Total	50	180.18	27.78				

TABLE 2

Pair wise comparisons of five groups (1, 2, 3, 4, 5) with respect to fracture resistance (Mpa) by Post Hoc Tukey's HSD to see whether the mean difference between individual group is significant or not

	Group 2	Group 3	Group 4	Group 5
Group 1	50.9*	24.0*	81.9*	35.8*
Group 2		-26.9*	31.0*	-15.1*
Group 3			-57.9*	11.8
Group 4				-46.1*

*Indicates that the difference in the mean is significant at 0.05 level.



GRAPH 1 - Comparison of Mean, Standard Deviation and P-value of fracture resistance values in MPa for experimental and control groups

VI. DISCUSSION

The occurrence of trauma in the permanent dentition has been reported to range from 2.6% to 35% with the greater incidence occurring between the ages of 7 and 15 when most

permanent teeth are in an incomplete root development stage. Unfortunately, approximately 50% of the traumatized teeth are diagnosed with pulpal necrosis and incomplete root formation.²¹ Immature teeth have thin dentin walls and, thus, are more fragile than the mature teeth, posing difficult for the clinicians.²² In spite of current feasibility of treatment of open

apex, immature teeth remain very sensitive to fracture, especially in the cervical area.²³Therefore, a material that reinforces strength must be selected in such cases, which should be easy to manipulate, prevent microleakage, removed easily when necessary and can adhere consistently to the dentin walls.²⁴ For such open apices, apexification involving induction of a calcific barrier at the apex with calcium hydroxide has been tried. The root-end closure procedure using calcium hydroxide is standardized but time-consuming and require on an average of 7–8 months for apical bridge formation. It is also associated with long treatment time and thus increasing the risk of failure of treatment²⁵and decreases the fracture resistance of root dentin.²⁶ Various materials including composite resins, resin-reinforced glass ionomers, resin-based root canal fillings (Resilon), different post systems and different root-end filling materials like MTA and BA have been used previously to reinforce the immature permanent teeth.^{23,26,27}In this study, the efficiency of MTA angelus and Biodentine on root fracture resistance was evaluated and also compared in human simulated immature premolar teeth with predetermined and same diameter and length. When restoring immature teeth, single-visit apexification by using a MTA barrier offers several advantages over traditional apexification. These include lesser appointments for the patient and development of an immediate apical seal and less potential to weaken the tooth structure compared with long-term Ca (OH)₂. MTA offers a biologically active substrate for bone cells which stimulates interleukin production owing to its alkaline pH and calcium ion release. It also initiates the calcific bridge formation within first postoperative week.¹⁶ But the procedure of apexification with MTA poses various disadvantages such as difficult handling characteristics, prolonged setting time, potential coronal discoloration, and less compressive strength as compared to dentine and Biodentine.²⁸The roots were placed into acrylic block for homogeneous distribution of the force. The influence of the periodontium was not considered in this study. The root length was standardized to 12 mm, and the apex was enlarged using peeso reamers (No. 1–5).Stuart *et al.*,²⁹ Tanalp *et al.*,¹⁴ and Seto *et al.*³⁰had used asimilar method for preparation of root canals. During apexification procedure, the most common disadvantage with gutta-percha usageas a backfilling material is microleakage.³¹Previous research has indicated that no known method with various techniques of cold or warm compaction of gutta-percha can predictably produce a coronal bacterial tight seal when the material is exposed to microorganisms and their by-products.³²This has led to the current focus in endodontic research over exploring various alternatives to gutta-percha as obturating material.

Studies have proved that MTA apexification and backfilling with gutta-percha have less fracture resistance than MTA apexification and backfilling with different types of prefabricated intracanal metalposts or fiber posts.^{14,33}One study has also stated that there is no statistical difference between MTA apexification with gutta-percha backfilling and complete root canal obturation with MTA.²²

Considering these conflicting results, the present study compared the complete root canal obturation using Biodentine or MTA Angelus. Mandibular premolars were used which have a circular cross-section in the mid to apical region that would result in uniform distribution of load to fracture. They also simulate

clinical situation better, where chewing forces are maximum. Some other studies have stated that smear layer might act as a coupling agent enhancing MTA bonding to root dentin.³⁴However, recent studies have showed that the removal of smear layer must be done with 17% EDTA to improve the sealing ability of MTA.³⁵ Hence, in the present study, 17% EDTA was used to remove the smear layer before obturation of canals. A 90° angle was applied for placement of the teeth into the testing machine as previously demonstrated by Tuna *et al.*²⁶Although the force applied in *ex vivo* studies cannot completely simulate the clinical situations, standardizing the force in all of the study groups makes it possible to compare the strengthening effect of materials tested.

In present study, the mean bond strength values were higher for control group when compared to the experimental groups with a difference that was statistically significant. Contrary to these findings, a few studies concluded that control group exhibits less fracture resistance than the canals completely obturated with MTA.^{16,36} Also, it appears that long-term (tested for 1 year period) placement of MTA in the canal system not just provides increased resistance to fracture but also increases the strength of the tooth with time. Researchers postulated that MTA might prevent the destruction of collagen by inducing the expression of a tissue inhibition of metalloproteinase-2 (TIMP-2) in the dentin matrix. According to histological analysis, expression of collagen type I, matrix metalloproteinase (MMP)-2, -14, and TIMP-2 on the dentin were noticed in MTA-treated teeth. TIMP-2 prevented the organic matrix from degradation caused by MMP-2,-14.³⁴ Hence, Hatibovic-Kofman *et al.*³⁷stated that the reason for high fracture resistance of dentin at long-term MTA placement might lie in the inhibitor activities of TIMP-2 and reduced expression of MMP-2, -14 in the dentine matrix.

The mean fracture resistance values were higher for root canals obturated completely with MTA Angelus when compared to Biodentine. However, the difference was not statistically significant. This finding was in line with results of a study conducted by Elnaghy and Elsaka.³⁸ Biodentine has shown high compressive strength, reduced setting time (9–12 min), and less solubility and better handling characteristics as compared to MTA. A special feature of Biodentine is its capacity to continue improving the compressive strength with time over several days. It reaches up to 300 MPa after 1 month, which is actually more than compressive strength of natural dentin (297 MPa).³⁹ The mean fracture resistance values were higher for root samples of MTA angelus apexification group as compared to for root samples of Biodentine apexification group, and the difference between them was statistically significant. This can be due to the superior sealing ability of MTA angelus as compared to Biodentine.

The present mechanical testing was performed with greater effort to simulate the exact clinical conditions and to achieve standardization. However, *in vitro* conditions do not completely simulate *in vivo* conditions. The teeth used in the present study may simulate the shape of immature teeth but do not simulate the tissue composition and physical properties. The ability of these materials to reinforce the strength of the immature teeth should be evaluated clinically.

VII. CONCLUSION

Complete obturation of root canals with bioactive materials (MTA Angelus/Biodentine) displayed improved fracture resistance of immature teeth when compared to apexification groups. Further *in vivo* and *in vitro* studies with larger sample sizes are necessary to support or refute the efficacy of MTA Angelus and Biodentine as a root canal filling materials.

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Impact of climate change on water in south Sudan

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ABSTRACT:

The Republic of South Sudan became a member to the United Nations framework convention on climate change on 17th January, 2014 after attaining its independency from Sudan in 2011 after a 98.8% vote in a referendum for self-determination. As one of the least developed countries, which is vulnerable to climate change impacts, having emerged from a long civil war, the country is being faced with a lot of challenges ranging from effects of war to institutional development and economic prosperity. South Sudan is vulnerable to the effects of climate change and associated socioeconomic losses and damages due to the dependence of its population on climate sensitive natural resources for their livelihoods. Given the frequent droughts experienced in the country, a major priority is to promote the harvesting and retention of water for different uses. The poor quality of water can directly impact the water availability, this paper search the possible implication of climate change for the use and management of water resources in South Sudan. By observation there is changes in river water quality and quantity and climate change is serious increased demands for water and give more pressure on water resource because of the impact and is not only from climate also from non-climatic flooding and drought etc.

The aim of this study paper is to review the impact of climate change on water resources to assist the future of water resource in South Sudan and the outcome of this work will also be important for studies on Nile River. Water quantity and quality in South Sudan have declined in the past two decades. This review paper also shows that the impact of climate change is manifested in the frequency of droughts and shrinking rivers and streams. In a number of previously perennial rivers, water flow has become seasonal among. Lower water flows can lead to siltation. Large quantities of sediment are held along the river course downstream and flash flooding is also impacting negatively on the livelihood of the communities downstream as torrential rainfalls had become unpredictable consequently destroying lives of the masses. Crop yield is also being impacted upon by climate change with high reduction in production raising alarming effects on food insecurity. South Sudan is vulnerable to the impacts of climate change due to its poor infrastructure and a range of developmental challenges resulting from the long civil conflict while 95% of the population depend on climate-sensitive natural resources, particularly rain-fed, subsistence agriculture and total dependence on forests as a source of energy and other environmental goods and services.

Key Words: Climate Change, South Sudan, water quality and quantity availability, water demand, water withdrawal.

INTRODUCTION

1.1 Background

The impact of climate change is crucially important for deciding on a proper course for greenhouse gas emission reduction policies. However, establishing a comprehensive estimate of the impact of climate on human welfare is exceedingly difficult. Water is a linchpin that integrates many sub regions and sectors. Water quantity and quality will be directly affected by climate change. Available water supplies also will be affected by changes in demand from multiple sectors competing for water resources.

Changes in the hydrological cycle will cause changes in ecosystems which will, in turn, affect human health (e.g., by altering the geographic distribution of infectious diseases) and biological diversity.

Increases or decreases in annual runoff could occur over much of the lower latitudes and in mid continental regions of mid and high latitudes. Increases in temperature lead to a rise in evapotranspiration which, unless offset by large increases in precipitation or decreases in plant water use, results in declines in runoff, lake levels, and groundwater recharge and levels. The greatest impact of declines in supply will be in arid and semi-arid regions and in areas with a high ratio of use relative to available renewable supply, as well as in basins with multiple competing uses. Alternatively, regions that experience substantial increases in precipitation are likely to have substantial increases in runoff and river flows.

Science and policy agenda on global concern because global warming are continues to rule the world and the primary concern is the impact of climate change on water resource¹. The 1997 UN comprehensive assessment of the freshwater resources of the world estimated that approximately a third of the world's population were living in countries deemed to be suffering from water stress, they were withdrawing more than 20% of their available water resources. The assessment went on to estimate that up to two-thirds of the world's population would be living in water stressed countries by 2025². Due to impact of Climate change on water resources there is migration and population change. It is very important for water resources managers to know and prepare to deal with the effects of climate change on the changes of water availability. The better understanding on the relationship between climate change, anthropogenic activities and the water resources availability as well as its withdrawal and use, will allow water resources managers to make more rational decisions on water allocation and management³.

Virtually all studies into the impact of climate change on water resources have assessed the implications of future climate for the current water management system⁴.

South Sudan's water resources are unevenly distributed both spatially across the country, and temporally, since water quantities vary substantially between years depending on periodic major flood and drought events. The Nile River hydrological basin covers most of the country. Water is held in perennial rivers, lakes and wetland areas, in seasonal pools, ponds, rivers, streams and extensive floodplains. Water demand is still low given the country's relatively small population, density and the lack of industrial development, but it is expected to increase rapidly in the future with projected population growth and economic development. In 2007, the Ministry of Water Resources and Irrigation reported that the impact of human activities on the availability and quality of water resources was already evident and a growing concern. There is increased pollution, reduced river flows, declining water tables in urban areas and both surface and ground waters are becoming contaminated (MWRI, 2007)⁵.

Water is a naturally circulating resource that is constantly recharged. Therefore, even though the stocks of water in natural and artificial reservoirs are helpful to increase the available water resources for human society, the flow of water should be the main focus in water resources assessments. The climate system puts an upper limit on the circulation rate of available renewable freshwater resources (RFWR). Although current global withdrawals are well below the upper limit, more than two billion people live in highly water-stressed areas because of the uneven distribution of RFWR in time and space¹. Climate change is expected to accelerate water cycles and thereby increase the available RFWR. This would slow down the increase of people living under water stress; however, changes in seasonal patterns and increasing probability of extreme events may offset this effect. Reducing current vulnerability will be the first step to prepare for such anticipated changes.

There is a need to consider the likely positive and negative impacts of climate change on the natural environment and people across the globe. Deltas are widely recognized as being highly vulnerable to the impacts of climate change particularly sea level rises and river runoff changes⁶.

Increases in hydrological variability (larger floods and longer droughts) are likely to result in increased sediment loading and erosion, degraded shorelines, reductions in water quality, reduced water supply for dilution of point-source water pollutants and assimilation of waste heat loads, and reduced stability of aquatic ecosystems.

Both the quality and quantity of water must be considered for the sustainable management of freshwater resources. Globally, water quantity is being stressed by changes in climate, increased demand from growing populations, and an increased need of water for agriculture and industry⁷.

Water quality is similarly being stressed from pollutants associated with growing populations, land cover change, and irrigation and industrial effluents⁸. Water quality is fundamentally connected to water quantity by the fact that water of inferior quality effectively reduces the amount of available water for some users (or it can dramatically increase the cost of obtaining available water because of necessary treatment).⁹

2.0 MATERIALS AND METHODS.

2.1 Study Area

South Sudan is a landlocked country that falls almost entirely (96 per cent) within the Nile River Basin in East-Central Africa¹⁰. It is bordered in the north by Sudan, by Ethiopia and Kenya in the east, by Uganda and the Democratic Republic of the Congo (DRC) in the south, and in the west by the Central African Republic. South Sudan lies within the tropical zone between latitudes 3.5° and 12° North and longitudes 24° to 36° east. It occupies an area of 658,842 km²¹¹. The country is covered by extensive grasslands, wetlands and tropical forests. Its natural assets include significant agricultural, mineral, water, and wildlife, timber and energy resources.

With less than 13 people per square kilometre, population density in the country is one of the lowest in sub-Saharan Africa¹². Livelihoods in the northern dry areas are dominated by seasonal agriculture, pastoralism, fishing and hunting. Livelihood opportunities vary in the low woodland savannahs in the country's centre¹³. The country is divided into three regions (former historic provinces): Bahr el Ghazal in the northwest, Equatoria in the south and Greater Upper Nile in the northeast. The country initially comprised of ten states but this has now increased to thirty-two.

2.2 Data Sources

The study review of the impact of Climate Change on water resource in South Sudan was developed through analysis of secondary source data. These sources include reviewed materials present in the journal, books, national presentations, supplemented by non-peer reviewed literature from a wide range of other sources, including international and non-governmental organizations, and some commercial organizations. These sources were collected through comprehensive and extensive literature search using academic reference databases including Web of Knowledge, Science Direct and Google scholar (including databases such as aquatic science, conference papers index for life, Environment and Aquatic science, GeoRef, International Bibliography of the Social Science, Oceanic Abstracts) were all used to identify relevant literature and articles in the news line from the country. This review involved obtaining data from the past and present studies, and current literature on the impacts of climate change on water resource and hydrology. The study relied on secondary data, and the data were analysed using descriptive methods to obtain logical deduction and sequential presentation of facts from the data obtained that gave a precise picture of the subject matter.

2.3 The Environmental implication of Climate Change

2.3.1 Water withdrawals and balances

Water availability in upstream and downstream areas of trans-boundary river basins is an extremely sensitive issue¹⁴. Because South Sudan is located in the "middle" of the Nile Basin, between the upstream Nile Equatorial Countries (Burundi, Democratic

Republic of Congo, Kenya, Rwanda, Tanzania and Uganda) and the downstream Eastern Nile Countries (Egypt, Ethiopia and Sudan), natural water retention, water withdrawals and development activities in countries upstream of South Sudan affect its water quantity and quality¹⁵. Lateral water transport flows from positive to negative areas and via floods and groundwater flow. Each individual country and water-use sector in the transboundary Nile Basin monitors water data, such as withdrawals, stocks, wastewater return flows and groundwater-well yields, making it difficult to assess the state of the entire basin's water flows. Earth observation data at the ecosystem scale helps to understand the Nile River Basin's major water flows and fluxes¹⁴.

2.3.2 Water quality

Higher water temperatures, increased precipitation intensity, and longer periods of low flows are projected to exacerbate many forms of water pollution, including sediments, nutrients, dissolved organic carbon, pathogens, pesticides, salt and thermal pollution. This will promote algal blooms¹⁶, and increase the bacterial and fungal content¹⁷. This will, in turn, impact negatively on the ecosystems, human health, and the reliability and operating costs of water systems. The Nile Basin Initiative's 2012 State of the River Nile Basin report noted that over the previous several decades, population growth, agricultural intensification and industrial development throughout the Basin has led to accelerating soil erosion and generally deteriorating water quality. Data on the state of South Sudan's water quality and quantity are lacking, but given that it is more sparsely populated than other Nile Basin countries, it is likely that water quality still corresponds to standards set by the riparian countries and those of the World Health Organization¹⁸. Water quality problems have intensified through the ages in response to the increased growth and concentration of populations and industrial centres. Polluted water is an important vehicle for the spread of diseases. In developing countries 1.8 million people, mostly children, die every year as a result of water-related diseases¹⁹.

At local levels in South Sudan, however, rising urbanisation is associated with municipal wastewater, sewage and industrial effluents running straight into water sources, since most towns have no wastewater treatment facilities, and lack adequate sanitation and sewage management systems²⁰.

Storm water and wastewater infrastructure may need to include climate change effects in their design and evaluation to improve performance under changing water availability, water demand, and water-quality conditions. Likewise, the use of contemporary best management practices to control future non-point-source pollution situations may be most effective if system developments are planned in the context of possible future climate conditions²¹.

2.3.3 Quantity of water

Many of the world's countries already struggle under existing water stress from pressures such as irrigation demands, industrial pollution and water borne sewerage. These pressures will be significantly exacerbated by climate change, which for many regions will result in reduced rainfall and increasing temperatures, further reducing the availability of water for drinking, household use, agriculture and industry. As these competing demands intensify under climate change, effective governance for balancing water demands will become essential, particularly in the face of strong pressures to prioritise industrial uses over other uses such as drinking supplies.

For example, in Africa's large catchment basins of Niger, Lake Chad and Senegal, the total available water has already decreased by 40-60 percent²², and desertification has been aggravated by lower than average annual rainfall, runoff and soil moisture, especially in Northern, Southern and Western Africa. The consequences for water supply include smaller flows in springs and rivers, and decreasing groundwater levels.

In 2016, South Sudan's Ministry of Environment and Forestry reported that over the past two decades, water flow in a number of previously perennial rivers along the border with the Central African Republic had become seasonal. One of the main ecological

impacts of decreased water flow is river siltation. A large part of the sediment created in the White Nile headwaters becomes confined in the Equatorial Lakes, held in the Sudd marshes or deposited along the river course downstream of the Sudd; thus, over its low-gradient course, the Nile's flow is very sluggish¹⁸. Other impacts include the congestion of irrigation channels, water-table declines, receding wetland areas and the loss of vegetation due to the lack of water. In turn, the loss of ecosystem goods and services is having adverse effects on the livelihoods of people who depend on wetlands within South Sudan²³.

The single most critical environmental issue related to the pollution of local water supplies is the recurring incidence of gastrointestinal diseases, due mainly to the consumption of contaminated water²⁰.

Water sources are also subject to the runoff of agrochemical fertilisers and pesticides, which adversely affect water quality. In addition, pollution from the development of the oil industry, particularly in the Unity and Upper Nile States, poses serious threats to wetlands and fisheries²⁴. For example, spillage during oil exploration and the overuse of agrochemicals threaten the Sudd wetlands with pollution and eutrophication²⁰.

2.4 THE IMPLICATION OF CLIMATE CHANGE ON HUMAN WELFARE

2.4.1 CHANGES IN THE DEMAND FOR WATER

The increase in demand is due largely to an increase of population, increase use of domestic appliances and particularly, an increasing usage of water in large scale oil field and industrial use is predicted to decline. Higher temperatures and longer dry periods are expected to lead to increased water demand for irrigation. This may be partially offset by more efficient use of water by plants due to rising atmospheric carbon dioxide.

Higher temperatures are projected to increase water usage for cooling as water withdrawals by electrical generating stations increases. Climate change can be expected to add to this increasing demand. Accordingly Herrington (1996) concurred with this statement when exploring the potential effect of climate change on demand in southeast of England and concluded that per capita domestic demand would rise by an extra 5% by 2021, over that forecast by the NRA, due to climate change temperature increase of just over 1°C

2.4.2 Conflict over water

Changes to accessibility of water have the potential to increase conflict, as the competing demands of private, agricultural, and industrial uses for water put pressure on this precious resources. This may exacerbate conflict in existing water stressed areas competing locally for access to natural springs and rivers, as well as lead to conflicts on a larger international trans-boundary scale. For example, in northern Kenya, the Samburu are having to cope with changing patterns of rainfall and reductions in rainfall amount, which coupled with other pressures on the natural resources are leading to increasing conflict among tribal groups over access to scarce water. whereas in Central Asia, reduced water availability for agriculture has increased tensions among the former Soviet states²¹. The republic of South Sudan is characterised by agro-pastoral communities that depends on rain fed agricultural activities and animal farming thus with the growing concern over the deteriorating condition of water quality and quantity, conflict over water resource accessibility is in the rise as tribal conflict over this shared natural resource is evident.

2.4.3 Impact on Traditional Institutions of Authority and Social Harmony

One area in which oil pollution has dealt a death knell to our customs and traditions is the rugged individualism which it has fostered amongst members of our communities which is contrary to our communal lifestyles as this has resulted into the disintegration of customs, traditions and social values, such as respect for our elders.

By the Dinka tradition (a common practices among the tribes in the whole of South Sudan), elders are given the traditional authority to be custodians of the community and its protectors in times of stress and inconvenience such as during environmental incidents.

The traditional system ensures that no single individual has the right to take what belongs to the community for him or herself. However with the current trend of climatic change, a new level of pattern of living and social moral decay is taking toll, as more tribal conflict is looming due insufficient availability of water for pastoral communities leading to cattle wrestling and conflict between cattle herders and agro pastoral communities hence land grabbing in rampant.

2.5 WATER QUALITY MANAGEMENT

According to the water resource policy, the ministry of water resource and irrigation of the republic of South Sudan is task with the responsibility to maintain and enhance the quality of river, lake and groundwater for the betterment of the population of the republic of South Sudan. They do this both by regulating activities which discharge effluent into water, and by responding to pollution emergencies. The main areas of concern with respect to climate change are the maintenance of water quality through discharge consents, the management of algal blooms, minimising storm sewer overflows and managing pollution incidents (Arnell et al., 1994) possible changes in public health risks were also identified in the 1996 CCIRG report.

2.5.1 Water security under climate change

In most developing countries, especially African and Asian, there are urgent needs to understand the dynamics of local climate patterns and make predictions to respond to climate variability and change. The economies of most developing countries depend heavily on climate-sensitive sectors such as water, agriculture, fisheries, energy and tourism, climate change therefore poses a serious challenge to social and economic development in developing countries²⁵. The shortage of water can be augmented from wastewater utilization after suitable treatment²⁶. Recycled water for irrigation requires less treatment than recycled water for domestic purposes and till date no documented case of human health problems has been reported by the use of unconventional water for irrigational purposes since irrigational agriculture is zero to none. Through the natural water cycle the earth has recycled and reused water for millions of years²⁷. Water recycling by giving technological support can speed up these natural processes. Usually the recycling of unconventional water may be classified as planned recycling and unplanned recycling of which South Sudan lack water recycling mechanism hence water security is a challenge.

2.5.2 Future water use

There are several factors influencing the growth of future water resource use in the republic of South Sudan given the current trend of climate change patterns.

- Population growth: an increase in population means greater demand for water.
- Population concentration: population, particularly in developing countries, is becoming increasingly concentrated in large cities. This has two implications. First, water use is different in an urban environment than in a rural environment. For example, water will be supplied through a pipe network, so more is used than in rural areas, and water is lost through leakage. Second, the increasing concentration of demand means greater pressure on water resources in specific areas such as Juba town, Wau etc.
- Industrial change: industrial development increases the demand for water, but industrial restructuring may reduce it as it can be seen in larger parts of Europe²⁸. As water is seen as more of an economic good, it will be used more efficiently in a country that values the resource given the increasing water stress population.
- Expansion of irrigation: the growth in irrigated areas will lead to more usage of water for agriculture, but this may be offset to a certain extent by improvements in irrigation efficiency by government of respective countries.

- Water use efficiency and demand management: more generally, increased water use efficiency and demand management measures will bring down domestic, municipal and service industry demands, particularly in developing countries.

Environmental requirements: increasing demands for environmental protection will put additional constraints on water resource use. These demands are currently not included in estimates of resource use.

3.0 RESULT AND DISCUSSION

Water uses in the Nile Basin as a whole, threaten its capacity to meet the region's future water demand, including the water needs of South Sudan. Throughout the Nile Basin, irrigated agriculture accounts for more than 80 per cent of water withdrawals¹⁰. Compared to other countries in the Nile Basin, South Sudan's water withdrawal is very low.

According to the Food and Agriculture Organization of the United Nations, total water withdrawal estimates in pre-2011 Sudan was about 27,590 million m³ for the year 2005. The largest water user by far was agriculture, with 26,150 million m³. Municipalities and industry accounted for withdrawals of 1,140 million m³ and 300 million m³, respectively. To arrive at an estimate for water use in South Sudan after 2011, Food and Agriculture Organization calculations were based on the figures for pre-2011 Sudan, with the following assumptions: the same total for South Sudan and Sudan together; no essential changes had taken place; almost all irrigation is located in Sudan; the population of South Sudan is 17 per cent of the total population of pre-2011 Sudan; and most (75 per cent) of the industries are located in Sudan (specifically in the petrol sector)²⁹. After 2011, it is estimated that surface and groundwater withdrawal (primary and secondary) is about 658 million m³/year, representing about 1.3 per cent of the total renewable water resource, with agriculture using the most water and a per capita annual withdrawal of about 60 m³³⁰. By comparison, annual per capita water withdrawal in Ethiopia is 106 m³, in Egypt it is 911 m³ and in Sudan, it is 714 m³.

3.1 Rural communities, sustainable development and water conflicts

Transboundary water co-operation is recognised as an effective policy and management tool to improve water management across large regions sharing common resources. Climate change and increased water demand in future decades will represent an added challenge to such framework agreements, increasing the potential for conflict at the local level. For instance, unilateral measures for adapting to climate-change-related water shortages can lead to increased competition for water resources. Furthermore, shifts in land productivity may lead to a range of new or modified agricultural systems, necessary to maintain production, including intensification practices. The latter, in turn, can lead to additional environmental pressures, resulting in loss of habitat and reduced biodiversity, siltation, soil erosion and soil degradation³¹.

The demand for groundwater resources is likely to increase where surface water resources are becoming inaccessible or unavailable. Intensification of irrigated cropping to meet the food demand of the growing population may also increase groundwater use. Although in South Sudan irrigation practices is very minimal, the need for water resource management is very crucial and estimation of future demand is paramount for the sustainability of population of the republic of South Sudan.

3.2 Water Resources Management

There are several water-management options that might be considered to facilitate adaptation to climate change, including operational changes, demand management, and infrastructure changes. Climate change may translate into changed design and operational assumptions for determining resource supplies, system demands, system performance requirements, and operational constraints. The strategy options available for consideration will vary from system to system, as will the preference among these options. The below outlines some of the potential strategies that might be considered and also discusses some of the challenges in evaluating and implementing the adaptation options²¹.

The Water Resources Management Strategy of South Sudan aims to improve knowledge and capacity in water resource mapping, assessment and monitoring; strengthen the water information system; and promote conflict prevention and sustainable management of water resources

The national government of different countries particularly in the less developed nation must undertake this key ways for water management policies and institutions to address the impacts of climate changes on water resources;

- Undertake assessments to identify areas prone to shortages under climate change and inform integrated water resources management.
- Promote the development of water harvesting structures, including dykes, water reservoirs and canals, to increase water availability.
- Improve water and sanitation infrastructure in urban areas to improve water supply and quality.
- Develop supplementary irrigation systems in rural areas to improve agricultural production and increase food security.
- Establish a regulatory framework for the monitoring of water quality, including penalties for pollution of water sources.
- Develop a solid waste management plan to ensure water quality is maintained.

Although the government of South Sudan is gradually instituting water management policies and regulations, the state of conflict, low population densities and widely scattered villages and towns present formidable challenges to providing water facilities, services and infrastructure in a cost-effective way.

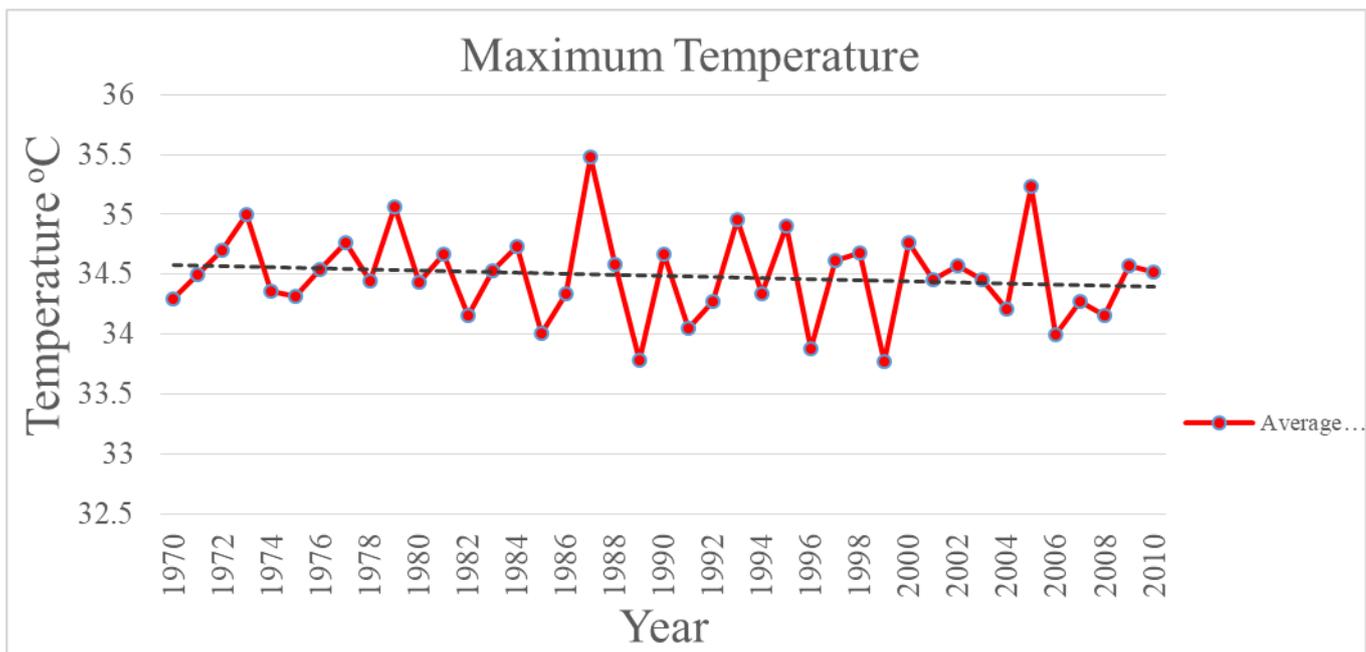
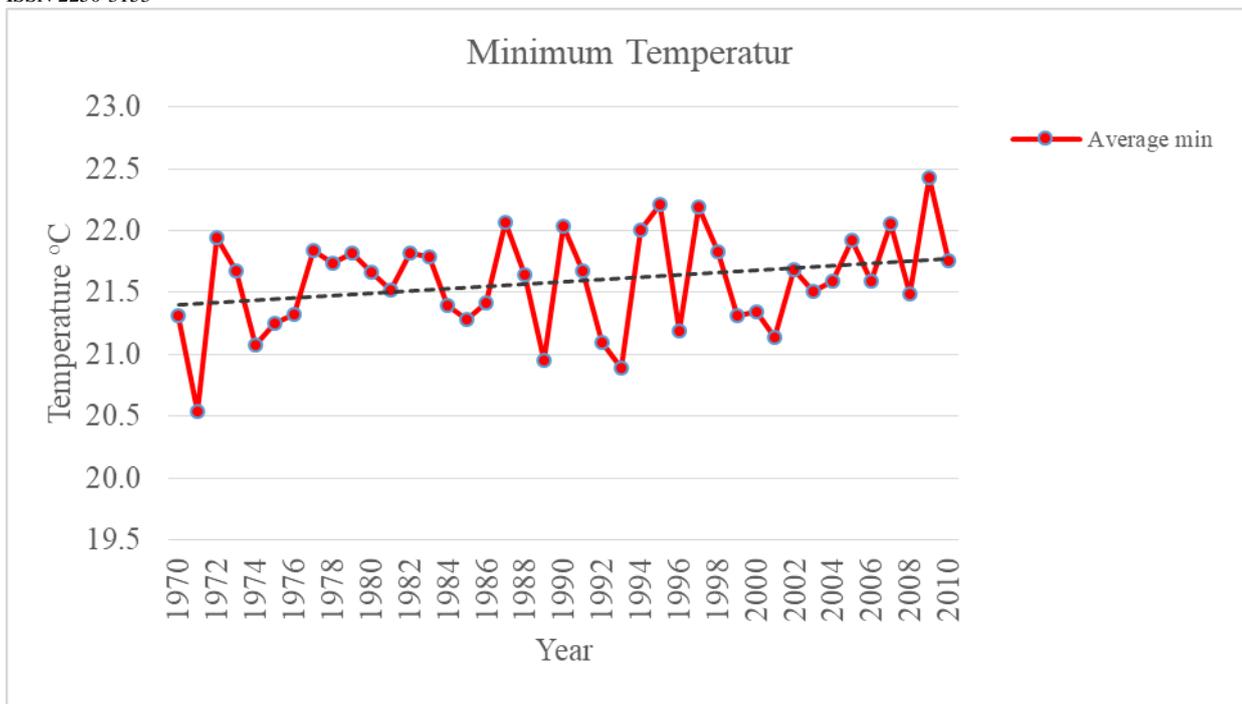
3.3 Temperatures are increasing

Global average surface air temperature has increased substantially since 1970³². The estimated change in the average temperature of Earth's surface is based on measurements from thousands of weather stations, ships, and buoys around the world, as well as from satellites. These measurements are independently compiled, analysed, and processed by different research groups. There are a number of important steps in the data processing.

These include identifying and adjusting for the effects of changes in the instruments used to measure temperature, the measurement times and locations, the local environment around the measuring site, and such factors as satellite orbital drift. For instance, the growth of cities can cause localized "urban heat island" effects.

A number of research groups around the world have produced estimates of global-scale changes in surface temperature. The warming trend that is apparent in all of these temperature records is confirmed by other independent observations, such as the melting of Arctic sea ice, the retreat of mountain glaciers on every continent,³³ reductions in the extent of snow cover, earlier blooming of plants in spring, and increased melting of the Greenland and Antarctic ice sheets.^{34, 34b} Because snow and ice reflect the Sun's heat, this melting causes more heat to be absorbed, which causes more melting, resulting in another feedback loop.³⁵

Additionally, temperature measurements above the surface have been made by weather balloons since the late 1940s, and from satellites since 1979. These measurements show warming of the troposphere, consistent with the surface warming.^{36, 37} They also reveal cooling in the stratosphere.³⁶ This pattern of tropospheric warming and stratospheric cooling agrees with our understanding of how atmospheric temperature would be expected to change in response to increasing greenhouse gas concentrations and the observed depletion of stratospheric ozone.³⁸ as it can be seen in the climatic condition in the republic of South Sudan where in the 1970's the temperature cooler than today.

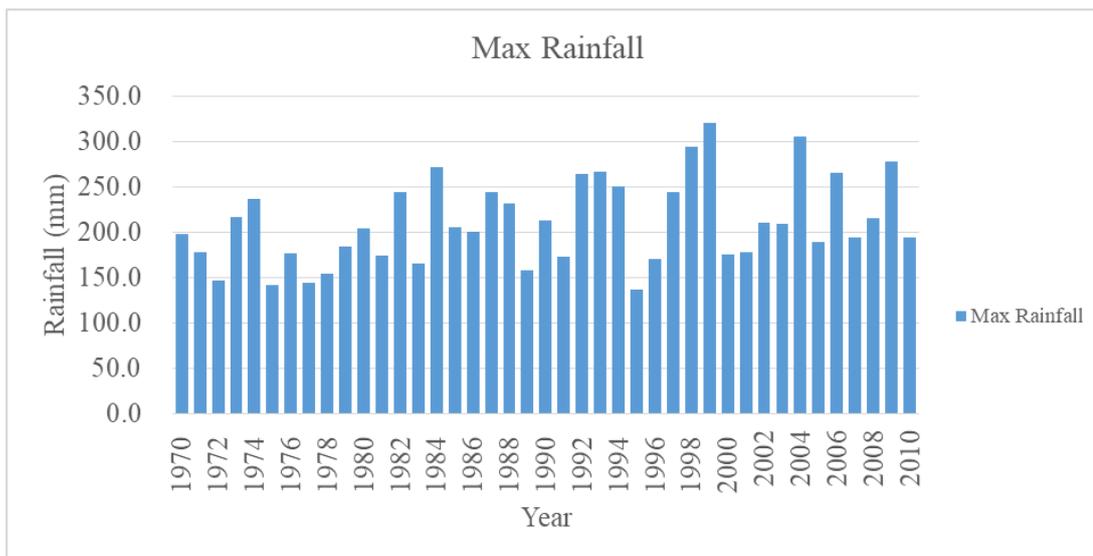
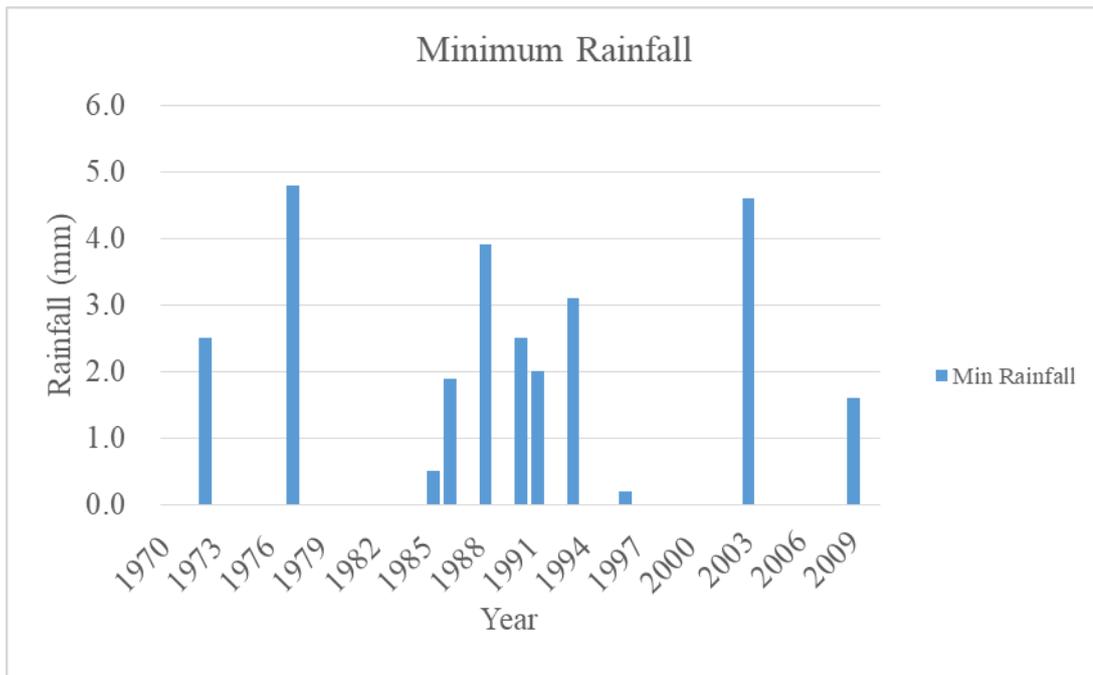


Increased extremes of dryness and wetness are projected for much of the globe, meaning a generally greater risk of droughts and floods. This has already been observed and is projected to continue. In a warmer world, precipitation tends to be concentrated into heavier events, with longer dry periods in between.

3.4 Precipitation patterns are changing

Precipitation is not distributed evenly over the globe. Its average distribution is governed primarily by atmospheric circulation patterns, the availability of moisture, and surface terrain effects. The first two of these factors are influenced by temperature. Thus, human-caused changes in temperature are expected to alter precipitation patterns, observations show that such shifts are

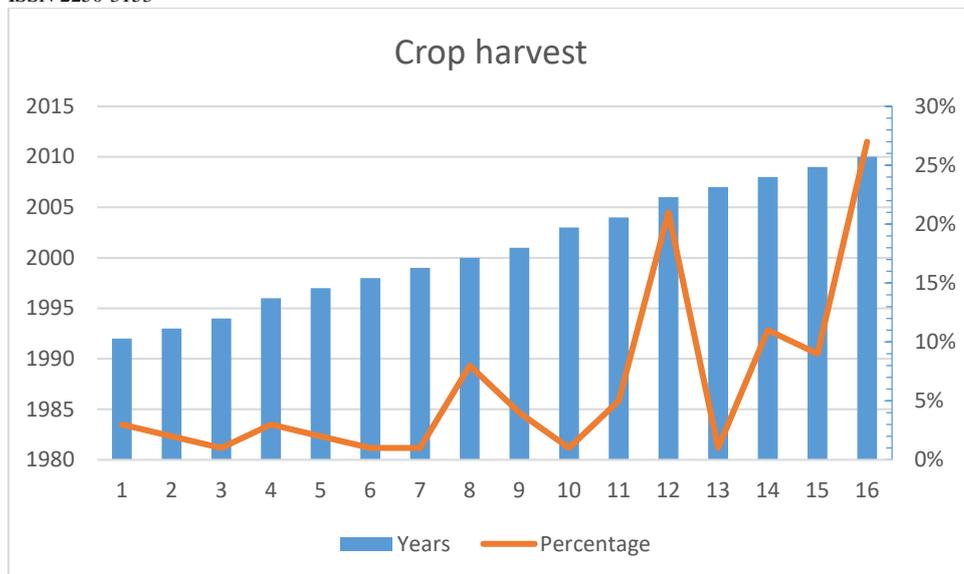
occurring compared to 1980's in the republic of South Sudan with the current situation as changes have been observed in the amount, intensity, frequency, and type of precipitation.



3.5 Crop production patterns

According to the Food and Agriculture Organization of the United Nations, total water withdrawal estimates in pre-2011 Sudan was about 27,590 million m³ for the year 2005. The largest water user by far was agriculture, with 26,150 million m³. In the below figure, shows the results of water resource management compared to the early days when mechanised system of agriculture is lacking in the country.

However, in a warmer future climate, there will be an increased risk of more intense, more frequent, and longer-lasting heat waves, example of the type of extreme heat event that is likely to become much more common unless people adapt to new climate change adaptation mechanism.



3.6 Factors contributing to current vulnerability to climate variability

3.6.1 Reliance on rain-fed subsistence agriculture

Traditional subsistence agriculture is the dominant economic activity in the republic of South Sudan with approximately 78% of households reliant upon crop farming and animal husbandry as their main sources of livelihood. Farmers rely on rain fed agricultural activity and the use of traditional methods of farming. This combination renders them highly vulnerable to climate variability, particularly erratic rainfall. Unfavourable weather conditions such as persistent droughts and annual flooding resulting into crop and livestock losses. Droughts are also enhancing the encroachment of the desert while flash floods have destroyed forests in low lying areas of South Sudan and particularly in areas close to the Sudd and Marcher wetlands and the White Nile.

3.6.2 Increased soil erosion

Deforestation, overgrazing and wildfires and soil erosion in South Sudan is increasingly becoming a threat to the country. Consequently rivers, lakes, seasonal streams, are silting up, reducing the supply of water for domestic uses. Soil quality is also deteriorating which is negatively affecting agricultural productivity.

3.6.3 Increased deforestation

With the independency of South Sudan, influx of refugees, and population growth in South Sudan have resulted in an increased demand for fuel wood, as well as land for agriculture and residential purposes. The alarming rate of deforestation is accelerating day in day out. Land cover changes indicates a dramatic shift from woodland and forest to cultivated land and bare soil. Deforestation and habitat degradation have decreased the ability of forest ecosystem to provide important environmental goods and services to rural communities. This increases the vulnerability of rural communities to climate variability, as the goods and service provided by these ecosystems buffer communities against the crop failures associated with erratic rainfall, floods and droughts. Deforestation is also having a negative impact on biodiversity and wildlife conservation in South Sudan.

3.6.4 Limited institutional capacity to cope with climate variability

There are several institutional capacity constraints in South Sudan that limit the ability of the government to reduce climate change vulnerability. As a new country, many policies and strategies related to environmental management and agriculture are nascent and do not explicitly include climate variability and change. There is inadequate institutional arrangement in the country for effective coordination, planning and implementation of climate change adaptation interventions. Countries like South Sudan which is under developed has limited financial resources to implement programmes geared towards reducing vulnerability to climate change. These institutional capacity constraints limit the integration of climate change adaptation into national policies and development planning processes in South Sudan.

4.0 RECOMMENDATION AND CONCLUSION

4.1 Recommendation

Projected increases in human demand for water would exacerbate problems associated with the management of water supply and quality. Managing increased water demands will be particularly problematic in regions experiencing increases in variability and declines in runoff. Improved management of water infrastructure, pricing policies, and demand-side management of supply have the potential to mitigate some of the impacts of increasing water demand.

There is a need for the government of the republic of South Sudan to improve the environmental health related infrastructure to reduce the spread of water borne diseases which will be exacerbated by climate change as the quality of water deteriorates impacting negatively on its availability.

South Sudan is home to the largest designated Ramsar site of environmental importance that helps in purifying and buffering the excess water, the Sudd, which is very crucial in regulating the weather patterns in the Sahel region, the horn of Africa and the greater East Africa region. The Sudd wetland as a barrier to the Southward encroachment of the Sahara Desert and its preservation and management should be a top priority of the republic of south Sudan.

4.2 Conclusion

Over the next few years, an increasing population and increasing use of water will put increasing pressure on water resources pressures will increase most rapidly in parts of the world. Climate change has the potential to exacerbate water resource stresses in some areas, but ameliorate them in others. This paper describes an Impact of climate change on water resources. The climate change impact on water resources has been shown to be very sensitive to the climate change scenario, to the water demand, quality, quantity scenario, and also to the precise definition of water resource stress.

Water quantity and quality in South Sudan have declined in the past two decades. In a number of previously perennial rivers, water flow has become seasonal. Lower water flows can lead to siltation. Large quantities of sediment are held along the river course downstream. With municipal wastewater, sewage and industrial effluents running straight into water sources due to a lack of wastewater and sanitation management, water quality is declining in urban areas and contaminated water is responsible for recurring incidences of gastrointestinal diseases. Other significant threats to water resources.

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Anthelmintic resistance in naturally infected sheep flocks of Cuddalore district, Tamil nadu.

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ABSTRACT

Anthelmintic resistance against commonly used anthelmintics (ivermectin, levamisole, and fenbendazole) was studied in naturally occurring gastrointestinal (GI) nematodes in adult sheep flocks of Cuddalore district, Tamil Nadu by using Faecal egg count reduction tests (FECRT) and also to determine the efficiency of anthelmintics (fenbendazole, levamisole and ivermectin) used for treatment against nematode parasites. The results of the present study revealed high levels of anthelmintic resistance to Fenbendazole treated sheep flocks in Cuddalore district with the reduction of 50 - 89 per cent, whereas, a low resistant to Levamisole with the faecal egg reduction of 93 - 95 per cent. Ivermectin was found to be effective in controlling nematodes in all the sheep farms. The post-treatment (fenbendazole and levamisole) larval culture revealed the presence of *Haemonchus contortus* larvae.

Index terms: Anthelmintic resistance, Sheep, Cuddalore

INTRODUCTION

The infections of gastrointestinal parasites among small ruminants were most prevalent throughout the year in organized and small holding flocks in varying intensity (Varadharajan and Vijayalakshmi, 2015a). Parasite control, especially the control of helminth parasites, predominantly relied upon the use of anthelmintic drugs and it will continue to remain as the cornerstone of helminth control in the foreseeable future (Sanyal, 2004). Therefore, periodic evaluation of efficacy of commonly used anthelmintics against gastrointestinal nematodosis in sheep to detect the emergence of resistance is an important area of helminth control. This would help in strategic and judicious use of anthelmintics in a particular area and further limit the development of resistance. Anthelmintic resistance has become an increasingly widespread problem in recent years in many parts of India (Dhanalakshmi *et al.*, 2003; Das and Singh, 2005; Chaudhary *et al.*, 2007; Singh *et al.*, 2010, Varadharajan and Vijayalakshmi, 2015b). As, the informations available on anthelmintic resistance is sparse in Cuddalore district, Tamil Nadu, so the present study was undertaken to detect anthelmintic resistance against commonly used anthelmintics (ivermectin, levamisole, and fenbendazole) in naturally occurring gastrointestinal (GI) nematodes in sheep flocks.

MATERIALS AND METHODS

The study area

The study was conducted in six small holder sheep flocks of Chidambaram, Kattumannarkoil, Cuddalore, Panruti, Vridhachalam and Tittakudi taluks of Cuddalore district. One sheep flock from each taluk was selected based on good management and having more than 60 animals. Cuddalore district is located between 11⁰11' to 12⁰35' North latitude and 78⁰38' to 80⁰ East Longitude and is predominately an agricultural district. Average elevation of the district is 1 m (3 ft) above mean sea level.

Experimental design

The selected sheep were of both male and female and of 5 to 15 months of age. The age of individual sheep was determined from birth register maintained in the farm and also by dentition. Each sheep was identified using a numbered ear tag. None of the

sheep received any anthelmintic two months before the start of the experiment. The sheep were then naturally infected on pastures. Faecal egg counts expressed as egg per gram was done on day 0 before treatment and then 10 days after treatment with anthelmintics.

Anthelmintic treatment

Each sheep was treated with an anthelmintic with a dose recommended according to the manufacturers. The anthelmintics used were: Fenbendazole - 5 mg/kg body weight [PANACUR – Intervet India pvt Ltd]; Levamisole Hydrochloride- 15 mg/kg body weight [NILVERM – Virbac Animal Health India pvt Ltd] and Ivermectin - 0.1 mg/kg body weight [HITEK – Virbac Animal Health India pvt Ltd]. Fenbendazole and levamisole were administered orally using calibrated syringes whereas Ivermectin was administered via subcutaneous injection route with calibrated syringes and needles. Pretreatment fasting of 8 hrs was instituted to facilitate effectiveness of the anthelmintics administered.

Assessment of efficacy of anthelmintics

Rectal faecal samples were collected on day zero before treatment and then day 10 after treatment. Using gloved finger, about 10 gm of samples were obtained from each sheep by digital rectal extraction and then immediately placed in a plastic bag. The bag was tightened as close to the faeces as possible to keep off air. Each sample was carefully labeled with the details of the individual sheep for identification, and put in a cold box containing ice packs. The samples were transported to the laboratory for further analysis.

Detection of nematode eggs and estimation of faecal egg counts (FEC)

The simple test tube floatation method was used in the detection of the nematode eggs. Identification of nematode eggs was done as described by soulsby, 1982. FEC were determined as number of eggs per gram for each sample using a modified McMaster technique. The detection level of the McMaster method used was 100 epg.

Faecal egg count reduction test (FECRT)

The EPG of strongyle- type nematodes were subjected to the faecal egg count test (FECRT), to estimate anthelmintic efficiency using the following formula:

$$FECR = \left\{ 1 - \left[\left(\frac{T_2}{T_1} \right) \times \left(\frac{C_1}{C_2} \right) \right] \right\} \times 100$$

Where T_1 and T_2 are pre-and post treatment arithmetic means of the epg in treated groups, and C_1 and C_2 are pre-and post-treatment arithmetic means of the epg in the control group.

Efficacy of each anthelmintic was tested and interpreted according to the World Association for the Advancement of Veterinary Parasitology (WAAVP) recommendations for efficacy evaluations of anthelmintics [4]. Reduction in efficiency and presence of anthelmintic resistance is considered to exist if the FECRT percentage of an anthelmintic is < 95 %.

Coproculture and larval identification

Coproculture was done on pooled pre-treatment samples and post treatment samples for identifying the species of infecting nematodes. Mature third stage larvae were identified based on morphological characters (VanWyk and Mayhew, 2013).

Interpretation of results

The data were analysed statistically for finding out the per cent reduction in egg counts using a programme, RESO. Reduction in egg counts of less than 95 per cent with lower 95 per cent confidence limit less than 90 was considered as indicative of resistance against the drug (Coles et al. 1992).

RESULTS AND DISCUSSION

All the investigated sheep were found positive for GI nematode infection on day 0 of screening and on day 10, the post treatment revealed the variation in the degree of egg reduction in all the faecal samples (Table 1).

The mean FECR after treatment with fenbendazole ranged from 50 to 91 per cent in sheep flocks of various taluks indicating resistance for fenbendazole to GINs in Cuddalore district. The mean FECR values after treatment with levamisole ranged from 93 to 96 per cent for sheep flocks of Cuddalore district indicating the susceptibility of nematodes to levamisole. The mean FECR values after treatment with ivermectin ranged from 94 to 97 per cent in sheep is suggestive of susceptibility to ivermectin in nematodes of sheep flocks of Cuddalore district.

The results of the present study indicated multiple resistance for *H. contortus* against fenbendazole and susceptible to levamisole and ivermectin in all the sheep flocks of Cuddalore district. The prevalence of fenbendazole and levamisole resistant nematodes in sheep using FECRT was earlier reported by various authors in Tamil Nadu; Arunachalam *et al.* (2005); Lourderaj, (2005); Easwaran *et al.* (2009) and Meenakshisundaram *et al.* (2014).

In this study, *H. contortus* was the predominant nematode involved in resistance. This is in accordance with earlier surveys on anthelmintic resistance in Tamil Nadu; Meenakshisundaram, (1999); Jeyathilakan *et al.* (2003) and Lourderaj, (2005).

Anthelmintic resistance in *H. contortus* to fenbendazole was also detected in small holder sheep flocks of Cuddalore district, albeit not multiple anthelmintic resistance. A varied response either resistance or susceptibility was exhibited by each flock depending upon the type of anthelmintic drug. This may be due to frequent and indiscriminate use of anthelmintic drugs by the farmers that led to anthelmintic resistance in animals as reported by Jaiswal *et al.* (2013). Thus, the present study indicated that the anthelmintic resistance against fenbendazole in small holder sheep flocks was significant and warrants implementation of proper anthelmintic treatment strategies to check further development of resistance against levamisole and ivermectin.

CONCLUSION

Faecal egg count reduction tests (FECRT) were conducted in sheep flocks of all the 6 taluks of Cuddalore district, Tamil Nadu to determine the efficiency of anthelmintics (Fenbendazole, Levamisole and Ivermectin) used for treatment against nematode parasites. The results of the present study revealed high levels of anthelmintic resistance to Fenbendazole treated sheep of all the field flocks in the district. It was found that Levamisole and Ivermectin were effective in reducing the EPG in all the field flocks. It was clearly demonstrated that the sheep in the Cuddalore district developed resistance to Fenbendazole as a result of frequent and routine usage. The resistant anthelmintic to be withdrawn from use and replace it with an alternate drug along with suitable grazing methods could be the need of the hour.

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Table 1. Mean faecal egg counts and faecal egg count reduction values on pre and post anthelmintic treatments in Sheep

SI No	Smallholder flocks	Anthelmintic	Mean faecal egg count (EPG)		Mean faecal egg count in control group (EPG)		FECR (%)	95% confidence limit	
			before treatment	after treatment	before treatment	after treatment		Upper	Lower
1.	Chidambaram Taluk	FBZ	1386.66±74.13	700±41.64	1806.66 ± 46.80	2326.66± 104.71	50 ^R	57	41
		LEV	1793.33±127.56	86.66±19.86			95	97	92
		IVM	2226.66±46.80	100±24.74			96	97	92
2.	Kattumannarkoil Taluk	FBZ	1673.33±96.07	426.66±42.21	1626.66 ± 111.33	2293.33 ± 107.12	75 ^R	80	68
		LEV	1840±107.76	80±20.70			96	97	93
		IVM	1766.66±54.08	93.33±15.86			95	96	92
3.	Cuddalore Taluk	FBZ	1273.33±76.57	160±34.69	1186.66 ± 63.78	1753.33 ± 57.91	87 ^R	92	80
		LEV	1226.66±63.46	53.33±24.46			96	98	89
		IVM	1233.33±63.78	66.66±19.34			95	97	90
4.	Panruti Taluk	FBZ	1580±64.83	206.66±39.72	1633.33 ± 57.73	1993.33 ± 71.04	87 ^R	91	81
		LEV	1640±60.44	113.33±26.47			93	96	89
		IVM	1793.33±66.59	106.66±25.68			94	96	90
5.	Vridhachalam Taluk	FBZ	1780±87.01	166.66±32.99	1480 ± 72.28	1800 ± 76.93	91 ^R	94	86
		LEV	1986.66±76.17	93.33±21.34			95	97	92
		IVM	1766.66±67.51	60±16.90			97	98	94
6.	Tittakudi Taluk	FBZ	1826.66±60.15	206.66±34.20	1513.33 ± 94.14	1873.33 ± 74.55	89 ^R	92	84
		LEV	1953.33±57.02	93.33±25.68			95	97	92
		IVM	1513.33±94.14	66.66±19.34			96	98	93

R – Resistance by calculation method

The Supervision Strategy for the Process of Submitting Political Messages in Winning Campaign of the Election 2019 by PDIP Tangerang Indonesia

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Abstract- This study is entitled the supervision strategy for the process of submitting political messages in winning campaign of the election 2019 by PDIP Tangerang Indonesia. This study aims to understand and analyze the process of delivering political messages in the campaign to win the 2019 Election by Indonesia Democratic Party of Struggle (PDIP) Tangerang Indonesia. This study method is qualitative with a single case study design. The results showed that PDIP Tangerang in implementing the supervision carried out by the DPC of PDIP Tangerang in building and strengthening trust and interest to vote i.e. firstly, controlling the message conveyed to outdoor media to avoid sabotage by parties irresponsible. Secondly, controlling the public opinion that develops on social media related to issues or negative hoaxes that afflict the party. The steps taken are giving an explanation or clarification. If this is indicated to be detrimental to the party and has a criminal element, then it is possible to continue to the law process. Thirdly, controlling the implementation of various activities (events) and programs that are designed to build trust and interest in choosing constituents, especially among voters. Various events that are made are of course carried out monitoring, so that the programs implemented are in accordance with the design and targets set by the party. Fourthly, carrying out the assessment process. This assessment process is carried out after the Monitoring Team goes to the field and has made reports and records which are the material for assessment. An assessment of the realization of the program is then recommended for various similar activities that will be carried out in the future. Fifthly, the process of improvement where at this step each set of preparations builds trust and interest in choosing constituents, especially the starting voters, starting from the process of analyzing the situation, determining party direction and objectives, determining communicator, formulating message, creating events, supervising processes. Perception surveys the public is always carried out an improvement process in accordance with the findings based on the assessment that has been done.

Index Terms- strategy, monitoring of campaigns & political messages

I. INTRODUCTION

When the tap of democracy was wide open after the reform was rolled out in 1998, this made politics even more vibrant in Indonesia. As a result this condition has a positive impact on the portrait of politics in the country, which affects our lives in the nation and state. Through a democratic system that has been implemented so far, the people can become Government and State policy makers, through the election of the President and Deputy, the Governor and Deputy, the Mayor and Deputy, the Regent and Deputy, the Legislative Members at various levels.

Every democratic process in the Presidential Election will always have efforts to gain public support, especially those who have the right to vote. The introduction of political figures as personal and institutional and or political coalitions will be built along with the introduction of political ideas, to get acceptance in the eyes of the public voter. Through a democratic system, each individual has the same political rights “one person, one vote”, “one weight” depends on the majority of the people who have the right to vote and come to the election by legally choosing the presidential candidate. The presidential candidate pair will compete over the same target, namely the voting community (Rahman, 2018: 1167).

To realize a mature democratic system, high public participation is needed. All citizens who have fulfilled the constitutional requirements as voters must also cast their votes on the general election. In this condition, each individual has the same right to be chosen and elected. Of course, through this democratic system all citizens without recognizing social strata have the same opportunity and rights in determining the fate of the nation every five years. But in fact the current level of participation of the younger generation in politics is often the subject of debate. This is because the younger generation is seen as skeptical in politics. The democracy itself comes from the words *demos* and *kratos*. That is, the pattern of governance originating from the people. It could also be that the government (President) was elected by the people representatives. It means, the highest power is in the hands of the people. Democracy is developed to foster people participation, not someone or group participation. The role of the people (read: public) is more valued because it plays an important role in making decisions in the public interest. The Regional Head, Regent, Governor, and President as head of state in a democratic system must be elected by the people (Irawan, 2018: 91).

It is undeniable that the enthusiasm and public participation in the election had been proactive, where the voter turnout in Indonesia since the 1999 to 2009 elections had a chance to freeze (see the table of voter participation in Indonesia). However, since the 2014 Legislative Election, the 2014 Presidential Election, up to the 2015 Regional Election, the numbers are still in the range of 70 percent. In the past three years, participation rates have fluctuated: sometimes a little sloping, sometimes also slightly uphill. In the 2015 Election, for example, the average participation rate in 264 regions was 70 percent (www.republika.co.id).

Voting in elections is a form of political participation. But political participation is not solely measured by voting during elections. Basically there are many forms of political participation such as: sending messages to government officials, participating in protests or demonstrations, becoming members of political parties, becoming members of community organizations, running for public office, giving contributions to parties or politicians, to participate in fundraising events (Morissan, 2016: 98).

To win the hearts of the people, political parties will choose and develop a strategy of political communication in a mature manner, and determine resources both from within the party and from outside the party as political communicators, spokespersons, advertising models that are seen as capable and have the attraction of the people. In addition, political figures, religious leaders, legal experts, education experts, economists, state detained experts, technology experts, civilians and various experts in their fields even the community does not escape being targeted as political communicators.

In addition, packing political messages, determining political communicators and media also become an important instrument in supporting political party communication strategies. The power of the media chosen was very calculated, considering that today the type of media is very diverse, ranging from electronic mass media, printed mass media, digital mass media, social media which are currently in demand by the people. The political message that is incorporated in these media has an important role in public opinion. Media as a source of opinion, not all media content can be controlled by political parties. Media coverage, political news, political dialogue and various media publicity can be controlled by political parties. One of the efforts of political parties in controlling the contents of the media is by renting mass media space. One way to rent media space is by political advertising.

Sometimes political parties and politicians only focus on preparing political communication and campaign strategies, especially on aspects of preparing communicators, political messages, and media for political communication. Another important point in political communication activities is to form a supervisory strategy in the process of delivering political messages in campaigns to win elections. Sometimes in some cases, messages that have been communicated have not been carefully guarded and monitored. Supervision is of course very important, where messages that have been communicated through various media need to be seen whether the message is experiencing obstacles or disturbances during the campaign.

As the winning party in the 2014 election, the Indonesian Democratic Party of Struggle (PDIP) was faced uneasy challenge, in which the PDIP had to defend the victory. PDIP certainly does not expect to repeat the failure of several previous party winners.

Therefore various political communication strategies were intensively launched. Referring to these targets, this study was conducted to analyze the strategy of overseeing the process of delivering political messages in the campaign to win the 2019 Election by the Indonesian Democratic Party of Struggle (PDIP) in Tangerang Indonesia.

II. LITERATURE REVIEW

2.1 Political Communication

Political communication is a conversation to influence in the life of the state. Political communication can also be an art of designing what is possible (art of possible) and can even be an art of designing that is not possible (art of impossible) (Arifin, 2011: 1). Furthermore Littlejohn (2009: 757) the theory of political communication explains the purpose process in which elected leaders, leaders, media, and citizens use messages to build meaning about political practice. When people use power to support public interests, their messages and interactions are a strategic means of influencing public policy.

Political communication at the practical level presents a politically charged message that is managed by political actors in relation to the activities of power, power, and policies related to political institutions. Political communication is also interpreted as part of how to carry out functions contained in the political system, such as political socialization, political participation, political recruitment, and articulation of interests, aggregation of interests, legislative processes, policy execution, and justice. This is in accordance with Gabriel Almond's opinion, that political communication is a function that always exists in every political system. In other words, the political system will not work as it should without the functionalization of political communication (La Nora, 2014: 46).

Political communication aims to form and foster images and Public Opinion, encourage political participation, win elections, and influence state political policies or public policies. In detail, Anwar Arifin (2011) describes it as follows: 1) Political Image. One of the objectives of political communication is to form a good political image for the public. The political image is formed based on information received, both directly and through political media, including social media and mass media that work to convey the general and actual political messages, 2) Public Opinion. As one of the purposes of political communication, it is actually the effect of political communication, namely public opinion. Public opinion can be interpreted as: a) Public Opinion is opinions, attitudes, feelings, predictions, establishment and average expectations of individual groups in society, about something related to public interests or social problems. b) Public Opinion is the result of interaction, discussion or social assessment between individuals based on a conscious and rational exchange of thoughts expressed both oral and written. c) The issue or problem discussed is the results of what is reported by the mass media (both print and electronic media). d) Public Opinion can only develop in countries that embrace democracy, 3) Participation of Politics and Political Policy. Nimmo states that political participants are "members of the audience" who are not indifferent, but active, not only pay attention to the political message of political communicators or politicians, but also respond and engage in dialogue with those politicians.

General Elections. One of the most important goals of political communication is to win elections (general elections). The success or failure of effective political communication is measured by the number of votes obtained through clean, free, direct and confidential elections. In that case there is no systematic intimidation or money politics, both individual and mass. General election activities that are directly related to political communication are campaigns and voting. The general election campaign is an attempt to influence the people in a persuasive (not coercive) manner by carrying out activities: rhetoric, public relations, political marketing, mass communication, lobbying and political action. Although agitation and propaganda in democracies are strongly criticized, in political campaigns, many agitation techniques and propaganda techniques are also used by candidates or politicians as political communicators (Arifin, 2012: 178-216).

According to Nimmo in Cangara (2009), political communication as a body of knowledge has elements consisting of: 1) Political Communicators. All parties involved in the process of delivering messages. These parties can take the form of individuals, groups, organizations, institutions or governments, 2) Political Messages. Political messages are statements that are either written or not, in symbolic or verbal form that contain political elements such as political speeches, laws, etc., 3) Political Channels or Media. In the current development, mass media is considered as the most appropriate channel to carry out the process of political communication, and 4) Recipients of Political Messages. All levels of society are expected to respond to the message of political communication. For example by voting in general elections, 5) Effects or Influences. Effects are a measure of how far political messages can be received and understood (La Nora, 2014: 50-51).

2.2 Political Participation and Beginner Voters

Political communication, political socialization, political image, ultimately lead to goals and objectives, namely the achievement of political participation and participation in the process of determining political policy. Political participation or people participation in political agendas are very important in democracy (the cornerstone of democracy), especially in representative democracy (Arifin, 2012: 235-266).

To realize a mature democratic system, high public participation is needed. But the level of participation of the younger generation in politics is often a matter of debate. The young generation is often seen as a group of people who are least concerned with political issues, which often experience a breakup with their communities, who are not interested in political processes and political issues, which have a low level of trust in politicians and are cynical about various political and government institutions (Haste & Hogan, 2006). This view is often justified by data that shows that young people who join political parties are relatively few, and they tend to choose to be non-voters in elections (EACEA, 2012). The role of the younger generation in political events is very important to the growth of a good democratic system.

Participation is an important part of democracy, where Huntington & Nelson (1976: 3) put forward his views as follows: "By political participation we mean activity by private citizens designed to influence government decision-making." Based on

this definition, political participation is interpreted as a private activity of citizens carried out to influence government decisions. Then Dahrendorf (2003) stated "Political participation affords citizens the opportunity to communicate information to government officials about their concerns and preferences and pressure on them to respond." This definition emphasizes that everyone who lives in a democratic country has the right to express their views and attitudes towards everything that happens in the public domain or things related to their interests so that the government is known and then the government responds.

Political participation according to Herbert McCloky is the voluntary activities of the citizens of the community through which they take part in the process of selecting the ruler, and directly or indirectly in the process of forming public policies. These activities include political actions such as voting in elections, attending campaigns, lobbying politicians or the government (Purboningsih, 2015: 108). Verba et al. (1995: 38) which states that: "By political participation we simply refer to activity that has the effect of influencing government action - either directly by influencing the selection of people who make those policies." From this explanation, it can be interpreted that what is meant by political participation includes activities to influence government actions, either directly or indirectly.

Beginner voters are voters who will first use their voting rights. Beginner voters consist of people who are eligible to vote. The conditions that must be owned to make someone can choose are: (1) Age is 17 years old; (2) Have/ have been married; and (3) retired/ no longer a member of the Army/ Policemen. Understanding beginner voters according to Law No. 10 of 2008 in Chapter IV article 19 paragraph 1 and 2 and article 20 states that what is meant by beginner voters is Indonesian citizens who on the day of election or voting are Indonesian citizens who are even 17 years old or older or have/ have been married who have the right to vote, and previously not including voters because of the provisions of the Election Law.

Most beginner voters have an age range of 17-21 years, except because they are married. And the majority of young voters are high school students, young students and workers. Beginner voters are very potential voters in voting in elections. The behavior of beginner voters has characteristics that are usually still unstable and apathetic, their political knowledge is lacking, tend to follow the game group and they are just learning politics especially in general elections. The spaces where they research politics are usually not far from the room which is considered to provide a sense of comfort in themselves.

According to article 1 paragraph (22) of Law No. 10 of 2008, voters are Indonesian citizens who have reached the age of 17 (seventeen) years or more or have been married, then article 19 paragraph (1 and 2) of Law No. 10 of 2008 explain that voters who have the right to vote are Indonesian citizens who are registered by the Election organizers in the voter list and on polling day they are even 17 (seventeen) years or more or have been married.

III. RESEARCH METHODS

Data is on qualitative study with single case study design. This study is generally in the form of descriptions, narratives, data, images or statements obtained from study subjects, both directly and indirectly related to the Monitoring Strategy for Submitting Political Message Processes in the 2019 Election Winning

Campaign by PDIP Tangerang Indonesia . The main data sources in qualitative study are words, and actions, the rest are additional data such as documents and others. In this section the data types are divided into words and actions, written data sources, photographs and statistics.

The object of the study was PDIP Tangerang , then the resource persons were selected Resource Persons from the DPC Board of PDIP Tangerang , Community Leaders, Beginner Voters, KPUD Members, and Bawaslu Members. The speakers were detailed as follows: Chairperson of DPC Irvansyah Asmat, Secretary of DPC Akmaludin Nugraha, Division of Victory Didin Muhidin, Division of OKK Surdin, Community Leader of Subandi Misbach, Beginner Voters Arif Rohman and Siti Aam Fatriah, Management of KPUD Tangerang Ali Zaenal Abidin, Management Bawaslu Muslik, and the Journalist. The location of this study is in the office of the DPC of PDIP Tangerang. It located at metropolis town square block GM 6 No. 3 beautiful coconut city Tangerang, Klp. Indah Tangerang, Banten 15117.

The process of data collection refers to several steps, namely the process of interviewing, observation and documentation study. Then the data analysis technique used refers to the opinion of Miles and Huberman which includes three activities together: data reduction namely data that has been classified based on this category is then sorted and if there are those that are not in accordance with the aspects studied, the data is discarded, data presentation i.e. In this process researcher group similar things into categories or groups of one, groups of two, groups of three, and so on, and conclusions (verification) are arranged into a conclusion, where this conclusion is the result of study that can answer study questions previously formulated.

Then data validation uses the source triangulation technique through source triangulation, researchers compare and check back on the degree of trust in information obtained by: (1) comparing observational data with interview data (2) comparing the consistency of the answers of the sources, namely by comparing what the public speakers say for example, with what is said personally (3) comparing a person's perspective, for example in this case that is comparing the opinions of various pre-determined sources (4) comparing the results of interviews with the contents of a document (literature) related to the discussion of interviews.

IV. RESULTS AND DISCUSSION

To build trust and interest in choosing a political party, it certainly needs strategic steps when developing a political marketing communication strategy. This strategy greatly determines the success of targets set by political parties. As a victory party, of course the PDIP is considered by the public not to have difficulty victory the political contestation. However, this perception is certainly not exactly right, considering that there is nothing impossible in political contestation.

Understanding these conditions, the DPC of PDIP Tangerang also took part in the success of communicating various party programs to the public, especially beginner voters. The importance of building and strengthening this trust and loyalty, given that there is a change in the lifestyle trend of public behavior, especially beginner voters in obtaining information related to political content, from conventional media to digital media It must be addressed by political parties and cadres in order to transfer

information and political message to the public. In this context, political parties need to compete to build trust and loyalty as a modern political party and the present is a mandatory step for politicians and administrators of political parties.

Therefore, political parties should develop and strengthen brand awareness consistently. According to Durianto et al (2001: 54), brand awareness alone can be concluded as a potential buyer in this case the constituents to recognize, recall a brand as part of a product category in this case a particular political party. Referring to this opinion, political parties need to enhance strong relations between political parties with a strong vision.

Referring to this opinion, it is clear that political parties now have additional jobs, namely they must be able to introduce themselves to the public well. Thus, the public not only knows political parties, but has a desire to vote for the party. In a political context, products that are sold to the public are ideas and ideas for change in a sustainable and equitable development process.

Brand awareness of party programs that bring out party brands (brand awareness) is the constituent's ability to recognize, recall PDIP as a Pancasila-based Party as embodied in the Opening of the 1945 Constitution of the Republic of Indonesia, and have the identity of a Party is Nationality, Population and Social justice. As well as having the character of mutual cooperation, democracy, independence, unyielding and revolutionary progressives. This awareness of party identity is expected to be the highest brand awareness level, namely in the Top of Mind, which can be interpreted that the constituents when they hear PDIP will remember that PDIP is attached to Pancasila, 1945 Constitution, fighting for nationality, popularity and Social Justice. As well as having the character of mutual cooperation, democracy, independence, unyielding and revolutionary progressives.

Then, supervision activities certainly are a very important thing to do consistently. Supervision is one of the ways to ensure that various strategies and activities are implemented in accordance with the organization's planning and expectations. This was also applied by the DPC of PDIP Tangerang . Based on the results of the study, it shows that the supervision is carried out starting from the situation analysis process, setting the direction of objectives, formulating the strategy, implementing tactics, the implementation step (action), until the measurement, supervision, assessment, and control.

Supervision activities carried out by the DPC of PDIP Tangerang in the process of trust and interest in choosing among constituents were carried out through various methods. The activities and steps in carrying out supervision are *firstly*, controlling the message delivered to outdoor media. At this step, cadres routinely supervise the banners and billboards not to be sabotaged by irresponsible parties. In this context, the DPC of PDIP Tangerang carried out logistical monitoring and campaign demonstration with the voluntary capital of party cadres and sympathizers.

Secondly, controlling the public opinion that develops on social media related to issues or negative hoaxes that afflict the party. This is done by looking at responses or comments that are scattered on social media published by the DPC of PDIP Tangerang. If this happens, the party provides an explanation or clarification. If this is indicated to be detrimental to the party and has a criminal element, then it is possible to continue in the law process.

Thirdly, controlling the implementation of various activities and programs designed to build trust and interest to vote among constituents, especially beginner voters. Various events that are made are of course carried out monitoring, so that the programs implemented are in accordance with the design and targets set by the party.

Fourthly, carrying out the assessment process. This assessment process is carried out after the Monitoring Team observed and has made reports and records which are the material for assessment. Through the data obtained from the monitoring team, the DPC of PDIP Tangerang assessed the program realization. The results of this assessment are certainly recommended for various similar activities that will be carried out in the future.

Fifthly, the remedial process. At this step the DPC of PDIP Tangerang realized various recommendations from the assessment and evaluation steps. This step of improvement is an absolute matter, considering that this refers to the recommendation of the PDI-P evaluation meeting. Every program implemented must refer to recommendations and improvements given to similar programs that have been implemented.

Sixthly, the step of public assessment. To ensure whether various messages of political party communication are accepted by the public or not, the DPC of PDIP Tangerang conducted a public perception survey of various programs that have been carried out. The survey can be in the form of filling out questionnaires or direct interviews with several community representatives, especially beginner voters involved in the event or interacting with the political communication message of the DPC of PDIP Tangerang.

V. CONCLUSION

Based on the results of study related to how the application of political marketing communication strategies in building trust and interest to vote the constituents, especially the beginner voters, were implemented by PDIP Tangerang. The results showed that PDIP Tangerang in implementing the supervision carried out by the DPC of PDIP Tangerang in building and strengthening trust and interest to vote through the following mechanism. *Firstly*, controlling the message conveyed to outdoor media to avoid sabotage by irresponsible parties. *Secondly*, controlling the public opinion that develops on social media related to issues or negative hoaxes that afflict the party. The steps taken are giving an explanation or clarification. If this is indicated to be detrimental to the party and has a criminal element, then it is possible to continue in the law process. *Thirdly*, controlling the implementation of various activities (events) and programs that are designed to build trust and interest to vote constituents, especially among voters. Various events that are made are of course carried out monitoring, so that the programs implemented are in accordance with the design and targets set by the party. *Fourthly*, carry out the assessment process. This assessment process is carried out after the Monitoring Team goes to observed and has made reports and records which are the material for assessment. An assessment of the realization of the program is then recommended for various similar activities that will be carried out in the future. *Fifthly*, the process of improvement. Each set of preparations builds trust and interest to vote constituents, especially the beginner voters,

starting from the process of analyzing the situation, determining party direction and objectives, communicator determination, message formulation, event creation, supervision processes, the public perception surveys are always carried out an improvement process in accordance with the findings based on the assessment that has been done. Referring to the study findings, it is better for the process of supervision (controlling) public opinion on social media, the party should be equipped with monitoring applications media, so that the party can understand young people with young awareness and trust and interest to vote. In addition, through the application, the party is easier to detect various attacks in cyberspace easily and practically. The political party strengthens the base of volunteers in various regions. So, the volunteers can ensure the outdoor media such as banners and posters, etc. can be installed properly and avoid sabotage of irresponsible parties.

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The Influence of Corporate Social Responsibility on Consumer Volume

With Special Reference to the Banking Industry in Sri Lanka

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Abstract- Corporate Social Responsibility (CSR) has become a vital concept in business environment due to the idea that the CSR benefits an organization to improve their performance in terms of the goodwill, social image and the customer base. Therefore most of the organizations attempt to practice CSR strategies for the success of the business. With the growing acceptance of the concept of CSR there is increasing trend that the organizations are spending huge cost on CSR practices. Hence the primary objective of this study was to explore whether the cost of CSR practices influence on the Consumer Volume in Banking Industry of Sri Lanka. Top five banks in Sri Lanka based on the Fitch rating were selected as the sample of the study and the study was conducted based on the secondary data collected from the published annual reports and the official web sites of the banks selected as the sample of the study. Descriptive statistics and the correlation analysis was employed as the main analysis technique of the study. The results of the study indicated that there is no relationship between cost of CSR practices and the Consumer Volume in banking industry in Sri Lanka. Hence this study recommends initiating some other strategies for the purpose of improving the Consumer Volume while practicing the CSR activities economically as it will generate some indirect benefits to the organization.

Index Terms- Banking Industry, Corporate Social Responsibility, Consumer Volume, Fitch Rating.

I. INTRODUCTION

A variety of factors are cited as being important in building the current momentum behind CSR. Ernst and Young (2002) suggest that five key drivers have influenced the increasing business focus on CSR, greater stakeholder awareness of corporate ethical, social and environmental behavior; direct stakeholder pressures; investor pressure; peer pressure and an increased sense of social responsibility. The Commission of the European Communities (2002) argues that CSR has gained increasing recognition amongst companies as an important element. It helps them to respond to fundamental changes in the overall business environment. These changes include globalization, which increases the importance of relationships of a company worldwide. These relationships lead to discussions about the responsibilities of a company within the production process.

Information is rapidly available to stakeholders through different sources. The issues of image and reputation; which has become an increasingly important element in corporate success. This growing awareness persuades companies to involve more social activities and have been become a more integral part among their core business activities. (Girod and Bryane, 2003) adopt a strategic marketing perspective arguing that CSR is “a key tool to create, develop and sustain differentiated brand names”; and finally the need for companies to recruit and retain highly skilled personnel. The roles of governments are now changing; which increases the pressure for companies to embrace their social responsibility and act according to their own CSR policy. For example, The European Union, promoted CSR in all member states and the UK Government has emphasized its ambitious vision for CSR.

CSR is a form of corporate self-regulation integrated into a business model. CSR policy functions as a built in, self-regulate mechanism whereby business monitors and ensures its active compliance with the spirit of the law, ethical standards, and international norms. The goal of CSR is to embrace responsibility for the company’s actions and encourage a positive impact through its activities on the environment, consumers, employees, communities, stakeholders and all other members of the public sphere. Furthermore, CSR focused business would proactively promote the public interest by encouraging community growth and development and voluntarily eliminating practices that harm the public sphere, regardless of legality.

CSR is titled to aid an organization’s mission as well as a guide to what the company stands for and will upload to its consumers. Development business ethics is one of the forms of applied ethics that examines ethical principles and moral or ethical problems that can arise in a business environment.

Today, more and more companies are realizing that in order to stay productive, competitive, and relevant in a rapidly changing business world, they have to become socially responsible. In the last decade, globalization has blurred national borders, and technology has accelerated time and masked distance. Because of globalization, there is also fierce competition for skilled employees, investors and consumer loyalty. How a company relates with its workers, its host communities, and the marketplace can greatly contribute to the sustainability of its business success.

In recent decades the concept of Corporate Social Responsibility (CSR) turned out to be a vital strategy for companies to survive in a ruthless market environment. In a condition where market's shift and customers' preferences becomes more unpredictable and complex, adopting CSR strategy could be a powerful tool for survival. Moreover, companies try to practicing CSR for its business success. Moreover, various types of CSR practices are conducted by the organizations and they attempt to reach the consumers and satisfy them by using this strategies. With the high competition of the dynamic business environment CRS plays an important role and it impacts on the internal as well as the external aspects of the organizations.

Margolis and Elfenbein (2007) addressed CSR as economic approach and considered as the relationship between firm social performance and firm economic performance Friedman (1962) Henderson (2001) viewed CSR as an organizational-level construct. It provides a socially positive image to both public and internal staff (Stancu et al., 2011). Nowadays many organizations use corporate social responsibility strategies in order to improve the brand image of the organization (Newman et al., 2014). Corporate social responsibility has been creating so much attention in the minds of the public and media during the recent years. Hence, it delivers a socially positive image to both public and internal staff (Stancu, Grigore, & Rosca, 2011).

When it consider about the banking field in Sri Lanka there is a high competition among bankers. Every banker tries to communicate their service is better than others' service. So, bankers always improve their service awareness by various ways. They are practicing CSR practices in the fields of corporate governance, employment equity, environmental management, human rights, corporate social investment, and product stewardship (World Bank, 2004)

As far as the organizations hope to achieve large volume of consumers through their CSR practices.

But there is no any sufficient study available to identify the influence of CSR on Consumer Volume. Hence from the observation and literature survey there are limited researches done regarding the relationship between CSR practices and Consumer Volume in banking field therefore drawing from this knowledge gap as well as there is no any research in Sri Lankan context researcher identified the empirical gap. Hence the researcher asked a main research question in order to find the answer that is "Does CSR practices influence on Consumer Volume?" .Based on the primary objective of the study researcher asked the secondary objectives as, Does amounts of Deposits increase because of implemented CSR practices? As well as what are the CSR activities in banking sector in Sri Lanka?

Research Questions

According to above research problem research questions are derived as following.

1. Does CSR practices influence on Consumer Volume?
2. Does amounts of Deposits increase because of implemented CSR practices?
3. What are the CSR activities in banking sector?

Objectives of the study

The purpose of the research is to study how CSR influences customer base. This research work is designed to achieve the following specific objectives.

Objectives

- To examine the influence of CSR practices on Consumer Volume at banking field in Sri Lanka.
- To assess whether banks can increase the customer base through practicing CSR.
- To obtain sound knowledge about the CSR practices at banking field in Sri Lanka.

II. LITERATURE REVIEW

Although there is no single, authoritative definition, CSR is broadly understood as the type and scope of social obligations that corporations must consider in the course of their routine business practices (Shamir, 2005). Frankental (2001) has argued that CSR is an indistinguishable and intangible which can mean anything to anybody and the UK's Confederation of British Industry (2001) emphasized that CSR is highly subjective and therefore it does not allow for universally applicable definition. Each company differs in how it implements corporate social responsibility. The differences depend on such factors as the specific company's size, the particular industry involved, the firm's business culture, stakeholder demands, and how historically progressive the company is in engaging CSR.

CSR is the concept used most widely to address the relationships between business and society. However, some concepts, such as corporate sustainability, corporate citizenship and corporate social performance have been proposed recently to conceptualize these relations. Some authors view these three concepts as synonymous (Andriof & McIntosh, 2001) where as others propose some distinctions between them (Marrewijk, 2003, Matten et al., 2003, Matten and Crane, 2005; and Valor, 2005). In this article such concepts are considered to address the same basic issues as CSR. They all are about companies' social involvement, responsiveness, and accountability (Gail Thomas, 2006) explores his research to find out the definition of Corporate Social Responsibility (CSR). In his discussion about stakeholder approach, CSR and sustainability, Wheeler et al suggested that 'Perhaps the problem has been that

traditionally we have tended to take too narrow a view of each of these ideas. Stakeholder theory has never been just about social issues...., sustainability is not just about environmental issues.... And there is no necessary that 'There is no one definition of what it takes to be a responsible corporate. The key is to have a rigorous process for identifying those responsibilities and fulfilling them. (Blomback & Wigren, 2008) Dichotomy between sustainability and profitability' (Wheeler, Colbert, & Freeman, 2003) Conversely, Van Marrewijk has suggested that if CSR is too broadly defined, it will be 'too vague to be useful in academic debate or in corporate implementation'. (Marrewijk.V, 2003) Perhaps the final comment should rest with Blyth, who has suggested. Business for Social Responsibility (America's largest organization devoted to CSR) Business decision making linked to ethical values, compliance with legal requirements, and respect for people, communities, and the environment around the world. (Moir, 2001) According to the Prince of Wales Business Leaders Forum open and transparent business practices which are based on ethical values and respect for employees, communities, and the environment. It is designed to deliver sustainable value to society at large, as well as to shareholders. (Alnajjar, 2000) Customer satisfaction is defined as an overall evaluation based on the customer's total purchase and consumption experience with a good or service over time (Luo & Bhattacharya, 2003). In the marketing literature, customer satisfaction has been recognized as an important part of corporate strategy and a drive of firm long term profitability (Gruca & Rego, 2005). Why should a firm's CSR initiatives lead to greater customer satisfaction? At least three research streams point to such a link: First, both institutional theory (Scott 1987) and stakeholder theory (Maignan, Ferrell, 2005) (Raimond, 1996) suggest that a company's actions appeal to the multidimensionality of the consumer as not only an economic being but also a member of a family, community, and country (Handelman and Arnold 1999). Building on this, Daub and Ergenzinger (2005) propose the term "generalized customer" to denote people who are not only customers who care about the consumption experience but also actual or potential members of various stakeholder groups that companies need to consider. Viewed in this way, such generalized customers are likely to be more satisfied by products and services that socially responsible firms (versus socially irresponsible counterparts) offer.

Second, a strong record of CSR creates a favorable context that positively boosts consumers' evaluations of and attitude toward the firm (Brown and Dacin 1997; Gürhan- Canli and Bara 2004; Sen and Bhattacharya 2001). Specifically, recent works on customer-company identification (Bhattacharya and Sen 2003, 2004) suggest that CSR initiatives constitute a key element of corporate identity that can induce customers to identify (i.e., develop a sense of connection) with the company. Indeed, Lichtenstein, Drumwright, and Bridgette (2004, p. 17) note that "a way that CSR initiatives create benefits for companies appears to be by increasing consumers' identification with the corporation ... [and] support for the company." Not surprisingly, identified customers are more likely to be satisfied with a firm's offerings (e.g., Bhattacharya, Rao, and Glynn 1995; Bhattacharya and Sen 2003). The third literature stream that enables us to relate CSR to customer satisfaction examines the antecedents of customer satisfaction. For example, perceived value is a key antecedent that has been empirically shown to promote customer satisfaction (Mithas, Krishnan, & Fornell, 2005). In our context, all else being equal, customers likely derive better perceived value and, consequently, higher satisfaction from a product that is made by a socially responsible company (i.e., added value through good social causes). Furthermore, engaging in CSR may allow firms to understand their generalized customers better and thus improve their customer-specific knowledge (Sen and Bhattacharya 2001). Because improving customer knowledge represents another antecedent that has been found to enhance customer satisfaction (Luetkenhorst, 2004). Krasnikov, Jayachandran, and Kumar (2005) argued that CSR initiatives may help to promote customer satisfaction in the organizations.

Rathnasiri (2003) explores his study to investigate the CSR status of Sri Lankan private sector organizations. CSR is still a novel concept to many organizations, employees and to civil activists in Sri Lanka. The most common understanding of CSR relates to sponsorships of community activities and donations to good causes. Most people are ignorant of the broader objectives of CSR, which also encompass areas such as human rights, employee and community welfare, biodiversity, environmentally friendly behavior, awareness of HIV/AIDS, etc.

Sri Lanka's long tradition of parliamentary democracy has nevertheless entrenched basic labour regulations and human right protection measures in the legislative enactments. These have been in practice for a long period and are accepted by the business community as a whole. In addition, Sri Lankan civil society including employees of organizations is also not aware of the true meaning of CSR. Civil society respondents were much more favorable towards the private sector. Finally, the study findings should be interpreted in the context of Sri Lankan corporate culture, work ethics, social norms, national culture and the way civil society activist groups operate. However, there is little evidence of examples of internal CSR policy level operations by firms. These areas are not popular areas or themes of public interest. Better working conditions for employees, gender equality, and equal opportunities, waste treatment, truth in advertising, preserving immediate environment, and ethical dealings etc. fall into this category. One could argue that the real commitment for discharging CSR is visible from the performance in these areas. Since an organization's achievements in internal policy level areas cannot readily be used as themes for public propaganda (short-term competitive advantage over rivals), this requires a genuine commitment to CSR. The propaganda campaigns of private companies based on social responsibility themes would not mean they are good corporate citizens. There is a trend in present corporate behavior to secure a competitive edge over other competitors by projecting an image of being "socially responsible". Whether these corporate bodies deliver what they promise to society is a much debated issue. The evidence on Corporate Responsibility in Sri Lanka suggests that it is a neo-liberal model of CSR that is mostly prevalent. However, this needs to be qualified and tempered against the reality that there is a lack of knowledge and understanding of the broader understanding of CSR. (Rathnasiri, 2003) All firms indicated that they have a vision / mission statement but in reality only a few stakeholders within these organizations seem to engage in the development and implementation of these statements. Further, most

respondent companies do not appear to have properly understood the concept of sustainable development, which goes hand in hand with CSR. The corporate sector in many ways has been subjected to political maneuvering which has affected society. Survival for most has meant creating allies with the political power base of the time. Companies that have thrived under one regime have floundered under another, especially, large businesses that supply goods and services to the government. Funding politicians and political parties has become an accepted norm, but in turn has become the bane of society, which is riddled with bribery and corruption. Therefore, many firms were not willing to discuss this sensitive area, as it is a matter of survival. Also, even though most companies do not violate basic human rights, there is no mainstream thinking in this area where companies consciously understand that the protection of human rights falls under the purview of CSR. This can especially be sensitive when the country is facing an ethnic war. There can be polarization in certain companies where others are not considered for employment based on race alone. Even though there are laws in place to prevent these types of violations, the process is not easily accessible to the average person. Companies also seem to be weak in the area of seeking employee satisfaction feedback. However, as awareness grows on the importance of being good corporate citizens, more companies are becoming more responsible in the area. Therefore, there is a need to create more awareness among the business community of the long-term advantages of becoming better corporate citizens. (Rathnasiri, 2003)

Research Hypothesis

Based on variables identification I have developed following hypotheses. It will provide large contribution for this study.

H0: There is no relationship between cost of CSR activities and Consumer Volume

H1: There is a positive relationship between cost of CSR practices and Consumer Volume

Methodology

The population of the study consists of all the public and private Banks in Sri Lanka and among them researcher has selected top five banks according to the national ratings of Sri Lankan banks assigned by Fitch in 2015 as the research sample,

- National Savings Bank (NSB)
- Bank of Ceylon (BOC)
- People's Bank (PB)
- Commercial Bank (CB)
- Hatton National Bank (HNB)

Secondary data were collected by using corporate website and annual reports and the data analysis was done by using descriptive statistics and the bi variant analysis.

III. DATA ANALYSIS AND INTERPRETATION

Following table represents the cost of CSR as a percentage from savings deposits during 2010 to 2015.

According to the following tables it shows percentage of CSR practices from deposits. The chart is representing the table's data. The charts it gives an idea about increase and decrease the percentage of CSR from savings and time deposits

Table I: Cost of CSR as a percentage from Amounts of savings Deposits

Deposits	Bank	years					
		2010%	2011%	2012%	2013%	2014%	2015%

Savings Deposits	COM	0.059	0.074	0.042	0.051	0.054	0.032
	HNB	0.025	0.056	0.030	0.019	0.007	0.007
	NSB	0.017	0.017	0.018	0.018	0.019	0.019
	BOC	0.021	0.031	0.028	0.092	0.023	0.028
	PB	0.027	0.018	0.006	0.013	0.012	0.010

Source: Survey Data

Considering the Commercial Bank, with regarding savings deposits there were not huge variance from 2012 to 2014. But concentrating year 2011 savings deposits has considerable variance which is increased by 0.02% and in 2015 it has reduced by 0.02%. In other word, Commercial Bank has contributed to the CSR activities in large portion from their deposits than previous years in 2011. Following table represents the increased or decreased savings deposits amounts when it compares with the previous year. Below table represents the cost of CSR as a percentage from time deposits during 2010 to 2015.

Table II: Cost of CSR as a percentage from Amounts of Time Deposits

Deposits	Bank	years					
		2010%	2011%	2012%	2013%	2014%	2015%
Time Deposits	COM	0.077	0.076	0.029	0.032	0.044	0.028
	HNB	0.026	0.048	0.016	0.010	0.005	0.004
	NSB	0.006	0.006	0.006	0.005	0.007	0.007
	BOC	0.019	0.024	0.017	0.043	0.014	0.021
	PB	0.026	0.017	0.004	0.007	0.009	0.009

Source: Survey Data

Observing time deposits of Commercial Bank, it has reduced from 2012. Considering Hatton National Bank’s CSR portion, it reflects increment in 2011 but it has decreased from 2012 to 2015 year by year. As well as in National Savings Banks there is no any considerable increment in contributed to CSR from their savings and time deposits. When consider about the Bank of Ceylon there is huge increment in their savings and time deposits in 2013 than other years. In other words, Bank of Ceylon has contributed it the CSR activities in large portion in 2013. PB has reduced their CSR contribution from their deposits 2012. It was lower amount when it compares with the other years.

Following table represents the increased or decreased savings deposits amounts when it compares with the previous year.

Table III: Increase/ Decrease of Savings Deposit

BANK	Years				
	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015

COM	16096674	33517776	17581952	5099697	32109892
HNB	12234194	12960703	15333601	33436382	26258271
NSB	11131118	2113313	7127168	26331410	21783131
BOC	25725783	5238663	13105413	55456319	62204546
PB	29335222	3891141	19750295	62966562	53252892

Source: Survey data

Following table represents the increased or decreased time deposits amounts when it compares with the previous year.

Table IV: Increase/ Decrease of Time Deposits

Deposits	BANK	Years				
		2010-2011	2011-2012	2012-2013	2013-2014	2014-1015
Time Deposits	COM	33926499	102778496	43168195	-49085416	17742052
	HNB	35109426	87493382	32282960	22727654	50132953
	NSB	43893503	53076590	37112133	25839214	19932266
	BOC	52714123	70811565	109220152	-8212928	12239168
	PB	36901833	129561575	84739815	-42940660	31801919

Source: Survey data

Concentrating above table it shows the decrease and increase values of savings deposits and Time deposits in banks recent years. Considering about time deposits in 2014 it has reflected a negative value in Commercial Bank, Bank of Ceylon and Peoples Bank. In other word, Time deposits have been reduced in those three banks in 2014.As well as savings deposits amounts has increased in all banks and therefore it has recorded as positive values.

Following table as well as the chart illustrates whether cost of CSR has increased or not and if it is increased or decrees then what are the percentages of those deviations from the cost of CSR

Table V: Increase/ Decrease of savings deposits as a percentage from Cost of CSR

Deposits	BANK	Years				
		2010-2011	2011-2012	2012-2013	2013-2014	2014-1015
Savings Deposits	COM	0.341	0.239	0.341	1.589	0.276
	HNB	0.166	0.416	0.214	0.073	0.044
	NSB	0.147	0.878	0.271	0.079	0.125
	BOC	0.112	0.943	0.357	0.298	0.088
	PB	0.188	1.079	0.076	0.052	0.069

Source: Survey data

This table represents whether time deposits has increased when it compares with the previous year and if it is increased or decreased what is the percentage of the deviation as the percentage from the cost of CSR.

Table VI: Increase/ Decrease of Time deposits as a percentage from Cost of CSR

Deposits	BANK	Years				
		2010-2011	2011-2012	2012-2013	2013-2014	2014-1015
Time Deposits	COM	0.162	0.078	0.139	-0.165	0.499
	HNB	0.058	0.062	0.102	0.107	0.023
	NSB	0.037	0.035	0.052	0.081	0.136

	BOC	0.055	0.069	0.043	-2.009	0.447
	PB	0.149	0.032	0.018	-0.076	0.117

Relationship among study variables.

Table VII-Correlation between Savings Deposits and Cost of CSR

Bank	Correlation-Cost of CSR and Saving Deposits	P-Value	H ₀ Not rejected /Rejected
COM	0.382	0.526	Not rejected
HNB	-0.495	0.397	Not rejected
NSB	0.611	0.247	Not rejected
BOC	0.545	0.342	Not rejected
PB	-0.035	0.956	Not rejected

Source: Survey Data

According to the above table, there is no relationship between cost of CSR and Savings deposits. Because the significant value is higher than the 0.05 level Therefore at 0.05 significant level H₁ is rejected and H₀ is accepted. Hence Customers not consider about CSR practices of Banks with regarding Savings Deposits. In other word, Savings Deposits not depend on CSR practices of Bank.

Table VIII: Correlation between Time Deposits and Cost of CSR

Bank	Correlation-Cost of CSR and Time Deposits	P-Value	H ₀ Not rejected /Rejected
COM	-0.176	0.777	Not rejected
HNB	0.680	0.206	Not rejected
NSB	-0.818	0.091	Not rejected
BOC	-0.675	-0.211	Not rejected
PB	-0.051	0.935	Not rejected

Source: Survey Data

Concentrating about Cost of CSR and Time deposits there is no relationship shown between the variables. The H₁ is rejected at 0.05 significant level. Therefore, H₀ is accepted it reveals that Customers not pay attention regarding CSR practices of Banks when they got Time Deposits.

The first hypothesis is there is no relationship between Cost of CSR practices and Customer Base. In other word, there is no relationship between independent variables and dependent variables. Correlation values indicates that there is no relationship between both savings deposits and fixed deposits with the cost of CSR. Hence H₁ is rejected and H₀ has accepted

IV. CONCLUSION

Some research findings present the positive relationship between deposits and cost of CSR but, those values are not significant at 0.05significant level. Therefore, it reveals that banks not have influence of CSR practices on the customer base.

Social responsibility across industries also indicates a wide variation in terms of emphasis on the customer base. In Banking Field has mainly engaged in developing facilities and financing facilities by introducing various technologies or methods among customers. Considering about deposits the banks have introduced various type of deposits based customers' needs such as savings deposits, time deposits, current deposits...etc. Furthermore, concentrating about bank loan, the banks also have introduced various types of loans such as short term loans, long term loans, pawning services...etc. Banks more engage with deposits and loans especially customer relations. Among those dimensions, it is unable to identify CSR engagements with their different customers separately because details are not

provided. Another important finding is that the nature of the cost of CSR has not huge effects on the customer involvement. Because of correlation values between Cost of CSR and savings Deposits are not significant. Moreover, I found that the CSR practices those were implemented by bank performed in high quality. It proved through observation and the information got from web site and Annual reports. According to information, researcher can have concluded that the Banks are highly pay attention to the CSR practices.

Concentrating about savings deposits is recognized as separate activity in Bank among their customer services. Considering the relationship between cost of CSR and the customer base, it reported that there is no relationship. it could be concluded that the CSR practices were not affect to the Savings deposits of the banks.

As mention in the literature review section there were contradictory arguments about the CSR practices and customer base, Luo and Bhattacharya (2006) found a positive link between published CSR ratings and customer satisfaction (ACSI) scores using secondary data. Similarly, Sen and Bhattacharya (2001) found a positive association between CSR and a customer evaluation of the company. In support, Brown and Dacin (1997) found that CSR perceptions of the company are positively correlated with new product evaluations by the customer. On the other hand, several studies report a weak or no correlation between CSR initiatives and customer-focused service outcomes. For instance, Berens et al. (2005) found a non-significant relationship between CSR practices and customer volume.

Although there were contradictory arguments in literature this study concluded that although banks allocated high amount for CSR activities in each and every year, CSR practices have not influence on the Customer Base in banking fields as well as deposits amounts are not increased due to implemented CSR practices. Based on the above findings research objectives were achieved.

Managerial implications and Recommendations

This study conducted mainly concentrating the CSR practices done by the Commercial Bank, Hatton National Bank, National Savings Bank, Bank of Ceylon and Peoples Bank those are most popular banks in banking field in Sri Lanka. In here only value of Savings Deposits and Time Deposits were considered.

Banks are implementing CSR activities by maintaining close relationship among peoples because CSR activities related with every business activity. To identify frauds and errors, mistakes and changes should be implemented immediately as soon as happened it is essential to good relationship among customers. Therefore, the relationship between banks and people should be developed.

In the savings deposits, the banks should reach their customers by using communication channel or other way about their CSR activities. As well as considering all variables, banks should try to get advantages from CSR practices.

Areas for future Research

According to the observation, it is recommended the following things for the successful future researches. The sample must be represented by the all kind of banks. (To represent a larger sample that includes more banks of government and private sector).

It would also be to conduct a deeper parallel analysis of the other facilities means that banks use to attract customers such as advertisements, television programs etc. I did not consider as a huge about the qualitative information of the CSR practices implemented by banks. If that could have considered, the results will give more accurate information.

Not only considered that actually what they reported but also those activities and figures are similar or having limitation. Therefore, a deeper investigation should be implemented to find out whether actual behavior is similar to the reported information. It should be considered all the monitory, qualitative and quantitative figures for such kind of analysis to get accurate and complete picture.

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Characterization of the Agglutinin in the Hepatopancreas of the Freshwater Crab *Travancoriana Charu*

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Abstract- Hemagglutination assay of the extract from the hepatopancreas of the freshwater crab *Travancoriana charu*, using diverse mammalian erythrocytes revealed the presence of an agglutinin with specific affinity for rat > mice erythrocytes. Hemagglutinability was dependent on divalent cations and highly sensitive to the changes in the pH and temperature of the medium. Maximum agglutination was observed at pH 9.5 and temperature of 30°C with the inclusion of 1-5 mM calcium or 1-10 mM manganese. HAI assay indicated the unique specificity of the agglutinin from the hepatopancreas to lactoferrin, a single subunit N-glycoprotein with Gal(α1-3) Gal(β1-4) GlcNAc (αGal), GalNAc(β1-4) GlcNAc (LacdiNAc) epitopes and N-glycolyl neuraminic acid (Neu5Gc).

Index Terms- Lectin, hemagglutination, hepatopancreas, agglutinin, *Travancoriana charu*.

I. INTRODUCTION

In Invertebrates, the physical barriers are the first obstacle to detain pathogenic micro-organisms [1]. Arthropods in general use a wide range of cellular and humoral defense mechanisms to protect themselves from disease agents that manage to gain access to their internal tissues by penetrating the exoskeleton/cuticle or alimentary canal. The hemocytes and hepatopancreas are crucial for the immune system in crustaceans as it is the main production site for immune recognition molecules, initiates the humoral reaction, and takes part in the cellular reaction by the specialized cells and phagocytes [2]. In crustaceans, phagocytes can be found free in the hemocoel or on the surface of the hepatopancreas, and/or in the gills [3, 4]. The cells principally involved are the circulating and sessile body cells (termed hemocytes) and various other cell types, including those in the hepatopancreas and gills in crustaceans. Hepatopancreas is considered an important immune-related tissue in crustaceans and the place where most CTLs (C-type lectins) are generated [5]. The hepatopancreas is morphologically similar in most decapods [6, 7, 8].

The midintestinal glands (often called the "hepatopancreas") in molluscs and crustaceans are important source of molecules of the innate immunity [9, 10, 11, 12, 13, 14]. These molecules include hemocyanin, various lectins, ferritins, serine protease inhibitors, proteolytic enzymes,

bacterial cell surface recognition molecules and nitric oxide [15, 16]. The midintestinal glands are the major digestive glands which are paired, tubular and associated with the midintestine of bivalves, gastropods and crustaceans. They are thus a multifunctional organ, with primary roles in nutrient uptake and intermediary carbon and nitrogen metabolism [17, 18] and also a source of molecules required for pathogen defense. The midintestinal gland of bivalve and crustacean species synthesize lectins such as C-type lectins and ficolins in response to infection [19, 20, 21]. The hemocoel sinusoids of the midintestinal gland allow the release and rapid distribution of the immune molecules that actively phagocytose cells and are also capable of removing foreign particles such as cellular pathogens from the hemolymph [22].

II. MATERIALS AND METHODS

2.1 Animal collection and maintenance

The freshwater crab *Travancoriana charu* was collected from the freshwater streams of Ponmudi, Thiruvananthapuram District, Kerala, India. Crabs were maintained in plastic tubs with freshwater. Water was changed on alternate days and the crabs were fed with paddy grains.

2.2 Preparation of tissue extract

Adult healthy crabs were dissected and the tissues were washed twice in cold tris buffered saline (TBS) to remove the adhering hemolymph. After weighing, the tissue extract was prepared by homogenizing 100 mg each of the tissue in 1 ml of cold TBS (Tris Buffered Saline: Tris HCl 50 mM, pH 7.5, NaCl 100 mM, CaCl₂ 10 mM) using a homogenizer. The extracts were centrifuged at 4000 x g for 10 minutes at 4°C and the supernatant was used for hemagglutination activity.

2.3 Preparation of erythrocytes

Blood from various mammalian species were obtained either by heart puncture (rat, mice) or venipuncture of the ear (rabbit), fore arm (dog) and blood bank (Human A, B, O). Erythrocytes were collected directly in sterile modified Alsevier's medium pH 6.1 (30 mM sodium citrate, 77 mM sodium chloride, 114 mM glucose, 100 mg neomycin sulphate and 330 mg chloramphenicol). Before use the

erythrocytes were washed thrice by centrifugation at 1500 x g for 5 minutes and resuspended in TBS pH 7.5 as 1.5% erythrocyte suspension.

2.4 Hemagglutination assay (HA)

The hemagglutination assay was performed in U-bottom microtiter plates. The tissue extract of the hepatopancreas (25 µl) was added to equal volume of TBS and serially diluted. To this 25 µl of 1.5% of various mammalian erythrocyte suspension was added and mixed well. The last well in the microtiter plate with TBS alone and no tissue extract was treated as the control. The ability of the agglutinin to agglutinate erythrocytes at its highest dilution was considered as the positive result. A positive result was indicated by the formation of a uniform net like layer over the surface of the mixture. Formation of a discrete button at the bottom of the well indicated negative results.

2.5 pH and thermal stability

The stability of HA activity at different pH was determined by serially diluting 25 µl of the extract of the hepatopancreas with TBS of varying pH (5 to 10). After 1 hour incubation at room temperature (30±2°C), 1.5% rat erythrocytes suspension was added and mixed well. To study the effect of temperature on hemagglutination activity, the extract of the hepatopancreas (25 µl), after incubation at various temperatures (0°C to 100°C) for 1 hour was serially diluted with TBS and then assayed for hemagglutination activity. HA titer value was determined as the reciprocal of the highest dilution of the extract giving complete agglutination.

2.6 Effect of cations and chelators

25 µl of the extract of the hepatopancreas was serially diluted with 25 µl of the divalent cations Ca²⁺, Mg²⁺ or Mn²⁺ of varying concentration of 0 mM to 100 mM. After 1 hour incubation at room temperature, HA was determined using 1.5% rat erythrocyte suspension.

Sodium/tetrasodium EDTA and trisodium citrate in TBS were prepared. 25 µl of each of the EDTA/trisodium citrate in different concentrations from 0 mM to 100 mM were serially diluted with 25 µl of the extract of the hepatopancreas and incubated for 1 hour at room temperature. HA was checked after 1 hour incubation using 1.5% rat erythrocyte suspension.

2.7 Cross adsorption assay

Cross adsorption assay was carried out as described by Hall and Rowlands [23, 24] and Mercy and Ravindranath [25]. Extract from the hepatopancreas (1 ml) was incubated with 1ml of washed and packed erythrocytes of rat/mice. The mixture was incubated at 10°C over night (18 hours) with gentle occasional shaking. After centrifugation at 4000 x g for 5 minutes, the supernatant was used for hemagglutination against the selected erythrocytes. HA was observed after 60 minutes of incubation at room temperature.

2.8 Hemagglutination inhibition (HAI) assay

Glycoproteins and sugars were tested for their ability to inhibit hemagglutination. 25 µl of the various inhibitors were serially diluted with 25 µl of TBS. To this the extract of the hepatopancreas at sub-agglutination level (diluted tissue

extract which gave a HA of 2 wells) was added. After incubation for 1 hour at room temperature, HAI was determined using 1.5% rat erythrocyte suspension.

III. RESULTS

3.1 HA assay

Among the various erythrocytes tested, extract from the hepatopancreas of *Travancoriana charu* agglutinated only rat (HA=64) and mice (HA=32) erythrocytes.

Table 1: Hemagglutination titer of the extract from the hepatopancreas of *Travancoriana charu*

Erythrocytes (n = 25)	HA titer
Rat	64
Mice	32
Dog	0
Rabbit	0
Human A	0
Human B	0
Human O	0

n= number of animals tested

3.2 pH and thermal Stability

The extract of the hepatopancreas of *Travancoriana charu* showed maximum hemagglutination titer at the pH 9.5. The activity gradually increased from pH 5.5 and decreased beyond pH 10. The HA titer was highly thermostable as it retained high activity for 1 hour up to 60°C, the activity decreased beyond 60°C markedly. However maximum activity was observed at 30°C

Table 2: Hemagglutination titer of the extract from the hepatopancreas of *Travancoriana charu* in relation to different pH and temperature using rat erythrocytes

pH (n=10)	HA titer	Temperature (°C) (n=5)	HA titer
5.0	32	0	128
5.5	32	10	128
6.0	64	20	256
6.5	64	30	512
7.0	64	40	256
7.5	64	50	256
8.0	128	60	128
8.5	128	70	32
9.0	256	80	32
9.5	512	90	4
10.0	128	100	4

n=number of animals tested.

3.3 Effect of cations and chelators

The HA titer of the extract from the hepatopancreas of *Travancoriana charu* showed that hemagglutination was dependent on divalent cations. Maximum activity was observed when treated with TBS containing 1 mM and 5 mM concentration of Ca^{2+} and 1-10 mM Mn^{2+} . The chelators di- and tetrasodium EDTA and trisodium citrate showed an increase in HA titer with increase in concentrations up to 10 mM. However when tested with 50 and 100 mM EDTA (di- and tetra sodium) there was a marked decline in HA activity.

Table 3: Effect of cations (Ca^{2+} , Mg^{2+} , Mn^{2+}) on the hemagglutinating activity of the extract from the hepatopancreas of the freshwater crab *Travancoriana charu*

Concentration of cations (mM) (n=10)	HA titer		
	Ca^{2+}	Mg^{2+}	Mn^{2+}
0	128	128	128
0.01	128	128	128
0.1	256	128	256
1	512	256	512
5	512	256	512
10	128	64	512
50	32	32	8
100	8	16	8

n=number of animals tested

Table 4: Effect of chelators (Ca^{2+} , Mg^{2+} , Mn^{2+}) on the hemagglutinating activity of the extract from the hepatopancreas of the freshwater crab *Travancoriana charu*

Concentration of chelators (mM) (n=10)	HA titer		
	Disodium EDTA	Tetra sodium EDTA	Trisodium citrate
0	128	128	128
0.01	128	256	128
0.1	256	256	128
1	512	512	128
5	512	512	512
10	1024	1024	512
50	64	8	128
100	8	8	128

n=number of animals tested

3.4 Hemagglutination inhibition (HAI)

Among the glycoproteins tested, lactoferrin (HAI=128) was the most potent inhibitor. Fetuin and apotransferrin (HAI=2) were able to inhibit the hemagglutinin activity

very feebly. The hexose sugar glucose-6-phosphate (50 mM) was the only sugar inhibitor of the extract from the hepatopancreas.

Table 5: Hemagglutination inhibition of the agglutinin from the extract of the hepatopancreas of *Travancoriana charu* by various glycoproteins

Glycoroteins (n=5)	HAI titer	Minimum concentration for inhibition (µg/ml)	Relative inhibitory potency (%)
Lactoferrin	128	39.06	100
Fetuin	2	2500	1.56
Apotransferrin	2	2500	1.56
BSM	0	0	0

n=number of animals tested

Table 6: Hemagglutination inhibition of the agglutinin from the extract of the hepatopancreas of *Travancoriana charu* by various sugars

Sugars (n=5)	HAI titer	Minimum concentration for inhibition (mM)	Relative inhibitory potency (%)
Glucose-6-phosphate	2	50	100
N-acetyl-D-glucosamine	0	0	0
Trehalose	0	0	0
D-galactosamine	0	0	0
L-fucose	0	0	0
Galactose	0	0	0
N-glycolyl neuraminic acid	0	0	0
N-acetyl neuraminic acid	0	0	0

n=number of animals tested

3.5 Cross adsorption assay

Cross adsorption assay revealed the presence of a single agglutinin in the extract from the hepatopancreas as HA activity was completely lost after the fourth round of adsorption.

Table 7: Hemagglutination titer of the extract from the hepatopancreas of the freshwater crab *Travancoriana charu* after adsorption with different erythrocytes

Erythrocytes absorbed (n=5)	HA titer	
	Rat	Mice
None	256	32
Rat	64(32)(2)(0)	16(0)
Mice	16(0)	0

Values in the parenthesis refer to HA titer after successive adsorption

IV. DISCUSSION

Invertebrates lack adaptive immune systems, but they have developed various defense systems of innate immunity that recognize antigens on the surface of potential pathogens, including a set of humoral and cellular immune reactions [26]. Some of the innate immune mechanisms in crustaceans are able to recognize specifically surface determinants on pathogens (pathogen-associated molecular patterns, PAMPs) [27] through the active production of lectins. Lectins have the property of recognizing specifically the carbohydrates from the membrane or surface of cells and consequently, are able to induce agglutination of these cells or can lead to diverse cellular events such as phagocytosis, acting as opsonins [28, 29]. Diverse crustacean C-type lectins with structural and functional variations are mainly expressed in the hepatopancreas and constitute a pathogen-recognition network against invading bacteria and viruses [30]. The ability of the tissue extract from the hepatopancreas of *Travancoriana charu* to specifically agglutinate rat erythrocytes indicates the presence of hemagglutinin. The receptor component of rat erythrocytes is NeuGc/NeuAc, O-AcSia [31].

The hemagglutinating agglutinin in the hepatopancreas of *Travancoriana charu* was heat sensitive and required divalent cations for activity, properties commonly observed for invertebrate lectins [32]. Most of the lectins reported in decapods are known to be dependent upon divalent cations, usually calcium, and they are sensitive to divalent chelators in a reversible or irreversible manner [33, 34]. Calcium dependent (C-type) lectins, which contain a characteristic carbohydrate recognition domain (CRD) with two or three pairs of disulphide bonds, mediate pathogen recognition and play an important role in the clearance of pathogens in innate immunity [35, 36, 37, 38]. Calcium is not only directly involved in the carbohydrate binding itself at the binding site [39] but contributes to the structural maintenance of the lectin domain that is essential for the lectin activity [40]. The crustacean hepatopancreas and hemocytes are the main source of many L-type lectins [41, 42] and C-type lectins [43]. C-type lectins are the most diverse and best studied among the lectin family. A C-type lectin in *Litopenaeus vannamei* with two CRDs (LvCTL) is expressed, only in the hepatopancreas

[44]. In *Fenneropenaeus chinensis*, two C-type lectins (Fclectin (FcLec-1) and Fc-hsL (FcLec-2)) have been reported [45, 46]. FcLec-1 contains dual CRDs and is expressed in hemocytes, while Fc-hsL contains only one CRD and is expressed specially in the hepatopancreas. LvLectin-1 and LvLectin-2 mRNA transcripts of the shrimp *Litopenaeus vannamei* were mostly detected in hepatopancreas, and the result was consistent with the other C-type lectins such as MjLecA, MjLecB, MjLecC in *Marsupenaeus japonicas* [47], Fc-hsL (*Fenneropenaeus chinensis*), PmLT (*Penaeus monodon*), LvLT (*Litopenaeus vannamei*), PmAV (*Penaeus monodon*) [48, 49, 50, 51, 52]. The C-type lectins from the mud crab *Scylla paramamosain* SpLec1 and SpLec2 mRNA in the megalope stage was first increased and was expressed mainly in hemocytes, muscle and hepatopancreas, with the highest expression level found in hepatopancreas [53].

Concerning carbohydrate specificity, invertebrate lectins vary from specific molecules to others that exhibit a broader spectrum of recognition. The most potent inhibitor of the agglutinin from the hepatopancreas was lactoferrin, a member of the transferrin family. Lactoferrin is a sialylated N-glycosylated linked glycan [54]. In N-glycans, the linkage of a glycan to the protein is always formed by a GlcNAc-residue linked to an asparagine within the consensus sequence Asn-Xxx-Ser/Thr. Lactoferrin (LF) is an 80 kDa single subunit N-glycoprotein with multiple functions and is involved in many processes such as activation of the immune system [55, 56] inhibitory effects on tumourigenesis [57] and anti-metastatic activity [58, 59]. Lactoferrin complex-type N-glycans has Gal(α 1-3)Gal(β 1-4)GlcNAc(α Gal),GalNAc(β 1-4)GlcNAc(LacdiNAc) epitopes and N-Glycolyl neuraminic acid (Neu5Gc). Sialic acid-containing glycoproteins (eg, fetuin, human chorionic gonadotropin, α 1-acid glycoprotein, serotransferrin, lactoferrin, fibrinogen etc.) and gangliosides have been found to be good ligands of sialic acid-binding proteins [60, 61, 62]. Sialic acid-binding lectins histochemically and cytochemically localize the sialoglycoconjugates in various cells and tissues. They can be used as specific probes to investigate the role of cell surface carbohydrates during development, differentiation and malignant transformation of cells, as indicated for other types of sugar receptors [63, 64, 65].

Repeated adsorption of the extract from the hepatopancreas with the agglutinating erythrocytes entirely removed the agglutinability, suggesting the presence of a single agglutinin. The simple sugar glucose-6-phosphate (50 mM) was capable of hemagglutination inhibition. Several functions have been attributed to the lectins detected in the hepatopancreas of crustaceans. In *Penaeus monodon*, PmLT distributes only in hepatopancreas and can enhance hemocyte encapsulation [66]. PmLec was purified and serves as an opsonin while PmAV is involved in virus resistance [67, 68]. In the shrimp *Litopenaeus vannamei*, LvCTL-1 has direct activity against white spot syndrome virus (WSSV) and can prolong the survival of the WSSV-infected shrimps [69]. LvLec in *Litopenaeus vannamei* with one CRD can agglutinate Gram negative bacteria [70]. The C-type lectin, Fc-hsL in the shrimp *Fenneropenaeus chinensis* exhibits antimicrobial activity [71]. FcLec2 and FcLec3 were

constitutively expressed in the hepatopancreas of normal shrimp and were highly up-regulated following challenge with either bacteria or WSSV [72, 73, 74]. The C-type lectin, EsLecF in the Chinese mitten crab *Eriocheir sinensis* is involved in antimicrobial response [75]. The presence of agglutinin in the hepatopancreas of *Travancoriana charu* suggests that it may take part in the defense mechanism of this animal, which can be ascertained only after further tests. Independent of the organs where the agglutinins are expressed in crustaceans, these proteins seem to be constitutive and inducible active-phase proteins that might be involved in immune responses to microbial infections and in virus resistance by inducing agglutination and opsonisation process.

V. CONCLUSION

Agglutinins/lectins are proteins or glycoproteins that have the ability to bind to specific carbohydrates expressed on different cell surfaces. Invertebrate immune system must rely on non-self-recognition molecules to ensure efficient defence responses against infectious pathogens that continuously threaten their survival. An agglutinin with specificity for N-glycolyl neuraminic acid was isolated from the hepatopancreas of the freshwater crab *Travancoriana charu*. The agglutinin was specific for glucose-6-phosphate, calcium dependent and sensitive to EDTA. The erythrocytes (rat, mice) agglutinated by the extract of the hepatopancreas of *Travancoriana charu* share N-glycolyl neuraminic acid as the common species if sialic acid. Considering the importance of sialic acids in the field of glycobiology and research, the sialic acid specific lectin in the hepatopancreas of the freshwater crab *Travancoriana charu* will play a significant role in biomedical research and therapy.

Author statement

All authors read, reviewed, agreed and approved the final manuscript.

Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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The Effect of United Theory of Admission Theory and Use of Technology (UTAUT) to Understand the Administration Level And Use of Go-Jek Applications in Padang City

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Abstract: The emergence of online transportation in the city of Padang is caused by poor services provided by public transport and frequent congestion, because online transportation is more interesting to use, because it helps people to reach their destination quickly. Another reason that makes people interested in using it is the online transportation fleet more than public transportation. This study aims to determine the effect of acceptance and use of Go-jek applications in Padang city using the UTAUT model. The factors in the UTAUT model affect consumers in using transportation technology online in Padang City. The results showed that the factors that influence the Behavior of Intentions in the application of online transportation technology in the City of Padang were Hope Performance and Business Expectations. Meanwhile, the factors that influence behavior use online transportation services Facilitation Conditions, and Behavioral Intentions. The value of influence on Behavior Behavior is 62, 8%, and the effect on Use of Behavior is 80%.

Keywords: *Performance Expectation, Effort Expectation, Social Influence, Facilitating Conditions, Behavior Intention and Use Behavior*

I. INTRODUCTION

City economic development requires adequate transportation services. Without transportation as a means to support the economic development of a region it will not be achieved as expected. Transportation from the social side is a process of cultural affiliation where when someone uses transportation and moves from one place to another, people will see differences in culture and pluralism, such as in Indonesia. For example, there are problems regarding congestion, noise pollution, air, and various accidents because public transportation facilities are not good.

Developing countries, such as Indonesia, the conventional transportation sector is slowly becoming less attractive to the younger generation. With online transportation they can save more time than driving a conventional motorcycle taxi, or other

public transportation. Online transportation is more expensive than public transportation.

conventional, because you have to have an application to be able to access online transportation services to use this transportation for daily activities, although the costs incurred are more expensive but the benefits can be felt in using motorcycle taxi online

The background of the people of Padang City who are interested in using the first Ojek Online to save time and energy, both online transportation has a non-cash payment system that uses credit and e-cash cards. Credit cards can also get cashback promos plus value from online transportation, four customers who often use online transportation such as Go-Jek, then customers will also get discounts from Go-Jek company, transportation Fifth Go-Jek has a customer loyalty program, six fleets more, compared to conventional public transportation, there are more online transportation fleets because many want to become partners with Go-Jek companies from all walks of life, even students who already have job

Many models of acceptance of information technology were developed by researchers. One model for knowing the factors of technology acceptance is the Unified Acceptance and Use of Technology Theory (UTAUT). UTAUT shows that behavioral intention is influenced by public perceptions of performance expectations, effort expectations and social influences. Next the behavior to use technology is influenced by interesting perceptions in behavioral intention and facilitating conditions. Venkatesh, et al., (2003)

Go-Jek strives to provide satisfying services to customers such as being able to be accessed anytime and anywhere, a more compact digital format, and the availability of varied features. In addition, the ease of accessing the Go-Jek application, support from the social environment, is expected to make consumers feel comfortable using it, so that it will increase customer behavior intention to use Go-Jek. And a person's attitude is a form of desire and purpose to be achieved by that person.

Based on the above phenomenon, we can conclude several research problems as follows:

1. Does performance expectations affect Go-Jek customers' behavioral intentions in Padang City?
2. Does the hope of effort influence the behavior intention of Go-Jek Kota customers in Padang City?
3. Do social influences influence Go-Jek customers' behavioral intentions in Padang City?
4. Does behavioral intent affect Go-Jek's customer usage behavior in Padang City?
5. Does facilitating conditions affect Go-Jek customer usage behavior in Padang City?

II. LITERATUR

A. Ojek online

In terms of terminology, based on the Big Language Dictionary (1989), motorcycle taxis are bicycles or motorbikes run by the presence of tenants who hitch a ride (Language Center, 2016). OJek is defined as informal transportation using motorbikes, used to transport humans and goods based on agreements between users and drivers

According to Adisasmita (2014) the quality of transportation services must meet several aspects, as follows:

- a) Fast
- b) Safe
- c) Adequacy
- d) Frequency
- e) Regularity
- f) Responsibilities
- g) Acceptable fees or affordable prices
- h) Comfort or comfort

B. Smartphone

Smartphone is a touch screen phone and tablet computer based on Linux. Android is also interpreted as software that can be used on mobile devices that are the scope of the operating system, middleware, and main applications released by Google (EMS Team, 2015).

D. United Theory Of Acceptance And use Of Technology (UTAUT)

The presence of information technology has changed many organizations. information technology to improve performance. In order for information technology to improve performance, technology must be accepted and used by users. Several theories based on psychology and sociology have been introduced and used to explain this phenomenon. Venkatesh, et al., (2003) reviewed theories about the acceptance of technology by system users. A total of eight theories are reviewed as follows:

1. Theory of reasoned action (TRA)
2. model of technology acceptance (TAM)
3. Motivational model (MM)
4. Theory of planned behavior (TPB)

5. A model combining technology acceptance models and planned behavior theory (TAM + TPB)
6. Model of PC utilization (MPCU)
7. Diffusion of innovation theories (IDT)
8. Theory of social cognitive (SCT)

Venkatesh, et al., (2003) then used preexisting theories to develop new integrated integrated models. This combined model (integrated model) which is then called by the name of the combined theory of technology acceptance and use (Unified Theory of Acceptance and Use of Technology) or called the abbreviation UTAUT. The Theory of Acceptance and Use of Technology (UTAUT) is a theory used to assess the level of acceptance and use of information technology by users Venkatesh, et al., (2012) concluded that there are four main constructs that influence behavioral and behavioral intentions using information technology. The four constructions are:

- a. Performance expectations
Performance expectations are interpreted as how high a person believes that using technology will help him improve his performance
- b. Effort expectations
Effort Expectation is defined as the level of ease a person uses the system.
- c. Social influence
SSocial influence is defined as the extent to which a person can influence others in using a new system
- d. Facilitation conditions
Facilitating this condition a person's level of trust that existing facilities can support the use of technology Venkatesh, et al., (2003)
- e. Behavioral intention
Behavior Intention is someone's intention to use technology continuously or continuously because they have access to the system
- f. Use Behavior
The popular definition of attitudes or behaviors quoted in is feeling happy about a certain thing

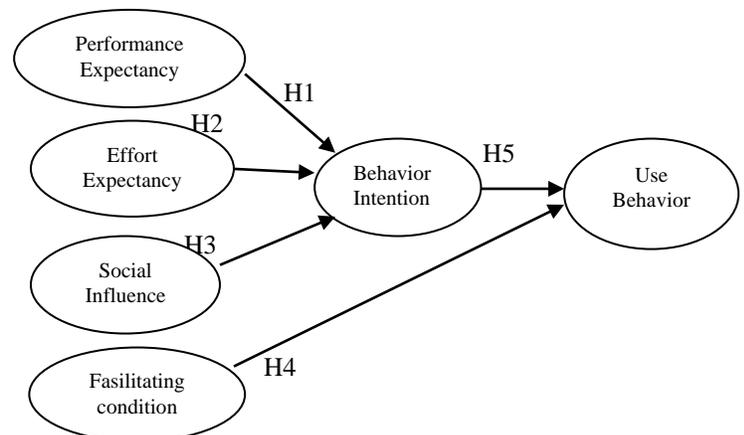


Figure 1: A theoretical framework

- Hypothesis 1: Performance expectancy has a positive effect on behavioral intention.
- Hypothesis 2: Effort expectancy has a positive effect on behavioral intention.
- Hypothesis 3: Social influence has a positive effect on behavioral intention.
- Hypothesis 4: A person's desire has a positive effect on use behavior
- Hypothesis 5: Facilitating conditions have a positive effect on use behavior

III. RESEACH METODOLOGY

A. Population and Samples

The population in this study were all Go-Jek customers in Padang City. The sample from this study is Go-Jek customers in Padang City. The method used in this study is non probability sampling where all populations do not have the same opportunity to become respondents and sampling is based on the consideration of researchers (Kuntjojo, 2009). Determination of the number of samples in this study using the requirements stated by Hair, et al (2010) that the number of samples as respondents must be adjusted to the number of indicators used in the questionnaire, assuming the $n \times 5$ observed variable (indicator) up to $n \times 10$ observed variable (indicator). The number of indicators used to measure 6 variables in this study is 19 statement items multiplied by 10 equal to 190 respondents

B. Variable Operational Definition

In this study, the operational limits used are as follows:

1. Variables:
 - a) Performance Expectancy (X1)
 - b) Effort Expectancy (X2)
 - c) Social Influence (X3)
 - d) Facilitating Conditions (X4)
2. Intervening Variables:
 - e). Behavioral Intention (Z)
3. Dependent Variables
 - f). Use Behavior (Y)

C. Data Analysis Method

The data analysis analysis metode is path analysis using Smart PLS 2.0 software (Partial Least Square). The Partial Least Square (PLS) evaluation model is based on predictive measurements that have non-parametic properties Ghozali, (2013)

1. The measurement model or outer model with reflexive indicators is evaluated with reliability indicators, internal consistency reliability, convergent validity and discriminant validity.
2. The structural model or inner model is evaluated by looking at the percentage variance described, namely by looking at the value of R2.
3. The stability of these estimates is evaluated using the t-statistical test obtained through the bootstraping procedure.

IV. ANALYSIS

A. Outer Model

1. Indicator Reliability

Table 1.
Loading Outer Value

Variables	No	An Indicator	Outer Loading (> 0.6)	Information
performance Expectancy	1	PE1	0,961	valid
	2	PE2	0,841	valid
	3	PE3	0,924	valid
	4	PE4	0,945	valid
	5	EE1	0,936	valid
effort Expectancy	6	EE2	0,825	valid
	7	EE3	0,790	valid
	8	EE4	0,876	valid
Social Influence	9	SI1	0,878	valid
	10	SI2	0,831	valid
	11	Si3	0,864	valid
	12	FC1	0,864	valid
facilitating Condition	13	FC2	0,863	valid
	14	FC3	0,797	valid
	15	FC4	0846	valid
behavioral Intention	16	BI1	0,783	valid
	17	BI2	0,903	valid
	18	BI3	0,872	valid
Use Behavior	19	UB1	1,000	valid

Based on the table above, shows that all the indicators or a valid statement items. According to Hussein (2015), when there is a value below 0.6 outer loading on a an indicator, the indicator can be omitted because it does not represent an existing construct. So that in this study there was no indicator to be removed or deleted. Here is a diagram drawing lines all indicators

2. Internal Consistency

Reliability In the second stage in reliability, the reliability of composite measurement. Internal consistency reliability is reliable if the reliability of composite values greater than 0.60 Chin, W., Marcoulides, G., & Saunders, (2012) . In Table 2 below are the results of the output from the PLS:

Table 2
Internal Consistency Reliability

variables	Composite Reability (> 0.7)	Information
<i>performance Expectancy</i>	0,956	reliable
<i>effort Expectancy</i>	0,918	reliable
<i>Social Influence</i>	0,893	reliable
<i>facilitating Condition</i>	0,908	reliable
<i>behavioral Intention</i>	0,890	reliable

Use Behavior 1,000 reliable

Based on the above table it can be seen that each of the variables used in this study had a composite value of a good reability ie, greater than 0.7. Therefore, each of the variables in this study can be said to have qualified that have high levels of reliability in accordance with the terms specified.

3. convergent Validity

Table. 3
Convergen Validity

Variables	AVE value (> 0.5)	Information
<i>performance Expectancy</i>	0,844	valid
<i>effort Expectancy</i>	0,737	valid
<i>Social Influence</i>	0,736	valid
<i>facilitating Condition</i>	0,711	valid
<i>behavioral Intention</i>	0,730	valid
<i>Use Behavior</i>	1,000	valid

In examining the value of convergent validity, can be seen from the AVE (Average Variance Extracted) each latent variable. If every variable produces a value greater than 0.50, we conclude criteria have met the convergent validityChin, (2010). Table 3 shows that all variables

4. Discriminant Validity

Discriminant validity is further analysis on the validity test in the analysis of PLS. Discriminant validity that is AVE must be greater than the correlation value between variables latent, Chin, (2010).

Table 4
Discriminant Validity

Variables	BI	EE	FC	PE	SI	UB
BI	0,854					
EE	0,403	0,858				
FC	0,643	0,439	0,843			
PE	0,784	0,419	0,857	0,919		
SI	0,358	0,249	0,311	0,349	0,858	
UB	0,745	0,390	0,858	0,953	0,278	1,000

From Table 4 above, we can see the results of the square root of the AVE value in latent variables. Thus, the above variables qualify.

1. R-Square

In assessing models with PLS begins to see R-Square for each dependent latent variables. Changes in the value of R-Square can be used to assess the effect of certain independent latent variables on the dependent latent variable whether it has substantive impact. The higher the R-square value, the more significant the influence exerted.

Table 5
R-Square

Variables	The R2
<i>behavioral Intention</i>	0,628
<i>effort Expectancy</i>	-
<i>facilitating Conditions</i>	-
<i>performance Expectancy</i>	-
<i>Social Influence</i>	-
<i>Use Behavior</i>	0,800

It can be seen from Table 5 the value of R-Square for the latent variable performance expectancy, effort expectancy and social influence variables that influence the behavioral intention in the structural model has a value R2 62,8% of the behavioral variables intention while the remaining 37,2% is influenced by other factors.

Variable facilitating conditions and behavioral intention that affect the variable use behavior in the structural models have R2 value of 0,800 then the variable facilitating condition and behavioral intention firmly explained 80% of variance variable use behavior, while the remaining 20% influenced by other factors as described in this study can explain variable use behavioral intention and behavior are factors that are not included in our model

Furthermore, using Q-square predictive relevance for the structural model, measure how well the observed values generated by the model and estimation parameters. Q-square value must be > 0 which indicates the model has good predictive relevanceGhozali, (2011). Q2 value, is as follows:

$$\begin{aligned}
 Q2 &= 1 - (1-R12) (1-R22) \dots (1-Rp2) \\
 Q2 &= 1 - (1-0,628) \times (1-0,800) \\
 &= 1 - (0,372 \times 0,2) \\
 &= 1 - 0,074 \\
 &= \mathbf{0,93}
 \end{aligned}$$

Q2 obtained amounted to 0,828 that is greater than 0 (zero) and show that the model has predictive relevance

2. Structural Model Test

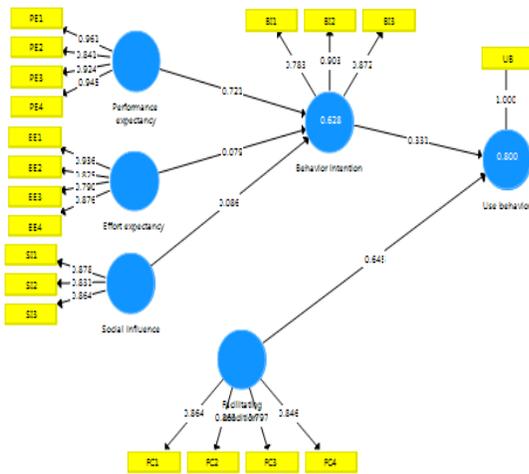


Figure 2. Structural Model Estimation Results

Results inner value of weight Figure 2 above shows that the power line (significantly) affect the behavioral intention expectancy performance for 0,721 and expectancy affect behavioral intention effort at 0,079. While the use behavior affects behavioral intention of 0,331 and facilitating conditions affecting the use behavior of 0,645.

C. Hypothesis

Table 6
Path Coefficient (Mean, STDEV, T-Values)

	Original Sample (O)	Samples Mean (M)	Standard Deviation (STDEV)	Standard Error (Sterr)	T Statistic (O / Sterr)
BI -> UB	0,331	0,331	0,048	0,000	6,950
EE -> BI	0,079	0,084	0,039	0,042	2,041
FC-> UB	0,645	0,646	0,042	0,000	15,470
PE -> BI	0,721	0,719	0,048	0,000	15,030
SI -> BI	0,086	0,086	0,059	0,143	1,469

The influence between variables is said to be significant if the t-statistics value is worth more than $t = 1,96$. So it is known that based on table 6 below, a significant difference between the performance of expectancy and effort expectancy on behavioral intention. Then, a significant difference between behavioral intention and facilitating conditions to use behavior. While social influence no significant effect on behavioral intention

V. CONCLUSIONS

1. The variable performance expectation is one of the factors that influence the significant and positive influence on Go-Jek customer behavior intentions in Padang. Go-Jek strives to provide satisfying services for Go-Jek customers in Padang, by providing satisfying services to customers, helping customers improve performance. Go-Jek can be easily

accessed via a smartphone with an internet connection, and can be accessed online anywhere and anytime.

2. Variable effort expectancy is one of the factors that influence the significant and positive influence on the emergence of Go-Jek customer behavior intentions. Go-Jek makes it easy for customers to access online, besides that customers can also operate the Go-Jek system easily customers can also menoperasikan system Go-Jek easily
3. The influence of social variables (X3) has no effect on Go-Jek's behavioral intentions in the city of Padang. In the sense that consumers' interest in using the Go-Jek service is not influenced by social or environmental factors such as friends or family
4. Variable behavioral intention have a significant effect on the use of behavioral. The results support the results Venkatesh, et al., (2003) which stated that there is a significant relationship to the interest in the utilization of information technology systems and their use. When customers want to try, to continue the use of Go-Jek and plan to use it on a regular basis, with an adequate device, customers will feel confident to use Go-Jek city of Padang
5. The condition of facilitating variables has the greatest significant positive effect for users in using Compass e-Paper. This is according to previous research. Triandis, (1980) states the Facilitation Condition as an objective factor that can facilitate an action. Ease will take action if supported behavioral intentions, will result in a better use of behavior. With availability

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Risk Factors and Chronic Complications Among Type 2 Diabetes Patients of Southern Punjab, Pakistan.

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Abstract- About half of the diabetic population in Pakistan is unidentified and almost half of the initially characterized diabetic patients are seen to have diabetic complications. The purpose of the current study was to evaluate the frequency of chronic complications of Diabetes Mellitus Type 2 in patients attending a primary care center at Jampur, Pakistan. Patients having their initial appointment at outpatient Department of Iqbal Diabetes Clinic from February 2017 to March 2018. A total of 100 diabetic patients were taken from February to June 2018. A detailed review of medical history, physical inspection and clinical and laboratory tests of blood samples were performed to recognize the dyslipidemia and related complications. A neuropathy disability scores greater than zero was used to classify peripheral neuropathy as low, medium and high. An ophthalmoscopic detailed observation of dilated retina was performed. Hyperglycemia was observed in 85%, hypertension in 62%, dyslipidemia in 58%, obesity in 52%, retinopathy in 15%, neuropathy in 47%, nephropathy was in 42% of diabetic patients. Obesity, low HDL, High LDL and total cholesterol were significantly higher in females (p at 0). Neuropathy was seen higher in patients with shorter diabetes duration while all other complications were high in patients with longer diabetes duration and of longer age group. The current study will be fruitful for the management and control of secondary complications in diabetic patients of Pakistan.

Index Terms- Type 2 diabetes, Chronic complications, Neuropathy, Retinopathy, Nephropathy.

I. INTRODUCTION

The Global prevalence of Diabetes is 8.8% of which 80% victims are from low to middle income countries[1,2]. Type 2 diabetes mellitus (T2DM) is the most common type of diabetes that covers 90% of the diabetic occupants. Still more than half of the diabetic population is declared to be undiagnosed. High infirmity and fatality rate by diabetes type 2 has lessened the caliber of life, IDF reports 5M deaths by the year 2015, likewise it casts a huge economic burden to check and cure the acute and chronic complications. Type II diabetes shows a direct alliance with complications, until then on identification [3,4]. Firstly, there can be two or more indications of disorder or may be not any. It holds up the identification, aggregating the chance of comorbidities that are often chronic micro and macrovascular complications.

Macrovascular complications contain cardiovascular heart disease, cerebrovascular disease, and peripheral vascular disease, quite linked with the disease and are likely to direct to demise. More than half of the diabetic patients die of cardiovascular diseases, primarily heart attack and stroke[5,6]. Microvascular complications are described by maligned eyes (retinopathy), renal illness (nephropathy) and neurological abrasion (neuropathy). These are the major familiar reasons of visual impairments, renal illness and leg amputation [7]. About 30–45% of patients with Type 2 Diabetes Mellitus have microvascular complications[8].

Well-known risk factors for both types of complications include poor glycemic control, diabetes duration, hypertension and dyslipidemia. Age, gender and duration of Diabetes are also major risk factors to flourish the diabetic complications in patients. Over weight and obesity are found huge risk indicators for Diabetes. Proper management and early screening of Diabetes type can be a good outcome for the patients to combat the diabetic complications [9].

II. MATERIAL AND METHODS

A cross sectional study was carried out in Outpatient Department at Iqbal Diabetes Clinic (IDC), Jampur, Dist. Rajanpur. A total of 100 diabetic patients were included in this study and all of them had their first visit at IDC. The inclusion criteria were: (1) T2DM diagnosed in accordance with international standards (WHO 1999), i.e. fasting plasma glucose (FPG) ≥ 7.0 mmol/L and/or 2 hours' postprandial plasma glucose (PPG) or casual plasma glucose ≥ 11.1 mmol/L, under regular anti-diabetic drug treatment for at least 6 months, >18 years old, resident of the same district, provided written informed consent to participate in the study. The majority of patients belonged to the low and middle socio-economic class. Only chronic complications such as cardiovascular conditions, cerebrovascular conditions, nephropathy, retinopathy, neuropathy, and diabetic foot problems that develop mostly after the proper diagnosis of T2DM were considered in this study. All the patients were interviewed via a full structured questionnaire to grab information about their demographics, diabetes related complications and medical history. All the information deduced from patients were kept confidential. Medical records and prescription reviews were done to know if they had cardiovascular and cerebrovascular complications. Moreover, to assess various complications blood and urine tests such as serum creatinine level, FPG, lipids were also performed in certified labs. Following is the detail of methods used to assess the diabetic complications: All the patients were tested for Fasting Plasma Glucose for free of charge. A standard digital Glucometer was used to check the blood glucose levels and for successive visits of patients to OPD these values were averaged. Hyperglycemia was defined to be ≥ 126 mg/dl in fasting conditions. Blood pressure was measured with a standard mercury sphygmomanometer. Hypertension was defined as a systolic blood pressure of at least 140 mm Hg and/or a diastolic blood pressure of at least 90 mm Hg or current use of any treatment with antihypertensive medications. Blood pressure of each patient was measured after making sure that he took rest of at least 10 minutes. The average of two or more readings separated by 2 min was taken [10].

Body mass index (BMI) was calculated using the formula: weight (kg)/height squared (in m²). BMI between 18.5 and 24.9 was considered normal, while that of >25.0-26.9 as overweight. The WHO protocol for measuring waist/hip was followed, a value ≤ 90 for male and ≤ 80 for females was considered to be normal. An Ophthalmoscope was used by the Diabetologist for testing Diabetic Retinopathy. The structures present in the innermost facet of the eye ball mostly named as the eye ground/ retina, blood vessels of retina were examined. Detailed medical history of patients was also examined for previous cataract or laser therapy. The glomerular filtration rate (GFR) was estimated on the basis of serum creatinine levels. Spot urine samples were tested for microalbuminuria. Severe nephropathy was defined as a doubling of the serum creatinine level, a creatinine level of more than 3 mg per deciliter (265 μ mol per liter), or a GFR of less than 15 ml per minute. The lipid profile of each patient was recorded for this reason; laboratory tests for Total Cholesterol, Triglycerides, LDL and HDL were performed. To check the Diabetic Neuropathy patient's detailed interviews, review of medical history and a lower extremity physical examination was done by the same investigator to assure the uniformity. Neuropathy Disability Score and monofilaments (10 g) were used to identify peripheral sensory neuropathy as previously described by Boulton [11].

The Achilles tendon reflexes were assessed. 0 was used if the reflex could be detected positively by the patient with closed eyes and a score of 1 was marked if the response was negative. Sensory tests were also performed by using a pinprick using a neuro-tip over the hallux dorsal area proximal to toe. Vibration testing was done with tuning fork on the pulp of the hallux and temperature perception over hallux dorsal area proximal to the toe. The sum of scores presented the neuropathy disability score. If DNS was >6 indicated high risk for neuropathy. A patient detected to be irresponsive to the 10 g monofilament pressure was reported to be at high risk to develop foot ulcer. All the data and information were arranged on Microsoft Excel sheet and results were drawn. To analyze the data statistically SPSS version 25 was used. One sample t-test was done to assess the statistical significance of the sample mean with standard cutoff values. Frequency of chronic complications in young age group and old age patients; comparatively and in patients

with little and long duration of diabetes was measured. The significance of these differences was evaluated by performing Chi square test[12].

III. RESULTS

A total of 100 diabetic patients were included in these study 68% males and 32% females. Mean age of the patients for male was 51.6±11.3 years (p at 0) and for females it was 48.6±11.4 years (p at 0). Age of patients was recorded as 27% patients were between - 39 years, 25% were between 40-49 years, 26% were between 50-59 years, 14% were between 60-69 years and 8% were 70 and above 70 years old. The patients diagnosed with DM 2 at the age of 30 were 3%, 30-39 years were 27%, above 40 were 25%, at 50 were 27% and after 60 were 10%. The patients had different occupations 28% were home maker, 10% were school teachers, 15% were farmers and 19% were retired. About 80% of females were house wives. As a whole 52% patients were found with positive diabetes family history, 35% patients reported single diabetic parent, 13% had both diabetic parents and 4% had their siblings with diabetes. Fifteen percent were reported to be ex-smokers and 35% were smokers including 3% female smokers.

Table 1: Mean Values For Metabolic Risk Factors of Patients (N=100)

		Differences From Marked Values Specify Metabolic Risk Factors											
Parameters	Marked Value	Sex of Patients											
		Male						Female					
		Mean	SD	T	p value	95% CI of difference		Mean	SD	T	p value	95% of CI of difference	
Age		51.65	11.46	284.88	0	48.863	54.373	48	11.24	106.19	0	205.72	213.78
BMI (kg/m2)	25	27.7	5.21	24.53	0	90.202	91.475	29.3	5.51	86.67	0	156.63	164.18
Waist to Hip Ratio	M 90, F 80	90.94	2.5	67.06	0	177.01	208.37	84.87	3.46	29.35	0	42.454	48.796
FPG (mg/dl)	144	193	65.13	110.58	0	146.11	155.07	21.8	73.98	118.55	0	103.81	107.44
systolic BP (mmHg)	85	83	10.5	90.86	0	194.43	201.57	80	22.6	85.4	0	51.5	54
Diastolic BP(mmHg)	130	130	20.3	35.09	0	154.96	161.92	136	21.7	115	0	47.5	46.5
Cholesterol (mg/dl)	200	197.6	14.62	76.74	0	38.405	43.037	210	11.14		0.0003	155.8	162.5
Triglycerides (mg/dl)	150	158.11	14.23	6.64	0	107.21	112.94	161	10.68	4.91	0	0.2558	0.6192
Low HDL (mg/dl)	130	40.5	9.57	0.34	0	0.2777	0.5164	45.7	8.68	4.91	0	0.2558	0.6192
High LDL (mg/dl)	M 40, F 50	110	11.85	2.034	0.01	0.123	0.532	105	5.05	4.03	0	0.1698	0.5177

At reporting time 15% patients had diabetes duration more than 5 years, 35% had between 5-10 years and 12% had more than 10 years. Patients adhered to diabetic food were ≤45%. Table 1 shows the comparison of mean values of variables with the standard values that elucidates metabolic risk factors for patients, analyzed by one sample t-test. The mean values for variables and their statistical significance is given in table 1.

Table 2: Occurance of diabetes complications with respect to Gender

Complications	Gender			Chi square test
	Overall %	Male	Female	p-value
Metabolic risk factors				
FPG>144 (mg/dl)	86	83.8	90.6	Ns
TGL>150 (mg/dl)	68	60.3	84.4	0.016
HDL<40 male,<50female	70	67.6	75	0
LDL>130 (mg/dl)	57	47	78	Ns
Obesity (BMI>25)	59	55.9	65.6	0
Systolic HTN>130	90	89.7	90.6	0
Diastolic HTN>85	51	51.5	50	0.031
Total Chl.>200 (mg/dl)	36	27.9	53.1	0.014
Microvascular				
Neuropathy	60	60.3	59.4	Ns
Retinopathy	43	42.6	43.8	ns
Nephropathy	36	39.7	28.1	ns
Macrovascular				
Stroke	5	7.4	0	Ns
CVD	6	7.4	3.1	Ns

The frequency of complications overall and in male and female is shown separately. The most frequent risk factor calculated was Hyperglycemia 86% accompanied by other risk factors 59% were obese, 58% had abnormal lipids.

Table 3: Frequency of Diabetes Complications according to Age

Complications	Age		Chi square test
	< 40 Years	≥ 40 Years	p-value
Metabolic Risk Factors			
FPG>144mg/dl	92.6	83.6	Ns
TGL>150mg/dl	85.2	61.6	0.025
HDL<40 male,<50female	63	72.6	Ns
LDL>130mg/dl	52	61.5	Ns
Obesity (BMI>25)	55.6	60.3	Ns
Systolic HTN>130mmHg	81.5	93.2	0.084
Diastolic HTN>85mmHg	37	56.2	0.089
Total Chl.>200mg/dl	37	35.6	Ns
Microvascular			
Neuropathy	59.3	60.3	Ns
Retinopathy	29.6	47.9	Ns
Nephropathy	14.8	43.8	0.007
Macrovascular			
Stroke	0	6.8	Ns
Cardiovascular disease	11.1	4.1	Ns

Frequency of microvascular complications was as follows: retinopathy 43%, neuropathy 60%; nephropathy was 36% and more than three fourth of diabetic patients had high blood pressure. 75% of the patients were taking diabetic medications orally, 10% were taking insulin injections and 15% were on diet control. Occurrence of triglycerides, total Cholesterol and Hypertension was high in females

(p at 0). High triglycerides were found in younger age group of patients while High systolic blood pressure and nephropathy were more frequent in older group. Data is given in table 3.

Table 4: Frequency of Diabetes Complications according to Duration of Diabetes

Complications	Duration of Diabetes		Chi square test
	< 10 Years	≥ 10 years	P-value
Metabolic Risk Factors			
FPG>144 (mg/dl)	84.4	91.3	Ns
TGL>150 (mg/dl)	71.4	56.5	Ns
HDL<40 male,<50female	67.5	78.3	Ns
LDL>130 (mg/dl)	57.2	72.1	0.056
Obesity (BMI>25)	54.5	73.9	0.097
Systolic HTN>130mmHg	89.6	91.3	Ns
Diastolic HTN>85	49.4	56.5	Ns
Total Chl.>200mmHg	37.7	30.4	Ns
Microvascular			
Neuropathy	61	56.5	Ns
Retinopathy	40.3	52.2	Ns
Nephropathy	18.2	95.7	0
Macrovascular			
Stroke	1.3	17.4	0.002
CVD	6.5	4.3	Ns

The occurrence of complications according to duration of diabetes. High LDL and hypertension were found to be frequent in patients with longer duration of diabetes. Hypertension was recorded as most prominent risk factor for the patients. Total cholesterol also indicated high risk factor with clearly being higher in females than in males. The progression of complications with diabetes duration could not be clearly demonstrated, even some patients with recently diagnosed with diabetes had developed some complications. It was related to low economic status of patients, high illiteracy and latent period of diabetes diagnosis. Much more studies are needed to check these complications in this area.

IV. DISCUSSIONS

About 35% of the diabetic patients are found to have diabetic complications even at the time of diagnosis. Hence it is crucial to explain the epidemiology of Diabetes Mellitus 2 complications and its co-morbidities. To our familiarity this could be the first record for survey of prevalence of chronic complications of Diabetes Mellitus 2 in rural areas of Southern Punjab, Pakistan. The results of this study report the frequency of many chronic complications in Diabetes type 2 patients attending a primary care unit in Jampur (Dist.Rajanpur). Our discoveries are relative and not fixed so the results cannot always be compared. Twenty-seven percent of patients were ≤40 years of age. This tendency of occurring of DM2 at younger age in this region is proportionate to other studies. The high frequency of diabetes in the 40-60 age group patients showed that more than half of diabetics were at diabetes in their most fertile years of life. Mean age of the diabetics in this study group was 47 years whereas a study done in Karachi it was 52. As the study was district based and combines previous undiagnosed diabetes patients, it could be supposed that district based surveys describe a substantial reduced mean age of the diabetics.

More than 50% of our study population showed positive family history for Diabetes Mellitus type 2, showed a firm inherited increase of the disease in this locality. Moreover, certain other factors such as eating patterns also affected BMI and other risk factors to develop the illness and its associated complications. About three-fourth of the patients had poor glycemic control on their first visit

to the OPD and more than half of the diabetic population had diabetes for > 5 years. This showed the high liability of diabetes and its associated complications for > 5 years. A higher proportion of diabetic patients was instructed to take exogenous insulin but only 10% of patients were going through insulin treatment. This focused the demand of revolutionizing the care centers for diabetes and creating responsiveness among the public about this disaster and its worseness. Our study showed eloquently higher triglycerides and low a HDL were measured that is consistent with diabetes dyslipidemia studied in India[13].

However, patient's social and demographic background may have effects on these dissimilarities. As well as expert ophthalmologists and better monitoring of retinopathy in specific care centers is necessary to find out the exact number. Our study showed the frequency of macrovascular complications overall as 7%, cardiovascular diseases being 6% and 1% stroke that are comparatively lower than the results of another study who found 18% of the diabetic patients to have macrovascular complications 12% CVDs cases and 6% were found to have strokes [14].

The Frequency of neuropathy was 60% with no gender differences. A recent study in India conducted by showed the same results 59% for neuropathy. High prevalence of foot ulcers was also recorded about 20% of total of 60%. This is because a large proportion of patients belonged to backward areas and had poor life style. Knowledge about the complications and life style improvements can reduce the number of diabetic patients with peripheral neuropathy and foot problems. Total cholesterol, triglycerides, obesity and Hypertension was recorded more prevalent in females than in male. While microvascular complications showed no significant gender differences. In our study prevalence of diabetic nephropathy was 36% comparable to that conducted in India was 40% . The calculations were based on the values of estimated glomerular filtration rates by measuring serum-creatinine ratio and urine test for micro albuminuria. 5% patients were detected with end stage renal disease. Timely detection and proper treatment can reduce the kidney failures. Triglycerides and hypertension increased with the age but diabetes duration had no significant effect on these variables, indicating that these risk factors emerged in latent period of diabetes. Detection of more than half of diabetics with hypertension declares it to be a major risk factor towards a number of diabetes related complications.

V. CONCLUSION

The higher frequency of the diabetic complications is worsening the caliber of life in this area. It demands a high need for advanced health care centers and alertness in patients to take greater self-care and revolutionize their lifestyles. The screening methods for diabetes should be made improved to combat the chronic complications of diabetes. Further research with improved methodology is needed to hit upon the exact frequencies of these complications and to find the relation between several risk factors and the complications.

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Reference Ranges for Glycosylated Haemoglobin And The Correlation Between Glycosylated Haemoglobin Levels And Random Blood Glucose, Hemoglobin And It's Related Red Blood Cell Indices

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Abstract: A reference value for glycosylated haemoglobin in the Kenyan population in Kiambu County was developed. 600 normal adult individuals were recruited in the study, 7 (1.2%) of their sample were not analysed as they were positive for HIV (5) and HbsAg (2). The remaining 593 study participants had representation of male 325 (54.8%) and female 268 (45.2%). Six millilitres of blood was obtained from the participants three millilitres put in EDTA vacuitainer for analysis of glycosylated haemoglobin and three millilitres put in a plain vacuitainer for screening of HIV, HbsAg and VDRL. Statistical package for the social sciences (SPSS) programme (version 21) was used for data analysis. T-test was used to compare the levels of the measured parameters between sexes, ANOVA and post ANOVA was used to compare the value of each parameter across the various age groups. $P < 0.05$ was considered significant. Means difference between male and female for analysed glycosylated haemoglobin parameter was statistically significant ($p < .003$.) and therefore separate reference ranges were established for adult population in Kiambu county. Mean and standard deviation (SD) for the studied male population was 4.57 and 0.90 respectively. Using the formula; Mean \pm 1.96 SD lower reference value was found to be 2.8 % and the high reference value to be 6.4. Mean and standard deviation (SD) for the studied female population was 4.34 and 0.92 respectively. Using the formula; Mean \pm 1.96 SD hence lower reference value was found to be 2.5 % and the high reference value to be 6.2 %. 323 diabetic patients attending diabetic clinic at Thika level five hospital were recruited to assess the correlation of glycosylated hemoglobin with random blood sugar, hemoglobin, packed cell volume, mean cell haemoglobin, mean cell haemoglobin concentration and mean cell volume. For the diabetic patients all the recruited study populations were included in the study. Four millilitres of blood sample was obtained from the patients and was put in EDTA vacuitainer. The sample was used for analysis of glycosylated haemoglobin and the full haemoglobin. Pearson's product moment correlation matrix with the dependent and independent variables was performed to assess the strength and direction of the associations between the variables of interest. Four factors especially correlated with the dependent variable glycosylated hemoglobin: hemoglobin ($r = .467$, $\rho = .000$), packed cell volume ($r = .435$, $\rho = .000$), mean cell hemoglobin ($r = -.165$, $\rho = .003$), and random blood glucose ($r = .626$, $\rho = .006$). This meant that an increase in random blood glucose, hemoglobin, packed cell volume, and mean cell hemoglobin, increases glycosylated hemoglobin. Mean cell haemoglobin concentration and mean cell volume had no significant correlation with glycosylated haemoglobin. A multiple linear regression analysis was applied to explain the direction and strength of relationships between the dependent variable glycosylated hemoglobin and independent variables, random blood glucose, haemoglobin, packed cell volume, mean cell haemoglobin, mean cell hemoglobin concentration, and mean cell volume. The coefficient of determination R^2 in this model equation was found to be .552, which meant that the six independent variables explained 55.2% of the variation of glycosylated hemoglobin. The other 44.8% of the variation being accounted for by factors other than those included in this study.

Key words: correlation, glycosylated haemoglobin, reference ranges, Kiambu County.

INTRODUCTION

Glycosylated hemoglobin (HbA1c) is the hemoglobin to which glucose is attached to the haem part of the red blood cell. It is the type of hemoglobin that is analysed to help determine the mean blood glucose levels over a given period of time of about three to four months. Increased level of plasma glucose leads to increased amount of glycosylated hemoglobin. In diabetes mellitus, increased

glycosylated hemoglobin levels, indicates poor management of hyperglycemia. This has been associated with conditions such as kidney failure, retinopathy nerve damage and cardiovascular disease (Sidorenkov et al., 2011)

Prior to the last two decades of the twentieth century, Clinical Chemistry Laboratory qualitative results were interpreted by comparison to tradition but inadequately defined “normal ranges” often used to characterize the values of health subject. The term “normal” was confusing in that in the context of Clinical Chemistry, it was assumed to present the normal (healthy) subject and to signify the normal (Gaussian) distribution. However, increasing awareness of the biological changes in physiological processes demands precise and comprehensive interpretation. A lot of review and recommendation have facilitated the abolishment of “normal” ranges to introduction of reference ranges (Grasbeck, 1969; Martin *et al.*, 1975; Galen, 1977).

Currently there are no reference values for glycosylated hemoglobin in health institutions in Kiambu County which are based on the healthy local population who seek medical care from these institutions. Health providers use glycosylated hemoglobin reference ranges quoted from diagnostic reagent kits which represent population from other geographical location to manage diabetes mellitus in the county health institutions. The purpose of the study was to develop reference ranges for Glycosylated hemoglobin for health population to be used by Clinical Chemistry Laboratories in health institutions in the County of Kiambu, Kenya and to establish if there is any significant differences between the obtained values for this parameter in the study population of Kiambu County and those provided in reagent manufacturer’s literature. The study was also designed to establish if there is correlation of glycosylated hemoglobin levels with random blood glucose, hemoglobin and its related red blood indices.

MATERIALS AND METHODS

Study Period: July 2016 to December 2016.

Study site: The study was carried out at Thika Level Five Hospital, The main analytical centers were the Laboratory Medicine department, Kenyatta National Hospital and Jomo Kenyatta University of Agriculture and Technology, Medical Laboratory Sciences department, Hematology and Virology laboratories.

Study population: Five hundred and ninety three health individuals comprising of 325 male and 268 female were recruited into the study for establishment of the reference ranges. Three hundred and twenty two diabetic patients attending diabetic clinic at Thika Level five hospital were also recruited for establishment of correlation of glycosylated hemoglobin levels with random blood glucose levels, hemoglobin and its related hematological indices levels. The participants aged between 18-60 years.

Blood specimen collection: Four millilitres of venous blood were collected from the diabetic patients. The samples were put in a 5 millilitres Ethylene Diamine tetra-acetic acid (EDTA) vacutainers and then properly mixed with the anticoagulant by gently swirling the tube for about 30 seconds. Samples were used for analysis of glycosylated haemoglobin and full haemogram. Six millilitres of blood was collected from the health population, 3 millilitres of the sample was put in an EDTA tubes well mixed for analysis of glycosylated haemoglobin and 3 millilitres put in a plain tube. These were left to clot and separated by centrifuging at 3000g for 5 minutes. The samples were used to screen for Hepatitis B surface antigen (HBsAg), human immunodeficiency virus (HIV), Syphilis (VDRL), Hepatitis C virus (HCV), and pregnancy in females.

Sample Analysis: Glycosylated haemogram was analysed using midray 800 auto analyser (Germany). Auto Hematology Analyzer (Nanjing Perlove Medical equipment Co, Ltd, China) was used to analyse full haemoglobin and random blood glucose was analysed using exped glucometer in combination with glucose electrode. For HIV, HbsAg, HCV, VDRL and pregnancy tests rapid screening tests were done using an Immunochromatographic reagent strip Quality control samples were run always before analysis of the study samples.

Data Analysis: Version 21 of the Statistical package for the social sciences (SPSS) programme was the tool applied to analyse the results. T-test was used to compare the levels of the measured parameters between sexes, ANOVA and post ANOVA was used to compare the value of each parameter across the various age groups. $P < 0.05$ was considered significant. The Pearson’s product moment correlation analysis measured the associations between the dependent and the independent variables and Multiple Linear Regression was used to determine the strength of those factors affecting glycosylated hemoglobin.

RESULTS

The reference values were determined using the means and standard deviations as the data was found to be normally distributed. The means difference for both sexes were statistically compared using t- test as shown in table1. They were statistically significant since ρ was less than 0.05 and hence the reference ranges were established for each individual sex. Using the formulae $\text{Mean} \pm 1.96 \text{ SD}$, the reference ranges for male (Mean= 4.57, S.D = 0.91) were established lower limit 2.8% and higher limit 6.4%. For the female (Mean= 4.34, S.D = 0.92) the reference limits were established lower limit 2.6% higher limit 6.2%.

Table 1: Established reference ranges for the HbA1c for both male and females

Gender	N	Mean±SD	Mean-1.96SD	Mean+1.96SD	Range	t-value	ρ-value
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M &F	593	4.48±0.98	2.56	6.40	3.84	3.000	0.003
M	325	4.57±0.91	2.79	6.35	3.56		
F	268	4.34±0.92	2.53	6.15	3.62		

N stands for number of the subjects, SD = Standard difference.

Using the T- test the means difference for the two sexes within the same age groups for all the age categories (18-29 years, 30-39 years, 40-49 years and 50 and above years) were not statistically significant. Using ANOVA the means difference of the analyte in the four categories for the male was statistically significant ($\rho = 0.006$) whereas the means difference was not statistically significant in the case of the females within the four categories ($\rho = 0.851$). Using the post hoc test in males, the means difference between category 1 and 2, category 1 and 3, category 1 and 4 were statistically significant ($\rho = 0.005$, $\rho = 0.004$ and $\rho = 0.005$), respectively. The means difference between category 2 and 3, category 2 and 4 and category 3 and 4 were not statistically significant ($\rho = 0.684$, $\rho = 0.506$, $\rho = 0.769$), respectively as shown in table 2.

Table 2 Comparison of means differences between age and sex

AGE GROUPS	18-29 Years Mean±SD	N	30-39years Mean±SD	N	40-49years Mean±SD	N	≥50years Mean±SD	N
F &M	4.35±0.77	196	4.52±1.03	187	4.55±1.22	125	4.57±0.95	85
Female	4.42±0.93	104	4.29±1.00	71	4.31±1.14	53	4.34±0.85	40
Male	4.28±0.54	92	4.66±1.02 ^a	116	4.72±1.26 ^b	72	4.77±1.00 ^c	45

a indicates significant means difference between age group 1 and age group 2 in male where $\rho < 0.05$

b indicates significant means difference between age group 1 and age group 3 in male where $\rho < 0.05$

c indicates a significant means difference between age group 1 and age group 4 in male where $\rho < 0.05$

For the three hundred and twenty two samples analysed from diabetic patients, the associations between the variables were assessed using the Pearson's product moment correlation. The predictive power of the factors affecting glycosylated hemoglobin was determined by use of Multiple Linear Regression.

Correlation Matrix: The Pearson's product moment correlation matrix with the dependent and independent variables enabled the study to test the strength and direction of the relationships between the variables under study. Four factors correlated with the dependent variable glycosylated hemoglobin: hemoglobin ($r = .467$, $\rho = .000$), packed cell volume ($r = .435$, $\rho = .000$), mean cell hemoglobin ($r = -.165$, $\rho = .003$), and random blood glucose ($r = .626$, $\rho = .006$) as shown in table 3.

Table 3 Results of the Correlation Matrix

		HbA1c	Hb	PCV	MCH	MCHC	MCV	RBG
HbA1c	r	1						
	ρ							
	N	322						
Hb	r	.469**	1					
	ρ	.000						
	N	322	322					
PCV	r	.435**	.982**	1				
	P	.000	.000					
	N	322	322	322				
MCH	r	-.165**	-.099	-.112*	1			
	ρ	.003	.075	.045				
	N	322	322	322	322			
MCHC	r	-.044	-.034	-.061	.319**	1		
	ρ	.431	.539	.273	.000			
	N	322	322	322	322	322		
MCV	r	.084	.321**	.314**	.114*	.059	1	
	ρ	.135	.000	.000	.041	.289		
	N	322	322	322	322	322	322	
RBG	r	.626**	.223**	.217**	-.076	-.056	.214**	1
	P	.000	.000	.000	.173	.319	.000	
	N	322	322	322	322	322	322	322

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Multiple Linear Regression Analysis A multiple linear regression was used to explain the direction and strength of associations between the outcome variable glycosylated hemoglobin (HbA1c) and predictor variables, random blood glucose (RBG), hemoglobin (Hb), packed cell volume (PCV), mean cell hemoglobin (MCH), mean cell hemoglobin concentration (MCHC), and mean cell volume (MCV) as shown in table 4. The Multiple Linear Regression analysis was used to test the hypotheses that the six predictor variables, random blood glucose, hemoglobin, packed cell volume, mean cell volume, mean cell hemoglobin and mean cell hemoglobin concentration could significantly predict the outcome variable, the level of glycosylated hemoglobin

Table 4 Results for Multiple Linear Regression Analysis

Model	R	R square	Adjusted R square	Change Statistics				
				R square Change	F. Change	df1	df2	Sig. F Change
1	.773	.552	0.543	.552	64.471	6	314	.000

The coefficient of determination R^2 from the analysis was found to be .552. This meant that the six independent variables (random blood glucose, hemoglobin, packed cell volume, mean cell hemoglobin, mean cell hemoglobin concentration, mean cell volume) explained 55.2% of the variation of glycosylated hemoglobin. The other 44.8% of the variation was accounted for by factors other than those included in this study. More studies need to be carried out to find out those other factors influencing the levels of glycosylated hemoglobin.

DISCUSSION

The reference ranges obtained from this study for glycosylated hemoglobin differed with the reference ranges that are given in the reagent literatures. According to IFCC the reference ranges for glycosylated hemoglobin are 2.9-4.2 % which applies to both sexes. According to NGSP/DCCT the reference ranges for glycosylated hemoglobin are 4.8-5.9 % which is applies to both sexes. According to JCCLS the reference ranges for glycosylated hemoglobin are 4.3-5.8%, which is applies to both sexes. These are the same reference ranges used today in all the laboratories in Kenya including those in Kiambu County to interpret patient’s glycosylated hemoglobin results; each laboratory selects one of the above depending on the standard operating procedure of that particular laboratory. Reference interval derived from a population different to the individual tested, may give a misleading impression of the status of the individual patient (Solberg *et al.*, 1989). Use of the reference values currently used today will lead to mismanagement of patients attending the various hospitals of Kiambu County. This is because the lower reference ranges from the literature are higher than the actual value obtained in this study from the residence of Kiambu County. On the other hand, the upper reference ranges from the literature are lower than the actual value obtained in this study from the residence of Kiambu County.

The difference in the values of the reference range given in the literature which was established from people in a different regions like America, United Kingdom and other overseas countries and the values established in this study could be attributed to different operating conditions in the different laboratories, different criteria for selection of healthy subjects, difference in subject preparation and sample collection, different geographical location of the two populations with different temperatures, altitudes, barometric pressures, humidities and time zones. This contributes to difference in life styles including food eaten, physical activities and so difference in the levels of blood glucose, hematological parameters such as the hemoglobin which influences the levels of glycosylated hemoglobin. The difference would also be as a result of genetic difference between the two populations under comparison (Www. Clinlabnavigator.com, 2016). As a result of this it is recommended that each laboratory establishes its own reference ranges for the analytes being analysed in that particular laboratory using samples from the normal population within that geographical region.

Four factors correlated with the dependent variable glycosylated hemoglobin: hemoglobin, packed cell volume, mean cell hemoglobin and random blood glucose. This means that an increase in random blood glucose, hemoglobin, packed cell volume, and mean cell hemoglobin, respectively, increases glycosylated hemoglobin. This means therefore the levels of the above variables need also to be considered when interpreting the levels of the glycosylated haemoglobin

RECOMMENDATIONS:

This study recommends that the established reference values should be circulated to all hospitals in the county of Kiambu and be used henceforth in management of patients with glucose impairment. A similar study to be conducted to establish HbA1c reference values in Kiambu County for children and any other age category not included in the study. A similar study to be conducted for all other biochemical analytes and other disciplines of laboratory science for the whole population in the county. With the references ranges for all analytes for the Kiambu County in place, the dependence of literature reference ranges from other population and regions will be phased out. Further research to be conducted to identify other factors that influence the levels of glycosylated hemoglobin.

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Use of Seasalt for Artemia Biomass Culture In Corporation With Biofloc Technology

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Abstract: In this study, *Artemia* were cultured at three substitution rates of seawater by sea-salt water involving 0% (control; seawater); 50 and 100% incorporated with two ways of culture method known as normal and biofloc application. The two-factorial experiment produced 8 treatments and there were 3 replicates for each. *Artemia* were reared in 5L plastic bottles, contained 3L culture medium with a density of 500 nauplii/L, salinity 30‰ and lasted for 4 weeks. In the first two days after stock, *Artemia* was fed with fresh *Chaetoceros* algae and after that till the end of experiment, *Artemia* formulated feed was used as daily food. In biofloc treatments, the C/N ratios were regulated by adding molasses into the *Artemia* culture medium based on TAN concentration from days 5th. Results from experiment showed that most of followed parameters such as survival, growth, reproduction as well as biomass production were more or less similarity between treatments ($p > 0,05$) except reproduction rate. These results indicated that the sea-salt water can be used for *Artemia* biomass culture and bioflocs did not make sense when applied in this case, although the biomass production in biofloc treatments were a bit higher than in normal culture. However, it was calculated that the feed utilization in biofloc treatments was lesser 13.3% compared to normal culture for getting the same amount of live biomass at harvest. Besides that, biofloc application also saves water exchanges about 30% and labour cost for this work.

Index term: *Artemia*, substitution rate, biomass production, bioflocs

I. INTRODUCTION

Artemia is an ideal live food item that has widely used in aquaculture, especially in fish and crustacean larvae production due to their nutritional values such as high protein content (45-55%), essential fatty acids, pigments and vitamins ... (Léger *et al.*, 1986.; Nguyen Thi Ngoc Anh, 2009). Beside nutritious worth, the difference in sizes of biomass from nauplii (500 μm) till adults (8-10mm) easily to fit the larval mouth sizes during larval culture to nursery stages of shrimps, fishes. Former researchers announced that newly hatched *Artemia* nauplii can be feed directly to most of shrimp, fish larvae and resulting in higher survival rates, better performance compared to other live feed or artificial feed (Bengtson *et al.*, 1991). Moreover, *Artemia* biomass including pre-adults and adults when used as food source in nurseries most of aquaculture species gave better results in term both of utilization and economic efficiency (Olsen *et al.*, 1999). Additionally, *Artemia* had been documented that it contained rather large amount of vitamins, pigments as well as reproductive hormones which is very beneficially in pet fish culture and shrimp, fish and crab brood-stocks (Sorgeloos *et al.*, 1997; Lim *et al.*, 2003).

Although *Artemia* biomass has been cultured worldwide a long time ago but it is always incorporation with either salt lakes or salt-field for outdoor culture (Van Stappen., 2002). The indoor culture was not favorite because of high operation costs such as seawater transportations, electrical power, feed and labors...despite of many advantages known as serving in demand, disease control and no seasonal depending like outdoor culture (Hoa., 2002; Anh., 2009). Recently, aquaculture is fast developed in Vietnam, requiring many billions shrimp, fishes, crabs... babies a year and that leading to a big amount of *Artemia* biomass has been used as feed source for both nurseries and grow-out activities in the Mekong Delta (100-150 thousand hundred tons, data from our survey 2016-2017, not published yet). However, this biomass can only provide during the dry season (from February to June) by outdoor culture in salt-pans, out of this time it became shortage or had to storage under frozen form which is not attractive to many predators liked shrimp babies, pet fishes who is a hunter of live prey. For this reason, an indoor culture has been tried in a series of experiments based on *Artemia* biological characteristics known as easy to adapt with diversified habitats including differential salt compositions (Van Stappen, 2002) resulting in our trials of using sea-salt water; a cheap and always available instead of seawater (high transportation cost). Besides that, bio-floc technology which is well documented during recent years in aquaculture as a new

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way to save food, exchange water and environmental support, especially in *Artemia*, it has also been noticed by Sui *et al.*, 2013; Ronald *et al.*, 2013. These advantages should be tested in combination with the sea-salt water culture medium in order to produce not only actively fresh *Artemia* biomass year-round but also reasonable, clean and disease controlled live food.

II. MATERIALS AND METHODS

This study was carried out at the *Artemia* laboratory, Department of Coastal Aquaculture, College of Aquaculture and Fisheries, Can Tho University and *Artemia franciscana* Vinh Chau strain was used for experimental test.

Experimental setup

A two factorial experiment was set up in which the first factor were substitution rates of seawater medium (SM) by sea-salt medium (SSM) in turn of 0%, 50%, 75%, 100% and the second factor was with biofloc (BF) and without biofloc (NBF) application in culture medium. The combination of two factors resulted in 8 treatments as described in Table 1, there were three replicates for each treatment

Table 1: Describe of treatments in experiment

Substitution rates of SM by SSM	Biofloc application	
	None (NBF)	Bioflocs (BF)
0% (SM)	NBF_0	BF_0
50%	NBF_50	BF_50
75%	NBF_75	BF_75
100% (SSM)	NBF_100	BF_100

Preparation of culture medium: the seawater culture medium (SM) was prepared by diluting high saline water (80‰; was collected and transported from solar salt pans) in tap water to a salinity of 30‰; while the sea-salt water culture medium (SSM) was prepared by dissolving 3kg sea salt in 100L tap water. Both mediums were then treated with 30 mg/L chlorine and strong aeration for at least 48 hours before used. The mix culture medium (50% SM+50%SSW and 25% SM+75%SSW) was done with exact ration from both prepared medium.

Preparation of Artemia nauplii: One gram of *Artemia franciscana* Vinh Chau was added into the 1.5 L conical plastic bottle containing 1 L of seawater at 30‰, the optimal conditions for hatching were maintained at pH about 7.5-8.6, temperature at 28°C, light 1000 lux and continuously aeration (Sorgeloos *et al.*, 1986). After 24hours of incubation, newly hatched *Artemia* nauplii were harvested for stocking into the different culture medium (experimental treatments).

Artemia stock and culture maintaining: *Artemia* newly hatched were cultured according to treatments (Table 1) in 5L plastic bottles, contained 3L culture medium with the density was 500 nauplii/L, light aeration. All treatments were kept in room condition with air-conditioner during 28 days of culture period. *Artemia* were offered fresh microalgae *Chaetoceros* sp. (2 million cells/mL), during the first two days of culturing and from the 3rd onwards to the end of experiment, *Artemia* were fed with *Artemia* feed containing 30% of protein and 9% of lipid following feeding regime by Hoa (1993). *Artemia* feed was soaked in seawater (salinity 30‰) for 15 minutes, and then the solution was filtered through the 50 µm net before feeding. The total amount of daily feed was divided in four parts, and distributed to *Artemia* in four times per day (at 8:00, 11:00, 14:00 and 17:00). The amount of feed was adjusted by day based on the demand of *Artemia* through the observation of feed in water (water color) and in digestive track of *Artemia*.

Water exchange and C:N regulation: The NBF treatments was renewed 30% at day 7th and day 14th, after that water exchange was done depending on each culture bottle status, i.e. water quality and *Artemia* activities. The C:N=5 in biofloc treatments were regulated by adding molasses from day 5th of culture and every 3 days after that until end of experiment based on TAN concentration in culture medium.

Data collection and analysis

Water quality: pH and temperature were daily recorded at 8 AM and 2 PM by pH meter and thermometer, respectively. NH₄⁺/NH₃ (TAN) concentration was recorded every 3 days and nitrite (NO₂⁻) concentration was recorded weekly by Sera-test (Germany).

Survival at day after hatching 7th (DAH7) and at DAH14 was counted and calculated following the below formula:

Survival rate (%) = final number of Artemia at DAH7 or DAH14/Initial number of Artemia at stock x 100.

Individual length of *Artemia* at DAH7 and at DAH14 was recorded by randomly measuring the individual length of 30 *Artemia* in each treatment, *Artemia* was measured from the head to the telson of *Artemia* under specific binocular (Olympus SZ51, Japan)

Fecundity: Number of cysts or nauplii per female were recorded from 30 randomize females in each the brook sac of each *Artemia* female was opened and counted all the number of cysts (yellow-brown in color) or nauplii (orange in color) under microscope (10X).

Reproductive pattern: percentage of oviparity (cyst bearing) or ovoviviparity (naupliar bearing) females per total observed females; were recorded from 30 randomize females.

Reproduction rate: percentage of females that released the offsprings per total oserved females; were calculated from 30 randomize females

Final *Artemia* biomass production is a lump sum of biomass harvesting in wet weight at the end of experiment according to treatments.

III. RESULT AND DISCUSSION

Culture condition

The experiment was set up in laboratory, equipped air-conditioner, therefore the temperature was rather stable and did not differ between treatments, average temperature at 7 AM and 2 PM was $27.2 \pm 1.3^{\circ}\text{C}$ and $28.0 \pm 1.2^{\circ}\text{C}$, respectively. In the other hand, the pH of culture water in this study was in the range of 8.1 – 8.7. Previous studies has confirmed that this temperature and pH levels were in suitable range for the performance of *Artemia* (Dhont et al., 1996; Hoa et al., 2007).

The water quality parameters including $\text{NH}_3/\text{NH}_4^+$ (TAN) and NO_2^- during experimental period varied from 0.1 – 2.5 mg/L; 0.1 – 2.0 mg/L, respectively with similar trend; low at beginning, then gradually increase by cultured timing and rather high concentration at the end of experiment due to accumulation of organic matters i.e. feces, moulted shell, extra feed...; especially TAN at biofloc treatments was highest because of no water exchange. Another notification was at those treatments using seawater; TAN và NO_2^- was stable while at treatments with different substituton rates presented a larger fluctuation. However, the values of these factors always reached higher with biofloc treatments (BFT) than in none biofloc treatments (NBFT) except the NO_2^- content at NBF_0 treatment (Fig.1), that might be related to the growth of bacteria when molasses were daily added. Stability of TAN và NO_2^- at SM despite of adding molasses or not (BF vs. NBF) was a proof of bacteria activity in BF application and enhancing water quality due to there was none water exchange in BF but it was almost 30% for NBF. Hari et al. (2006) had confirmed that adding carbohydrate into shrimp culture system resulted in reducing TAN và NO_2^- accumulation in water column and this seems to fit with the results of SM treatments.

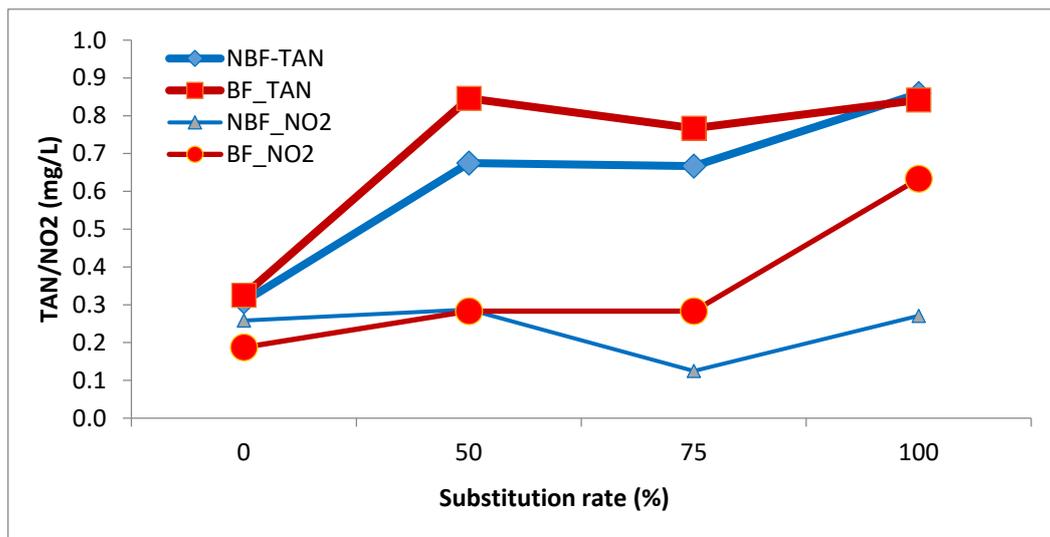


Fig.1. Average TAN and NO_2^- concentration in NBF and BF treatments

However, when replacing 50% SM by SSM upwards, TAN and NO_2^- concentration showed a larger variation than in SM, might concern to the growth and diversity of bacteria community because according to Shadia et al., (2016) there is a relationship between limiting nutrients and microbial growth, development and diversity in which varied with environmental factors. Regarding to this

study, the SSM eventhough have similar macronutrients with SM but lesser amounts of many trace elements found in natural seawater (Kolev et al., 2013) might cause lesser diverse of bacteria, especially chemochophic group who required chemical compoumd for they growth. However, Dhont *et al.* (1996) reported that *Artemia* have ability to resist high level of $\text{NH}_4^+/\text{NH}_3$ and NO_2^- content and LC50 (lethal concentration of 50%) of *Artemia* on $\text{NH}_4^+/\text{NH}_3$ and NO_2^- concentration 24 hours is 1000 mg/L and 320 mg/L, respectively. Therefore, $\text{NH}_4^+/\text{NH}_3$ and NO_2^- concentration in this study was in suitable range for the growth of *Artemia*.

Artemia performance

Survival rates

The survival rates of *Artemia* are showed in Table 2. A week from stock, the survival was recorded in range 85% - 97.7% and then slowed down around 7-10% more at day 14th. However, there was no statistical different between treatment on survival at both sampling time (DAH7 and DAH14; $p>0.05$)

Table 2: Survival and length of *Artemia* in different treatments at DAH7 and DAH14

Treatm ent	Survival rates (%)		Length (mm)	
	DAH7	DAH14	DAH7	DAH14
NBF_0	97, 7±1, 5 ^a	87, 3±8, 5 ^a	3, 87±0, 58 ^a	5, 53±1, 01 ^a
NBF_50	87, 3±3, 5 ^a	83, 3±4, 5 ^a	4, 40±0, 87 ^a	5, 27±1, 12 ^a
NBF_75	86, 0±8, 7 ^a	79, 3±9, 7 ^a	4, 23±0, 21 ^a	6, 70±0, 60 ^a
NBF_100	89, 7±6, 1 ^a	80, 0±5, 1 ^a	4, 37±0, 25 ^a	5, 80±0, 56 ^a
BF_0	97, 3±2, 9 ^a	89, 7±2, 1 ^a	3, 83±0, 21 ^a	6, 07±0, 25 ^a
BF_50	81, 3±15, 3 ^a	78, 3±15, 9 ^a	4, 63±0, 23 ^a	6, 97±0, 72 ^a
BF_75	86, 7±7, 0 ^a	79, 6±2, 8 ^a	4, 27±0, 25 ^a	6, 43±0, 38 ^a
BF_100	85, 0±12, 8 ^a	82, 7±13, 0 ^a	4, 50±0, 17 ^a	6, 00±0, 53 ^a

(Values shared the same character in the same column presented no statistic difference ($p>0.05$; Two-way ANOVA)

Results from Table 2 also revealed that the culture medium (with and without BF) had no effect on survival, the difference was very tiny (highest only 3% between BF and NBF). The explaining for this similarity could come the fact that heterobacteria was not developed yet in BF treatments since molasses just was added after day 5th of the culture. In another hand, *Artemia* just overcame two weeks; there was not much organic matter accumulation that migh influence to the water quality and in turn survival rates. This was demonstrated in water quality parameters of both type of culture medium; in which TAN and NO_2^- in BF and NBF was 0.28 Vs. 0.31; 0.3 Vs. 0.4mg/L, respectively.

According to the results in Table 2, survival was not enhanced when bioflocs was applied, while Toi *et al.* (2013; 2014) reported that *Artemia* culture in biofloc system with C/N=10 and using *Tetraselmis* sp as food resulted in better survival. In our study, C/N=5 was applied and this lower rate may be a reason for slow grow of heterobacteria and as a sequence giving a little amount of supplemental food by bacteria, moreover fresh *Tetraselmis* was always better food in term of biology and nutritional value compared to artificial food that was used in present study. Those reasons could be an explanation for none improved survival when BF application in our study compared to previous studies.

Regarding to the ability of using sea-salt instead of seawater through substitution rates, results from Table 2 illustrated that when replacing SM by SSM despite of BF and NBF; survival always was 8-16% lower than none replace (using seawater) but no statistic difference was found ($p>0.05$). The poorer survival in treatments that seasalt was used apart of full (100%) could be the result of lacking of micronutrients compared to seawater and this is not good for *Artemia* at young age but after that those can adapt with new environment, they became more flexible with it; i.e. at 7th survival between SM and SSM was 16% lower but it was only 7-10% at day 14th.

Length

Artemia performance in term of individual length was presented in Table 2. At DAH7, the length of *Artemia* was in range 3.8-4.4 mm and there was no difference found between treatments ($p>0.05$). The length of *Artemia* in BFT varied from 3.83 – 4.63mm, a bit longer than those in NBFT (3.87 – 4.40mm) and the same tendency was recorded at DAH14 with BFT was in range of 6-7mm, while NBFT reached around 5,2- 6,7mm. Although, the difference in length of *Artemia* from BFT and NBFT did not differ from each other ($p>0.05$; Table 2) but it was observed that in BFT, they grew better and this result suited with Toi *et al.* (2013) who confirmed in his

study that the higher growth performance in term of length was obtained in the carbon added treatment, which may result from bacteria grown in the culture medium when they used added carbon as nutrition source. As a consequence, *Artemia* benefitted from these bacteria because they can use as direct food source (Intriago et al., 1993; Hoa et al., 2007).

Table 3: p-value of experimental factors on *Artemia* performance

p-value	Source of variation		
	Biofloc application (BA)	Substitution rate (SR)	BA x SR
Survival at DAH7	0,4693	0,0703	0,8831
Survival at DAH14	0,9822	0,3442	0,8862
Length at DAH7	0,5962	0,0583	0,9480
Length at DAH14	0,0772	0,2762	0,1352

(***:p<0,001; **: p<0,01 và *: p<0,05)

In general, results from Table 2 and detail statistics (Table 3) demonstrated the substitution rates of SM by SSM as well as the biofloc application did not have neither independent effect nor combine effect on *Artemia* performance in term of survival and leng growth (p>0.05)

Reproduction characteristics

Browne et al. (1984) stated that *Artemia* displays two of their reproductive partterns including oviparity (release cysts) and ovoviviparity (release nauplii) and which of these happen depended on a lot of environmental factors such as food available, stress, salinity and temperature changes.... Some authors assumed that like animals who can born the dormant cysts when their living condition was out of their stand, *Artemia* also tends to release cysts to remain their population when they have to challenge with rigorous change in their living condition (Sorgeloos et al., 1980; Hoa et al., 2007). In this study, *Artemia* got mature at DAH12 and the fecundity in NBFT varied from 61-75 offspring/female, a bit higher than what recorded in BFT (51-72 offspring/female); however, these differences was not statistically significant (Table 4). This result was rather similarity as found in previous studies on (Anh, 2009; Van anh Toi, 2018) demonstrating *Artemia* population was in normal development despite of using apart of full SSM to culture them.

Table 4 : Reproduction characteristics in different treatments

Treatment	Fecundity (offspring/female)	Ovoviviparity (%)	Reproduction rate (%)
NBF_0	75 ± 14 ^a	58,3 ± 2,9 ^a	100,0 ± 0,0 ^b
NBF_50	61 ± 4 ^a	49,3 ± 12, ^a	80,0 ± 10,0 ^b
NBF_75	62 ± 8 ^a	46,1 ± 6,0 ^a	80,0 ± 8,7 ^b
NBF_100	61 ± 7 ^a	64,6 ± 25,3 ^a	65,0 ± 18,0 ^{ab}
BF_0	51 ± 3 ^a	63,3 ± 32,1 ^a	38,3 ± 17,6 ^a
BF_50	72 ± 12 ^a	49,3 ± 12,9 ^a	83,3 ± 10,4 ^b
BF_75	58 ± 13 ^a	35,8 ± 10,4 ^a	68,3 ± 24,6 ^{ab}
BF_100	58 ± 19 ^a	30,9 ± 4,3 ^a	65,0 ± 8,7 ^{ab}

(Values shared the same character in the same column presented no statistic difference (p>0.05; meanwhile had different character showed a statistic difference (p<0.05); Two-way ANOVA)

The ovoviviparity percentage in population of this experiment displayed a big amplitude resulted in no difference seen between treatments, as had been explained above on the reproductive parttern, beside environment effect, some unknown reasons had been noticed (Sorgeloos et al., 1980; 1996; Hoa et al., 2007). Nevertheless, except the NBF-100 treatment, there was a tendency for substitution rate, the higher substitution rate, the lower of ovoviviparity percentage was observed in both BF and NBF application (Table 4). This is fit with statement from previous studies that vigorous living condition led to *Artemia* tends to release cysts. The lack of some micronutrients may be produced some effected on *Artemia* reproduction as well as reproductive mode because data showed that in BF and NBF treatment that used 100% SSM, the reproduction rates were lower in both of them compared to other

substitution rate treatments such as 50 and 75% (65% Versus 68-80%). An interesting observation was lowest reproduction rate found in BF_0 treatment (only 38%) while other treatments reached 65-100% (Table 3) and this was significant difference with most of NBF treatments. The difference in may be the result of the massive growth of bacteria in BF_0 treatment due to the medium (seawater) not only with better micronutrients but also was added molasses that stimulate the huge development of bacteria in the culture. According to Toi et al. (2013), bacteria with adequate amount would be a good food for *Artemia* but they become harmful when presented with high density and that would be the the explanation in this case.

Table 5: p-value indicated the effect of experimental factors on reproduction however characteristics and biomass of *Artemia*.

p-value	Source of variation		
	Biofloc application (BA)	Substitution rate (SR)	BA x SR
Fecundity	0.2742	0.7304	0.0938
Ovoviviparity	0.1643	0.2480	0.2194
Reproduction rate	0.0079**	0.2423	0.0036**
Biomass	0.4253	0.5137	0.9689

(***: p<0.001; **: p<0.01 and *: p<0.05)

Results from statistic analysis in Table 5 also confirmed that fecundity and reproduction pattern both were not effected by experimental factors (biofloc application and substitution rate) in term of either independent or combined effect (p>0.05); meanwhile there was an effected on reproduction rates by biofloc application and as a sequence the interation between the two factors was found (Table 4; p<0.05).

Biomass at harvest

After 28 days of culture period, the highest biomass weight was collected at BF_50 treatment (12,2g), lowest was at NBF_0 treatment (9.1g). Despite of culture medium in which bioflocs was applied or not; the substitution rates of SM by SSM from 50-75% always gave better biomass yield compared to other substitution rates, eventhough the difference was not statistically significant. Results from Fig 2 and Table 4 indicated that the average biomass in BFT was higher than in NBFT (11,4 ± 2.4g versus 10.5 ± 2.0g but this was not proved by statistic signification (p>0.05). However, the biomass weight at harvest of all treatments in present study was better than those was recorded in previous trial of Thong and Hoa (2018) when the culture was done at the same stocking density and salinity (average 3.3g/L versus 1.08-1.48g/L); or similar with those reported by Toi and Van (2017) but shorter in culture time (42 vs. 28 days). Base on the biomass at harvest and the amount of feed was used during experimental period, result from calculation showed that the feed for producing 1g *Artemia* biomass was 1.47g in BFT; while it was 1.7g for NBFT, saving about 13,3%. Moreover, those treatments with BF application was zero water exchange during the culture but for NBFT (normal culture) water exchange was started at day 7th and upwards by every 5-7 days depending on culture status; resulted in total water exchange was about 20%-30% for whole culture period plus the labour cost for doing this job.

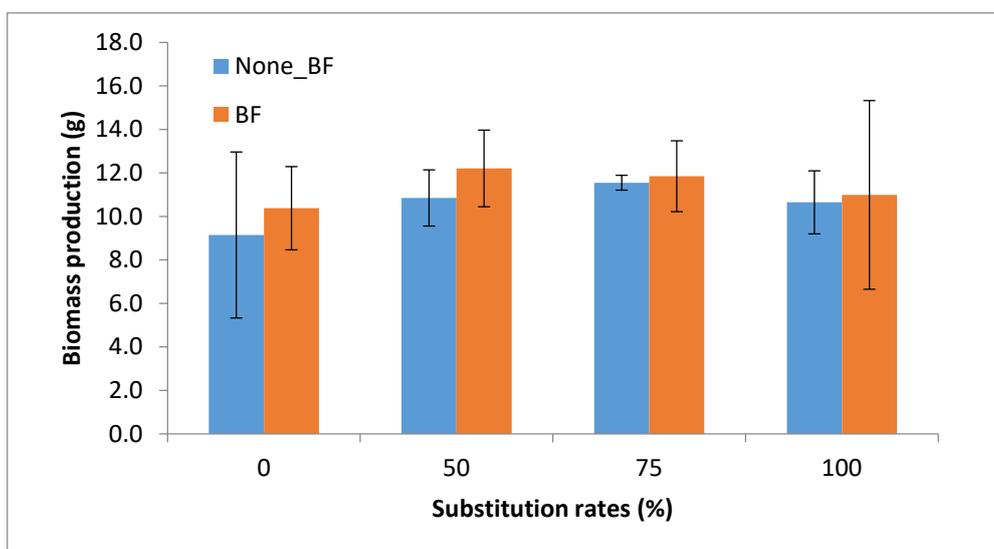


Fig 2: Biomass at harvest from experimental treatments

IV. CONCLUSION AND RECOMMENDATION

Conclusion

Survival and length of *Artemia* were not affected by neither biofloc application nor substitution rates of seawater by seasalt water and also no interaction between them.

There was difference in reproduction characteristics of *Artemia* between treatments but no statistical signification was found, except the reproduction rate. However, the higher percentage of salt water was sued in culture medium, the more females had oviparity mode (cyst bearing) and the lesser reproduction rate in female.

Biofloc application in *Artemia* culture was effected on reproduction rate of female, especially at seawater medium (0% substitutions) showed the lowest reproduction rate (2-2.5 folds lesser than others)

The biomass weight in biofloc treatments was higher than those was collected in normal culture about 9%, and saving 13,3% feed use as well as 20-30% water exchange.

Recommendation

The sea-salt can be used for *Artemia* biomass culture incorporation with biofloc application in order to break down the seasonal depending of *Artemia* biomass and high saline water transportation for inland shrimp/fish hatcheries or nurseries. However, the trial in larger scale should be tested before mass production for evaluation the real cost-effect. Besides that, microbial flora during the culture, especially with biofloc system should take into account for further research for best microbial management to avoid the crash of culture batch due to bacteria growth in excess.

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The Impact of Entrepreneurial External Resource Networks on Venture Growth of Female Small Business in Sri Lanka

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Abstract

Purpose - Researcher is exploring the female entrepreneurs and impact of networking in the Sri Lankan context. Few studies have been especially focus on the female entrepreneurship in terms of the impact of networking. This paper aims to investigating the relationship of entrepreneurial external resource networks and venture growth of female small businesses.

Design/approach – Social constructionist method is applied by the researcher to conduct the study. In-depth interviews were practiced as the data collection tool. Eighteen female entrepreneurs in Gampha district were interviewed after carefully separate them in to successful and unsuccessful according to the current business status. Data was analyzed and interpreted by using content analysis and coding methods.

Findings - Empirical results of the study indicate that entrepreneurial external resource networks have a clear impact on the venture growth of the female small businesses. Moreover, family and acquaintance appeared as prominent role inside the findings by leading in both driving and resistances for the female small business. Suppliers impacted as the most driving network apart from the family and relatives are extremely resisting networks for successful small business while frequently looking for the informational support. Within the entrepreneurial networks of unsuccessful entrepreneurs, acquaintance is second only to family in both driver and the resister while mostly expecting financial support. Regardless of the current status of the business all female entrepreneurs who conduct small business are negatively impacted with the emotional support. The findings of the study are highly essential for the Sri Lankan female entrepreneurs who conduct small business as it reveals real experiences of both successful and the unsuccessful small business separately.

Keywords: Entrepreneurial Networks, External Resource Support, Female Small Business, Venture Growth

Paper type Research paper

Introduction

The female participation in entrepreneurial activities were upstretched around the world in ever before (Brush et al.,2010). Even though the circumstance is like that majority of the entrepreneurial related researchers are still focused on male entrepreneurs and role of female entrepreneurs are still not highly concentrated and undervalued (Marlow et al., 2009).

Nevertheless, in present, entrepreneurial behavior in gender wise has become highly attention given area in

academic (Blackburn and Kovalainen, 2009) and women entrepreneurship has emerged as most significant research domain among researchers (Carrasco, 2014). For the reason that women entrepreneurs vary in point of personal attributes, social networks and resources. Essentially the environment of the female is coming up with varies opportunities, obstacles and challenges to them. Researchers need to inspect how entrepreneurial affect entrepreneurial behavior and cognitive process for the better understand about women entrepreneurs and firms conducted by women.

The networks of entrepreneur are a major activity which enhance and easier the reachability to essential key recourses. Further networking provides opportunities for the firm and improve entrepreneurial effectiveness (Slotte-Kock and Coviello, 2010; Timmons, 2009). A Network can be simply defined as any interactive relationship or alliance that an individual currently has or looking to develop with others. Therefore, Networks are highly essential to entrepreneurs due to the privilege of getting admission to scare resources like information and knowledge. (Jonsson,2015). The literature proves that networking and networks are valuable to any entrepreneur regardless of the performing industry. Because those aid for the decision making process by allowing short cuts with higher confidence level. Directly the limited and valuable time of the entrepreneur will be saved. Moreover, it helps entrepreneur to learn from personal experience and others experience. (Taylor and Thorpe, 2004). Further network is a good opportunity to consume external sources to a business and it enhances unity and diversity of any business (Martinez and Aldrich,2011).

Literature review

Women SME

There are theoretical arguments which support to clearly differentiate networking of men and women social psychology. It suggests that men and women have different socialization experiences, such as prior experience and social network affiliation. Those lead for different expectancies, effort, performance beliefs, and strategic choices (Manolova et al., 2007)

Networks are highly beneficial to the women entrepreneurs since it provides significant advantage through effective networking. (Linehan and Scullion, 2008). Miller et al. (2007) says it helps to gain a competitive advantage over competitors in the industry. The advices which can be lead to the greater success can be gained through the expert networks. (Bru'derl and Preisendo'rfer, (1998), Greve and Salaff (2003)

emphasis the support which are needed for the business, acquire the tacit knowledge which is hard to transfer (Linehan and Scullion, 2008), create strategic alliance to grow the business inorganically (Strohmeier et al., 2005), look for viable and lucrative business opportunities (Farr-Wharton and Brunetto, 2007) and aid to acquire trustworthiness and legitimacy for themselves and their business (Carter and Shaw, 2006). According to Klyver and Terjesen(2007), there are some major differences are appeared when men and women network specially in the early stage of the business. Females are not willing to enter to male dominant networks because of low level of confidence (Tonge 2008). Women are looking for networks which include people who have high level of empathy, trust and confidence (Farr-Wharton and Brunetto, 2007). Therefore, most of the time women expect advice from their family and friends (Robinson and Stubberud 2009). Especially in the early stage of the women business, there are limited and only female networks (Hampton et al., 2009). Knouse and Webb (2001) indicate that females have small size of networks. Moreover, those networks are less mature, least available or less committed networks due to playing the huge role inside the family and networks which actors has no prior work experience (Brush et al., 2001).

Theories related to entrepreneurial networks and relationships

There are theories in networking which provides dissimilar viewpoints related to the networking. Further the structure of the networking in small enterprises are provided though these networks. Therefore, it is important to understand the theories of networking. The major objective of the researcher is to draw attention to extensive range of related theories and recognize possible syntheses.

Social Network Approach

Any individual in the society is having number of social connections with others in the society. Steier and Greenwood (2000) states that these social relationships are extremely important to entrepreneurial process. Hence the social networks assist entrepreneurs to obtain information, knowledge, finance and the resources. (Casson and Della Giusta, 2007). Three types of sub interactions are there when defining the Social Networks. First one is exchange network which represents the commercial relationship of the organization. Particularly the relationship between Vendors/Suppliers and Customers are considered as exchange networks. Second social network type is communication networks which includes set of individuals and organizations where an entrepreneur could receive the knowledge which needed to take fruitful decisions in terms of business. Consulting firms, Trade Associations, Financial Advisors and other kind of expertise plays major role inside the communication networks (Klyver, 2008). Personal networks are last network type of Social Network approach. Ongoing communication with family members, close friends, relatives and acquaintances are the elements under personal network. Exchange and the Communication networks are defined as formal/external networks while personal networks conceptualized as informal/internal networks. (Sequeira et al.,2007) Recent studies results that impact of social networks are significant to become an entrepreneur.

According to the Ostgaard and Birley (1996) two basic principles are provided by social network approach. Obtaining scarce resources from the external environment is contain in the entrepreneurial process is the first one. These emphases scarce resources are included with not only finance, but also information, ideas, customer contacts, advices and other material and non-material support. The resources which are usually acquired through the personal network of the entrepreneur is the second one. In this point, information, support, contact and credibility is important.

Scholars use social network approach to analysis the venture growth in Small and Medium Enterprises, new venture development and to analysis entrepreneurship. Entrepreneur or SME owner is not person who has abundant of resources or either experience. Therefore, entrepreneurs or SME owners collect essential resources from the external environment by using their social networks. Nevertheless, a few researchers have been conducted to analysis how female entrepreneurs are obtaining essential resource from the external environment

Social Network Approach is highly essential when discuss the nature of the entrepreneurial networks and the impact of venture growth which is the question of the researcher through this study. Further how to procedure relationships to obtain resources are disclosed by studying the social network approach.

P1 : There is a relationship between the entrepreneurial networks (personal networks, supporting networks, inter-firm networks and communication networks) and the female small business receiving external resource support (Finance, information, Knowledge, emotional and nonmaterial support).

Swedish Network Model

Actors, Activities, Recourses, and Linkages are the four basic elements in the Swedish network model. (Hakansson and Snehota 1995). Any individuals, firms and government agencies are defined as actors in the Swedish network model. (Moller and Willson 1995). Each and every actor in the network has its own kind of resources, activities and knowledge about the activities they conduct and rest of actors in their network. Actor is the one who govern the resources and execute activities. Actors have their own kind of independent goals, objective and strategies though they are connected to each other through links in their network. Actors have freedom to move in and leave at any time. The relationship of actors in the network can be varied according to the activities and resources of each actor. An activity is a result of add together, enhancement, exchange and generate resources using other resources by an actor or numerous actors. (Hakansson and Johanson 1992). The action of an actor is depending on the activities of other actor. (Auwah 1997). Beije and Groenewegen (1992) identify two major activities specifically transformation activities and transfer activities. Physical assets, human resources and financial assets are needed to perform these activities. According to the Hakansson and Johanson (1992) there are characteristics of resources. Actors are the one who control resource. Either resources directly control by an individual actor or jointly control by several actors. Those resources can be indirectly control by the actors who has good relationship with the actor who is entitled to control resources. The second characteristic of the resource is resource utilization also an activity. Number of dimensions of resources and how much standardization is

utilized under each dimension is considered. Versatility of resources is the third characteristic of resources. It considers the extent and the cost of the resources if it used in other activity cycle and in other transfer chains. Actors are no interest of controlling resources if the supply is unlimited. In the other hand there is no requirement of networking with actors if the resources are uncontrollable to actors. To conclude networks should be developed and used. Hence resources are controlled by many actors.

Relational theory

Miller (1976) development of female and worth of an individual is formed by a sense of connection to others, counting family followers. Number of females are devoting major proportion of their lives to aid to enhance other people. As a result of that females enhance their skills including authenticity, sympathy, caring and openness. Some literature stands for that female relationships are be subject to the emotional closeness while males focus on shared activities. (Johnson, 2004). Emotional closeness is that people value and prefer to have a relationship with the individuals who they are closely and emotionally engaged. Individuals are looking for intimacy, mutual empathy, security (Johnson, 2004), loyalty, trust and sensitivity (Camarena et al., 1990). Most of the time closeness in emotions and relational aspects of women are differed when compare to men in network composition. This is highly applicable in entrepreneurial context hence the family involvement an entrepreneur differs according to the gender. Pugliesi and Shook (1998) kin proportion in female networks are higher than the male networks. The studies on gender base networking are generally come up with significant difference in the kin proportion. The kin position of the studies related to entrepreneurial context are mixed results. Renzulli (1998) states that female entrepreneurs are more interest on the kin-homogeneous networks and some studies resulted with no dissimilarities in the involvement of family members (Menziez et al., 2004). According to the relation theory and the emotional closeness concept there is a high involvement from family if the entrepreneur is female. The spouse or partner is inside the social network if the particular entrepreneur is coupled up.

P2: Family members are the highest proposition inside the female entrepreneurial network

P3: Females are devoting major proportion of their lives to uplift other people inside the network

P4: Female entrepreneurs value and prefer to have a relationship with the individuals who they are closely and emotionally engaged

Social Support Theory

There are four types of support. Informational support, Emotional support, Social companionship and instrumental support (Agneessens et al., 2006). It emphasis that females are mostly seek and offer emotional support under the previous researchers which are relevant to social support theory (Plickert et al., 2007). Male seek and provide the instrumental support under social support theory (Reevy and Maslach, 2001).

P5: Female entrepreneurs are mostly seeking for the emotional support

Methodology

The networking relationships of female small business owners are the focus of this study and the social constructivism approach is adopted by the researcher to understand this relationship. Gergen, (2009) social and cultural factors are impacted for the meanings and realities through interaction with others. It is a combination of the norms and expectations that are experienced in daily life. The social constructivism approach is predominantly appropriate to understand the impact of external resource networks on venture growth of female small businesses in Sri Lanka. The research gives insights to the underlying reason of how do successful and unsuccessful female small business owners differ when obtaining external resource support by examining their relationship between external resource networks.

In depth interviews are practiced as the data collection method of the study. Gampha district in Sri Lanka which most number of people are engaged in small business are selected as the research site. Surangi (2018) a very tiny documented work is available on small and medium enterprises according to the gender in Sri Lanka. Nevertheless, according to the Department of Census and Statistics (2012) 80 percent of the economy is driven by the small and medium enterprises in Sri Lanka and 10 percent of them are led by female small and medium business.

Three months were taken to collect data and a pilot study was conducted to investigate the important components of the main study and answer the question whether main study also can be conducted in the same way which has been planned or alternations are needed. The responders of study clustered into two groups as successful female small business owners and the unsuccessful female small business. Eighteen female small business owners were interviewed including nine successful and nine of unsuccessful. Two meetups for each respondent was held with the selected sample. The interview is conducted during the first meet up and second meet up is used to enhance the validity of the research by confirming the findings and/or enhancing the core content of the particular responder. Ethicality is maintained during the entire process of the research. Each and every interview were recorded with the authorization of the participant. Each interview took 60 to 90 minutes.

Findings and Discussions

According to the findings of the study, Family and acquaintance appeared as prominent roles inside the findings by leading as both driver and as well as the

resistances for the female small business. For successful entrepreneurs, Suppliers are the most positively impacted network apart from the family and relatives are extremely resisting networks. Most successful female entrepreneurs are frequently looking for the informational support while unsuccessful entrepreneurs were looking for financial support. Within the entrepreneurial networks of unsuccessful entrepreneurs, acquaintance is second to only family as a driver and as resister. Regardless of the current status of the business all female entrepreneurs who conduct small business are negatively impacted with the emotional support.

Females are devoting major proportion of their lives to uplift other people inside the network

Authenticity, sympathy, caring and openness are skills of females which have been improved while uplifting people inside their network. Women acting in a highly empathic and caring manner nevertheless female business owners are in a profit generation activity.

Prashadi added relating to this:

"I have helped a lot to the financially incapable kids. I do to getting fees from this. Likewise, I helped to the number of kids during my journey so far"

Customers are the main income source for a business and due to empathy and with the intention to uplift the life of a kid, Prashadi devote her portion of profit and high level of caring is there with Prashadi towards her customers. Nelumi also added to how she treats for the customers to uplift them:

"We never cheat on customer, even me or my worker. I have never let my workers to do wrong things. Even I also don't do so. We lost thousands sometimes. But we never cheat on customer"

Sachini also added similar thoughts relating this:

"I always do not consider about the profit. If my loyal customer says that he/she needs a particular product. I just buy and give that product to a cost even. Likewise, I am helping to my customers. Sometimes I open my shop at mid night and early in the morning to distribute products to my clients"

Further she said:

"I attend for the funerals and alarms giving of my customers and I also invite them to the such a functions of mine"

The considerable level of caring also attached with female entrepreneurs as a part of uplifting the life of customers.

As Piyumi stated:

"when an old person or poor person asked the price and try to bargain the with it I would ask my sales people to reduce the price because I fell sin for them. Even if I feel that someone is so dedicated I would help them from my side, sometimes my predictions could be wrong and they might be so cunning"

With her words we can say that she is so sensitive and empathy when constructing networks.

According to the survey findings suppliers play a significant role inside the network of successful small business and females small business owners aid to uplift the life suppliers as well.

Piyumi added related to this:

"I was buying pots from company X and during that time a person from rural area start manufacturing flower pots at very little stage. I get to know that they had many difficulties. I helped them as I maximally capable and it is a Sri Lankan manufacturing product. I helped them to purchase a machine also. Today they are performing well"

According to Piyumi, she has helped to light up a small business by start buying products from him and by purchasing capital assets for the local manufacturers.

The female small business owners act as a wife to her husband and mother to her children. There also she plays a significant role to uplift the life of family. Nelumi shared her thought relating to this:

"I do everything to make my father happy. That's all. I love my father than my kids. My success is his happiness. Therefore, I am growing my business to make him happy"

Nelumi is devoting her entire life to growth the business to make her father happy. She is growing her business not because of intention to grow it but for the happiness of father. Further she elaborated regarding this:

"I don't think that I might continue this business when he leaves us one day. Even I might not ask my kids to continue this"

Her only one priority of doing the business is to make her father happy. She has devoted her life for that objective.

It is clearly visible with the statements of Prashadi, Nelumi and Sachini, women devoting to ensure the greatness for their network actors.

Female entrepreneurs do not only prefer to have a relationship with the individuals who they are closely and emotionally engaged

Some literature stands for that female relationships are be subject to the emotional closeness (Johnson, 2004). Emotional closeness is that people value and prefer to have a relationship with the individuals who they are closely and emotionally engaged. Hence Individuals are looking for intimacy, mutual empathy, security (Johnson, 2004), loyalty, trust and sensitivity (Camarena et al., 1990).

According to Piyumi:

"I always do to consider about the profit. If my loyal customer say that he/she needs a particular product. I just buy and give that product to a cost even"

She cares for the loyalty of customer inside the relationship. Therefore, as Piyumi said she is not always money oriented and secure the loyalty of customer by building a healthy relationship which is positively impact to the growth of their business. As Sachini said:

"I have not much considered about gender when forming networks and I am not selective on gender at all, Because I am in the fertilizer industry which all the network actors are male including farmers (customers) and sales people. I just consider the confidence which I feel with him/her and the feeling that he/she try not to cheat me is considered here when forming networks"

Women entrepreneurs must come up with strategic decisions to build up partnerships with man to face the sex-hurdles in the male dominated industries (Godwin et al., 2006).

As Maduri said:

"I have no gender discrimination when forming networks. I actually consider his/her knowledge, talent and new constitutions. Because we cannot go forward without new constitutes in this industry. Day by day it should be updated. You cannot get competitive advantage by doing the same things in this industry"

Many factors are considered when forming and developing networks and according to the Sharafizad (2011), experience in industry also considered. as Maduri also endorsed through the above statement. Further responsibilities of the family also matter when it comes to networking of female small business owners. Hence the responsibilities of family have direct influence on forming and developing networks of female small business owners.

As Nelumi explained:

"My customers invite me to night parties. But I do not attend to them. Because nothing worth than two kids of mine"

after 7pm. No one is there than them to me. Once I close the shop and went home nothing important me than my two kids until next day morning”

The domestic responsibilities and the family is most important to female small business owners (Stumbitz et al., 2018) with their role inside the family as a housewife, a daughter and a mother as well. As a result of that ability of women to build up a strong network are disrupted due to the responsibilities of their children and family (Kirkwood,2016)

According to the above two small business females we can say female entrepreneurs who are conduct small businesses are do not base on the gender when forming networks. At the same time the considered factors are differ according to the industry. Therefore, we can conclude that women entrepreneurs are not emotional when forming networks and they consider rational factors than the emotional bias.

Attitude and the moral of women

Some entrepreneurs form networks to obtain the external resource support and some have an attitude of “doing the business independently”. The entrepreneur with this kind of mind set do not develop networks. Further do not realize any value of forming entrepreneurial networks (Stephanie, 2010). The highly confidence on them self.

Maduri shared her thinking:

“My Husband helped always as he can. But I didn't wait for his support by bothering him. Because he also has a job. I was not afraid to any one and I was young and beautiful in that time. But I do not afraid. I went everywhere to get my work done”

Some studies emphasize that women do not utilize their connections of networks effectively when compare to men (Sing et al., 2002).

Further she added:

“My business dropped down to the bottom. But as a result of my knowledge, strength, and my hands I stood up alone. I came alone a difficult journey so far”

Some females do not believe on the impact of networking and even a little effort do not put to form any entrepreneurial relationship. The hard work herself is the only thing they believe on as fact for the venture growth.

Female entrepreneurs sacrifice family

According to the most studies women are family oriented and it is disadvantage to the running business of them. Nevertheless, women in twenty first century sacrifice the responsibilities as a mother and wife to obtain the venture growth of their business.

Nelumi talked about her scarification towards the business:

“My elder daughter is just two months when my husband is migrating. I kept her in a day care center since I wanted to involve my business. I did a massive duty at the initial stage of my business”

Motherhood is culturally defined (Johnston and Swanson, 2006) and in Sri Lanka context she is the one who stays at home full time with the kids (Duberley and Carrigan, 2013). The females who have been engaged in the business

sacrifices her responsibilities being as good mother her children and dutiful wife to her husband.

Isuri said related to this:

“Actually I don't have time to cook for my husband and my children. We used to eat from outside therefore”

Responsibilities of a mother and wife are determined by a diversity of social, religious and cultural values (Silva, 2005; Kodagoda, 2012). Therefore, in Sri Lankan context housewife plays a major role inside the home. She must be there for the tired spouse who comes back home after his work, prepare meals for the household, take care of children and clean activities (Kodagoda, 2012).

Isuri shared about her experience relating to lack of time to take care of her children:

“My kids have said that you are too into business and you are not taking care of us. Then I say we can hug and wait at the payment too. but without foods and all the other facilities you currently enjoy, you can always stay around your mother by hugging tightly. But to stay in A/C rooms, to go trips and to eat delicious food we need money. Therefore I have to engage in this to earn money to make your life better without staying around you all the time”

Duberley and Carrigan, (2013) typical good mother is the one who stays at home entire twenty-four-hour with her children. At the same time some other researchers point out that the good mother should not need to stay at home all the time and it is all about doing everything for them (Kodagoda, 2012). Moreover, mother is the one who feels the responsibility of caring, practicing children for the domestic works and social development. The most of female entrepreneurs do not spending a quality time with their kids. Nevertheless, as Isuri explaining they are doing everything else to make a better future for their children.

Look after children and cooking meals are the conventional motherhood actives of a mother in Sri Lanka context and it is essentially base on the gender and there is no differ even women represent different generation (Kodagoda, 2012).

Rasuni added opposition to this:

“My husband is very supportive me though he does a job. When he come after the job also he cooks when I have an urgent order to complete”

The above quote from Rasuni illustrate that there are no gender base activities within the home as a mother and a wife for the women who is conducting a business which wealthier entire household. Spouse are playing a very supportive role inside the female networking.

Piyumi added further related to this:

“My husband is not used cook at all. He never involves to the household activities. But now he does everything. Sometimes I feel sin for him”

Additionally, the absence of father inside the family temporally for permanently put lot of weight on the role of mother as an economic provider, protector as well as the nurturing and care taker (Kodagoda, 2012; Duberley and Carrigan,2013)

Nelumi added relating to this:

“My elder daughter is just two months when my husband is migrating. I kept her in a day care center since I wanted to involve my business”

According to Nelumi she had enormous responsibilities about the family even without a spouse. She has to act as the protector and nurturing to their kids. Amali

also has become the bread earner in the family and the protector of the family without male head.

Amali also added to this:

"My husband left me and my son. Then I started this business to feed my son"

Trust of Women with Network actors

Klapper (2008) trust is one of the emerging concept in literature which is related to social capital and it is highly important element under exchange relationships since it enhances the opportunities for the business growth, improve number of sources to acquire resources, enrich the flexibility. Nevertheless, the lower level of trust lead for the higher transactional cost (Klyver et al., 2008). Further building trust is one of the most essential skill of an entrepreneur and it reduces the transactional cost (Klyver et al., 2008). Premaratne (2001). Therefore, trust is vital role of an entrepreneur when reduce cost of transaction and to build economically feasible networks. Majority of entrepreneur emphasis that trust is an essential factor in networking and it will create path for the many kind of benefits to the business when referring the literature. But trust is not a thing which builds within seconds. Trust is built after some period of time when association develops. (Gilmore et al., 2006).

As Prashadi explained related to this:

"People cannot believe in now a days. I don't trust anyone at once. Trust is built over time. That means number of opportunities we get to deal and interactive with them. There are some contacts I deal with the trust as result of long time interactions and at the same time there are contacts cannot trust at all. Some are some suppliers not even appropriate to even take inside to the institute"

Networking comprises an anticipation that the both involved parties are investing a long relationship (Aldrich et al., 1987). Nelumi relates:

"I trust my workers, they open the lockers. They know that I trust them. Then they do not anything which is harmful to me hence they are fear that they will miss the trust of mine towards them"

Gilmore et al. (2006) states better relationship with clients will be ended up with positive word of mouth as the knowledge of the organization and a recommendation.

Nelumi explained related to this:

"We do our work properly and maintain good relationship with customers. Then that customer recommends us to others. Sometimes customers come and give me blank cheque by asking to insert the total amount arrears for them and credit it my account. That trust is very important for a business"

The loyal customers of her keep coming to get the service because of the trust she has built with customers.

"I believe the trust which built through proper service is the best part of my business. We never cheat on customer, even me or my worker. I have never let my workers to do wrong things. Even I also don't do. We lost thousands sometimes. But we never cheat on him because it breaks the trust of the customer towards us"

Strategies of women towards trust

"I do not trust anyone and I am not telling that I do not trust them. I act as I associate them as the most trustful person in my life. Then they also feel that I trust them and they do not try to cheat on me"

Trust of the Spouse

Sri Lanka is a country where people try to secure the relationship of marriage. It is not only because of the children but also in the point of socially. Mothers were afraid of hearing unpleasant things from others, including family and friends (Kodagoda, 2012)

Isuri added related to this:

"Sometimes I come in late night after business work. If my husband distrust me in that time I cannot continue the business by tomorrow. We have an agreement between us from the day we started the business. There are times that I needed to talk to men by holding their hands to impress that we have a good business relationship and sometimes I used to tap and talk to impress the familiarity. He also facing such a circumstance. When I do the shop at that time I used to keep my husband when I wanted to go out. So my husband used to dress the ladies with Saaries. Sometime near shop owners slander me about my husband that he was dressing saaries to pretty ladies and so on. There is no problem occurred between us as a result of that understanding and the trust"

The understand and trust between the spouse and the female entrepreneur is significantly important to the happiness of the family as well as the sustainability of the business. It is a hard task to continue a business by a lady lacking of mutual trust between the spouse.

Conducting business as Women

Most of Scholars are evidenced that females are disadvantaged when conducting business. Nevertheless, with the survey findings female small business owners added their opinions related to conducting business as a female.

According to the Nelumi:

"Some people also updating me about the newest technology. The customers are supportive most of time, I don't know is it because of a lady doing a business. They come up with new suggestion and ask me to add them. That kind of customer base is around me"

As she explained she feels that she is getting special support from customers being a female. She obtains information support within her network as a result of being female. According to Nelumi, it is a privilege to being female to enjoy the support from the entrepreneurial network.

Sachini added her thought about women conducting a business:

"Being a female in this industry has come a blessed to me"

She also believes that being a female in the agriculture industry is an advantage to her hence almost other actors inside the network are male.

Isuri also shared her experience:

"I am engaged with the business since I am 30 years old. Even I was 30 I look so young and pretty in that time also. In that time whatever we did there are lot of people to help me around. I took help from every person. Sometime when I asked where the bus halt from a person, he come to help me with another intention I don't say that I neglect their help in that time. I took the help from them and thanks them in very

friendly manner and back out them smoothly. That is an actually lie If we say that kind of things are not happened to us as a woman”

According to Isuri, there is inherent advantage with is a mix of risk for being as a woman. That is applicable to the women who engaged with the small business as well. There are lot of people support you whenever you need an external resource support. Nonetheless the intention of them are not pure. As Isuri explained women should aware of back outting them after getting the external resource support. It is ordinary to face these kind of things as a woman from the society and the braveness of women should be important to prevent from those.

The faith of women about purchase intention of customer

Customers in exchange networks are highly essential for the growth of business since it is the only way to incur money for a small business. Therefore, female small business owners are so keen on finding potential customers and maintain profitable relationship with existing customers.

Female small business owners have a faith on invisible approaches of acquiring customers.

Isuri added relate this:

“I always telling to god that let customers to feel liking to my products and let my designs be attractive to customers. I don’t know that I am blinded believer. But I have faith in God, worship load Buddha, worship to boo tree, I mediate in front of Sri Maha bodi, I am waiting hours looking at Ruwanwali Seya, I go katharagama and asking from god to customers prefer my products and let them feel to purchase my products. That is luck of mine if a customer felt of buy what they taken to their hand. I don’t know how to explain that. But I am requesting that from god”

From the above extract we can see the invisible belief of female small business owners which influence for purchase intention of customers.

Excepting sexual bribes to networking with female small business owners

For any product or service entrepreneurs should find out their markets which the particular product or service targeted for. Usually small business caters for the niche market. Nevertheless, the relationships with firms are highly essential as customers if the business is B2B. (Business to Business). That means business sell its products or services to another business instead of end customer. As a small business owner maintain healthy relationship with exchange networks are highly essential. Hence female small business owners are not capable of catering to number of shops or firms due the many barriers. Further finding a buyer for their products also a difficult task for female small business owner.

Isuri said:

“Currently I supply for a one company and I don’t want to disclose the name that particular company. Hence there are competitors who are willing to supply with less price and break my orders from the particular company”

That is how female small business try to secure their benefited exchange networks. Even forming healthy relationship with exchange network also not an easy task for female entrepreneurs. Building networks has inherent structural barriers for females and all networks are nor approachable to women even (D’Exelle and Holvoet, 2011).

Hence they are trying to secure what they have constructed healthy.

Isuri shared some experience of her:

“Sometimes the purchase managers in the shops are expecting sexual bribes to except the order from me”

Further she said:

“One day I asked one of my customer to find a person to borrow some money. Couple of days later he said okay and there is a small issue though. When I asked what’s wrong, he said that particular person is willing to lend some money for you, but he is expecting you as well”

Networks actors inside the exchange networks are expecting sexual bribes when forming an exchange networks. Sexual bribery is an inappropriate benefit which the nature is sexual. Usually sexual bribery is demanded by men who are in the position which has power to exchange for a service or for a help. Small business is lack of resources and less healthy compare to the large business. Hence they are not wealthier enough to corrupt by financially. Therefore, potential network actors are expecting sexual bribery from female small business owner.

Rule of women inside the family

Duberley and Carrigan (2012) good mothers are the one who stay at home and spend their entire time with their children according to some researchers. Even though this is the responsibility of women, female entrepreneurs involve for the income generation activity which is the responsibility of father. Nonetheless women are doing business to uplift the family economically. Therefore, small female business owners believe that is a duty of the family members to provide the labor resource to business. Hence the human resource is most challenging factor for the small businesses.

Isuri shared her thoughts:

“There is a rule of mine inside this home. We should not creditable for the meals we have from the home. My kids also accept that statement. So if my kids also involve for the operation activities, they add value to the business by Rs 1000 per day. My daughter is doing a fashion designing degree at NIBM. We need to pay Rs. 1,300,000 for that. So if she works here no need of doing part time jobs. Then she also aids with income generation inside the family. Initially we fulfill the labor requirement inside the family. If the demand cannot be catered within the family only we hired from the outside. We work our maximum capacity to fulfil the demand inside from family”

According to Isuri, members in the family also responsible for assisting with their human resource since they are the most benefited stakeholder of the business. Mishina et al. (2004) point out the fact that financial and human resources are the most important ones for the growth of the venture. With the ‘Rule of Women inside the Family’, female entrepreneurs are getting the human resource and diminish the cost of labor in the point of finance.

Thus the ‘Rule of Women inside the Family’ is applicable to every female entrepreneur to for better support with human resource while diminishing the cost of labor.

Networking is like double edge sword for female small business owners

Networks are a fundamental element for the market development as source of supply and as a facilitator. Hence networks are significant for the entrepreneurial development (Jack et al., 2010). Further entrepreneurial networks are which enhance the fruitfulness of the small business by improving the assets of the business through labor, market accessibility and technology (Fuller-Love and Thomas, 2004). Hence networking is a valuable component which small business should develop to gain above mentioned advantages

Sachini explained about benefits of networking as experience:

“Manager of a plantation company came here one day. He was looking for particular service everywhere and still he couldn't get it done. I repaired that thing anyhow through my one of worker. Lalan Rubbers is one of the leading company in Sri Lanka and He moved to Lalan Rubbers later and invite me for an interview of selecting chemical suppliers. I went for that interview and I was selected. As a result of that I supply chemical for Lalan Rubbers since from 2003. After that Pussellawa and Agalawatha Plantation are acquired by Damro. One of the Group General Manager from Lalan Rubber had moved to Damro. Since he recommended our service is good, we got opportunity to cater Damro also. Damro is the one of the growing leading company in rubber industry. We got opportunity to cater those leading companies as a result of the relationship”

According to Sachini network has been resulted with number of new business through the recommendation which is directly impacted to increase the number of sales. Nevertheless, networking is not always benefited to the female small business owners. There are people who network with female small business owners get benefits from them. Eventually that can be a threat to the business even.

Same as benefits there are negatives of being networked for female small business owners. Maduri shared her experience related to networking:

“I experienced a worst circumstance because of networking. One of the fresher beautician came to Kiribathgoda and she send me her best employee for my recruitment interview and she asked to recruit that employee for my saloon. In that time I had six pool employees. That wasn't not enough for me since I was at my peak level. I recruited her as my 7th employee. After a month she left the saloon with rest of my six employees. There are such an adventuress happened as a result of networking. The employees left the saloon with my customer base too. In that time, I was so helpless. Actually I drop down to the bottom of my business”

It seems most of network actors misuse their networks to get benefits unethically. Eventually impact of networking are act as a resistance to the business.

According to the Piyumi:

“There are two sides of networking. It's good from one side and in the other hand it is negative to the business. I am going with a person to buy plants for me. On the next day he is taking another person to there or he/she buying plants from there and selling them. They go with me and try to find their own way by using me. Some are building networks with us to get benefits from us. Networking is like a double edge sword therefore”

Stephanie (2010) some studies showed the drawbacks of networking as well. Accordingly, networking is a double edge sword for female small business owners.

The level of satisfaction of doing a business

Most of female small business owners are satisfy about conducting their own business according to the findings of the study.

As Nelumi said:

“A woman should not merely die after boiling rice, a woman should do something to the country then die, establish the name and then die. I did everything. I invite any man to compete with me and I say he cannot! That is my satisfaction”

Isuri also stated her opinion:

“I cannot express my feeling of happiness from words. I am so happy about where I am today. But that happiness might be differ from person to person with the family background and surrounded people”

As she says the gratification or frustration of going a business is not purely inherently befallen. The external factors like family back ground and people who surrounded by female entrepreneur also matter. Moreover, as an example if the parents are into a very succeed businesses or the female entrepreneur is from a rich family is dissatisfy by even performing considerably good in the introduction stage of the business and earning little profit when compare the income of other members in the family.

Nelumi added relating to this:

“I grow higher to show my father. I buy lands, I buy vehicles and I buy everything to make my father happy. My father is very rich and he has lot of money, not like me. I do not take his money. I will do more than him to show him one day. I want to make enormous company X than my father built and show it to him before he dies”

According to Nelumi, she will be satisfied at the point she built a wealthier company than her father's one. Her benchmarking measurement for succeed is the wealthier level of her father's company. Likewise, surrounded people who are inside the network also matters when measuring the satisfaction of the female entrepreneurs.

The Costume of Women also important to get an advantage in external resource support

The role of the women in Sri Lanka is culturally defined and there is a unique costume for females. Saari and osari are the culturally defined consumes for females and respect is embedded to those costumes by the society. As a result of that the costume of the female gives a silent idea about the particular person who wears them.

As Piyumi said:

“I travel Thailand to buy new plants which are not available in Sri Lanka. So every time I return to Sri Lanka I was wearing a Saari and I never wear short dresses. When I was waarning Saari officers in Bangkok stand up and greet me. Even they do not consider when there is little tolerance in the weight. Likewise, I have gained many supports when wear Saari. So I used to wear saari whenever possible”

The costume of the female is a fact which can bargain for the respect at the first impression. As a result of that favorable situation is created to obtain some external resource support occasionally.

Female small business owner's attitude towards Patriotism when forming Networks

Entrepreneurs are engine of the domestic economy and considerable level of contribution is given to the economy with the higher gross domestic production. Entrepreneurs directly contribute to the economy and at the meantime female small business owners are intentionally network with domestic business with the concept of Patriotism. Kleinig *et al.* (2015) Patriotism is defined as loyalty to the particular country, an identification with it, and a willingness to act on its behalf.

According to Piyumi:

“When my business was in growing stage I started purchasing from local manufacturers as a help to them”

Further she said:

“I was buying pots from company X and during that time a person from rural area start manufacturing flower pots at very little stage. I get to know that they had many difficulties. I helped them as I maximally capable and it is a Sri Lankan manufacturing product. I helped them to purchase a machine also”

Conclusion

This study was conducted to examine the impact of the entrepreneurial external resources (Financial, informational, knowledge, non-material, emotional support) on female small business growth. Mainly the entrepreneurial personal networks have a direct impact on the venture growth of female small enterprise with the external resources support. As result of research findings it is clear that numerous benefits are enjoyed as a result of networking. The question of the research is to how entrepreneurial networks impact for the venture growth through obtain external resources support. Accordingly, there is an impact with the support of external resources to the venture growth of female small business. Resources are highly essential to the any kind of business. Especially female small businesses are obtained resources from the outsiders and those are defined as external resources. An individual actor doesn't have all kind of resources. In view of that, this study originated that the female entrepreneurs who surrounded by networks which are capable of obtaining

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The loyalty for the country is highly visible within the female entrepreneurs and thus intentionally network with local entrepreneurs to support with external resource support.

She added more to her opinion:

“My responsibility is to teach something properly to next generation, we have no idea about when we will die. But we have to transfer our knowledge to next generation. Therefore, I support to the next generation even he/she is good or bad. I do so because of the country”

With the opinion of Piyumi it is clearly proven that the fact female small business owners are so much loyal to the national country. Patriotism is adopted to uplift the country as the ultimate result.

external resource/support (financial, informational, knowledge, non-material and emotional support) has a higher probability to success of the venture. The result of the study further found that personal network is the mostly impacted network within the entrepreneurial network of female small business owners and family is the highly impacted individual actor inside the network of female small business owners. Most importantly females are devoting major proportion of their lives to uplift other people inside their network and Female entrepreneurs do not prefer to have a relationship with the individuals who they are closely and emotionally engaged. Instead of that they consider the loyalty, knowledge, talent, innovations and the responsibilities of her inside the family. Female don not selective base on gender and emotional closeness when networking. Female small business owners were looking for the informational and financial support mostly and emotional support is negatively impacted for the female small businesses.

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Effect of Defoliation Interval on Growth and Quality of *Brachiaria brizantha*, *Brachiaria decumbens cv.mulato* and *Brachiaria decumbens* Grass on Critical Dry Land

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Abstract- This study aims to determine the effect of defoliation intervals on the growth and quality of *Brachiaria brizantha*, *Brachiaria decumbens*, and *Brachiaria decumbens cv.Mulato* planted into polybags containing soil originating from critical dry land. This research was conducted by factorial completely randomized design (3x3) with 3 replications for each treatment combination. Factor A was defoliation interval i.e 30-, 45-, and 90-day age and Factor B was a grass species. The total unit of the experiment is 27. The results showed that the defoliation interval in grass species had significantly affected ($P < 0.01$) plant height, number of tillers, leaf area, specific leaf area, dry weight, cumulative production, leaf chlorophyll content and crude protein content and so do both factors. Based on this study, defoliation interval of 90-day age has better response to plant growth and defoliation interval of 45-day age has better response to nutritional quality. *Brachiaria brizantha* grass has better growth and nutritional quality compared to other species grass

Index Terms- defoliation interval, growth, quality, tropical grass, critical dry land

I. INTRODUCTION

Development of the ruminant livestock industry is one step in an effort to achieve national meat self-sufficiency in 2016-2026, this program must be supported by the availability of quality, quantity and continuity forages throughout the year. Basically, the availability of forage is sourced from pasture because grazing is an ecological basis in providing feed for ruminants. Pasture lands are almost classified from III to VIII grade land, which have nutrient poor and acid soil types[1] Growth is changing the size of bigger plant and determine the yield of forage. Measurement of forage growth is a parameter used as an indicator of better cropping. In general, the quality of forages is reflected by nutrition content such as crude protein and crude fiber content. Generally, crude protein levels are higher and crude fiber is lower in young plants. Some important factors that affect the forage growth and quality are cutting age and defoliation intervals related to plant age and high defoliation. Proper defoliation intervals provide yield, quality of plants, botanical composition and resistance of plant species without interference [2]

Brachiaria brizantha grass has higher biomass production and nutrient content in each harvest. The high amount of grass production can fulfil feed needs for ruminants. The availability of feed quantity, quality and continuity is an important factor in ruminant living. This grass has a dry material production from 40 to 63 tons ha/year [3]

Brachiaria decumbens cv mulato grass is one of tropical prime grass in cutting and Carrying grass having drought resistant, quite high production, high nutrient content, responsive nitrogen fertilization and it could be used as cover crop[4]

Brachiaria decumbens is tropical prime grass having characteristic in long-lived grass, heavy growth through stolons. It has stiff leaves short, downy and dark green and has a rather rough structure, heavy grazing, stamping and drought resistance, as well as responsive to nitrogen fertilization. [1] Research reported that *Brachiaria decumbens* planted in post-mining land produced nutrient content such as 85.49% NDF, 48.66% ADF, 9.71%ADL, 37.98 cellulose and 36, 83% Hemicellulose. [5] Reported that signal grass grew in the range of extensive soil fertility, including nutrient-poor soils. Root system *Brachiaria decumbens* has finer and deeper roots, making it easy to absorb nutrient, especially P and N content from the ground. *Brachiaria decumbens* grass can grow well in a humid tropical climate with rainfall ranging from 1000 to 3000mm/year.

II. MATERIAL AND METHOD

A. Research Sites

This research was conducted from December 2017 to February 2018. This research is starting from planting in polybags and then measurements of plant growth in Pasture Fields. Grass quality was analyzed in Laboratory of Chemical and Livestock Feed, Faculty of Animal Husbandry, Hasanuddin University, Makassar.

B. Research Material

The research used some tools i.e. hoes, machetes, meters, sieves (sieving), shovels, scales, polybags, buckets, milling, measuring flasks, measuring cups, leaf area meters, Konica Minolta SPAD

502. Materials of this research were *Brachiaria decumbens cv.mulato* and *Brachiaria decumbens* grass, dry soil, water.

C. Research Design

This research was designed by Factorial Randomized Completely Design The treatments of this research were defoliation intervals i.e 30 days; 45 days; and 90 days and three grass species i.e. *Brachairia brizantha*, *Brachiaria decumbens cv mulato* and *Brachiaria decumbens*. Each treatment was repeated 3 times so that the total experimental was 27 experimental units [6] [7]. Planting was carried out in polybags with 30 cm x 40 cm size, 15 cm diameter, and 40 cm spacing. In one polybag consisted of 2 grass tillers. After growing for 2 weeks, the plant is cut to uniform growth with 10 cm cutting height above the soil surface. Variable measurements are plant height, tillering number, leaf area, specific leaf area, leaf chlorophyll content, crude protein, cumulative production, and dry weight.

D. Method of Collecting Data

Sampling of plant height was taken by meter measurement from the ground to the tip of the plant leaves every 10 days. The number of tillers was calculated by all the tillers growing in one polybag. Leaf area was observed at the end of this research by measuring the length and width of the leaves using the Leaf Area Meter Tool. Specific Leaf Area was obtained from leaf area divided by leaf dry weight. Chlorophyll content was calculated every defoliation by Konica Minolta SPAD 502. Crude Protein and Crude Fiber content were calculated by Kjeldahl method

E. Data Analysis

Data were analyzed using SPSS 16 Software Program based on Factorial Randomized Completely Design and Repeated by 3 times [6][7].

III. RESULT AND DISCUSSION

A. Plant Growth

The results of the diversity analysis in Table 1 show that the defoliation interval was significantly different ($P < 0.01$). Likewise, interactions provide real differences. The growth of *Brachiaria brizantha* grass, *Brachiaria decumbens*, *Brachiaria decumbens Cv mulato* is presented in Table 1.

Table 1. Plant Growth of Grass Species in different Defoliation Interval

Treatment	Parameter					
	Plant Height (cm)	Tiller Number (unit)	Leaf Area (mm ²)	Specific Leaf Area (mm ²)	Dry Matter (g)	Cumulative Production (g)
Defoliation interval (Age)						
30	140,67 ^a	36,22 ^a	9410,84 ^a	569,65 ^a	14,45 ^a	14,99 ^a
45	171,85 ^b	42,33 ^b	18153,41 ^b	1132,87 ^b	16,46 ^b	16,74 ^{ab}
90	197,77 ^c	66,55 ^c	20752,55 ^c	1502,51 ^c	17,34 ^c	17,35 ^b
Grass Species						
<i>B</i>	171,43 ^b	42,11 ^a	20302,49 ^c	1287,23 ^c	17,81 ^c	18,68 ^c
<i>D</i>	163,46 ^a	43,00 ^a	9838,42 ^a	633,87 ^a	15,50 ^b	13,82 ^a
<i>M</i>	175,41 ^c	60,00 ^b	18175,88 ^b	1283,93 ^b	14,94 ^a	16,57 ^b

Description: Different^{abc} superscripts in the same column show very significant differences ($P < 0.01$)

B = *Brachiaria brizantha* grass

D = *Brachiaria decumbens* grass

M = *Brachiaria decumbens cv.mulato* grass

Plant Height

Plant height at the 90-day age defoliation interval is higher when compared to 45 and 30 days. The existence of these differences is caused by increasing plant age and defoliation interval. The older the plant age, the higher the plant size. In addition, plants cut by different time will decrease the growth of plant. [8] Stated that the influence of intervals is very important because it deals with physiological aspects and products produced to grow back. Heavy Defoliation will inhibit plant growth, especially high growth and plant buds.

The height of the three grass is influenced by the ability to grow, the defoliation interval, the response ability of the liquid fertilizer used, the root length of each grass. The longer the cutting interval, the higher the plant yield. It depends on the growing ability and fertilizer response. The morphological conditions of the plants are appeared by leaves and stems in *Brachiaria decumbens cv. mulato* grass compared to the two tropical grass and it will appear around leaf armpit. [9] stated that faster cropping intervals in one period will stimulate plant growth, division and formation of new cells in plants. Thus the defoliation of plants with a short time or shorter plant life spurred the increase in plant height and number of leaves.

Number of Tiller

The number of tillers at the 90-day age defoliation interval produced was higher than the number of tillers at the 45-day and 30-day age defoliation intervals. This is because the cutting interval of 90 days is still in the category of light cuts. Whereas 45 and 30 days of defoliation are too heavy so the ability to regrowth (plant regrowth) is slow, inhibiting the development of new shoots and possibly at the age of 30 days the plant has not been able to accumulate carbohydrates. [10] Argued that cutting intervals that are too heavy without adequate rest periods will inhibit the development of new shoots so that production and plant populations will decrease.

Leaf Area

The leaf area at the age of 90 days is larger than the age of 45-day and 30-day age defoliation interval. Because the higher plant, the larger leaf area. The difference in leaf area in this study was obtained by the ability of light intensity received by plants. Where in old age the ability to absorb light is greater so that the leaf area formed is also getting bigger. The leaf area in Table 1 showed that the largest leaf area on *Brachiaria brizantha*, followed by *Brachiaria decumbens cv. mulato* and *Brachiaria decumbens* grass is obtained by availability of food reserves in the stems of *Brachiaria brizantha* grass that can be used for regrowth. In addition, this plant absorbs more water and light to be used in photosynthesis. Plants that often carry out photosynthesis, will produce more energy. This is supported by Research [11] that one of the factors that influence leaf area is the environment. These environmental factors are nutrients, temperature, humidity, soil acidity, biotic factors, radiation energy and the ability to absorb food reserves of each species. Leaf area is affected by light captured capacity. The light below the optimum will cause the number of branches to decrease and result in leaf characteristics, especially in leaf area.

Specific Leaf Area

Specific Leaf Area at the 90-day age defoliation interval is higher than at 45-day and 30-day age defoliation interval. This is caused by increasing the age of the plant. The Extent of Specific Leaves is significantly influenced by plant growth phase. The lower tendency of Specific Leaf Area the more increasing age of plants. With increasing age of plants closely related to water content. Old plants have decreased water content. The low level of water causes the dry weight of the leaves to be large. Converted into Specific Leaf Area will produce low values [12].

Another factor that causes a decrease in Specific Leaf Area at the end of the defoliation interval is decreasing dry weight of plants at the end of the planting period due to radiation from the sun. [13] stated that Specific Leaf Area determines the amount of light reached the leaves, but the amount of light received by each leaf is different. The upper leaf will receive more light than the below leaf.

Specific Leaf Area of *Brachiaria brizantha* grass was significantly higher compared to *Brachiaria decumbens cv mulato* grass although it is not much different. The lowest Specific Leaf Area is *Brachiaria decumbens* grass. It showed that *Brachiaria brizantha* and *Brachiaria decumbens cv mulato* have morphological adaptations through increasing leaf area to overcome stress. To secure optimal *Brachiaria decumbens* grass with high nutrient content, good production, then the defoliation or harvest must be carried out in the right period. The first harvesting should be done after planting in 2 months. The next harvest is at 40-day age whereas in the dry season it is carried out and extended to 8 weeks (60 days) [14].

Dry Weight

Dry weight at the 90-day age defoliation interval is higher compared to 45-day and 30-day. The high and low dry weight

production is influenced by the age of the plant. There is relation between changing weight and defoliation interval because the proposition of dry matter is contained by grass. The older the plant, the less water content and the proportion of cell walls [15] reported that the production of dry ingredients *Brachiaria decumbens* grass cut by different interval i.e. 30, 40, 50 and 60 days will increase continuously.

The highest dry matter was found in *Brachiaria brizantha* grass, followed by *Brachiaria decumbens* grass and *Brachiaria decumbens cv. mulato*. The difference is caused by the proportion of leaves and stems of each grass. Morphologically, *Brachiaria brizantha* grass has more leaves and stems compared to *Brachiaria decumbens* and *Brachiaria decumbens cv. mulato*. The difference in the proportion of leaves and stems of each plant will affect the nutrient content of each plant. This is supported by Research [16] that ratio of leaves and stems will change the chemical composition of forages. The stem is a structural support part of the plant. So that it has more lignin content.

Cumulative Production

Cumulative production at 90-day age of defoliation interval was significantly different ($P < 0.01$) with 30-day age, but was not significantly different ($P > 0.05$) with 45-day age. Likewise, 45-day age defoliation interval was not significantly different ($P > 0.05$) with 30-day treatment.

The defoliation interval of 90-day age gave higher cumulative production yield compared to 45-day and 30-day age of defoliation interval. This is because at 30-day age of defoliation interval will form regrowth longer. Cutting will impact on plant growth. Plants which are often cut by different time have the opportunity to be formed longer[3].

The highest cumulative production is found in *Brachiaria brizantha* grass, followed *Brachiaria decumbens cv mulato* grass and the lowest is found in *Brachiaria decumbens* grass. This is due to the ability of species to adapt and the intensity of light that is always changing. The decline in forage production along with the decreasing light intensity investigated previously [17]. In lower light intensity, the grass tends to grow elongated, the specific leaf width is reduced and decreased. This is due to a decrease in the quality and quantity of photosynthesis.

B. Plant Quality

Analysis of variance in Table 2 showed that the defoliation interval was very significantly different ($P < 0.01$). Likewise interactions were significantly different. The quality of *Brachiaria brizantha*, *Brachiaria decumbens*, *Brachiaria decumbens cv mulato* is presented in Table 2.

Table 2. Plant Quality of Grass Species in different Defoliation Interval

Treatment	Parameter	
	Leaf Chlorophyll (Unit)	Crude Protein (%)
Defoliation Interval (Age)		
30	42,89 ^a	20,56 ^c
45	43,39 ^a	18,23 ^b
90	45,59 ^b	13,64 ^a
Grass Species		
B	49,96 ^c	18,24 ^c
D	39,89 ^a	16,27 ^a
M	42,96 ^b	17,92 ^b

Description: Different ^{abc} superscripts in the same column show very significant differences (P <0.01)

B = *Brachiaria brizantha* grass

D = *Brachiaria decumbens* grass

M = *Brachiaria decumbens cv.mulato* grass

Leaf Chlorophyll Content

90-day age defoliation interval of chlorophyll content was higher than the 45-day the lowest is 30-day age. The wider the leaf of the plant, the greater the ability of photosynthesis to produce chlorophyll content. The difference in leaf shape of each plant will affect the absorption of light which in turn affects the penetration of light. Penetration of sunlight absorbed by plants will be utilized in photosynthesis [18].

The highest chlorophyll content was found in *Brachiaria brizantha* grass followed by *Brachiaria decumbens cv mulato* grass and the lowest *Brachiaria decumbens*. The high content of leaf klorofil in *Brachiaria brizantha* grass compared to other tropical grass is due to this grass having a higher leaf area than *Brachiaria decumbens cv mulato* grass and the lowest *Brachiaria decumbens*. The different leaf area of each grass will cause competition to absorb sunlight. Receiving light on the leaves can affect the rate of photosynthesis so that the energy needed for each plant is different. The higher leaf mass the leaf more chlorophyll content. Chlorophyll content of leaves is closely related to the leaf area of the plant [19]. The higher leaf mass, the chlorophyll content of leaves will increase so that the light captured by the leaves will convert CO₂ and H₂O into carbohydrates and O₂. The leaf area is greatly influenced by the availability of water for plants because lack of water for plants will affect the leaf area. Decreasing leaf area results in at least leaf chlorophyll content.

Chlorophyll content of *Brachiaria decumbens* grass *cv.mulato* is higher than *Brachiaria decumbens* grass, but lower than *Brachiaria brizantha*. It is because of grass adaptation after cutting depends on the morphological and physiological response of the plant. The ability of this plant uses very little carbon and nitrogen availability. The adaptation of *Brachiaria decumbens* grass is very low morphologically and physiologically, especially in using the availability of carbon and nitrogen used for photosynthesis in meeting organ needs to survive after cutting[20].

Crude Protein

Crude protein Levels at the 30-day defoliation interval protein content was higher than 45-day and the lowest crude protein was 90-day defoliation interval. 30-day defoliation interval is has crude protein content higher than other defoliation interval because plants are still young. The older the cutting age, the more quality of the plant which influences protein content and crude fiber increases. [18] Stated that cutting interval of plant greatly influences its nutrient content. Generally, the older the plant's age in cutting time the lower protein content and the higher crude fiber. Similarly, [21] Argued young-age plant has better quality because it has lower crude fiber and higher protein content.

Crude protein content of *Brachiaria brizantha* grass is higher than crude protein content of *Brachiaria decumbens cv. mulato* and the lowest crude protein content is *Brachiaria decumbens* grass. Different content of crude protein levels of each grass is influenced by genetic factors, plant age, number of leaves and stem proportions and the ability to photosynthesize. So that it influences and is closely related to the chlorophyll content of the leaves of each plant produced. This leaf chlorophyll is used to produce carbohydrates and provide energy. Carbohydrates produced in photosynthesis are converted into dry matter containing proteins, fats, nucleic acids and other organic molecules. In *Brachiaria brizantha* grass the dry matter content is higher so that the crude protein content is also higher. This is in accordance with the opinion [22] that chlorophyll is used for photosynthesis which produces carbohydrates and provides energy. Carbohydrates produced in photosynthesis are converted into dry matter containing protein, fat, nucleic acids and other molecules. The energy produced is used by plants to carry out growth processes, and the carbohydrates is produced to make dry matter content as other substances in plants.

IV. CONCLUSION

Based on this research, It was concluded that Defoliation intervals of 90-day and 45-day age give better response for planting and nutrient quality. *Brachiaria brizantha* has better growth and nutrient quality compared to other species grass. Therefore *Brachiaria brizantha* grass could be utilized for grazing.

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Current Practices by Mothers about the Management of Acute Watery Diarrhea Attending Sharif Medical City Hospital, Lahore

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Abstract- OBJECTIVE: Aims of this study include the awareness and information about management of diarrhea among mothers visiting Sharif Medical City Hospital, Lahore and to assess knowledge about basic prophylactic measures that can be taken including ORS and Rotavirus vaccination.

MATERIALS AND METHODOLOGY: It was a cross sectional descriptive survey done at Sharif Medical City Hospital Lahore. A total of 255 mothers attending Sharif Medical City Hospital were included in the study. The data was collected by the authors from those who were briefed and written informed consent was taken, using a pre-tested semi structured questionnaire which was analyzed using SPSS 23.0. Calculation of frequencies and percentages was done and data was entered in the form of tables and figures.

RESULTS: The study depicted that 54.3% children suffering from diarrhea were in age group of 12-24 months and 45.7% were in age group of 36-60 months. Regarding educational status, our study revealed that 75.3% mothers were literate and 24.7% were illiterate and among these 255 mothers 99.6% had knowledge about ORS. In our study 57.4% mothers preferred ORS for management of diarrhea and among them 86.7% mothers found ORS effective. Besides ORS 85.1% mothers gave syrup as prescribed by doctor in the management of diarrhea. 69% mothers reported ineffective of homemade remedies while 31% claimed beneficial values of homemade remedies. 100% mothers properly disposed of excreta and used to wash their hands before preparing food and after defecation.

CONCLUSION AND RECOMMENDATIONS: The study showed that majority of the mothers attending Sharif medical city hospital have knowledge about the management of diarrhea in their children. Few mothers lack proper information about the managing the diarrheal illness. Except few mothers attending Sharif medical city hospital majority of them are well aware of protective measures they could take that is, hand washing, breastfeeding and proper disposal of excreta for prevention of diarrhea. It is important that adequate education should be given

to mothers regarding the management and preventive measures of diarrhea including Rota virus vaccination. Further researches should be carried out from time to time in order to assess the awareness about the preventive measures of diarrhea and improvement in knowledge about the management of diarrhea.

Index Terms- Acute watery diarrhea, management, mothers

I. INTRODUCTION

Diarrhea is an increase in stool volume or frequency of passage of stool. It is most commonly associated with digestive disorders, but it can be the part of primary diseases outside of digestive system.¹ The serious economic issues for developing countries are because of diarrheal diseases. The most common reason of death from acute diarrhea is the deprivation of water and essential minerals, which can be replaced in many cases by the use of oral rehydration solution (ORS).²⁻⁴ Diarrheal disorders are the second most common cause of death of under five children after pneumonia worldwide. It kills a great number of children as compared to AIDS, malaria and measles combined.^{5,6}

Main causes of diarrhea include bacteria, virus and different parasites. Infection spreads via contaminated food or drinking water or from person to person because of poor hygiene. Diarrhea can be prevented and treated with better management and knowledge. Loss of fluid in diarrhea has dire consequences and it is the main contributing reason of malnutrition.^{7,8} A lot of factors are responsible for risk of diarrhea i.e. poverty, mother literacy rate, water supply, sanitation, poor hygiene practices and also important are pattern of infant feeding, weaning and other practices. Diarrhea can continue for several days and leaves the body without salt and water that are needed for survival. Lots of children who expire due to diarrhea mainly expire from severe dehydration and loss of fluid. Malnourished children or children with impaired immunity as well as suffering from HIV are mostly at the risk of life threatening diarrhea. It is mostly caused by

contaminated food and water sources. Globally, 780 million individuals are deprived of improved drinking water and 2.5 billion are deprived of improved sanitation. Infectious diarrhea is widespread in developing countries.

In developing countries, diarrhea is the second major cause of child morbidity and mortality. It is concluded that there are 2.5 billion diarrheal episodes and 1.5 million deaths in children under-five years of age per annum. This estimates 21% of all the deaths occurring in developing countries and the number is really high uptil now which is not acceptable.^{9,10} Diarrhea kills young children more the any other diseases.

According to World Health Organization (WHO), the mortality rate of less than 5 years of age is 87/1000 in Pakistan and diarrhea is the second major etiology after acute respiratory infection.¹¹ In a survey conducted among less than 3 years of age in Sindh, Pakistan prevalence of diarrhea was found as 51%.¹²

Globally, In developing countries an estimated 13,000 million of diarrheal episodes with 3.2 million deaths occur in children per annum. 80% of these deaths include in children under 2 years of age. 95 than 3 times per year. This study also supports under five deaths at 35% of mortality rate.⁹ % of all deaths (200,000) in infants and 23-30% in children less than five age group children and account for 15% of all pediatric deaths.¹³

It is among these communicable diseases which is both preventable and curable. Early and correct identification of disease plays a key role in reducing mortality. Major steps to prevent diarrhea including safe drinking water, use of improved sanitation and hand washing with soap can decrease the risk. Diarrhea can be managed with clean waters solutions, sugar and salt and with zinc tablets.

As it is universal phenomenon in our communities that the mothers are the first contact for these children in case of any ailment. It has been observed that many faulty, baseless practices exist among the mothers regarding the management of different common health problems. In case of diarrhea specially which is very common among the children less than 5 years of age. It has been observed that they use inappropriate ORS composition either making it too strong or too dilute which has its own harmful effects making the situation much worse. Some mothers especially in rural communities, they use spurious and homemade medicines for treating the diarrhea. Similarly use of the dried leaves i.e. jamun, they are also used to treat the diarrheal episodes. These harmful practices beliefs and customs which are existing in the communities make the situation even grimmer.

Finally some mothers, they even seek health advice from nonsense spiritual healers that ultimately leads to increase the morbidity. Keeping in view the above mentioned factors it is pertinent to study the current practices by mother of diarrheas among children in rural setup.

II. MATERIALS AND METHODS

STUDY DESIGN

It was a descriptive cross sectional epidemiological study.

SETTING:

The place of study was Sharif Medical City Hospital (SMCH) Lahore. There is a huge catchment area around hospital. The hospital has 300 beds. It provides general medical care, accident and emergency services, pediatric and neonatal intensive care unit. It has burn center, trauma center and radiology department which include the facility of CT scan. It also has well established nephrology and neurology departments. It also provides surgeries for accident cases.

DURATION OS STUDY:

The study was conducted in month after the approval of synopsis from April to May in 2017.

SAMPLING TECHNIQUE

The sampling technique was non-probability purposive.

SAMPLE SELECTION:

INCLUSION CRITERIA:

1. All age groups.
2. Mothers visiting SMCH after giving informed consent.

EXCLUSION CRITERIA

1. Unwilling Mothers

DATA COLLECTION PROCEDURE

A semi-structured survey questionnaire was made and finalized after pre testing containing both closed and open ended questions. The researcher visited Sharif Medical City Hospital and interviewed mothers of children under 5years of age.

DATA ANALYSIS:

Data analysis was done through computer software SPSS (Statistical Package for Social Science) version 23. The data was cleaned clearly and statistically analyzed by same software. The frequencies and percentage were calculated and data was entered in the form of tables and diagrams.

ETHICAL CONSIDERATION:

The permission from ethical community of Sharif Medical & Dental College was obtained before proceeding for the study. Confidentiality of data was maintained.

III. RESULTS

Table 1
FREQUENCY OF DISTRIBUTION ACCORDING TO AGE OF MOTHER
n = 255

	Frequency	Percentage
below 20	9	3.5
21-25	57	22.4
26-30	107	42.0
31-35	63	24.7
36-40	19	7.5
Total	255	100.0

This table demonstrates that among 255 mothers in SMC 9(3.5%) were below 20, 57(22.4%) were 21-25 years of age, 107(42%) were 26-30 years of age, 63(24.7%) were 31-35 years of age, 19(7.5%) were 36-40 years old.(Figure.1)

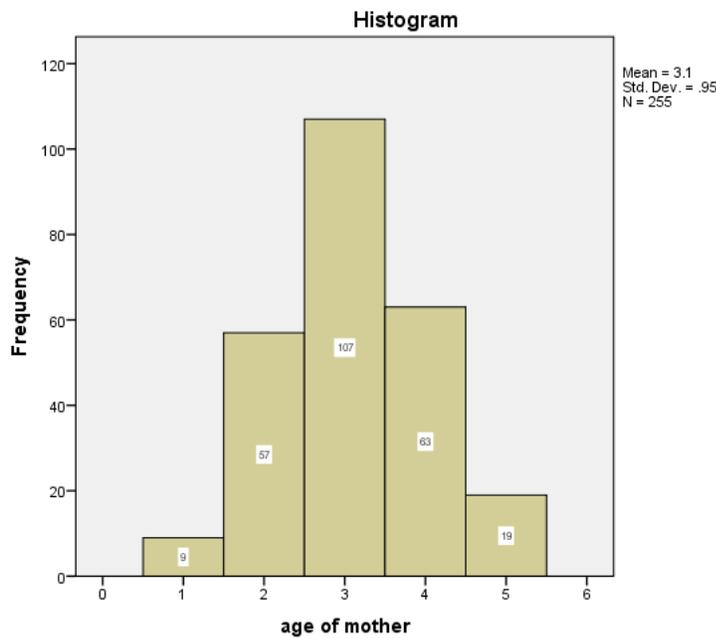


TABLE 2
FREQUENCY OF DISTRIBUTION ACCORDING TO EDUCATIONAL STATUS OF MOTHER

	Frequency	Percent
above intermediate	71	27.7
intermediate	42	16.4
matric	52	20.3
illiterate	63	24.6
primary	28	10.9
Total	256	100.0

This table demonstrates that 71(27.7%) mothers were above intermediate, 42(16.4%)mothers were intermediate,52(20.3%)mothers were matric,28(10.9%)mothers were primary and 63(24.6%)mothers were uneducated.(Figure.2)

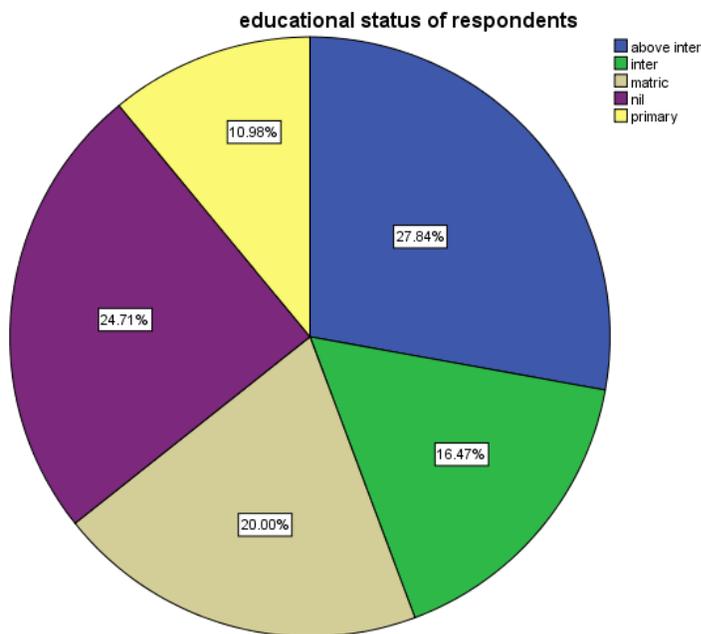


Figure.2
 Pie chart shows the educational status of mothers.

TABLE 3

FREQUENCY OF DISTRIBUTION ACCORDING TO LOCAL NAME OF DIARRHEA

Local names for diarrhea	Frequency	Percent
dast	25	9.8
diarrhea	6	2.3
loose motion	171	66.8
pechyas	12	4.7
potiyan	42	16.4
Total	256	100.0

This table demonstrates that 25(9.8%) mothers called it Dast, (2.3%)mothers called it Diarrhea,171(66.8%)called it Loose Motion,12(4.7%) called it Pechyas,42(16.4%) called it Potiyan.(Figure.3)

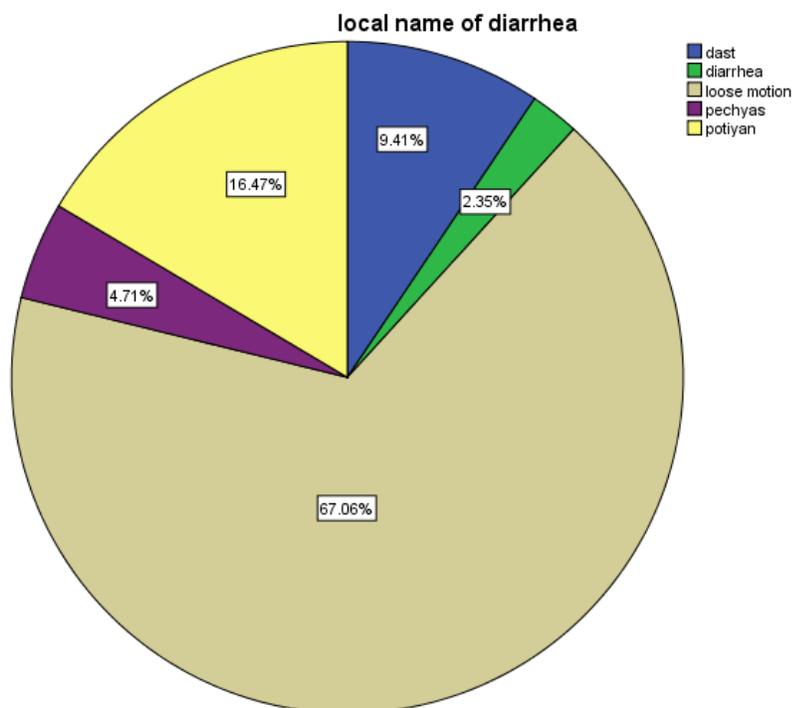


Figure.3
 Pie chart shows percentage of local names used for diarrhea.

TABLE 4
FREQUENCY OF DISTRIBUTION OF DIARRHEA ACCORDING TO AGE OF CHILD

Age of child	Frequency	Percent
1	50	19.5
2	67	26.2
3	66	25.8
4	40	15.6
5	33	12.9
Total	256	100.0

This table demonstrates that 50(19.5%)of children were of age 1 year,67(26.2%) children were of age 2 years,66(25.8%) children were of age 3 years,40(15.6%)children were of age 4 years,33(12.9%)children were of age 5 years.

TABLE 5
FREQUENCY OF DISTRIBUTION ACCORDING TO MANAGEMENT OF DIARRHEA

Management of diarrhea	Frequency	Percent
ORS	147	57.4
Home-made remedies	12	4.7
Medication	47	18.4
Hospitalization	48	18.8
Total	255	99.6

This figure demonstrates that 147(57.4%) mothers use ORS, 12(4.7%) mothers used Home-made remedies, 47(18.4%)mothers used Medication,48(18.8%) mothers Hospitalize their children.

TABLE 6
FREQUENCY OF DISTRIBUTION ACCORDING TO KNOWLEDGE ABOUT ORS

Knowledge about ORS	Frequency	Percent
nil	1	.4
Rehydration	117	45.7
Rehydration ,electrolyte balance	138	53.90
Total	256	100.0

TABLE 7
FREQUENCY OF DISTRIBUTION ACCORDING TO FORM OF ORS GIVEN TO CHILD

Form of ORS	Frequency	Percent
packet	206	80.5
liquid	33	12.9
Total	239	93.4

This table shows that 206(80.5%) mothers used ORS which is in Packet form and 33(12.9%) mothers used ORS which is available in Liquid form.

TABLE 8
FREQUENCY OF DISTRIBUTION ACCORDING TO SOURCE OF INFORMATION FOR PREPARING ORS

Source of information	Frequency	Percent
media	3	1.2
doctor	187	73.0
relatives	31	12.1
written on packet	16	6.3
Total	237	92.6

This frequency table shows that Media is the source of information for preparing ORS for 3(1.2%) mothers, Doctors for 187(73.0%) mothers, Relatives for 31(12.1%) mothers and 16(6.3%) mothers used method written on Packet.

TABLE 9
FREQUENCY OF DISTRIBUTION ACCORDING TO EFFECTIVENESS OF ORS

Effectiveness of ORS	Frequency	Percent
yes	222	86.7
no	15	5.9
Total	237	92.6

This table shows that ORS is effective for 222(86.7%) children and 15(5.9%) children have no effect of ORS.

TABLE 10
FREQUENCY OF DISTRIBUTION ACCORDING TO TYPE OF MEDICINE GIVEN

Type of medicines given	Frequency	Percent
antibiotics	14	5.5
homeopathic	1	0.4
I/V fluid	7	2.7
nil	16	6.3
syrup	217	85.1

Total	255	100.0
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This table shows that 14(5.5%) mothers used Antibiotics, 1(0.4%) mothers used Homeopathic medicines, 7(2.7%) mothers used I/V fluids, 217(85.1%) mothers used Syrup for the management of diarrhea in their children.

TABLE 11
FREQUENCY OF DISTRIBUTION ACCORDING TO EFFECTIVENESS OF MEDICINE

Effectiveness of Medicine	Frequency	Percent
yes	228	89.4
no	27	10.6
Total	255	100.0

This table shows that Medicine given to children is effective for 228(89.4%) children and has no effect on 27(10.6%) children.

TABLE 12
FREQUENCY OF DISTRIBUTION ACCORDING TO SOURCE OF INFORMATION FOR PREPARATION OF HOME MADE REMEDIES

Source of information for home made remedies	Frequency	Percent
media	1	.4
community	47	18.4
mother/mother in law	34	13.3
nil	173	67.8
Total	255	100.0

This table demonstrates that source of information for preparing Home-made remedies in 1(.4%) mothers is Media, 47(18.4%) mothers is Community, 34(13.3%) mothers is Mother /Mother in law, 173(67.8%) did not use any home-made remedy.

TABLE 13
FREQUENCY OF DISTRIBUTION ACCORDING TO EFFECTIVENESS OF HOME MADE REMEDIES

Effectiveness of home made remedies	Frequency	Percent
yes	79	31.0
no	176	69.0
Total	255	100.0

This table shows that Home-made remedies were effective for 79(31.0%) children and have no effect on 176(69.0%) children.

TABLE 14
FREQUENCY OF DISTRIBUTION ACCORDING TO SYMPTOMS THAT LEADS CHILD TO HOSPITAL

Symptoms that leads to Hospital	Frequency	Percent
repeated episode of diarrhea	107	42.0
Vomiting, dehydration, repeated episode of diarrhea	109	42.7
Weakness, fever ,abdominal pain	39	15.3

Total	255	100.0
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This table demonstrates that frequency of distribution according to symptoms that leads mothers to take their children to hospital.

TABLE 15
FREQUENCY OF DISTRIBUTION ACCORDING TO CONTINUATION OF BREASTFEEDING

Breastfeeding	Frequency	Percent
yes	170	66.7
no	85	33.3
Total	255	100.0

This table shows that 170(66.7%) mother continued breastfeeding to their children and 85(33.3%) mothers did not continue.

TABLE 16
FREQUENCY OF DISTRIBUTION ACCORDING TO FORM OF FOOD GIVEN TO CHILD

Form of food	Frequency	Percent
liquid	96	37.6
solid	158	62.0
Total	254	99.6

This table shows that 96(37.6%) mothers give liquid food to their children and 158(62.0%) mothers give solid food to their children.

TABLE 17
FREQUENCY OF DISTRIBUTION ACCORDING TO AGGRAVATING FACTOR

Aggravating factors for diarrhea	Frequency	Percent
yes	114	44.7
no	140	54.9
Total	255	100.0

This table shows that aggravating factor is positive for 114(44.7%) and negative for 140(54.9%).

IV. DISCUSSION

The present study “CURRENT PRACTICES BY MOTHERS ABOUT THE MANAGEMENT OF ACUTE WATERY DIARRHEA ATTENDING SHARIF MEDICAL CITY HOSPITAL, LAHORE “is based on the analysis of total 255 mothers.

This study showed majority of children were under 2 years of age i. e. 54.3% and 75.3% children were of educated mothers. Studies conducted by Dheeraj Shah et al and Patric Kelly et al had similar results showing children less than 2 years of age were more prone for diarrhea.^{14,15}

Social determinants in this study is showing that 75.3% mothers were higher educated and 24.7% were illiterate or only can write their name, 42(16.4%) were intermediate, 52(20.3%)

mothers were matric. Regarding age of mothers, 107(42%) were 26-30 years of age and least 9(3.5%) were below 20 years of age. The use as well as availability of ORS can minimize the diarrhea related morbidity and mortality it is not very effective in developing countries because of lack information about availability and use of ORS in treatment of diarrhea.

In present study, 99.6% had knowledge about ORS and 206(80.5%) mothers used ORS in the form of packets, while 33(12.9%) used liquid ORS. Mahor GR et al. showed similar results about the knowledge of ORS that 94.5% mothers had information about the benefit of ORS use in diarrhea and 5.5 % mothers had no knowledge about the implication of ORS use.¹⁶ Our study shows that 14(5.5%)mothers used antibiotics, 1(0.4%) mothers used homeopathic medicines, 7(2.7%) mothers used I/V fluids, 217%(85%) mothers used syrup for the management of diarrhea in their children.

V. RECOMMENDATIONS

1. Improvement in reach of safe drinking water and good sanitation as well as encouraging good hygiene are main factors in diarrhea prevention.
2. Children stool have a higher load of pathogens as compared to adults and many children play in area where stools are found therefore measures should be adopted for proper disposal of excreta in rural areas.
3. Rural access to improve drinking water resources should be made better.
4. Public should be educated to manage or store their household water supplies in a safe manner.
5. Mothers should be educated to treat about the nutritional needs of a child.
6. Infants should be take their mother milk exclusively for 1st six months of their life.
7. The more children could have access to ORS packet or zinc supplementation if packaged together in kits of diarrheal treatment which can be delivered by workers in community department, or directly to households via campaign or health days of children.
8. To promote sanitation and hygiene among children age 3 to 5 years schools can serve as important training grounds school children in turn mostly affects such practices in home.
9. Importance of hand washing on prevention of diarrhea should be communicated through media.
10. Government should allocate and mobilize resources for diarrhea control.
11. To control diarrhea in an effective manner, treatment and preventive steps should be included health workers training and be reflected in supply chain and programmed monitoring.
12. Families and communities should ensure that breast feeding, hand washing, sanitation and treatment of house hold water receives the deserving priority. The private sector can encourage innovation in supplying and delivering key interventions.
13. Higher authority's leaders can expand public awareness of the issues and their solutions.

VI. CONCLUSION

According to WHO, Antidiarrheal and antibiotics have a very little importance in management of diarrhea. Community health education has a big role in management of diarrhea. The health education which is effective can only be given on the basis of an exact understanding of prevailing information and practices of community people. Mothers give primary health care so that mother's information regarding etiologies of diseases, signs of diseases, symptoms of diseases, prevention and control are really essential, thereby decreasing morbidity and mortality because of diarrhea.

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Numerical simulation of flow over EPPLER 387 at low Reynolds number and comparison with experiment

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Abstract- This paper presents the numerical simulations of low-Reynolds-number flow past an Eppler 387 airfoil at $Re=20,000$, $30,000$, $60,000$, $100,000$ and $300,000$ where transition takes place through a laminar separation bubble. The analysis is carried out using ANSYS FLUENT. Two turbulence models, trans-SST and k- ϵ - ω models were used for investigation. The lift coefficient, drag coefficient, point of separation and the point of reattachment were established. The numerical results of the aerodynamic coefficients are validated against wind tunnel results available in the literature.

Index Terms- Low-Reynolds number Eppler 387, laminar separation bubble, Trans-SST, K- ϵ - ω models.

I. INTRODUCTION

Over the past decade, Micro Air Vehicles (MAVs) have received an increasing amount of attention in military and civilian markets. With a characteristic length not longer than 15 cm (6 in.), MAVs are barely detectable to the naked eye at 100 yards. This stealth capability makes MAVs a prime candidate for surveillance, detection, and reconnaissance missions. Often, prototype MAVs have been outfitted with cameras with the ability to send and receive data. MAV research generally falls into three vehicle classes: fixed wing, rotary wing, and flapping wing. Each class of MAVs has unique benefits and problems because the aerodynamics of each class is different, due to the different range of operating Reynolds number.

Flows with a chord $Re < 1,00,000$ are typically considered low Reynolds number flows.

LAMINAR SEPARATION BUBBLE:

Bubbles occur when the laminar boundary layer separates from the body and reattaches downstream. Low Re flows tend to separate before transition. Figure 1 shows a schematic view of an ideal separation bubble.

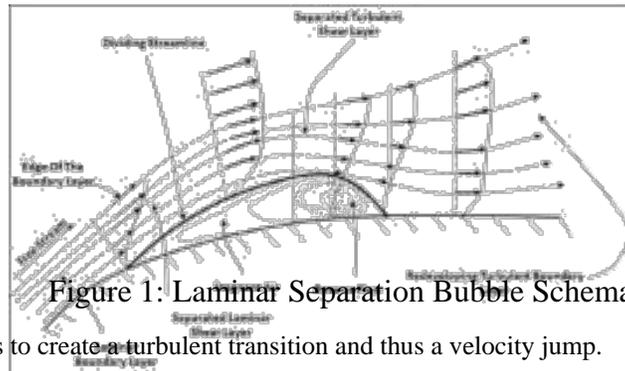


Figure 1: Laminar Separation Bubble Schematic

As discussed above, the bubble tends to create a turbulent transition and thus a velocity jump.

Figure 2 shows the momentum and velocity distributions across a bubble.

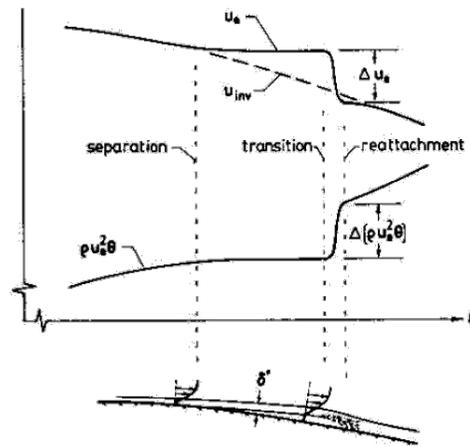


Figure 2: Laminar Separation Profile

Several studies have been made to predict the airfoil performance and LSB characteristics using transition models, but very few studies have been carried out over a thick airfoil at low Reynolds number. In the present study, numerical simulation of EPPLER 387 airfoil has been carried out for Reynolds number viz. 20,000, 30,000, 60,000 100,000 and 300,000. The angle of attack has been varied from 0 to 12 deg. which is below the stall angle and at an interval of 2 deg. In this study, the flow simulation has been carried out with low Reynolds number correction, trans- SST model and k-kl- ω turbulence model.

EPPLER 387:

The Eppler 387 airfoil is chosen for a 2-D validation due to its common use in low Reynolds number flow. This airfoil is about 9% thick with 3.87% camber. Though thicker than most MAV airfoils, the Eppler 387 validation shows the usefulness of the flow solver and gives insight into low Reynolds number flow physics.

II. BACKGROUND

Semi-implicit method for pressure linked equations, start with discrete continuity equation and substitute into the discrete ‘u’ and ‘v’ Momentum equations containing the pressure terms resulting in equation for discrete pressures. SIMPLE actually solves for a relative

quantity for pressure correction. The set of momentum and continuity equations are coupled and are non-linear so it is solved iteratively. The pressure field is assumed to be known from the previous equation. Using this 'u' and 'v' momentum equation are solved for the velocities. The computation uses third order accurate Second Order upwind Scheme for convective flux discretization with convergence criteria of 10^{-5} . The second Order Scheme was proposed as a third order accurate scheme with numerical diffusion reduced to minimum. The scheme assumes quadratic upwind interpolation for the face value of the variable by assuming Second Order polynomial through downstream, upstream and one node further upstream node of the cell.

III. METHODOLOGY

A. Use of simulation software

Computational Fluid Dynamics (CFD) is a valuable tool with the ability to investigate fluid flow for MAV airfoils, wings, and rotors. In this work, as in all CFD approaches, the first step is to generate an appropriate mesh system that accurately resolves the geometry and flow features of interest. The second step is to choose the appropriate governing equations for the flow field points as well as the boundary conditions on the aerodynamic surfaces and in the far-field. Finally, the actual flow solvers are chosen to efficiently and accurately solve the governing equations.

IV. RESULTS AND DISCUSSION

Analysis for Reynolds Number 20,000

Figure 3 shows the comparison between experimental [4] and numerical values for C_l vs Angle of Attack

It is seen that both the models shows a higher value at positive angles of attack. Trans-SST numerical values are more closer to experimental [4] values. However, at negative angles of attack, K-KI-G model shows a better agreement than trans-SST.

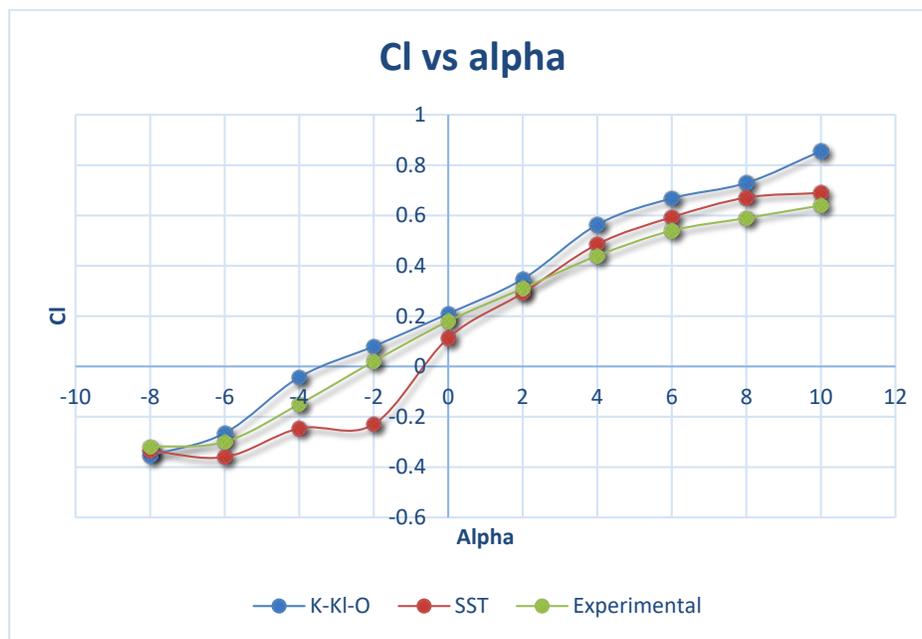


Figure 3

Figure 4 shows the comparison between experimental [4] and numerical values for C_d vs Angle of Attack

It is seen that trans-SST results are more closer to experimental [4] values for various angles of attack.

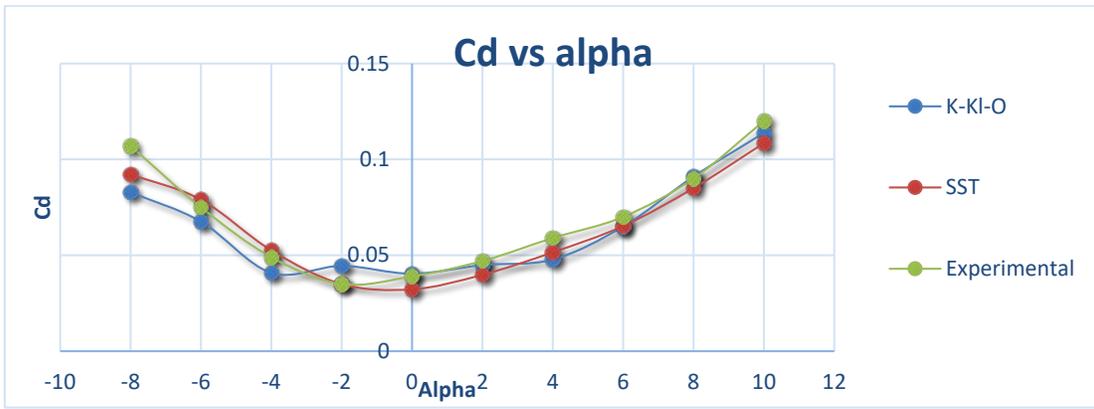


Figure 4

Figure 5 shows the comparison between experimental [4] and numerical values for Cl vs Cd

It is seen that for positive Cl, experimental [4] values are closer to trans-SST model whereas, for negative Cl, experimental [4] values are closer to K-KI-O model

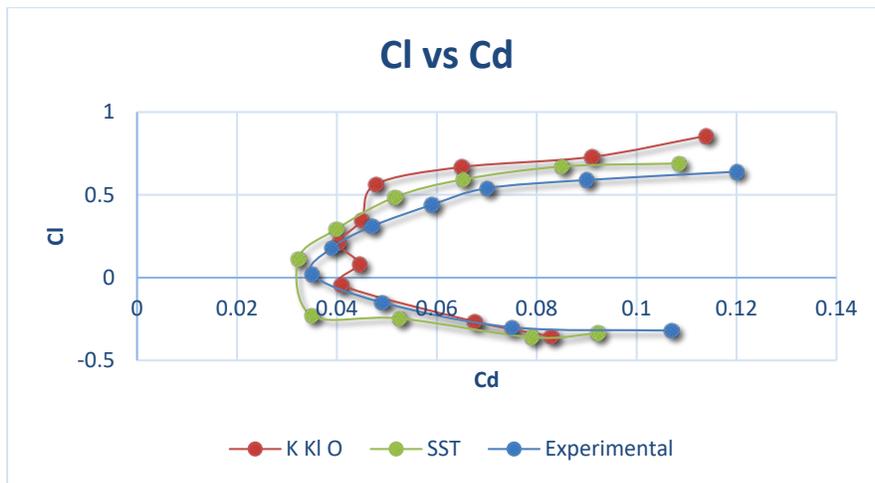


Figure 5

Shear stress distribution

Re=20,000

Figure 6 shows the results for trans-SST at -8deg

It is evident that the flow separates on the lower surface of the airfoil approximately at 10cm from the L.E and later reattaches close to the trailing edge. The flow on the upper surfaces remains in contact.

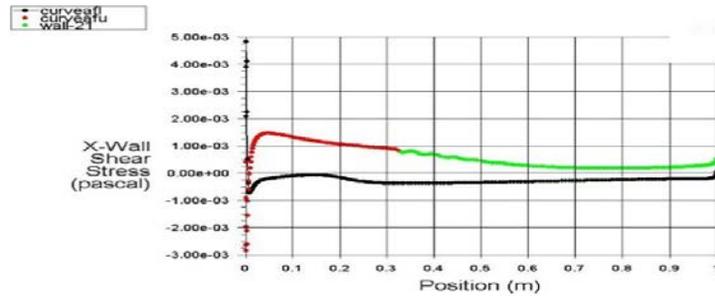


Figure 6

Analysis for Reynolds Number 30,000

Figure 7 shows the comparison between experimental [4] and numerical values for C_l vs Angle of Attack

It is seen that experimental [4] values and trans-SST model are close to each other when compared to K-KI-G model.

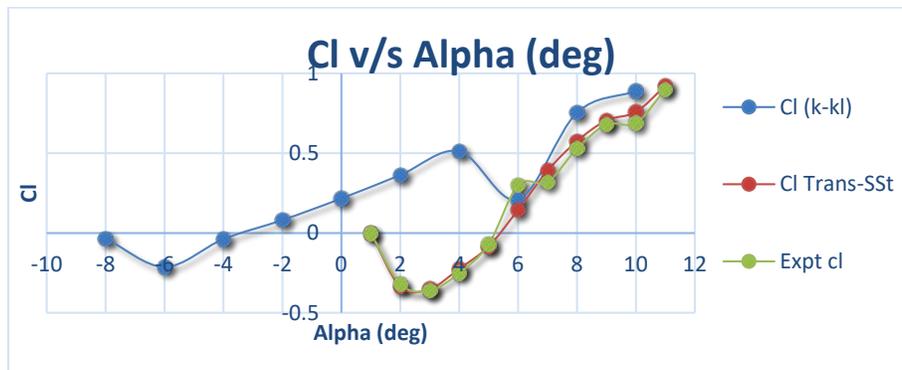


Figure 7

Figure 8 shows the comparison between experimental [4] and numerical values for C_d vs Angle of Attack

It is seen that k-kl-G model is behaving differently when compared to trans-SST model whose values are closer to experimental [4] values.

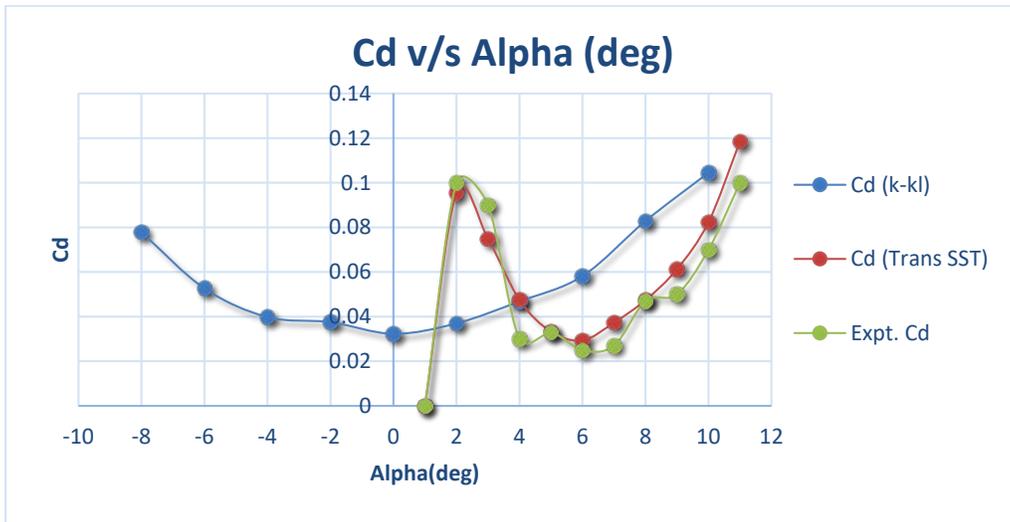


Figure 8

Figure 9 shows the comparison between experimental [4] and numerical values for Cl vs Cd

The figure shows that there is no correlation seen between the two numerical models. However, experimental [4] values are seen closer to trans-SST model.

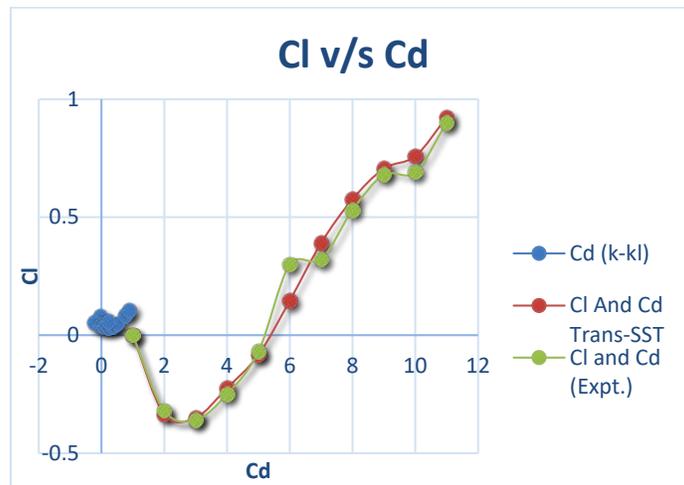


Figure 9

Shear stress distribution

Re 30,000

Figure 10 shows the results for trans-SST at -2 deg.

At this angle, the flow remains attached on the upper surface however the flow on the lower surface separates very close to the leading edge and later reattaches close to 0.57mtrs from the leading edge and remains attached thereafter.

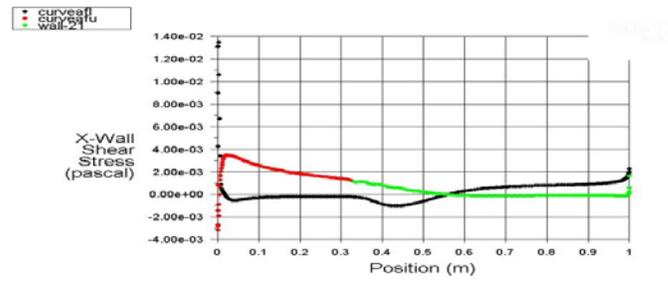


Figure 10

Analysis for Reynolds Number 60,000

Figure 11 shows the comparison between experimental [4] and numerical values for C_l vs Angle of Attack

It can be observed that the distribution using trans-SST model and experimental [4] values are almost matching but K-Kl- ϵ model over predicts the whole range.

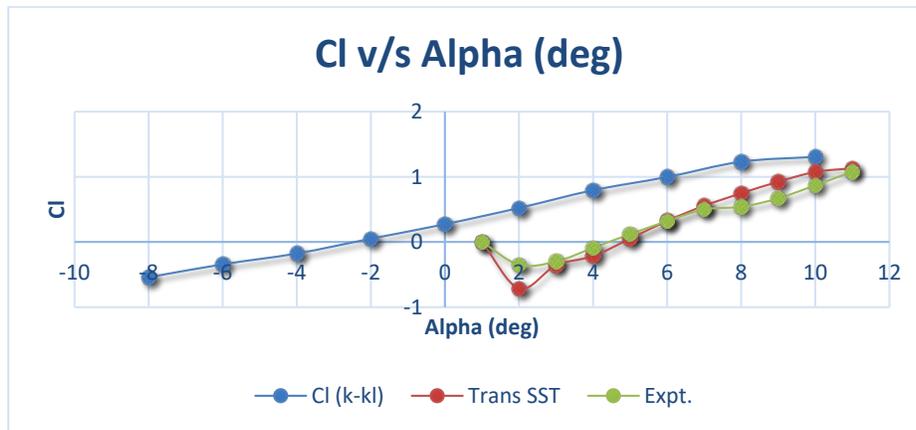


Figure 11

Figure 12 shows the comparison between experimental [4] and numerical values for C_d vs Angle of Attack

It can be observed that the distribution is in agreement with trans-SST model and experimental [4] values except over-predicting between 5 and 7 degrees. But, the C_d variation for K-Kl- ϵ model is not correlating with the experimental [4] values.

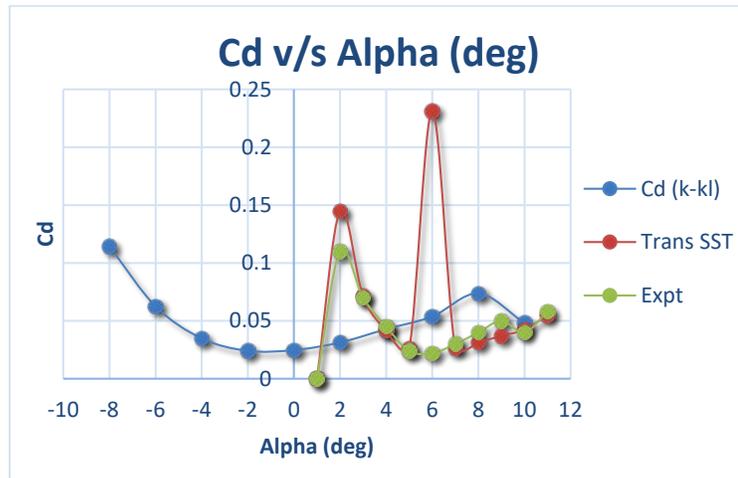


Figure 12

Figure 13 shows the comparison between experimental [4] and numerical values for Cl vs Cd

It is observed that Cd curves using k-kl-GD are not at all in correlation with experimental [4] values. However, trans-SST is in good agreement with experimental [4] values except for 2 deg.

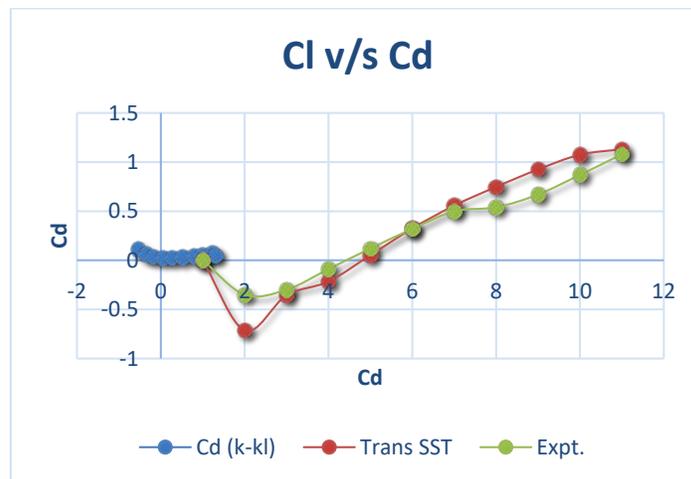


Figure 13

Shear stress distribution

Re 60,000

Figure 14 shows the results for trans-SST at 0 deg.

The flow separates at 0.45m from the leading edge and re-attaches close to the trailing edge.

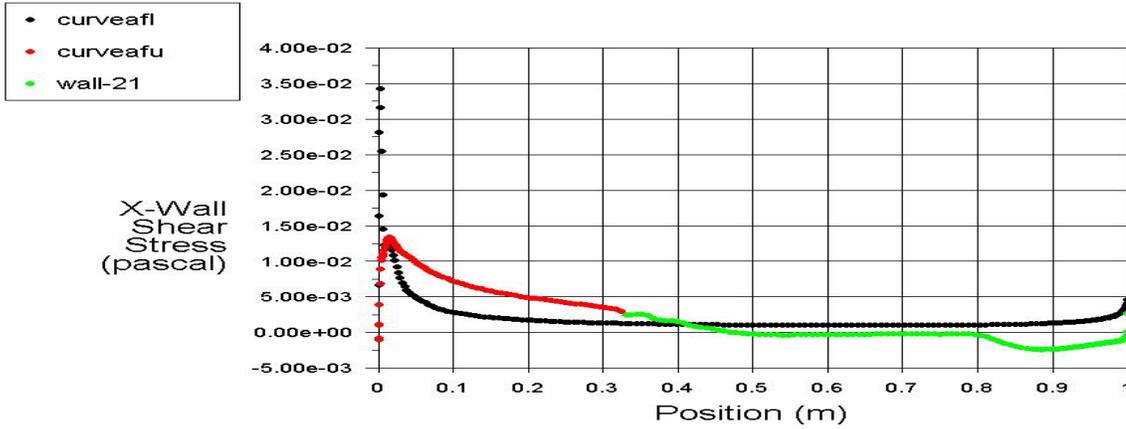


Figure 14

Re 60,000

Figure 15 shows the results for K-kl-GD at -2deg.

The flow on the upper surface remains attached. However, the flow separates very early and later reattaches at approx. 0.35mtrs from the leading edge.

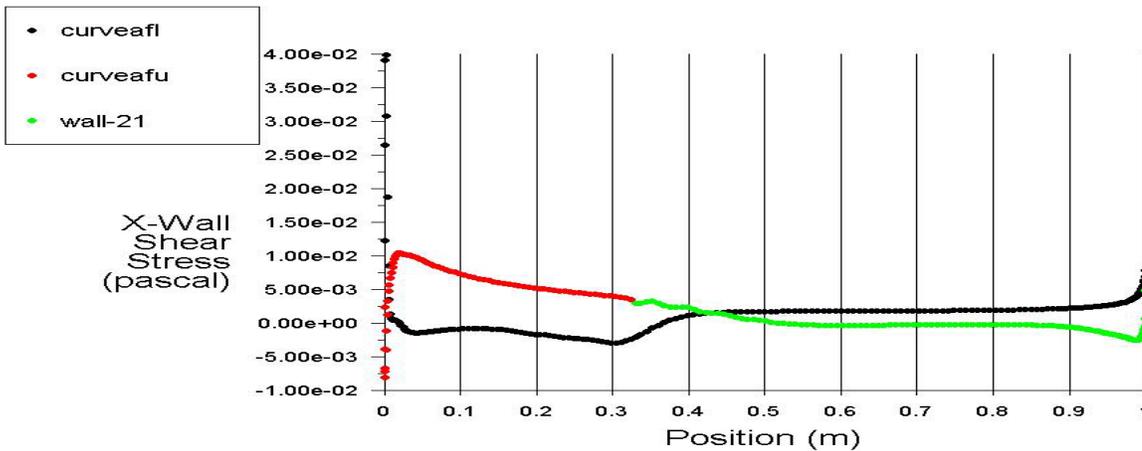


Figure 15

Vector plot representing the Laminar Separation Bubble at Re=60,000 using trans-SST

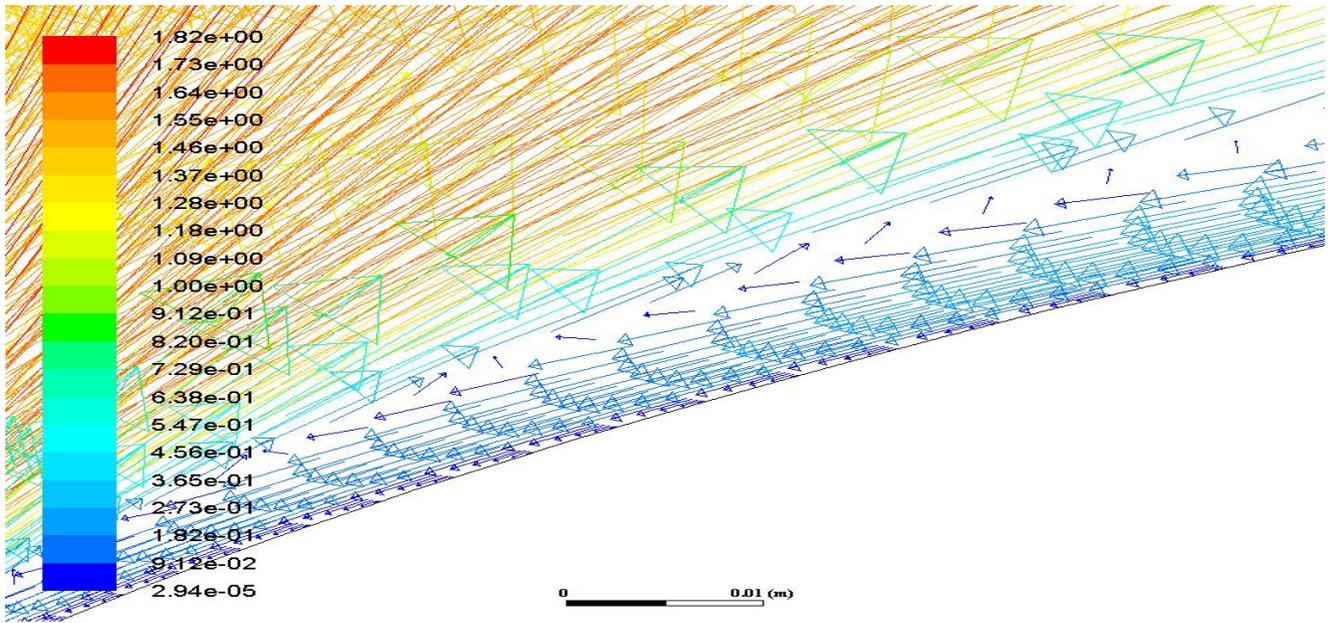


Figure16: Velocity vector showing separation at L.E

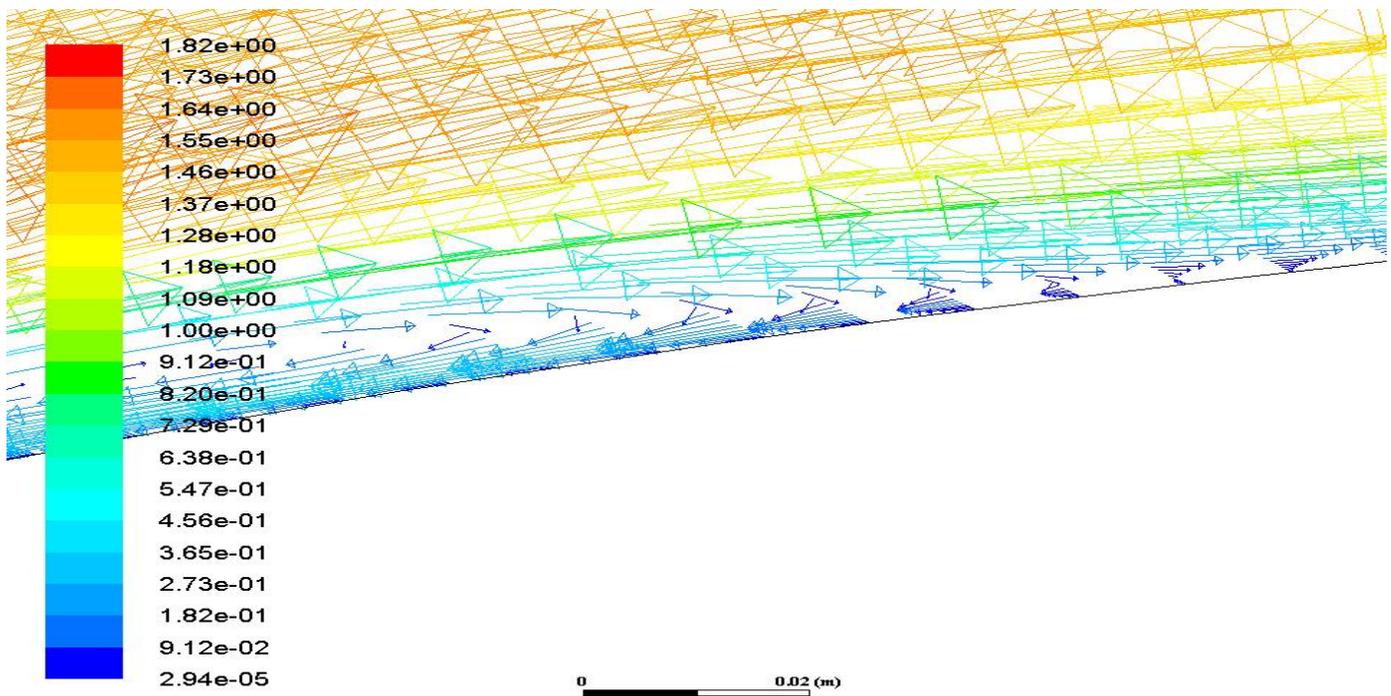


Figure17: Velocity vector showing Reattachment at 0.25m approx. from L.E

Analysis for Reynolds Number 100,000 using trans-SST model

Figure 18 shows the comparison between experimental [4] and numerical values for C_l vs Angle of Attack

It is observed that the values using trans-SST and experimental [4]values are agreeing well.

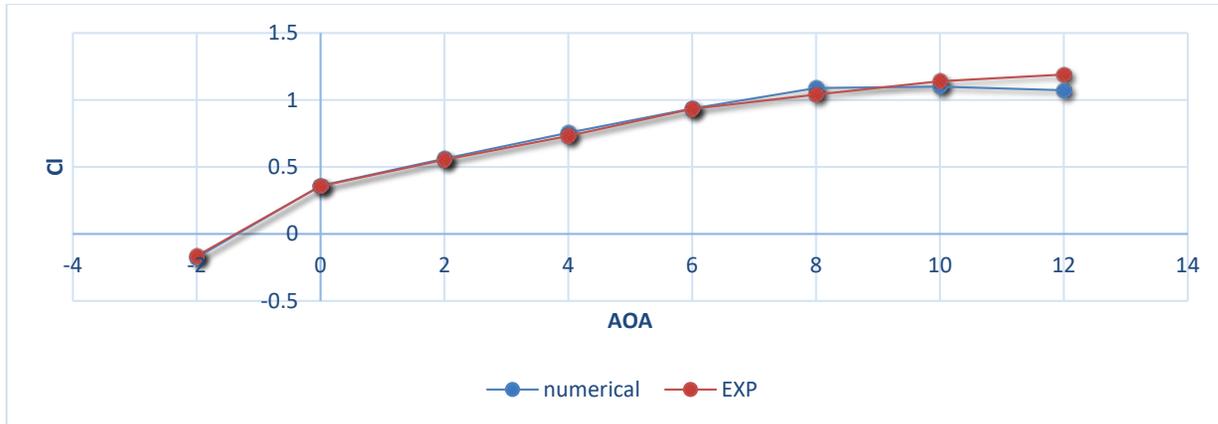


Figure 18

Figure 19 shows the comparison between experimental [4] and numerical values for Cd vs Angle of Attack

It is observed that the distribution obtained using trans-SST and experimental [4]values have some variations.

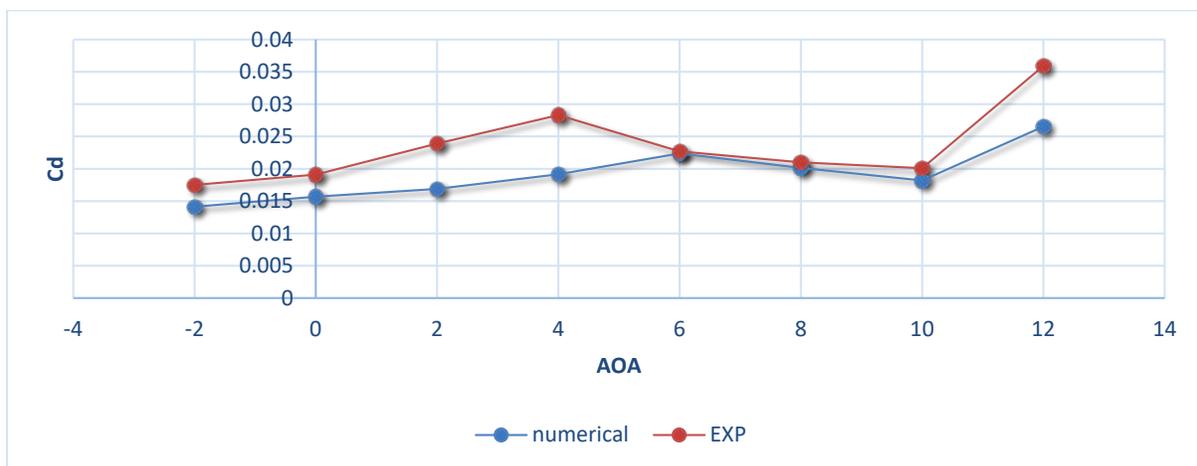


Figure 19

Figure 20 shows the comparison between experimental [4] and numerical values for Cl vs Cd

It is seen that agreement is good except with minor variation.

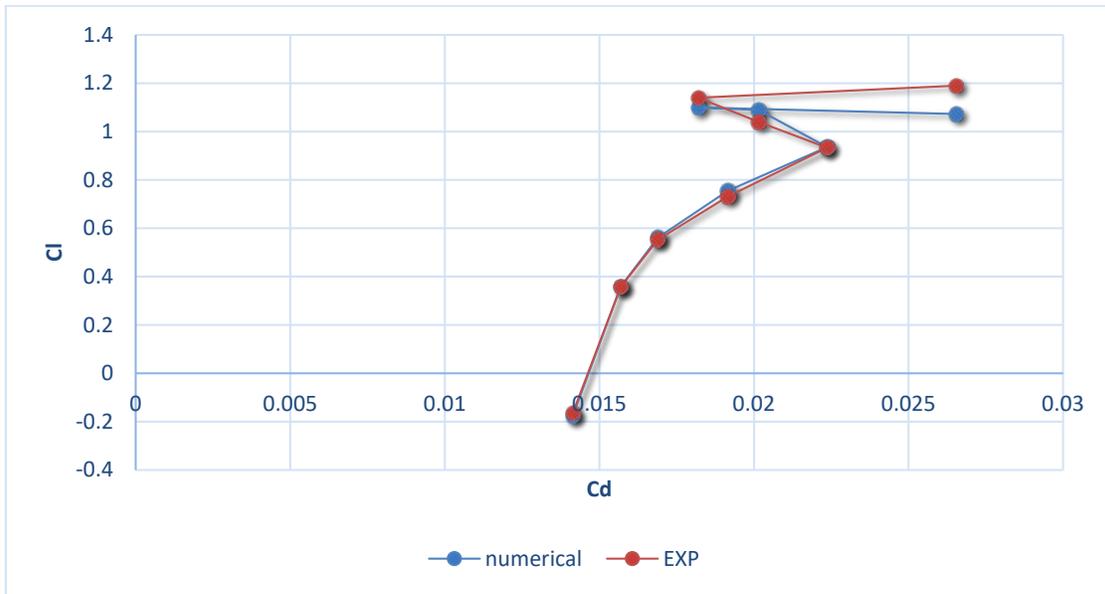


Figure 20

Figure 21 shows the separation plot for $Re=100,000$

It is seen that the numerical values and experimental [4] values are reasonably in good agreement.

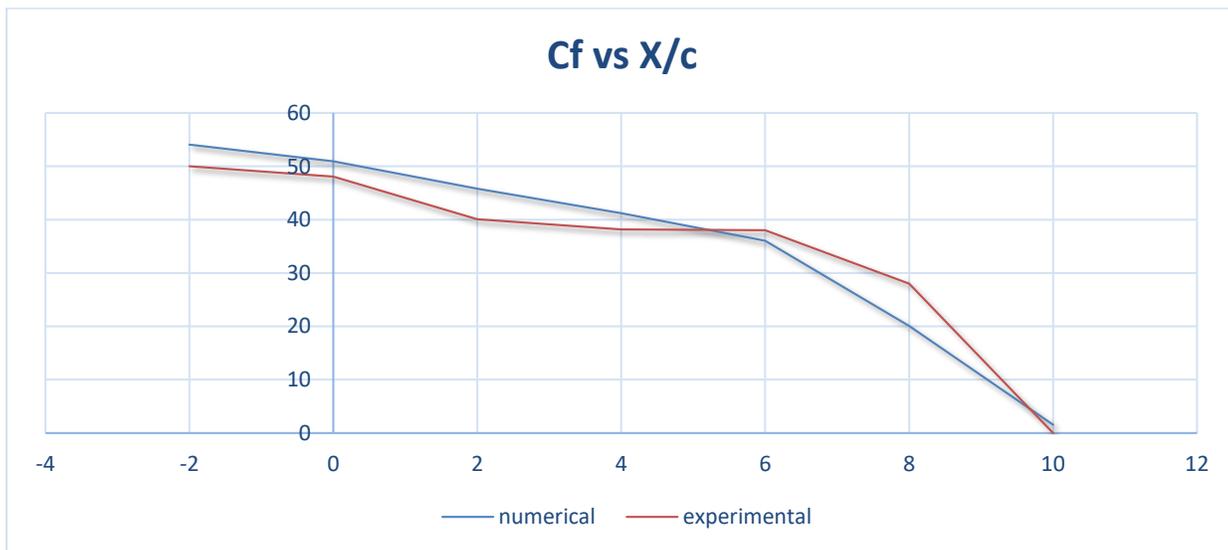


Figure 21

Figure 22 shows the reattachment plot at $Re=100,000$

It is seen that the numerical values and experimental [4] values are in good agreement with each other.

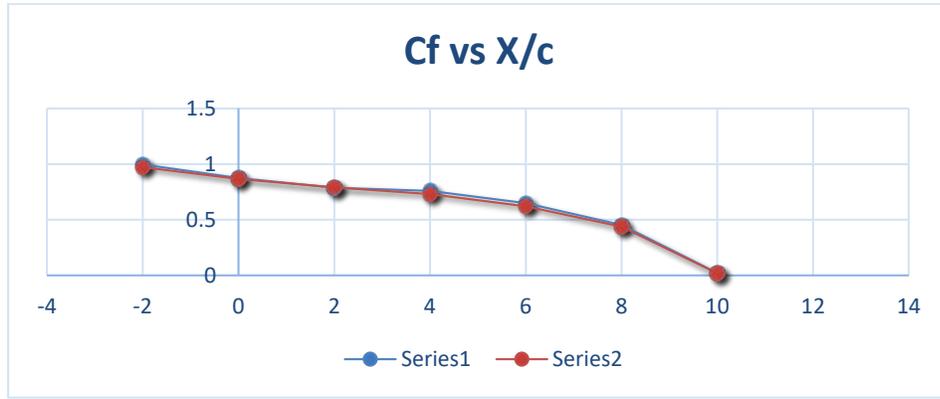


Figure 22

Analysis for Reynolds Number 300,000 using trans-SST

Figure 23 shows the comparison between experimental [4] and numerical values for C_l vs Angle of Attack

It can be observed that both the curves are perfectly correlated.

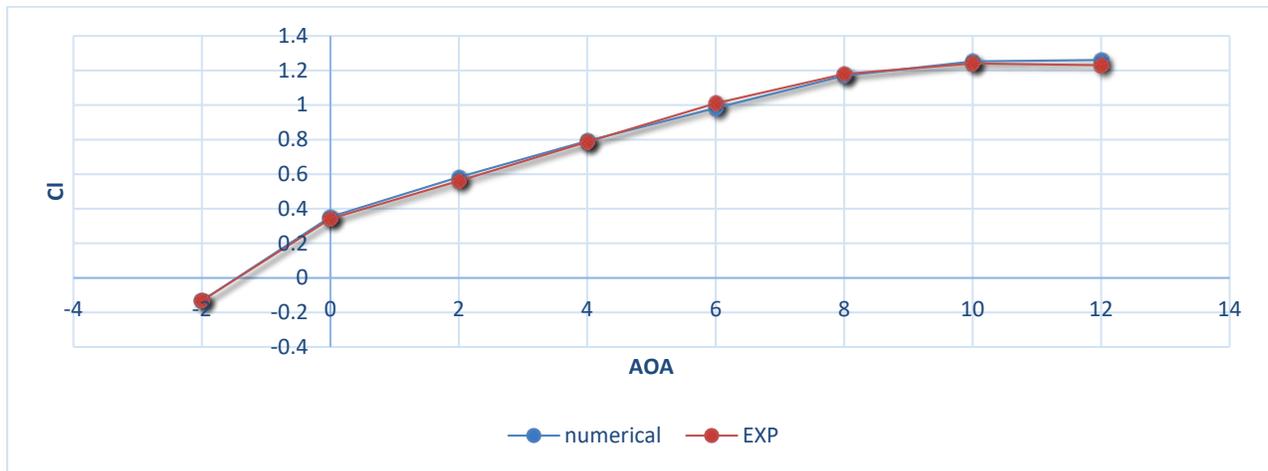


Figure 23

Figure 24 shows the comparison between experimental [4] and numerical values for C_d vs Angle of Attack

It is observed that numerical values almost align with each other.

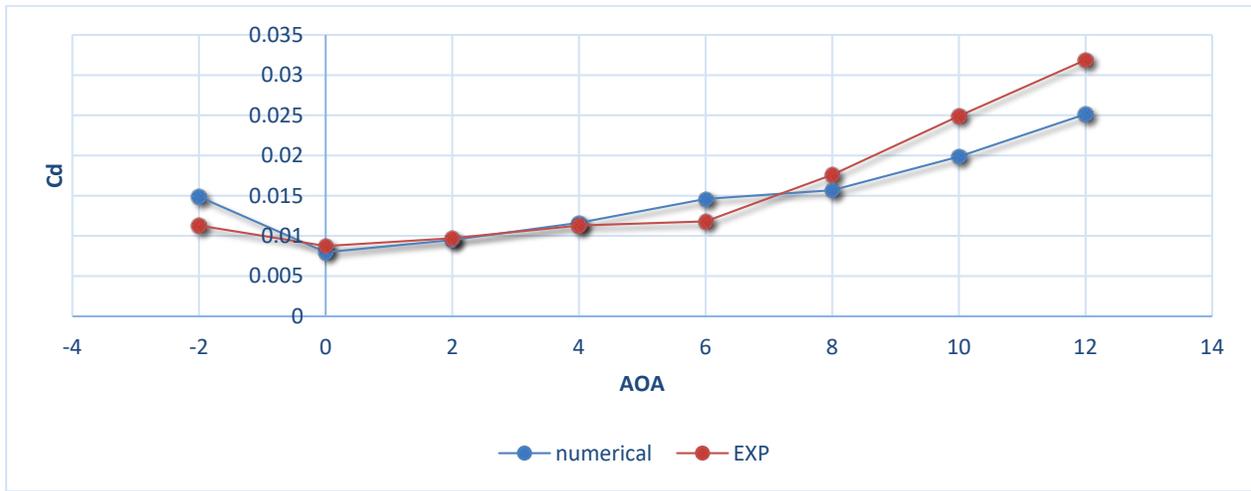


Figure 24

Figure 25 shows the comparison between experimental [4] and numerical values for Cl vs Cd

It can be seen that both the curves are in good agreement with each other.

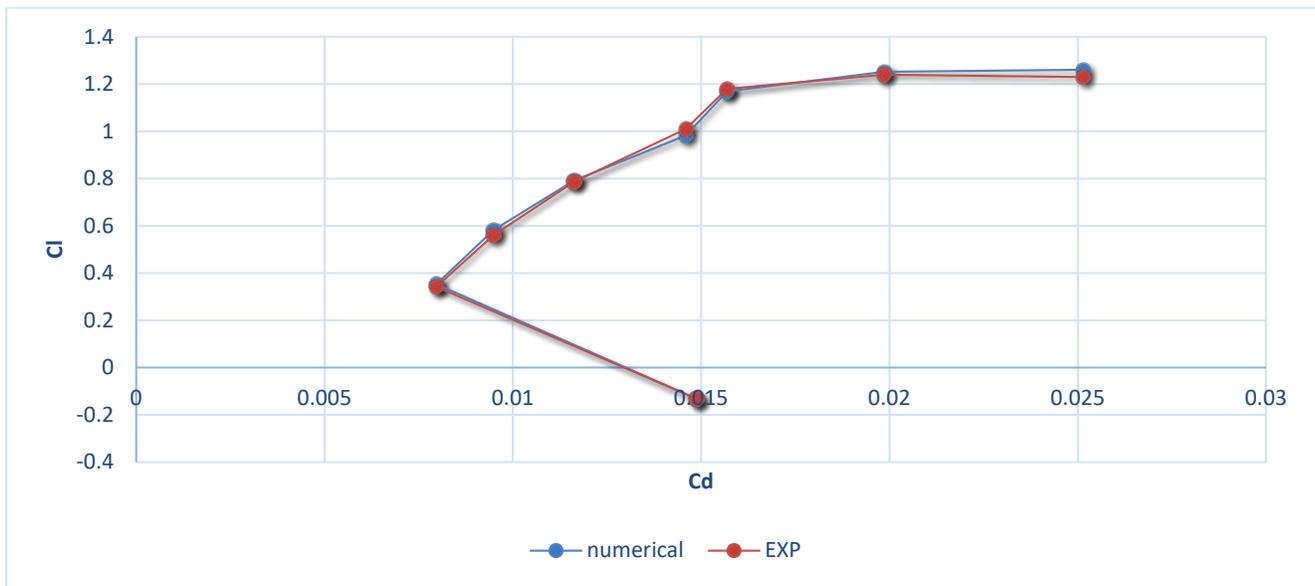


Figure 25

Figure 26 shows the Separation plot at Re=300,000

In the range of experiments, the agreement is good.

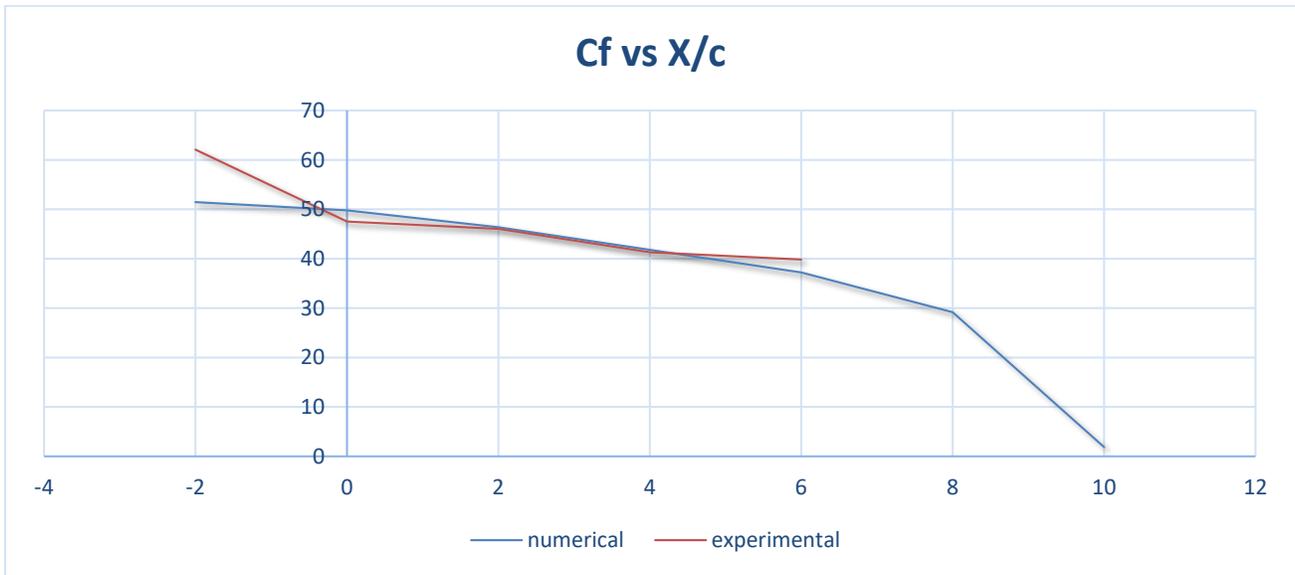


Figure 26

Figure 27 shows the reattachment plot at $Re=300,000$

By comparing numerical and experimental [4]value, it is seen that good comparison between the two.

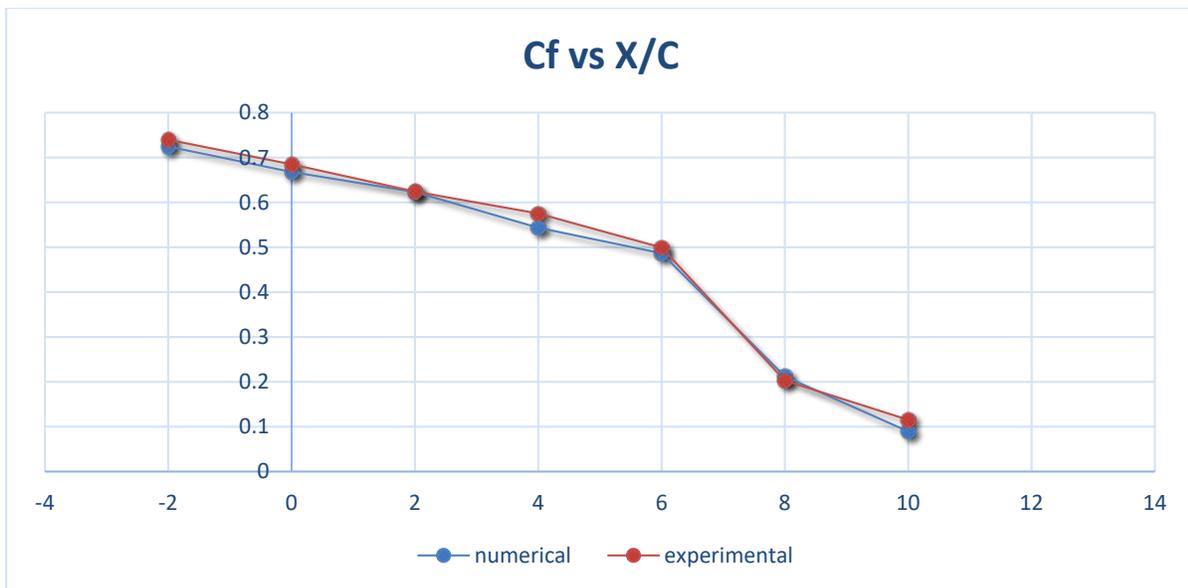


Figure 27

V. CONCLUSION

The simulations and analysis for the Eppler airfoil shows the expected behavior of lift curves at low Reynolds number. The performance of the Eppler airfoil is dominated by laminar separation bubble at Reynolds number below 200,000. At positive

angle of attack, a short laminar separation bubble becomes more evident on the upper surface and moves forward whereas the bubble on the lower surface moves aft. The separation increases with increasing angle of attack. Transition SST model shows a better trend when compared to K-KI-G Model.

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Pupils' Motivation And Perceptions Towards Learning English Using Quizvaganza

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Abstract- In accordance to 21st century learning conventional learning methods are not engaging and motivating resulting in poor pupils' participation in the classroom. Quizvaganza is used as a tool to increase pupils' motivation and engagement in the classroom in an ESL classroom. Using Quizizz web application as a platform this study is aimed to investigate secondary level pupils' motivation and perception in learning English using Quizvaganza game. Thus, Quizvaganza, game-based (gamification) learning platform has been used to stimulate pupils from a rural area in Melaka to learn English as their second language more effectively, actively and interestingly. The research design for this study is action research and the procedure is according to Kurt Lewin Model's Intervention Cycle. Forty pupils were chosen as the target group for this study. The Quizvaganza game was conducted for three different skills from the same topic after they completed the lesson each day. The data was collected using Likert Scale questionnaires consisting of 14 items and semi-structured interview questions for 3 selected students. The results of the questionnaires and interview were shown in figures and tables. Findings of the study shows that it increased the interest of pupils in the class, and have a positive impact on pupils' motivation they enjoy learning English using games and wish to have more games in future.

Index Terms- Gamification, Motivation, Perception, Quizizz

I. INTRODUCTION

Malaysia provides a stimulating socio-linguistic background for a study on learning beliefs. Malaysia is a multi-lingual and multi-cultural country. English and also the official language of Malaysia, Malay, each play a significant role in binding along a multicultural nation created up mostly of 3 separate and distinct races-the Malay, the Chinese and also the Indians. The importance of country language as a global language has continually been a significant motivating consider the learning and use of the language in Malaysia, mainly as a vehicle to achieve data on. In general, location and background play a significant half in deciding pupils' attitudes towards English. Urban pupils have a lot of exposure to the language yet as a lot of opportunities to use it. In fact, there are a growing number of youngsters whose mother tongue is English and who could also be termed native speakers since their parents have chosen to use solely English in the home rather than their ethnic languages. Rural school pupils have problems understanding English, and few are ready to use English in simple verbal communication due to lack of motivation, and they have developed a negative perception towards learning English.

The importance of motivation in enhancing second language learning is undeniable. Lifrieri [1] points out that when asked about the factors which influence individual levels of success in any activity such as language learning, most people would undoubtedly mention motivation among them. Brown [2] states that it is easy in second language learning to claim that a learner will be successful with the proper motivation. With similar views, Gardner [3] posits that pupils' with higher levels of motivation will do better than pupils' with lower levels. He further adds that if one is motivated, he or she has reasons that motives for engaging in the relevant activities, expends effort, persists in the events, attends to the tasks, shows the desire to achieve the goal, enjoys the activities, etc Gardner [3].

According to Yunus [4], pupils' tend to have a positive attitude and better motivation in learning English once they are given supportive environmental factors such as parents, teachers, and peers. Though they essentially had the intrinsic motivation and positive attitude and perceptions towards the English language, yet these supporting factors generally would possibly distract their interest in learning higher the language. For example, if a pupils' is not given a chance to communicate in English in-house or the teacher is usually stating harsh comments on his communication and his peers too making fun of his manner of speech. Thus it will

diminish the learner's interest to learn the language more. Yunus[4] has stated in her study that learners mentioned engaging class contents such as exciting topics and fun activities as the third most important factor which influences their active participation in language learning. From this, we can understand that learners are looking for active classroom session to be engaged in such as games, role plays and collaborative activities which can make them to communicate and socialize more rather than sitting and doing writing task alone.

Peterson [6] contends to as much paper, those sort of investment that is needed to intelligent media games heads would learners turning into entirely drenched. Those game- clients for these sorts about diversions are overwhelmed in the games, What's more in place to win alternately attain sure objectives those players need should have the capacity should convey and team up with co-players. There are contrasts the middle of the lifestyle the learners get input clinched alongside accepted learning manifestations and to intelligent media games, over universal learning polishes would learners frequently get reaction through to moment honing or on a composed form, however previously, games input turned through action, something happens, you bite the dust or you lose. In turn perspective should perspective crazy concerning mistakes and disappointment in intuitive diversions contrasted with different sorts about learning, maybe that clinched alongside game players regularly need to or are actually spurred toward the game with neglect what's more settle on mistakes, whose purpose behind this being that the outcomes of the disappointment are regularly fascinating and worth those trek. Furthermore, this contends should encourage learning in Prensky [7]. What we can understand from all these are games has many aspects such as ordained rules that have to be followed, enhancing cooperation together making learning a fun activity. In short, we can say that games are enjoying factors. Competition, which is equally yoked with games, plays an essential part as the characteristics of a game requires. Learners will be excited by competing in which the question of who will win or lose remains unanswered until the game is over.

Similarly, games enhance learning to occur quickly in an enjoyable way full of fun which often leads to an objective achieved learning. In most of the games, learners are required to work together in groups to reach their target and learners enjoy this kind of interactions and cooperation very much. It is believed that when collaboration and communication are combined with fun, successful learning becomes possible. To conclude, no matter how different games are described, one cannot underestimate their pedagogical value both in teaching and learning a second language.

According to McCallum [8], games stimulate learners automatically with a higher level of interest and motivation and also known as a higher motivation technique. Pupils' motivation level stirred up with games' competitive component. Another preference connected with games is that pupils' tension and anxiety towards language learning decreases as different kind of games were utilized. In language learning classrooms, learners feel so stressed and depressed because they have to master the target language that is required of them. Games are beneficiary in this part of the point in which they can decrease their anxiety level and increase certain positive emotions thus furthermore enhance self-confidence. Gamification aims to make the learning process more attractive to learners. A novel learning experience that increases pupils' motivation can be created in a learning environment that includes competition. Motivation is an important element leading to pupils' success in most learning designs, including gamification. Thus, a more effective learning process can be produced if gamified designs that consider the element of motivation are added to learning spaces The fact that traditional methods of providing motivation are no longer valid has been made evident through published psychological writings and self-help books, and by research studies [9]. Gamification method more attractive is that it causes an internal trigger by changing perceptions [10]. The integration of gamification in teaching English as the second language could enable to increase pupils motivation and pupils will have positive perception towards learning English. Thus, the objectives of this study are to investigate the motivation and perceptions in learning English using Quizvaganza among secondary school pupils' by answering these questions:

1. Identify that Quizvaganza game base learning increases the level of motivation among learners to engage in learning the English language.
2. Identify the perceptions of learners towards English language classroom with Quizvaganza game-based learning platform.

Literature Review

Motivation

Motivation is defined as the extent ones strive to acquire the language because of the desire to do so and the satisfaction derived from it Gardner [3]. It is said that pupils motivation toward English language learning can influence their learning result. Saville-Troike [10] claims that individual motivation is another factor that is used to explain why some second language learners are more successful than others. The more motivated pupils are, the more comfortable they will learn a new language. Palmer [11] as cited by Williams states that pupils' motivation is an essential element that is necessary for quality education. How we know the pupils are motivated is when they pay attention, begin working on the task immediately, ask question and volunteer answer, and appear to be happy and eager.

Gamification

According to The Longman Dictionary of Language Teaching and Applied Linguistics games are defined as an organized activity that usually has a particular task or objective, a set of rules, competition between players, and communication between players by spoken or written language also defined games as an activity with rules, a goal, an element of fun [12]. Games in language learning can help the teacher to create environments in which the language is beneficial and meaningful. Moreover, Ersoz [13] stated games are highly motivating since they are amusing and at the same time challenging. They employ meaningful and useful language in real contexts, encourage and increase cooperation as well. Language learners need variation to increase their motivation. Games are one such thing to increase motivation. However, in designing the games for language classroom, the teacher must regard the need, level of difficulty and the age of the learners. Games can be used for all age groups, but the teachers have to ensure that their games are age-appropriate and not too easy or challenging for the pupils. Kopecky states that adult pupils look for structure in lessons and by keeping a game tied to the work it helps maintain their confidence in the teacher [14]. For this, the teachers should know their pupils and prepare games that are intellectually challenging and have some substance.

Quizziz

The growth in technology has brought some influences in education especially in language learning. It has shifted the learning process from conventional teaching into contemporary learning. Quizziz is a game-based approach to blended learning has been introduced in some areas of life, especially in education. Once you access the program online, the users can create and design their own questions based on their needs and topics; they can set the time, play it to an unlimited number of players, creating a social, fun and game-like learning environment. Below is appearance you can find on the teacher's screen. To be able to play the games, of course, technical support is needed. The teacher as a leader of the game requires a laptop and LCD projector. And for the players, it is required a smartphone or laptop equipped with Wi-Fi. On the screen of the player, it will appear like this. The players then will be asked to enter the PIN and the nickname. This is the most common type of Quizziz, to blended learning. There is no limit to the number of questions in a quiz. Each question can have an associated picture or video, and 2 - 4 multiple choice answers. There must be at least one correct answer (but more can be chosen), and the time limit for each question can be individually set from 5 seconds to 2 minutes. The quizzes can be used to formatively assess the knowledge of each in the room, and adapt their learning accordingly. They can be used to track the progress of individuals over time, and inspire learners to enquire further by creating their own quizzes. Players answer questions displayed at the front of the room on their personal device, motivated to answer correctly and score the most points. The faster someone answers a question correctly, the more points they get. The points scorers are displayed on the leaderboard at the front in-between each question, and the ultimate winner is shown at the end.

II. METHODS

This study involves of forty participants from a secondary school in a rural area in Melaka. Twenty-three of the participants were male, and the 17 were female. All of them are from form 1 pupils. All the forty pupils were engaged in the study. All the participants involved in the research were from an estate community whereby English is their second language, and they only learn the language during the lesson hours. Other than that, they never use the language anywhere and not even in their communication or speaking as well. All the participants can be grouped into three categories as advanced, intermediate and beginners. The participants were categorized into this three level based on their English exam marks. Advanced level pupils marking range is 80, and above meanwhile the intermediates' marking range is from 50 to 79. Beginners level pupils marking range is below 49. All these participants were observed to be very inactive and quiet during every English class. They are very passive and seldom open their mouth to speak out during the lesson hours. The instruments used to collect the data for the study is a questionnaire consists of 14 items. The items of the questionnaires were chosen from Gardner's Attitude and Motivation Test Battery and adapted according to the need of the study. The questionnaires were ranged using four different emoticons and participants were required to tick the emoticons they choose for each item. The items in questionnaires were translated orally by the researcher for the participants who finds it very hard for them to understand. The second instrument that was used is an interview session for three participants chosen from three categories. The interview session was done by asking five semi-structured questions to the participants, and their answers were jotted down immediately by the researcher including with their reactions too. Secondly, the results of the Quizvaganza game that was played for three different topics by the participants also were downloaded in the form Microsoft Excel from the game platform as well and had been used to analyze to identify the mastery level of the participants on the targeted language skill for each lesson. The research design of the study is action research, and the procedure of the study is shown in Figure 1. The action chosen is using Quizvaganza game being played online at the end of each lesson. According to Kurt Lewin Model in Figure 1, the main problem was identified during the English lesson that is the pupils' were so passive and not interested in engaging in the English lessons.

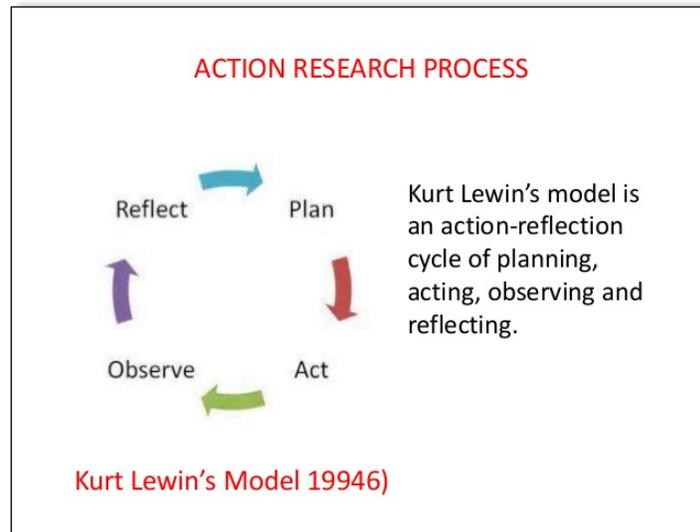


Figure 1: The Intervention Cycle according to Kurt Lewin Model.

Next, the analysis of the problem was done, and intervention to be done was chosen, and a few studies and findings were done relating to the technique selected. Then, the intervention done according to planning and data was collected and analyzed descriptively. Next, the procedures of intervention were briefly described in Figure 2 below.

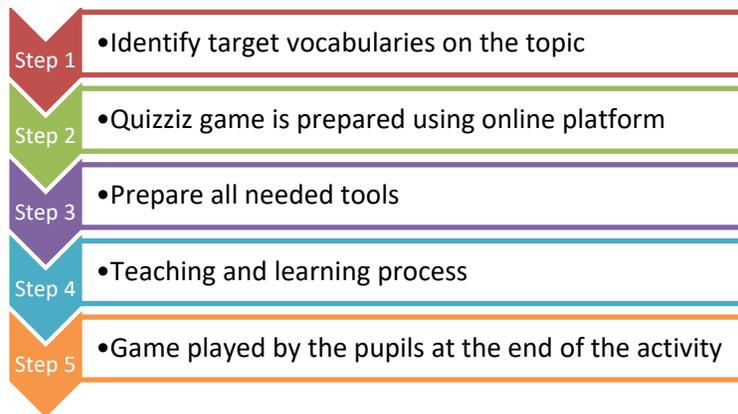


Figure 2: Intervention process

The Quizziz game was played for three different language skills namely listening, speaking and reading. The print screen figures of the Quizziz game prepared and played by the participants can be seen below.

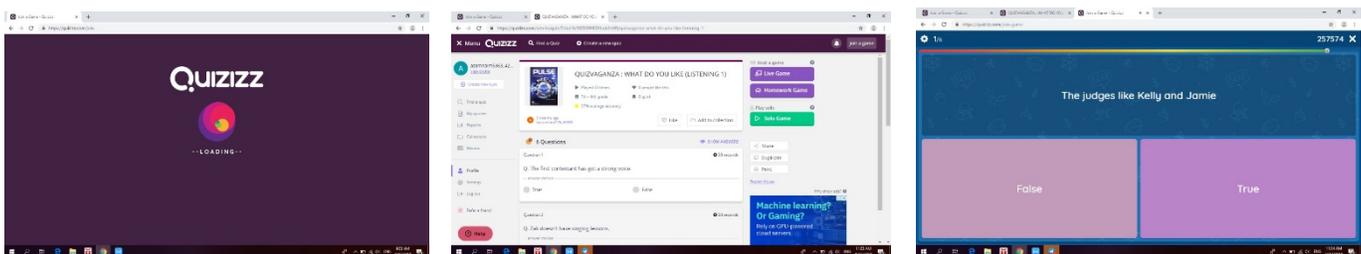


Fig 3: Print screen of Quizziz game

III. RESULTS AND FINDINGS

Questionnaire

The 14 items in the questionnaire are based on pupils' attitude and motivation towards learning English using Quizvaganza game. The result for each item answered by each participant has been shown in Table 1 and 2. Item 1 till item 8 is about the pupils' motivation towards learning English using Quizizz game. Based on Table 1, it is observed that for item 1 till 4, all the forty participants ticked the strongly agree which shows they are motivated towards learning English using Quizvaganza. All of them stated that learning English is great and they would rather spend more time in English classes and less in other classes. Moreover, they also really enjoy learning English using games such as Quizvaganza and happy to be engaged in this kind of game activities in their English classes compare to those that are in other classes. Next, for item 5, it is observed that all the forty participants' showed strongly disagree which means they do not agree with the statement that their English class with games are boring. In item 8, seven participants showed strongly disagree with the statement that they have no interest in English languages. On the other hand, the beginner level student and an intermediate level student shows confusing face which means they are not sure of their interest level in learning English. This indicates that they still have less motivation to be engaged in the English classroom. Next, in item 7, nine beginner level pupils showed confusing face whereby again they are not so motivated to be in a competitive environment to complete the task given in their English class. All the other 31 participants showed strongly agree which means they are ready to learn in a competitive game based environment. For item 8, all the forty participants showed strongly agree whereby all of them has the expectations to learn as much as English as possible using Quizvaganza game and to look forward to studying more on English in the future. Overall, it is observed that majority of the participants are showing a very positive attitude towards learning English using Quizvaganza games and they have the right perceptions too about the learning style used in the classroom. They were also having a very high level of motivation to be engaged in the learning of language and expecting more language-based games. The beginner level pupils only show a slightly a bit of low motivation level in learning the language using games. This might be due to his low self-esteem and fear of communicating in the classroom and anxiety of being ill-treated by his friends if he does he is to be corrected by the teacher.

Section 1: The pupils' motivation towards learning English using Quizizz					
No of Items.	Questions	Strongly Disagree 	Disagree 	Agree 	Strongly Agree 
1.	Learning English is really great.				100 %
2.	I enjoy learning English using games such as Quizizz.				100%
3.	I would rather spend more time in my English class and less in other classes.				100%
4.	I enjoy this kind of game based activities than those of my other classes.				100%
5.	I think my English class with games are boring.	100%			
6.	I plan to learn as much English as possible using this Quizizz.			7.5%	92.5%
7.	I like being placed in competition with other students in the classroom via a game based method increases my motivation		22.5%	77.5%	
8.	I like my English class so much and look forward to studying more English in future.				100%

Table 1: The pupils' motivation towards learning English using Quizizz

Section 2: The perception of pupils' towards learning English using Quizizz					
No of Items.	Questions	Strongly Disagree 	Disagree 	Agree 	Strongly Agree 
9.	A gamification method increases my interest in the lesson.				100%
10.	I study more to become more successful via gamification methods.			7%	93%
11.	I communicate more with my friends to become more successful via gamification methods.				100%
12.	The gamification method allows me to see my achievement status and improve myself in the areas that I am weak in.				100%
13.	Use of a learning method blended with a gamification method helped me to understand the lesson better.				100%
14.	Gamification methods are fun.			10%	90%

Table 2: The pupils' perception towards learning English using Quizizz

Semi-structured Interview Session

This interview session was done on three participants from three different categories that are advanced, intermediate and beginner level. This session was done after the third Quizizz game class was conducted. For advanced level, participant A has been chosen. For the intermediate level, participant G has been selected and finally, the beginner level participant too was interviewed. There were five questions asked by the researcher, and the answers and gestures of the participants were jotted down immediately. The semi-structured questions, keywords in responses by the participants and their gestures too are recorded and shown in Table 3.

Questions	Participants					
	A		G		I	
	Answer	Gestures	Answer	Gestures	Answer	Gestures
1.How do you feel for today's English class	Awesome, I really enjoyed it	Bright smile	I am very happy, it was interesting	Smiled	I enjoyed it	Laughed
2. What are the interesting activities being done in your English class today?	Quizizz	Smiling	Quizizz	Showed thumbs up	Quizizz	Bright smile on the face

3. Are you able to answer all the Quizziz questions?	No, so sad. Only 7 I can't believe I lost the game.	Confidently nodded his head	It was fantastic, not like normal days	Laughing	I want more Quizvaganza in net class	Nodded and smiled
4. How was your class environment today do you like it?	Really happy, I want more games net time.	Thumbs up again and smiled	I enjoyed Quizvaganza and I want more in future	Smiled with two thumbs up	I want to win too, I want more of it	Smiled
5. What are the activities that you are expecting for your next English class?	More games like this please.	Big laugh	I want to use more computer and games lie this	Smiled	I want to win prize and I want more games	Laughed

IV. DISCUSSION

Based on the data received and analyzed, the first objective of this study has been achieved whereby pupils' were able to cultivate a positive attitude and show a higher level of motivation towards learning the language using Quizvaganza game platform. It is shown that twenty-seven out of forty participants has a thoroughly positive attitude in learning language because Quizvaganza game has been assimilated in their learning. There are many changes in their behavior and responding in classes. Only three participant is slightly not positive and motivated because of some low self-esteem and fear of anxiety due to low acquisition in language. This can be changed entirely in another two weeks if he is exposed to more game-based learning. The participants were also showing very high motivation in learning the language after they were engaged in Quizvaganza games which means they want to perform better and seek for guidance from the teacher if necessary to improve their language. Thus, it can be concluded that the integration of Quizvaganza games in English language classroom able to enhance positive attitude and high motivation among learners to perform well in the language.

Next, the second objective of the study also has been achieved whereby pupils have good perceptions and expectations towards game-based language learning classroom. It is observed that all the forty pupils agreed that they like the English class with games better than other classes and they are looking forward to more Quizvaganza games in their future English classes. Thus, a total conclusion can be made that pupils are more towards to 21st-century learning style which assimilates ICT in their learning rather than involving traditional method learning. Pupils prefer to learn more by exploring and engaging in the virtual world which can enhance them to think on their own and having good social communication with their social members.

V. CONCLUSION

As a conclusion, it is proved that Quizziz game-based learning platform able to herald a positive perspective and good perception among the participants in learning English. All the nine participants feel happy to learn English with games quite the other lessons. Besides, this game too able to raise motivation among participants to attain higher results to win the game and be champion in the leaderboard. It initiates a healthy competition and positive communication among the participants while they were taking part in the games. On the other hand, the participants were also giving a lot of attention and vital in mastering the targeted language to induce correct answers and stay within the leaderboard. Moreover, English language classroom with games is more active, energetic, enjoyable, student-centered and fun too. Quizziz game platform is also an excellent way to be used as an assessment tool whereby all the results, scores and percentages of the questions will be recorded online and downloaded manually too. All level of pupils is benefited by getting involved in game-based learning. The games created in the Quizziz platform can also be kept for following years and teacher can reuse the games for different categories and upcoming years too. So, it will be better if teachers were able to add in additional games in their teaching and learning method to create it to make and valuable and usable to learners.

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Development of an Alphabetic Character Recognition System Using Matlab for Bangladesh

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Abstract- Character recognition technique, associates a symbolic identity with the image of the character, is an important area in pattern recognition and image processing. The principal idea here is to convert raw images (scanned from document, typed, pictured etcetera) into editable text like html, doc, txt or other formats. There is a very limited number of Bangla Character recognition system, if available they can't recognize the whole alphabet set. Motivated by this, this paper demonstrates a MATLAB based Character Recognition system from printed Bangla writings. It can also compare the characters of one image file to another one. Processing steps here involved binarization, noise removal and segmentation in various levels, features extraction and recognition.

Index Terms- OCR, Character Recognition, MATLAB, Cross-Correlation, Image Processing.

I. INTRODUCTION

Character Recognition began as a field of research in pattern identification, artificial neural networks and machine learning. The different areas covered under this general term are either on-line or off-line CR, each having its dedicated hardware and recognition methods. In on-line character recognition applications, the computer recognizes the symbols as they are drawn. The typical hardware for data acquisition is the digitizing tablet, which can be electromagnetic, electrostatic, pressure sensitive etcetera; a light pen can also be used. As the character is drawn, the successive positions of the pen are memorized (the usual sampling frequencies lie between 100Hz and 200Hz) and are used by the recognition algorithm [1]. Off-line character recognition is completed afterward the inscription or printing is performed. Examples of it are usually distinguished: magnetic and optical character recognition. In magnetic character recognition (MCR), the fonts are written with magnetic disk and are designed to modify in a unique way a magnetic field created by the acquisition device. MCR is mostly used in banking applications, for instance reading bank checks, because overwriting or overprinting these characters does not affect the accuracy of the recognition. While in optical character recognition, which is the field investigated in this paper, deals with recognition of characters acquired by optical means, typically by a scanner or a camera. The symbols can be separated

from each other or belong to structures like words, paragraphs, figures, etc. They can be printed or handwritten, of any size, shape, or orientation [2, 3]. Bangla, the mother tongue of Bangladeshis, is one of the most popular languages in the world, For the Indian subcontinent Bangla is the Second most popular language. Moreover 200 million people of eastern India and Bangladesh use this language and also the institutional language in our country [1]. So recognition of Bangla alphabet is always a special interest to us considering the massive number of official papers are being scanned and processed every day. This work aims to develop a system that categorizes a given input (Bangla Characters) as belonging to a certain class rather than to identify them uniquely, as every input pattern. It also performs character recognition by quantification of the character into a mathematical vector entity using the geometrical properties of the character image. Global usage of this system may reduce the hard labor of the concerning government employees every day.

II. BACKGROUND

Basic Bangla character set comprises 11 vowels, 39 consonant and 10 numerals. There are also compound characters being combination of consonant with consonant as well as consonant with vowel [1, 4]. The complete set of characters, need to recognize by the proposed recognition system, is provided in Figure1.

Numerals	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯
Independent Vowels	অ আ ই ঐ ঔ ঊ ঋ এ ঐ ও ঔ
Consonants	ক খ গ ঘ ঙ চ ছ জ ঝ ঞ ট ঠ ড ঢ ণ ত থ দ ধ ন প ফ ব ভ ম য র ল শ ষ স হ ঙ ঙ ঙ ঙ ঙ ঙ ঙ ঙ ঙ ঙ

Figure1: The whole character set of Bangla Alphabet

A. OVERVIEW OF THE IMAGE TYPES AND PROPERTIES

The RGB (true-color) images are put in storage as 3 distinct image matrices; one of red (R) in each pixel, one of green (G) and one of blue (B); similar to the wavelength-sensitive cone cells of human eye. While in a grayscale or graylevel digital image, the value of each pixel is a single value, carries only intensity information. A grayscale image is not the black and white Binary (2-leveled) image. Gray image is represented by black and white shades or combination of levels. 8 bit gray image

represents total 2^8 levels, from black to white, 0 equals black and 255 is White. While Binary images, have only two probable values for individual pixel, are produced by thresholding a grayscale or color image to separate an object in the image from its background [5].

Also, color images are generally described by using the following three terms: Hue, Saturation and Lightness. **Hue** is another word for color and dependent on the wavelength of light

III. METHODOLOGY

The proposed Bangla Character Recognition system is developed here by the following steps:

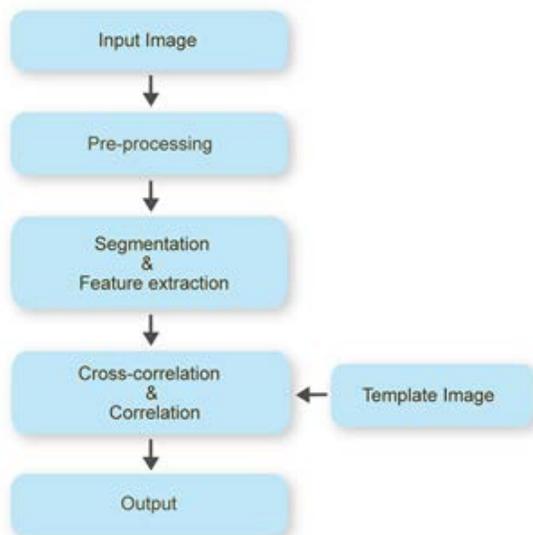
- Step1: Printed Bangla Script input to Scanner
- Step2: Raw scanned Document from Scanner
- Step3: Convert the scanned RGB image into Grayscale image
- Step3: Convert Grayscale image to Binary image.
- Step4: Segmentation and Feature Extraction.
- Step5: Classification and Post-processing.
- Step6: Output editable text.

A scanned RGB color image here is input to the system. The proposed text detection, recognition and translation algorithm (shown in Figure2) consists of following steps: *Binarization, Noise removal, Segmentation, Features extraction, Correlation and Cross-Correlation* [1, 7].

A. Pre-Processing

Binarization

Binarization is the technique here by which the gray scale pictures are transformed to binary images to facilitate noise removal. Typically the two colors used for a binary image are black and white though any two colors can be used. The color used for the object in the image is the foreground color while the rest of the image is the background color. Binarization separates the foreground (text) from the background information [1-2].



being reflected or produced. **Saturation** refers to that how pure or intense a given hue is. 100% saturation means there's no addition of gray to the hue - the color is completely pure [15]. **Lightness** measures the relative degree of black or white that's been mixed with a given hue. Adding white makes the color lighter (creates tints) and adding black makes it darker (creates shades). The effect of lightness is relative to other values in the composition [6, 15].

Figure 2: An overview of the proposed Bangla character recognition system.

Noise Removal

Scanned documents often contain noise that arises due to the accessories of printer or scanner, print quality, age of the document, etc. Therefore, it is necessary to filter this noise before processing the image. This low-pass filter should avoid as much of the distortion as possible while holding the entire signal [1, 8].

B. Segmentation

Image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as super pixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics or property such as color, concentration, or quality. The result of image segmentation is a set of sections that collectively cover the whole image, or a set of lines take out from the image (or edge detection). Segmentation of binary image is achieved in altered levels contains line segmentation, word segmentation, character segmentation. Thresholding often delivers an easy and suitable method to accomplish this segmentation on the base of the different concentrations or colors in the foreground and background areas. In a single pass, each pixel in the image is related with this threshold value. If the pixel's intensity is higher than the threshold, the pixel is set to white in the output, corresponding foreground. If it is less than the threshold, it is set to black, indicating background [1, 2, 8].

Features Extraction

Feature taking out is the special form of dimensional decrease that proficiently characterizes exciting parts of an image as a solid feature route. This method is suitable when image sizes are huge and a condensed feature illustration is essential to swiftly complete tasks, such as image matching and recovery. Feature detection, feature mining, and matching are often combined to solve common computer vision problems such as object detection and recognition, content-based image retrieval, face detection and recognition, and texture classification [1, 9].

C. Correlation and Cross-Correlation

Image correlation and tracking is an optical technique that works tracking and image registration method for accurate 2D and 3D dimension of changes in images. *Cross-correlation* is the measure of similarity of two images. Each of the images is divided into rectangular blocks. Each block in the first image is correlated with its corresponding block in the second image to produce the cross-correlation value as a function of position [10,11].

IV. MATLAB IMPLEMENTATION

An implementation is the realization of a technical specification or algorithm as a program, software component, or other computer system through computer programming and deployment. The proposed system is implemented in MATLAB and the accuracy is also tested. Using MATLAB 'imread' function of, a noisy scanned RGB image is loaded to the input system (Figure.3). After performing Grayscale conversion by 'rgb2gray', Figure.4 is thus obtained; 'rgb2gray' eliminates the hue and saturation information of the RGB image while retaining the luminance. Figure.5-6 shows outcome after binarization (using 'im2bw') and noise-removal from this black and white image. Figure.7-8 shows the process of character segmentation [12-13].

Performing cross-correlation between input image and template image, the peak point is found (Figure.9). Peak point is the point that indicates the highest matching area based on cross-correlation. Thus, the appropriate character is identified (Figure.10). Here Bangla Unicode Characters' hex value is used to make the recognized character machine-readable. Recognized character is here displayed in MATLAB built in browser [14].

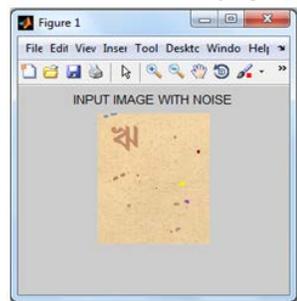


Figure 3: Input Image (RGB) with noise

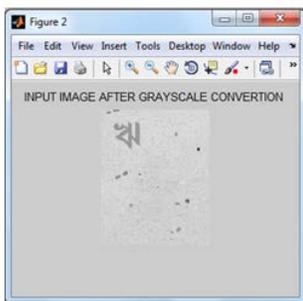


Figure 4: Converted Gray scale Image

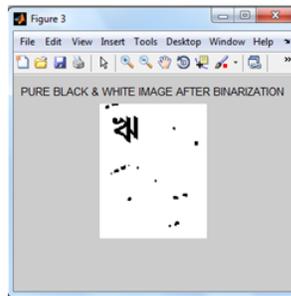


Figure 5: Processed Image after Binarization.

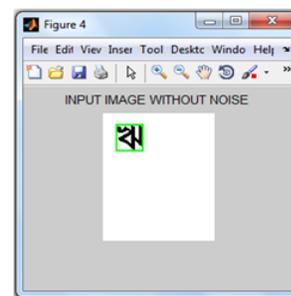


Figure 6: Processed Image after removing noise.

Figure 7: Image information for segmentation
0 represented by Black & 1 represents White.

Figure 8: Character after Segmentation.

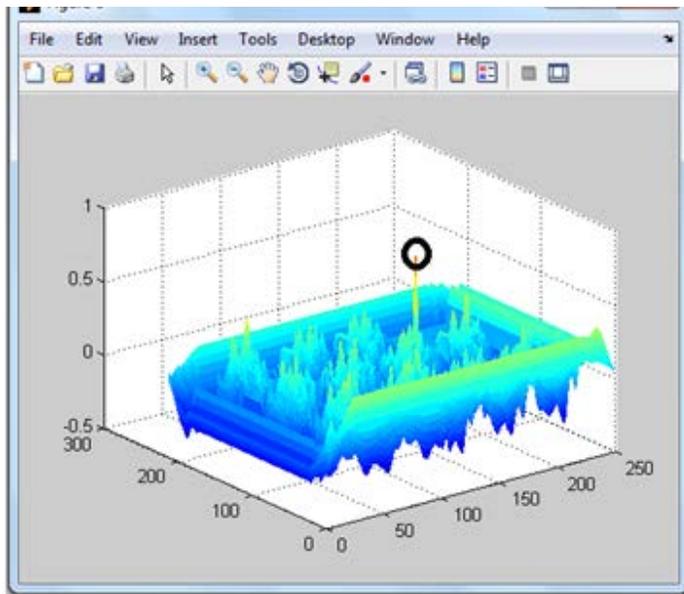


Figure 9: Marked Peak in cross correlation refer Character Detection

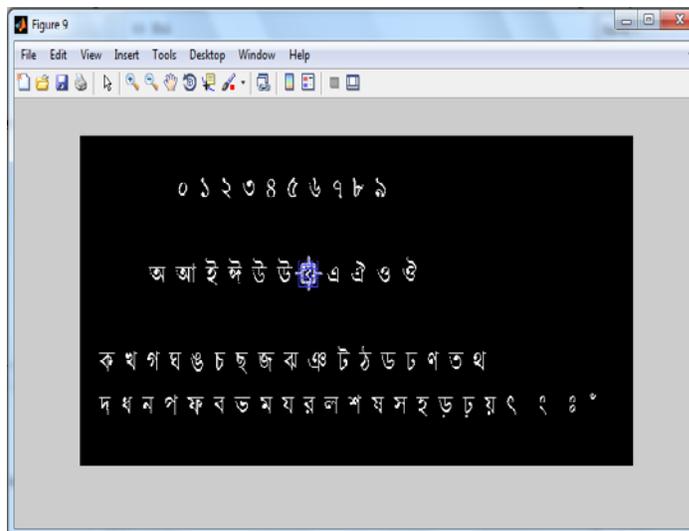
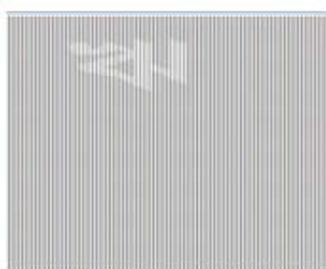


Figure 10: Recognized character from Template.



P.9.0



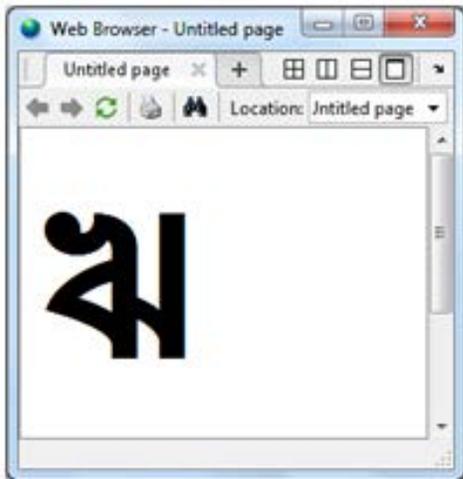


Figure 11: Computer editable Character

V. GUI (GRAPHICAL USER INTERFACE) DEVELOPMENT

A user-friendly Graphical User Interface is also designed for this system, where user can insert an image to recognize the desired character. User can input any image using “Load Image” option. After loading an image, user can select a character using mouse pointer, crop image and continue processing using “Image Processing” option. Following the algorithms, the system would recognize the selected character and provide it in editable format if “Recognize Character” command is executed from the options.

VI. ANALYSIS

The recognition rate of the proposed recognition method is remarkable with the accuracy rate of almost 98-100%. Image processing toolbox and built in MATLAB functions have been quite helpful here for detection of single Bangla character and digit. The input images can be taken from any optical scanner or camera. The output allows saving recognized character as html, txt etcetera format for further processing. The only limitation of the system is the fixed font size of the character. Further improvement for all possible font type and size is reserved for the future. Also it is developed only for single Bangla character recognition at a time. Multiple characters recognition along with connected letters is also left open for the future. Connecting the program algorithm with the neural network may also be helpful.

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VII. CONCLUSION

Complex character based language like Bangla clearly demands deep research to meet its goals. Recognition of Bangla characters is still in the intermediate stage. The proposed system is developed here using template matching approach to recognize individual character image. Even though the user-friendly GUI gives several advantages to individual users, this system is still facing a number of limitations which is quite considerable. Improving the system to suit handwritten characters, all printed fonts in considerable amount of time with high accuracy is the recommended future work.

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Finally, I must express my very profound gratefulness to my



Figure 12: A specific instance of character recognition using developed MATLAB GUI

parents and to my wife for providing me with constant support and encouragement during my years of study and through the process of researching and writing this paper. This accomplishment would not have been possible without them. Thank you.

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An Exploration of Cultural Theory: A Utilization of Culture to Examine Organizational Commitment

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Abstract- This study intends to find a relationship between organizational culture and organizational commitment. Organizational culture is a broad and complex concept. It determines the underlining principles and behaviors in an organization. Organizational Commitment refers to the level of attachment one feels for their job. For the purpose of this study, Meyer and Allen's (1993) instrument will be used to measure organizational commitment as a criterion, or dependent, variable. Culture will be measured using Wouters and Maesschalck's (2014) Grid- group culture scale as a predictor, or independent, variable. A questionnaire containing both measures was distributed through convenient sampling and analyzed using correlational analysis.

Index terms- organizational culture, organizational commitment, retention, workplace culture, workplace attitudes

I. INTRODUCTION

Extensive research on organizational culture lies in its relevance and complexity (Schien 1990). It is reasonable to question the effects of culture on an organization because of its ambiguous nature, particularly in areas such as productivity, employee satisfaction, and so on. However, the broadness and complexity of the topic is largely the reason it is so important to build on its literature. The more culture is studied within the organization, the easier it can be to understand, control and predict the culture and its antecedents. While there has been a large amount of research dedicated to the topic, it is still difficult to measure, define and understand. Culture has been most simply defined by Deal and Kennedy (1982) as the way things get done in an organization. For the purpose of this study, the relatedness of organizational culture and an employee's commitment to their workplace will be examined.

Literature on organizational commitment, organizational culture, and the relationship so far established, will be presented. A detailed description of group grid culture theory's application to organizations and a multi-dimensional commitment theory proposed by Meyer and Allen (1991) will also be discussed. The basis of group grid culture is to study the amount of connectedness groups share, along with how power is distributed in a particular culture (Douglas 1970). Meyer and Allen (1991)

particularly set out to study commitment as the mindset and psychological state of the individual. The dynamics which arise from culture differences, cause varieties in psychological mindsets. It is important to examine these for patterns or relationships relating the two.

II. LITERATURE

Culture. The study of organizational culture roots in anthropology. Schein applies a functionalist perspective to his theory (1990). Organizational culture can be defined as notions, beliefs and ideas developed by a group throughout the history of an organization acting as determinants for behavior among employees. The basis for behavior is derived from tradition and is deeply rooted in the organization. However, in the face of internal and external challenges, action must be taken to survive. Success or failure leads to adjustments of set behaviors. New employees learn established norms as accurate responses to environment (Schein 1990).

Organizational culture is studied at three different levels. The first way culture exhibits itself is through its artifacts. This refers to anything in the organization that produces a reaction in employees. Artifacts can be tangible, such as the objects at a physical location, or intangible, such as language, narratives, and practices (Trice and Beyer 1993). Employee interpretations and reactions to artifacts are difficult to study. The second level refers to the organization's values, such as its philosophy and norms, usually set by management. The third level is concerned with assumptions determining behaviors in an organization. These assumptions are so deeply ingrained in an organization they are subconscious and go unquestioned (Schien, 1990).

Organizational culture is observed, defined, and measured in various ways and perspectives. Any detail is subject to have an effect on an organization's culture. Pareek (2010) studied openness, collaboration, trust, autonomy proaction, authenticity, and confrontation. Denison (1990) studied involvement, consistency, adaptability, and mission traits.

Cameron and Quinn (2006) created competing values dimensions. They are based on internal vs. external focus and flexibility vs. stability. There are four resulting categories: Competing culture, controlling culture, collaborative culture, and creative culture. This way of studying culture is similar to the grid group culture theory due to its systematic, competing

framework. While the criteria and meaning of definitions differ, they are both closely related to how factors affect relationships among those in culture as a whole.

Organizational culture will be studied at the anthropological level for the purpose of this study. Group grid culture theory has received much attention in the study of culture, as it can relate to any type of culture. In this case, it is being related to organizational culture. One of the theories strengths lies in its inclusion of a passive culture. Being able to detect these passive cultures, gives us the opportunity to study trends and occurrences, which would otherwise be ignored.

To understand grid group theory we must first understand its two main components. The group component of the theory refers to how integrated the individual is to the particular group. The amount of time they spend together, the extent to which they perform tasks with each other, and how connected they are as a whole are all aspects being studied at this level. Grid refers to how much importance a role or position holds in the culture's context. The aspects studied at the grid level include the power one receives from belonging to a classification within a culture and how much one is able to do or not do because of whom the roles they hold. Depending on how high or low a culture identifies with these classifications, results in one of four classifications.

A hierarchy culture has a strong grid and a strong group classification. This type of culture would have strong group ties and regards authority. Egalitarian culture is weak in grid yet strong in its group affiliation. This type of culture may feel very connected to those around them but does not feel tied to roles or gives importance to titles. Individualism is when a culture is both weak grid and group. A fatalistic culture is that which is strong in grid and weak in-group ties. This is said to be a passive culture. Behavior can become distrustful due to lack of group ties but consideration and respect of titles and rules.

Although it is difficult to create a scale, which can be used to accurately measure culture, this theory can give us a good insight for measuring most types of cultures, including a passive one. It gives us an understanding of the importance of group ties and the amount of power various positions should hold. Wouters and Maesschalck (2014) created an instrument to quantitatively measure group grid theory specifically for organizations. The survey provided a high reliability rating, providing confidence in the instrument.

Commitment. The psychological state attaching an individual to the organization they work for is known as organizational commitment (Meyer and Allen 1991). Employee commitment has been studied in different ways through time. A main approach used was the exchange theory. The notion of "sidebets" was introduced to commitment levels (Becker 1960). This deals with an individual's unwillingness to lose investments already made in a company by leaving.

Attitudes and behaviors have also been proposed to explain commitment. While the two are similar, they differ particularly in the way they are studied. The sequence in which its main concepts are studied and the manner in which the conditions present are looked at reveal the main differences between the two approaches. Using a behavioral approach, one may want to begin by studying a behavior, then examine if the behavior is

repeated due to conditions present. The attitudinal approach will start by studying the conditions causing the behavior. Behavior is looked at as a process while attitudes are a mindset. Mayer & Lynne (2001) proposed the idea of attitudes of loyalty and commitment in employees producing favorable behaviors.

According to Steers (1997), commitment can be affected by personal attributes, job characteristics and work experiences. A Meta-analysis by Meyer and Stanley (2002) found personal attributes to be less closely related to commitment than work experience.

Meyer and Allen (1991) proposed a multidimensional model to explain employee commitment. The model is useful because it proposed a different form of studying commitment in the organization. They set out to study the level of commitment by focusing on the existing relationship between the individual and the organization. This was different than the behavioral and attitudinal approaches used at the time. The concept gathers the main theories and viewpoints of commitment then sets them as dimensions. This is done to better evaluate individual feelings and attitudes towards organization, and their reason, if any, to stay at an organization. The theory is widely accepted by those in the field.

The first component is affective commitment. This type of commitment deals with the emotional aspect of commitment. At this level of commitment, the individual is attached to an organization on a more personal level. The individual truly believes in the organization's goals and identifies with its philosophy. It is a more genuine commitment. This type of commitment is most closely related to this kind of commitment is Mowday's (1982) commitment scale.

Continuance commitment derives from the individual's belief they are best off working for the company. This part of commitment is closely related to exchange theory (Buchanan 1974). In this theory a person's attachment is mutual. The person's attachment is a result of what the organization can provide for them.

Normative commitment refers to the obligation one feels to the organization. While it is less common among commitment literature, it is still relevant. This type of commitment is appealing to an individual's sense of duty (Meyer and Allen 1990).

All three measures have been shown to negatively correlate with turnover. Affective commitment has shown to have the highest correlation to job satisfaction, job involvement and occupational commitment. However, affective commitment was shown to negatively correlate with personal stress and work/life balance while continuance commitment showed a positive correlation. (Meyer and Stanley, 2002) It is a useful construct to understand how an individual identifies with an organization's goals and values. Its importance in this particular study is due to the expression of culture through goals and values.

Culture and Commitment Simosi and Xenikou. (2010) Found a moderate but significant association between contents of organizational culture and employee commitment amount Greek employees working in large organizations.

Nongoe and Ikyanyon (2012) found relationships between several dimensions of culture (involvement, consistency and adaptability) and commitment. However, they found no

relationship between mission traits and commitment among Nigerian subject matter experts.

Competitive, entrepreneurial, and consensual cultures were all found to have a significant positive relationship in at least one or more of Meyer and Allen's commitment types among Nigerian employees working in the public sector. Bureaucratic culture was shown to negatively relate to affective, continuance, and normative commitment (Ezirim, Nwibere and Emecheta, 2012).

In a study, Dwivedi, Kaushik, and Luxmi, (2014) found that proaction, confrontation, experimentation, authenticity, collaboration, and trust as significant predictors of commitment. They found openness and autonomy to have no significance to commitment.

In a study conducted in India among IT employees using OCTAPACE (openness, confrontation, trust, autonomy, proaction, authenticity, collaboration, experimentation) cultural dimensions, affective commitment was the only commitment type to show correlation with each culture dimension. (Neelam and Bhattacharya, 2015)

Based on the literature, it is likely for organizational culture to effect behaviors in the workplace. Of those behaviors, commitment is likely to show a relationship.

H: Reported organizational commitment is related to organizational culture.

III. METHODOLOGY

Participants

A convenient sample was used for this study. Participants were recruited through the use of emails and social media. The requirement for inclusion was that participants be at least 18 years of age.

Materials

An informed consent was provided upon beginning the survey (see appendix A). The survey contained a set of demographic questions. These questions collected information, such as age, gender and ethnicity of participants.

Meyer and Allen's (1993) Organizational Commitment Scale was used to measure commitment as a criterion, or dependent, variable (See appendix C). The instrument consisted of 19 items. A 7-point Likert scale was provided for participants to rate their level agreement with the items from strongly agree to strongly disagree. 1 if they strongly agree, 2 if they agree, 3 if they slightly agree, 4 if they were neutral, 5 if they slightly disagree, 6 if they disagree and 7 if they strongly disagree. Questions 1-6 in the commitment portion of the survey measured affective commitment. Questions 7-12 measured continuance commitment. Questions 13-19 measured normative commitment.

To measure culture, Wouters and Maesschalck's (2014) Grid-group culture scale will be used to measure culture as a predictor, or independent, variable. (See appendix D) Items were based on the following culture classification: Hierarchy, egalitarianism, individualism, and fatalism. These classifications derive from group and grid dimensions. The degree of group and grid determines the cultures classification. Simply put, those in a high group and grid fall into a hierarchy classification. Those in a high group and low grid fall into the egalitarianism classification. Those in a low group and high grid fall into a

fatalistic culture. Those in a low grid and group culture fall into an individualism classification. Cameron and Quinn's (1999) culture instruments and grid-group literature provided insight for the making of this instrument. The instrument consisted of 28 items. A 7-point Likert scale was provided for participants to rate their level agreement with the items from totally disagree to totally agree. 1 if they totally disagree, 2 if they disagree, 3 if they somewhat disagree, 4 if they neither agree or disagree, 5 if they somewhat agree, 6 if they agree and 7 if they totally agree. Questions 1-7 in the culture portion of the survey measured hierarchy as a culture dimension. Questions 8-14 measured egalitarianism as a culture dimension. Questions 15-21 measured individualism as a culture dimension. Questions 22-28 measured fatalism as a culture dimension.

Procedures

The survey will be made using "QuestionPro". Participants will receive a link, which will direct them to the survey to which they can either accept or decline participation. They will be instructed to fill out the survey questions. All participants are made aware they can withdrawal from the survey at any time if they please. They will not be allowed to progress to the next section of the survey until they have completed the previous section in full.

SPSS was used to run data analysis. A t-test studying differences in commitment among gender. a correlational analysis was used to infer relationships across dimensions of culture and commitment.

IV. RESULTS

Of 106 participants of this study 33 were male and 73 were female. The average age of males was 36.24. The average age of females was 29. The average education level of males was 15.88. average education level for females was 15.71. the average amount of experience held by males was 11.18 years. The average amount of experience held by females was 8.82 years. Males received an average of 51684.06 in annual income. Females received an average of 75966.67 in annual income.

The amount of entry level jobs for females in this study accounted for 5.7% (9 female participants). 43 held professional jobs accounting for 58.9% of females in this study. 13 held managerial jobs accounting for 17.8% of females in this study. Three were self-employed accounting for 4.1% of females in this study. One was retired accounting for 1.4% of participants in this study. Four participants answered other accounting for 5.5% of participants in this study. None held executive positions, and none were unemployed.

Two males in this study held entry level jobs accounting for 6.1%. 12 held professional jobs accounting for 36.4% of females in this study. 9 held managerial jobs accounting for 27.3% of males in this study. Two held executive positions accounting for 6.1% of the males in this study. 5 were self-employed accounting for 15.2% of males in this study. One was unemployed accounting for 3.0% of males in this study. One participant answered other accounting for 3.0% of males in this study. 1 male participant preferred not to answer accounting for 3.0% of males in this study.

Males and females showed no significant differences in commitment level across any dimensions. A t-test revealed no

significant differences between male and female levels of affective commitment (.986) A t-test revealed no significant differences between gender levels in continuance commitment (.335). A t-test revealed no significant differences between gender levels of normative commitment (.849).

In the interest of the study's purpose to discover a relationship between levels of affective, continuance and normative commitment among different types of cultures, particularly hierarchy cultures, egalitarian cultures, individualistic cultures and fatalistic cultures correlation analysis between each variable rendered mostly positive correlations. A correlation analysis between levels of affective commitment and hierarchy culture revealed a positive correlation between the two variables ($r=.237$) which was found to be statistically significant ($p<.015$) using an α of .05.

Interested in discovering the existence of a correlation between levels of affective commitment of employees and the strength of egalitarian culture in the workplace, a correlation analysis revealed a positive correlation the two variables ($r=.568$). This was found to be statistically significant ($p<.001$) using an α of .01.

A correlation analysis revealed a positive correlation between levels of affective commitment of employees and the strength of individualistic culture ($r=.481$). This was found to be statistically significant ($p<.001$) using an α of .01.

Fatalism did not meet any of the pretest criteria and therefore a correlational analysis was not able to be ran. No correlations were found between continuance commitment in any dimension of culture.

This study was interested in discovering a relationship between employee levels of normative commitment and the strength of hierarchy culture in their workplace. A correlation analysis revealed a positive correlation between the two variables (.281) which was found to be statistically significant ($p<.004$) using α at .05 level.

This study was interested in discovering the existence of a correlation between levels of normative commitment of employees and the strength of egalitarian culture in the workplace. A correlation analysis revealed a strong positive correlation between the two variables (.615) which was found to be statistically significant ($p<.001$) using α of .01.

This study was interested in discovering the existence of a correlation between levels of normative commitment of employees and the strength of Individualistic culture in the workplace. correlation analysis revealed a positive correlation between the two variables (.578) which was found to be statistically significant ($p<.001$) using an α of .01.

V. CONCLUSION

Egalitarian cultures showed the highest correlation with affective and normative commitment from culture dimensions. Egalitarian cultures give employees the feeling they are equals in the workplace and in their groups.

Positive correlations between Individualistic culture showed higher correlations to affective and normative commitment than hierarchy cultures. In individualistic cultures employees are autonomous. Feelings of commitment to organization with weak group ties can be compensated if the employees feel ownership over their work.

Fatalism never met criteria to run analysis. This is not a surprising finding considering fatalistic cultures are said to be the most unpredictable. However, this is considered a limitation of the study because passive cultures were not able to be studied. Future research should focus on more ways to gain insight on fatalistic cultures.

While hierarchy cultures showed a lower correlation between affective commitment and normative commitment than egalitarian cultures and individualistic cultures, it still showed a positive correlation. This supports the idea that individuals do not like to feel restricted to role classifications, however strong feelings of group affiliation can improve attitudes. Respect for those holding roles and the hope of possibly moving up is a possible explanation. Since this is not a representative sample and correlations cannot explain the causes for behavior this up for speculation.

There was no significance found for continuance commitment across any of the culture dimensions studied. A possible explanation for these findings is that the majority of the sample were young, professionals, with high levels of education. It is possible that the individuals in this sample do not necessarily have the necessity for a job and income. they view their jobs as socially acceptable explaining the higher levels of normative commitment. Future studies can attempt to obtain a more representative sample in order to gain insight on commitment levels of older, more established individuals, in different culture settings.

APPENDIX A

Informed Consent Form

You are being asked to participate in an anonymous survey about Organizational culture and commitment, which is being conducted by Martha Armengol, a graduate student at Carlos Albizu University (CAU), as part of a research course project. This survey is anonymous, you will not be asked to include your name or any other identifying information. There are no known risks for participation in anonymous online surveys. If you feel uncomfortable with any part of the survey, you may discontinue at any time without any penalty or consequence. In addition, there are no specific benefits to you for your participation. If you agree to participate you will be asked to complete a series of questions including basic demographic information as well as questions related about [subject matter of the survey]. The survey should take approximately 10-15 minutes to complete. The results of this survey may be published. The data from this project will be stored in a password protected file and only the researchers will have access to it. The data may be combined with the data from other studies and published as part of other papers. No identifying information will be included in any publications. Results will be available to you upon request by contacting Martha Armengol, Marmengol910@sunmail.albizu.edu and 786-266-1233, in approximately 6 months. Questions regarding the purpose or procedures of the research should be directed to Martha Armengol, Marmengol910@sunmail.albizu.edu and 786-266-1233. If you have a question or concern that cannot be addressed by the primary researcher, you may contact her supervisor and professor for this course project, Toni DiDona, PhD at tdidona@albizu.edu. Your participation is completely voluntary and you may choose to withdraw at any time with no penalty. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

APPENDIX B

Demographics

Directions: Please follow the following demographic questions.
(If you wish not to answer a fill in the question you may type in 00.)

1. What is your gender?

- a) Male
 - b) Female
2. What is your age in years?
3. Which best describes your racial/ethnic identity?
- a) White/Non Hispanic
 - b) Black/African American Hispanic/Latino
 - c) Asian
 - d) Multiracial
 - e) Other
4. How many years of education have you completed? (If you finished high school you would answer 12, if you have a bachelor's degree you would answer 16, a doctoral degree would be 20)
5. Which best describes your current job?
- a) entry level
 - b) professional
 - c) managerial
 - d) executive
 - e) self-employed
 - f) retired
 - g) unemployed
 - h) other
6. How many years of experience do you have in your current field?
7. What is your annual income? (in thousands)
8. are you a U.S. immigrant?
- a) yes
 - b) no
 - c) prefer not to answer
9. What is your first language spoken at home?
10. What is your marital status? single
- a) Married
 - b) Divorced
 - c) Widowed
 - d) Other
 - e) prefer not to answer
11. Which best describes your household? single income household
- a) dual income household
 - b) more than 2 income household prefer not to answer
12. Approximately how many individuals does your workplace currently employ?
- a) Less than 50
 - b) 50-100
 - c) 100-500
 - d) over 500
 - e) prefer not to answer

APPENDIX C

Commitment Scale

Directions: Please indicate to what extent you agree or disagree with the following statements.

1. I would be very happy to spend the rest of my career with this organization.
2. I really feel as if this organization's problems are my own.
3. I do not feel a strong sense of "belonging" to my organization.
4. I do not feel "emotionally attached" to this organization.
5. I do not feel like "part of the family" at my organization.
6. This organization has a great deal of personal meaning for me.
7. Right now, staying with my organization is a matter of necessity as much as desire.
8. It would be very hard for me to leave my organization right now, even if I wanted to.
9. Too much of my life would be disrupted if I decided I wanted to leave my organization now.
10. I feel that I have too few options to consider leaving this organization.
11. If I had not already put so much of myself into this organization, I might consider working elsewhere.
12. One of the few negative consequences of leaving this organization would be the scarcity of available alternatives.
13. I do not feel any obligation to remain with my current employer.
14. Even if it were to my advantage, I do not feel it would be right to leave my organization now.
15. I would feel guilty if I left my organization now.

16. This organization deserves my loyalty.
17. I would not leave my organization right now because I have a sense of obligation to the people in it.
18. I owe a great deal to my organization.

Likert scale: 1 (*strongly agree*), 2 (*agree*), 3 (*slightly agree*), 4 (*neutral*), 5 (*slightly disagree*), 6 (*disagree*), 7 (*strongly disagree*)

APPENDIX D

Culture Scale

Directions: Please indicate to what extent you agree or disagree with the following statements.

1. In my organization, when employees break the rules there is an extensive inquiry about what happened and why.
2. My organization emphasizes clear lines of accountability.
3. My organization believes success depends on a clear and authoritative system of rules being in place and respected.
4. In my organization not behaving according to one's status or role in the organization is not tolerated.
5. In my organization, it is expected that clients follow proper procedures.
6. In my organization, the relationships we have with other organizations are based on rules and operating procedures which are proscribed for that organization.
7. The glue that holds this organization together consists of a sense of duty and respect for the distinct roles of each of the professions and tiers of management.
8. In my organization the shared opinion of the staff is taken into account when promotions are given.
9. The top executive of my organization emphasizes consensus on all levels of the organization.
10. My organization emphasizes teams within which all members are equally important.
11. My organization defines success as promoting the organization's values.
12. In my organization decisions are made by consensus.
13. In my organization exploiting one's personal power or influence, or "pulling rank" is not tolerated.
14. The glue that holds this organization together are shared values and commitment to our common principles.
15. In my organization, employees are promoted on the basis of individual performance.
16. In my organization, when employees break the rules a mix of incentives and sanctions is used in order to prevent it in the future.
17. The top executive of my organization emphasizes that it is important to evaluate every employee's performance individually.
18. My organization defines success on the basis of good individual performance.
19. In my organization promotions that are given on the basis of tenure alone are resented.
20. In my organization, we consider the relationship between clients and professionals important.
21. The glue that holds this organization together is the fact that it is useful for everybody to work together in the same organization.
22. In my organization, short-term thinking often compromises the long-term vision.
23. It is difficult to know what is important for the top executive of my organization.
24. My organization is characterized by the fact that we constantly have to react to things over which we have no control.
25. My organization defines success on the basis of dealing with each months or years problem as they come.
26. In my organization, clients have to be satisfied with what they get.
27. In my organization, we deal with other organizations only when it is necessary, otherwise there is no reason to.
28. There is nothing holding this organization together and binding its members to one another except for the fact that the law or the management has decided that this organization should exist.

Likert Scale: 1. Totally disagree 2. Disagree 3. Somewhat Disagree 4. Neither Agree or Disagree 5. Somewhat Agree 6. Agree 7. Totally Agree

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An examination of the Impact of Financial Inclusion on Poverty Reduction: An Empirical Evidence from Sub-Saharan Africa.

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Abstract

Sub-Saharan Africa has been regarded the home of poverty, housing a large number of poorly, malnourish leading to varied social vices. This study examine the impact of financial inclusion on poverty reduction in forty nine Sub-Saharan African countries using data spanning the period of 1980 -2017, the study employ a static panel data model to analyze the data. It was found that savings, credits to the private sector as percentage of GDP, access to ATM, access to information Technology, Inflation, and Government expenditure play a vital role in poverty reduction, explaining 32.5, 11.7, 27.4, 49.1, 96.1, and 25.2 percent poverty reduction in the sub-region respectively. While interest rate and economic growth were found to increase poverty, explaining increase in poverty by 124 and 14.8 percent respectively. On the bases of the findings, the study concluded that financial inclusion is a viable tool for poverty reduction strategy in Sub-Saharan African countries. It was recommended that apex regulatory institutions should reduce the policy rate in order to induce low income earners access formal financial resources in addition to the re-introduction of rural banking scheme and affordable internet services in both urban and rural areas.

Keywords: Economic Growth, Financial Inclusion, Government Expenditure, Panel Data Poverty.

JELCODE: O40, G00, H50, C23, P36

Introduction

Globally, financial inclusion has been acclaimed to be a robust tool to combat the three evils: unemployment, inequality and poverty. In addition to wealth creation and improvement in the welfare of the masses. The term financial inclusion has gained prominence in the early 2000s. As a result of the correlation identified between poverty and financial exclusion. With the recognition of this fact, on the 29th day of December 2003. The then Secretary General of the United Nation Kofi Annan assert that

“The stark reality is that most of the people in the World still lack access to sustainable financial services whether it is savings, credits or insurance. In addition, the great challenge is to address constraints that exclude people from full participation in the financial sector. Together we build an inclusive financial sector that help people better their live”

With the recognition of this fact, the concept of financial inclusion has become so important in recent years because at both global and international level by both institutions, governments and non-governmental organizations. The role financial inclusion in the fight against poverty is one of the sustainable development goals; this has made almost all countries across the globe to make financial inclusion a priority with sole aim mitigating the rate of poverty at both national and global level. It has been argued that high rate of financial inclusion is often associated with high rate of investment, employment, high income and low poverty rate and that economic growth can only be sustain if a significant number of the population have great access to formal financial services (Umar, 2013). This is because financial inclusion boost the effective demand, which induce investment, generate employment and income.

Martinez (2011) also argued financial inclusion help to accelerate the pace of sustainable and inclusive growth and development, with efficient distribution of scarce resources to improve societal wellbeing.

There are divergent views on the concept of financial inclusion; the global partnership and Alliance for financial inclusion assert that financial inclusion mean different thing in different circumstance (IFC Bulletin, 2018). In the context of this study, financial inclusion is viewed as a process of including the disadvantage segment of the society who have been historically excluded from the formal financial system, through the provision of the formal financial product at an affordable cost. Several initiatives and programmes to promote financial inclusion for in the banking sector in many countries to supplement government’s efforts to reduce financial exclusion. For example ‘no-frills’ accounts (2006) and ‘general credit card’ for low income earners in India, promotion of current account to everyone in Germany, National Financial Inclusion Strategy by the Central Bank in Nigeria, low cost account (Mzansi) in South Africa (2004) and Maya Declaration in Rwanda (2011) are committed to increasing access to formal financial services. Further, alternate financial institutions

such as rural banks, microfinance institutions, credit unions, savings club, rotating savings are on the rise in most developing countries as a means to bridge the wide gap of financial exclusion

International agencies such as the World Bank, G20, IMF, Alliance for Financial Inclusion (AFI), and Consultative Group to Assist the Poor (CGAP) are leading with many policies and initiates to reduce financial exclusion throughout the world. These agencies together with governments of many countries are committed to advancing financial services to the people who do not have access to financial services. The World Bank Group offers a comprehensive set of instruments (financing, policy advice, data, and technical assistance) to more than 100 emerging and developing countries to increase their access to financial services.

The advent of financial services on mobile phone is reported to reduce financial exclusion significantly. The inclusion of mobile financial services in the World Bank Survey of financial inclusion reduced the world 'unbanked' from 2.5 billion in 2011 to 2 billion in 2014 (Demirgüç-Kunt *et al.*, 2015). The use of financial services on mobile phone overcome the infrastructural deficiencies required in banks and broaden financial inclusion in Sub-Saharan Africa (Allen *et al.*, 2014). For example, Kenya has successfully implemented mobile phone financial services following similar innovations such as G-Cash (2001) and Smart Money (2004) in the Philippines. This has greatly improved payment services, reduced cost and time and reached the low income and the poor in a cheaper, safer and convenient manner. Access to financial services has therefore increased from 26% in 2006 to more than 75% in 2016 (Mugo & Kilon, 2017)

Globally, 50 percent of the adult population are estimated to be financial included, and geographically, 92 percent of the adult population in advanced countries have access to formal financial services, 43 percent in Asia, 35 percent in Latin America and 23 percent in Africa. Within the African sub-region, Southern Africa has 42 percent, 22 percent in East Africa, 20 percent in North Africa, 7 percent in Central Africa and 23 percent in West Africa (World Bank, 2017). The low level of financial inclusion in Africa has been argued to be due to the low income, consumption, investment and economic growth (Beck, *et.al*, 2004).

Poverty has been define as a situation where a person is unable to meet his/her basic needs such as food, water, shelter, health and education (Ajakaiye,1998). To Godon (2005), poverty is a condition of severe deprivation of basic human needs such as food, shelter, safe drinking water, sanitary facilities, information, education due not only to lack of income but also to lack of access to the services. World Bank (2014) has describe poverty as “ hunger, lack of shelter, being sick and unable to see a doctor, in ability to read and write and lack of access to school, lack of job and fear of the future.

As a global phenomenon, poverty has continue to receive global attention of governments, civil society organizations, donor agencies, international organizations among others, especially in the developing countries where the rate is already at alarming despite effort put in place to cub the problem.

Africa is by far been regarded the poorest continents in the world housing 28 of the world poorest countries in the globe, with half of the African population estimated to lives in poverty without access to basic human needs, such as nutrition, clean water, shelter and more 47 percent of the African population is living on \$1.90 or less a day (World Bank, 2017). Two out of five African adults are illiterate and the number of schools are increasing, the quality of learning and general attendance is still down due to local violence and gender oppression, it is projected that the global poor will become more concentrated in Africa, with the population rising at such a high rate on the continent, and having such a large number of poverty-stricken countries, it becomes very difficult to prevent increasing poverty. One in four people in the sub-Saharan African region are malnourished, this is the highest amount of hungry people in the world, and in addition, Sub-Saharan Africa is a home to the second largest population of hungry people behind Asia (World Bank, 2017). This phenomenal trend is associated with low level of financial inclusion in the continent.

It is against the background that this study seek to examine the link between financial inclusion and poverty in Sub-Saharan Africa in order to help policy makers designing policies that will promote financial inclusion and reduction of poverty in the region and other areas having the same characteristics. The rest of the paper is decompose into section two, three, four and five, which discusses the literature, methodology, data estimation, analysis, conclusion, and recommendations respectively.

Conceptual Issues

The concept of financial inclusion has gain different meaning from different people but they all seem to convey the same meaning. According to the Reserve bank of India, (2008) financial inclusion is a process of ensuring access to appropriate financial products and services needed by vulnerable groups such as the weaker sections and low-income groups at an affordable cost in a fair and transparent manner by mainstream institutional players. Central Bank of Nigeria (2012) define financial inclusion as a situation when adults have easy access to a broad range of financial product designed according to their needs and provided at affordable costs. These products includes payments, savings, credits, insurance and pension. According to Triki and Faye (2013) from the supply point of view, an inclusive financial system is the one that provides appropriate, affordable and widely accessible quality financial services to poor and marginalized groups in the society. In addition, from the demand side point of view, Hannig and Jansen (2010) define financial inclusion as financial system, which

guarantee every economic agents accessibility to the use of basic financial services, such as an opportunity to save, make payments, transfers, and have access to insurance services.

Poverty been one of the global syndrome, which has affect a significant global population has continue to receive the attention of governments, civil society organizations, international donor agencies and among all become one of the sustainable development goal agenda. there is no unanimity on the what constitute poverty, scholars have tried to define the concept according to norms, value and convention of the society they leave. That is why it is argued that poverty is easily recognize than define (Aboyade, 1975).

The word poverty is derive from latin word “pouper” meaning poor. Ajakaiye (1998) define poverty as a condition where an individual is unable to enjoy the basic acceptable standard of living due to his/her financial and other basic essentials like food, water, shelter, clothing, education, health ain addition to non-necessities such as participation etc.

World Bank (2014) has describe poverty as “ hunger, lack of shelter, being sick and unable to see a doctor, in ability to read and write and lack of access to school, high infant mortality, maternal mortality, lack of job and fear of the future. It can also be viewed from five perspectives, such as physical and personal deprivation as a result of lack of access to property, income assets, factors of production and finance; social deprivation due to the denial from full participation in political, social and economic activities; cultural deprivation due to lack of access to believes, values, knowledge, information and attitudes, which denied people controlling their personal destinies and political deprivation as result of lack of political voice to participate in decision making that affect people’s lives.

The Free Market Theory of Financial Inclusion.

The free market theory also known as “the shareholders wealth maximization theory” explain the determinants of financial inclusion at macro level. It is based on the assumption that market forces can best determine the access to financial services, that a free market economy has the capacity to financial inclusion to an optimal level. However, government intervention into the financial system in form of controls and reforms has the potential of excluding some segments of the society in the financial system (Leach, 2004).

In a free market economy, financial services providers are involve in the transactions in the financial service environment to provide and access fund that are used to carry out their daily activities. Competition among financial service providers can force them to device cheaper ways such as know your customer Tier one, two and three, internet banking, mobile banking, point of sales devices, children accounts etc. that target inducing

people to open an account, access other financial services available and hence, increasing access to financial services.

The proposition that market friendly system increase the rate of financial inclusion rather than exclusion is based on the assumption that free market and deregulated financial system always lead to the spawning of financial products. The need for profit, meeting minimum capital requirements, providing quality services to customers force the intuitions to target all segments of the society rather than a particular group. On the other hand, the public in the quest to meet their daily obligations access available financial services to financial their daily needs such education, health, shelter, and other facilities that will improve their living standard.

Empirical Review

Fadum (2014), investigated the nexus between financial inclusion, poverty alleviation and income distribution in developing countries, using fixed and random effect models. Reported that financial inclusion is a viable tool for combating poverty and income distribution. The study also reveal that increasing access to financial services has a positive impact on investment and employment generation and increase income of the society.

Cyn-Young & Rogelio (2015), study financial inclusion, poverty and income inequality in developing Asia, using fixed and random effect model. Reported that per capita income, rule of law, and the demographic characteristics of the population significantly affect the level of financial inclusion. The study further reveal that financial inclusion in turn reduce poverty and income inequality, and that the provision for old age and younger population in form of retirement pension, stronger rule of law, enforcement of financial contracts, financial regulatory oversight, increase access to financial services, poverty reduction and bridge the income inequality gap.

Anwar,Uppun & Reviani (2016), investigated the role of financial inclusion in poverty reduction in Indonesia using descriptive statistical method. Reported that financial inclusion has negative effect on poverty reduction but has positive effect on investment, employment and economic growth and indirectly reduce poverty and income inequality.

Coulibali & Yogo (2016), study the effect of financial services on poverty reduction in developing countries, using random and fixed effect model. Reported that improving access to financial services significantly reduce poverty especially the countries battling with the macroeconomic instability. It was also reported in the study that barriers to financial inclusion have positive effect on poverty and that increasing access to financial services to the low-income earners can reduce the number of working poverty.

Schmied & Marr (2016), investigated the impact of financial inclusion on poverty in Peru using random and fixed effect models. Reported that financial inclusion does not have alleviating effect on poverty indicators. However, the study further reveal that access to communication technology play a significant role in poverty reduction, that it create employment and income especially in the areas battling with high unemployment.

Anwar & Amrullahi (2017) also investigated the impact of financial inclusion on poverty in Indonesia using multiple regression. Reported that financial inclusion can affect the over all economic growth and indirectly reduce poverty but increase income inequality marjorly due to geographical, gender and age bias in financial inclusion.

Sanya & Olumide (2017) in their study of financial inclusion as a tool of poverty alleviation in Ekiti, using multiple regression. Reported that financial inclusion is an efficient and significant tool of combating poverty and it create employment especially in the rural areas housing the majority of unemployed population. They further reveal that age, marital status, income level, religion, financial discipline, use of bank products and services, distance from financial services providers, household size access to political contract and gender have significant impact on poverty alleviation.

Gunarsih, Sayekti & Dawanti (2018), in Indonesia, investigated the impact of financial inclusion on poverty alleviation using descriptive statistic, reported that increase access to financial services has significant impact on poverty alleviation, but the impact is more pronounce in the urban areas than the rural areas because of the concentration of the financial services providers in the urban centers.

Abimbola, Olokoyo & Farouk (2018), study financial inclusion as a catalyst for poverty alleviation in Nigeria, using multiple regression model. Reported that average current and savings account balance, average number of deposit money bank customers, average loan size to the agricultural sector have positive and significant impact on poverty alleviation. On the other hand, the study also reveal that cost of borrowing has negative impact of poverty alleviation.

A cursory view of the above review portray that most of the studies conducted are mostly country specific and the little once conducted on cross country concentrate mostly on developing countries, these study will contribute to literature by considering Sub- Saharan Africa which has been considered a major habitat of poor .

Data and Methodology

The study uses panel data estimations which have been supported by Panel data was employed because it increases the efficiency of estimators, and reduced the problems of multi-collinearity. It also increases the degree of freedom in the estimations and helps in controlling the problem caused by country and time specific

effects. The study employs annual country data for a period of 1980 to 2017, which were obtained from World development indicators. The period was chosen because it was the time many of the Sub-Saharan African countries stated launching financial reforms and the world development indicators has been proven to be a more reliable source of data that is of international standard

The model is specified as follows:

$$Y_{it} = \beta_0 + \alpha \sum Z_{it} + \pi_{it} \dots \dots \dots (1)$$

Where Y_{it} is the dependent variable in country i , and Z_{it} is the vector of country specific regressors, β_0 is the intercept, α is the slope parameter. π_{it} is the white noise error term.

$$\pi_{it} = \lambda + v_{it} \dots \dots \dots (2)$$

Where λ is the unobserved country specific effect and v_{it} is the usual error term

Because of restrictive nature of the common constant by pooling model, that did not take into account the individual specific effect by assuming the endowment and policies across countries, random and fixed effects method of estimation were employed to take into consideration these differences. In the random effect model assume the constant to be random, so, random model allows different constant for each section to be random.

The random model is started as follows:

$$Y_{it} = \beta Y_i + \alpha Z_{it} + v_i + \pi_{it} \dots \dots \dots (3)$$

To test whether the pool or random model is appropriate, the Langrage Multiplier test was employed.

The null hypothesis is stated thus;

$$\text{The } H_0: \delta^2=0 \dots \dots \dots (4)$$

If the calculated probability of chi-square value is less than 0.05 level of significant, we reject the null hypothesis and conclude that random effect model is appropriate.

Having established the presence of individual specific effect in the model, this necessitated the need for fixed effect model. The fixed effect model assume that the individual specific effects are fixed across entities, the cross sectional effect is captured by the dummy D_i which represent the countries, the fixed effect model is stated as:

$$Y_{it} = \beta Y_i + \alpha Z_{it} + \sum D_i + \pi_{it} \dots \dots \dots (5)$$

The fixed effect assumed that each country differs in its intercept term whereas random effect model assumed that each country differs in error term.

Hausman test (1978), was employed to choose which of the model is appropriate between random and fixed effect model. The test assume the null hypothesis of no correlation, that is, both Ordinary Least Squares (OLS) and Generalized Lease Squares (GLS) are consistent and OLS is inefficient, while alternative hypothesis is that OLS is consistent but GLS is not. The Hausman test model is started as follows:

$$H = (\beta^{FE} - \beta^{RE})[(var(\beta^{FE}) - var(\beta^{RE}))^{-1} (\beta^{FE} - \beta^{RE}) \rightarrow X^2(k) \dots \dots \dots (6)$$

If the of H-statistic is less than 0.05, we reject the null hypothesis and conclude that fixed effect model is appropriate.

Table 1: Pooled, Random and Fixed Effects Model estimation result

Variables	Pooled Model	Random Effect Model
Savings	-3.250	8.190
	(9.710)	(7.990)**
Credits	-0.117	0.126
	(0.306)	(0.151)
Interest Rate	0.148	0.216
	(0.496)	(0.073)**
ATM	-0.274	-0.637
	(0.496)	(0.405)
ICT	-0.491	-0.124
	(0.595)	(0.249)
GDP	1.240	9.000

	(1.910)	(1.300)
Inflation	-0.961	-0.093
	(0.726)	(0.210)
Govexp	-0.252	1.122
	(0.559)	(0.406)**
Constant	42.442	20.221
	(10.203)**	(6.834)**
Number of Observations	49	49
B-P LM-test	0.24	

Source : Authors' Computation using Stata 14

Note: ***, ** & * indicate significance at 1, 5 & 10 percent LM-test to choose between pooled OLS and fixed effects and the Standard Errors are in Parenthesis

By way of analysis, the Breush- Pagan langrage multiplier test was conducted after the pooled and random effects estimation to establish the presence of or otherwise of the individual effect and the LM test result favours the pooled regression. This suggest that Sub Saharan African countries have the same characteristics, and hence the interpretation of the model is based on the pooled Ordinary Least Squares result.

The coefficient of savings is negative and significant conform to the appriori expectation. This means that a 1 percent increase in savings will lead to about 325 percent fall in poverty rate in Sub-Saharan African countries. This is in tandem with the findings of Coulibali & Yogo (2016) and Abimbola, Olokoyo & Farouk (2018), who posit that average loan size and access to credit significantly reduce poverty in developing countries.

The coefficient of interest rate is positive but insignificant; this does not conform to the economic theory. It shows that a 1 percent increase in interest rate lead to about 14.8 percent increase in poverty, this is because in Sub- Saharan Africa, interest rate play a vital role in the determining access to financial services especially the

low and unstable income earners who earn basically low even the subsistence income. They find it difficult to borrow from a formal financial inclusion, although the effect is insignificant which likely due the measures put in place by the apex financial regulatory institutions to reduce to excesses of financial institutions in charging rate that is above the stipulated requirement.

The coefficient of Automated Teller Machine (ATM) (-0.274) is negative but insignificant, this has conform to economic theory. It means that a 1 percent increase in access to ATM will lead to about 27.4 percent fall in poverty, although this is not significant suggesting that more efforts has to be put in place to ensure more people especially the rural dwellers have access to the ATM. As this will encourage them to use formal financial product to boost their income through business activities.

The coefficient of ICT (-0.491) though conform to the economic theory but statistically insignificant. This means that a 1 percent increase in access to information technology lead to about 49.1 percent fall in poverty rate as suggested by the negative sign. This is in tandem with the findings of Schmieid & Marr (2016), who reported that access to communication technology play a vital role in poverty reduction in Peru.

The coefficient of GDP (1.240) did not conform to the appriori expectation though it is statistically insignificant. This means that a 1 percent increase in GDP leads to about 240 percent increase in poverty. This is basically because the proceed of economic growth is distrusted in favour of the reach who own and control most of the productive ventures.

The coefficient of inflation (-0.961) though conform to the appriori expectation but is statistically insignificant. This shows that a 1 percent increase in inflation explain about 96.1 percent of fall in poverty rate in Sub-Saharan African countries as a n increase in the prices of goods and services induce investors to invest more and create employment, income and reduce poverty.

The coefficient of government expenditure (-0.252) conform to the appriori expectation but statistically insignificant, meaning that a 25.2 percent fall in poverty that has been explain by increase in government expenditure is not significant. This most likely connected to leakages inform of corruption that serve as a major bottle neck to effort made by the government to reduce poverty in the region.

The coefficient of the constant intercept (42.442) is statistically significant which suggest that in the coefficient of financial inclusion are held constant, poverty rate will rise by about 424.42 percent, which is highly significant suggesting the importance of access to financial services in the fight against poverty, in the Sub-Saharan African countries.

Conclusion and Policy Recommendation

This study investigated the impact of financial inclusion in poverty reduction in Sub-Saharan African countries and the important variables that play role in poverty reduction were credits, access to ATM, Information Communication Technology, Inflation, and government expenditure. While interest rate and economic growth were found to increase poverty over the study period and the constant intercept, show how important is financial inclusion in poverty reduction strategies. On the bases of the above findings, the study conclude that availability of credit, access to ATM, availability of ICT facilities, inflation and government expenditure play a vital role in poverty reduction in Sub-Saharan Africa.

On the bases of the above conclusion the study recommend that financial institutions should be directed by the apex regulatory intuitions to grant loan at low rate of interest through the reduction of monetary policy rate with strict supervision to ensure compliance by the financial institutions. Both government put in more effort in the development of infrastructural facilities, especially in the rural areas as these will increase the rate of bank penetration to the un-bank areas, in addition to improving mobile network services and subsidizing the internet facilities in order to encourage the use of internet and mobile banking.

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Attitude of Physiotherapists about the Role of Transpore Tape in the Treatment of Facial Palsy Patients

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Abstract- Background: Facial palsy refers to the weakness of facial muscles mainly resulting from the temporary damage to the facial nerve. The recommended treatments for facial palsy include facial muscle exercises, biofeedback, electrical stimulation, massage and sensory stimulation.

Objective: The purpose of this study is to check the attitude of physiotherapist about effectiveness of Transpore tape in patients of facial palsy in early correction of mouth deviation and associated complications. This is prime study to determine therapist trend about the use of Transpore tape in facial palsy conservative treatment in Punjab Pakistan.

Methodology: The study was conducted in different physical therapy units including both government and private hospitals of Punjab, Pakistan. Data was collected by the help of modified Synkinesis assessment questionnaire from 500 physiotherapists to know their opinion about effectiveness of supportive therapy by using Transpore tape in facial palsy treatment

Results: Results were analyzed from the data given by physiotherapist. According to the data, 60% physiotherapists recommended the use of Transpore tape for facial paralysis treatment for improvement in chewing process. 58% recommended Transpore tape for ease of drinking water. 40% physiotherapists recommended electrical stimulation for puffing of mouth. And 56% physiotherapists recommended Transpore tape for early correction of mouth deviation.

Conclusion: Transpore tape was an effective supportive therapy in early rehabilitation of mouth deviation & associated complications in facial palsy

Index Terms- Adhesive tape, Facial paralysis, mastication, angle of mouth, puffing of mouth.

I. INTRODUCTION

Facial palsy is a neurological disorder caused by facial nerve injury. Facial nerve can be injured as a result of trauma, any infection to the nerve or degenerative diseases. Facial paralysis refers to the weakness of facial muscles (Orbicularis oris, buccinators, zygomatic major & minor, Angulii oris and Levator labii). It can occur sometimes on the lower half of the face and sometimes on one whole side of the face. This results in loss of normal facial functions like mastication and⁽¹⁾. Some causes are listed below:

- Viral Infections like Bell's palsy and Ramsay hunt Syndrome.
- Surgical causes, e.g. removal of acoustic neuroma or facial nerve tumor or when operating on the parotid gland.
- Bacterial causes.
- Neurological conditions such as Guillain-Barré syndrome,
- Traumatic injury such as fracture of skull.
- Birth Trauma
- Congenital conditions such as abnormal development of facial nerve.

Stroke⁽²⁾.

Bell's palsy represents very nearly 75% of all intense facial paralyses. Highest incidence was being in 15-45 years of age. The annual incidence in UK population was around 20 per 100,000 with one in 60 people being affected during their lifetime. Men and women were equally affected⁽³⁾. It occurs with equal frequency on either the right or left side of the face. Simultaneously, bilateral facial palsy is extremely rare with a prevalence of 0.3-2% of the facial palsies. Bell's palsy arises more frequently in the spring⁽⁴⁾. The loss of the capacity to move the face has both social and useful ramifications for the patient. Over half were found to have a significant level of mental trouble and social withdrawal as a consequence of their facial paralysis. Signs and symptoms can include an asymmetric smile, Synkinesis, epiphora or dry eye, abnormal blink, problems with speech articulation, drooling, hyperacusis, change in taste and facial pain⁽⁵⁾. Diabetic patients are 30% more likely have chance to recover than non-diabetic patients that have only partial recovery; recurrence of Bell palsy is also more common among diabetic patients. The effectiveness of neuromuscular facial retraining techniques in combination with electromyography to improve facial function was studied in cases of long-standing paralysis. All patients made significant improvements in function with improved symmetry in dual-channel electromyography readings and increased facial movement percentages. Facial retraining is an amazing case of the plasticity of the central nervous system to reorganize, even in cases of long-standing paralysis. In individuals with long standing facial palsy, Neuromuscular facial retraining exercises are effective to improve facial movements⁽⁶⁾. Mime therapy is a novel therapy combining mime and physiotherapy. The effects of mime therapy for patients with longstanding (at least 9 months) sequel of unilateral peripheral facial paralysis were

evaluated. Mime therapy, including auto massage, relaxation exercises, inhibition of Synkinesis, coordination exercises, and emotional expression exercises were performed⁽⁷⁾. On the basis of present evidence, mime therapy is a good treatment of choice for patients with long standing facial paralysis⁽⁸⁾. Multidimensional therapies were used for treatment of facial palsy. Most recommended treatments were electric stimulation⁽⁹⁾. EMG/Biofeedback⁽¹⁰⁾. Transpore tape on eyelid⁽¹¹⁾.

Researchers named⁽⁹⁾. Performed randomized controlled and experimental group trials. The study was conducted on the use of electrical stimulation in the sub-acute and chronic stages of facial palsy, yet some physiotherapists in South Africa had been applying this modality in acute stage. The aim of the study was to determine the safety and potential efficacy of applying electrical stimulation to the facial muscles during the early phase of paralysis. They took two groups having palsy less than 30 days (control and experimental). Both Groups were treated with heat, massage and home-based exercises but experimental group also received electrical stimulation. They estimated the results by using House Brackman's scale and showed improvement in experimental group to 75% which was statistically significant as compared to control group. It concluded that Electrical stimulation could be effective and safe during the acute phase of paralysis⁽¹⁰⁾. published a randomized trial in 29 patients who were divided into two groups after an electro diagnosis test. The point of this article was to examine the symmetry and prevention of Synkinesis. 16 patients in Group 1 were treated with EMG biofeedback for 1 year (daily for 1 month and once per week for 11 months). In the first step of treatment, EMG biofeedback was used to treat weak muscles (performed by attaching electrodes to the muscles with minimal tonicity and muscle strengthening performed using one channel). In the second step of treatment, when symptoms of Synkinesis appeared, this modality was used to prevent Synkinesis in addition to the treatment of weak muscles (using two channels, one first for voluntary movement and the 2nd for involuntary movement; the patient was asked to try to control Synkinesis during active movement). They were also advised exercise therapy. Control group was recommended only home exercise therapy. Evaluation was performed using the Sunnybrook scale. The study showed improvement in both groups, but Group 1 showed significant differences compared with Group 2 in symmetry and reduction in Synkinesis⁽¹⁰⁾. In 2012, a study was conducted by Camara & Colleagues, to evaluate the efficacy of Transpore tape for management of upper eyelid. A prospective, consecutive, comparative, non-randomized, interventional case study was done on 50 patients with symptoms of tearing. Transpore tape was applied on right upper eyelid of each patient and the left eye was used as a control. The horizontal length of each patient's right eyelid was measured. The Transpore tape was firmly applied horizontally, approximately 5 mm above the eyelid margin, with the excess eyelid skin held upwardly taut. The tape inclusively covered the horizontal length of the eyelid, correcting the overriding preseptal Orbicularis. Patients were advised to remove the tape completely on its loosening so that the tape no longer held the excess skin upward. The patients also were instructed to record the duration (in days) from initial adhesion to spontaneous loosening or detachment Symptoms in the control left eye remained the same before, during, and after tape adhesion. The mean (SD) duration of tape adhesion on the right upper eyelid was

5 (1.5) days. As a result of this tape application, symptoms were relieved only while the tape adhered to the eyelid⁽¹¹⁾.

II. METHODOLOGY

Materials & Methods:

The study was designed to determine the attitude of physiotherapists about the effectiveness of Transpore tape in treatment of facial palsy patients. The study was conducted in different physical therapy units of Government and private setups of Punjab, Pakistan. I.e. Lahore, Faisalabad, Sargodha, Jhang, Multan, Khushab. For this study we analyzed the data provided by 500 physiotherapists who treated the facial palsy patients with Transpore tape along with other treatment techniques. We inquired Physiotherapists by means of a modified Questionnaire based on Synkinesis Assessment Questionnaire⁽¹²⁾.

Assortment Criteria:

Inclusion criteria: All the physiotherapists who had the experience of treating the facial palsy patients and used Transpore tape along with other treatment modalities.

Exclusion criteria: All the physiotherapists who did not experience facial palsy patients.

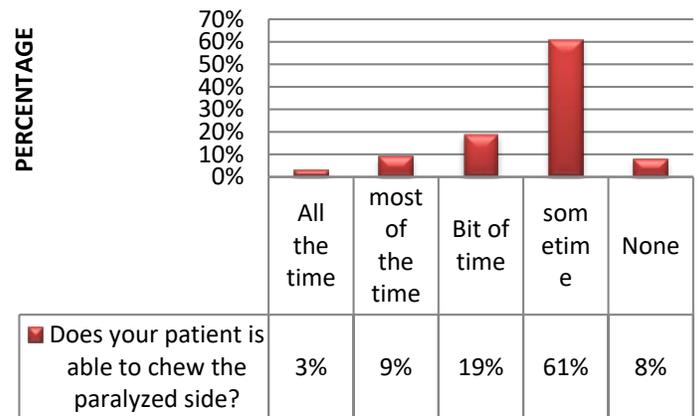
Measurement Procedure:

DATA Analysis: Data was compiled via SPSS (statistical package for the social sciences) and presented in tables and graphs.

Graphical Presentation:

Graph 1:

Does your patient able to chew on the paralyzed side?



61% physiotherapists said that it was only sometime when their patients were able to easily chew on paralyzed side. So, this data suggested that most of the physiotherapists' patients were having problem in chewing during their symptoms .

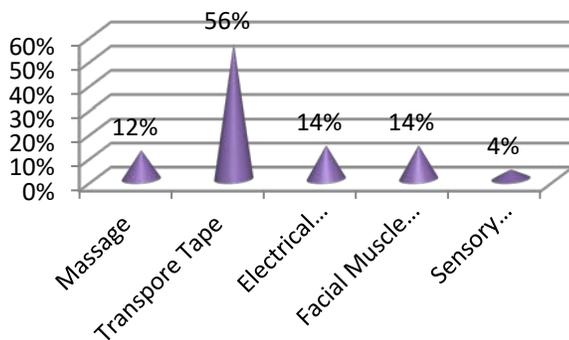
Table Representation:

Does your patient spills liquid while drinking?		
	Frequency	Percentage
All the time	60	12%
most of the time	190	38%
Bit of time	140	28%
sometime	95	19%
None	15	3%

This graphical presentation showed that (12%) subjects' patient spills liquid while drinking all the time, 38% told most of time, 28% answered the question as bit of time, 19% observed that sometime their patient spills liquid and 3% subject's patient never spills liquid while drinking.

Graph: 2

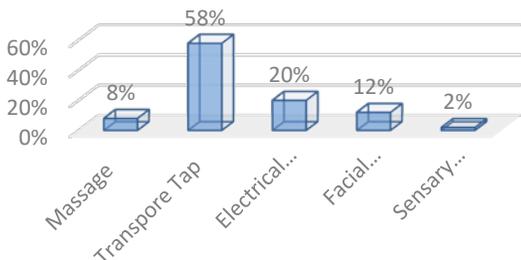
What do you think which technique is best for improvement in chewing process?



Physiotherapists gave their suggestion about the best technique for improvement in chewing process. 56 % favored Transpore tape, 12% physiotherapists suggested massage, and 14% answered electrical stimulation and 14% said facial muscles exercise and 4% suggested sensory stimulation.

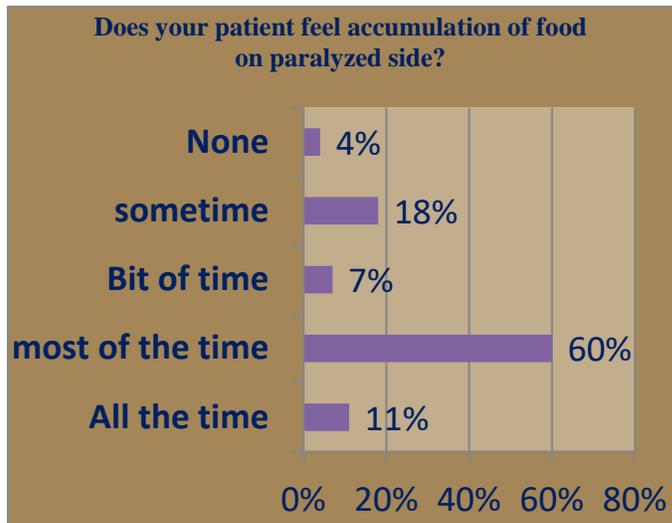
Graph: 3

What do you think which treatment option helps in ease of drinking water



Physiotherapists gave their suggestion about the best treatment option which helps in ease of drinking water. 58% physiotherapists recommended Transpore tape, 20% favored electrical stimulation and 12% said facial muscles exercise, 8% favored massage and 2% told sensory stimulation.

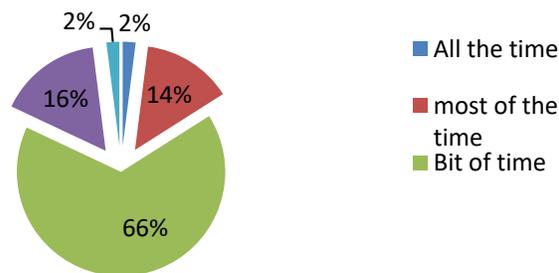
Graph: 4



This graphical presentation shows that (11%) subjects' patients feel accumulation of food on paralyzed side all the time, 60% told most of time, 7% answered the question as bit of time, 18% observed that sometime their patients feel accumulation of food and 4% subject's patient never feel accumulation of food on paralyzed side.

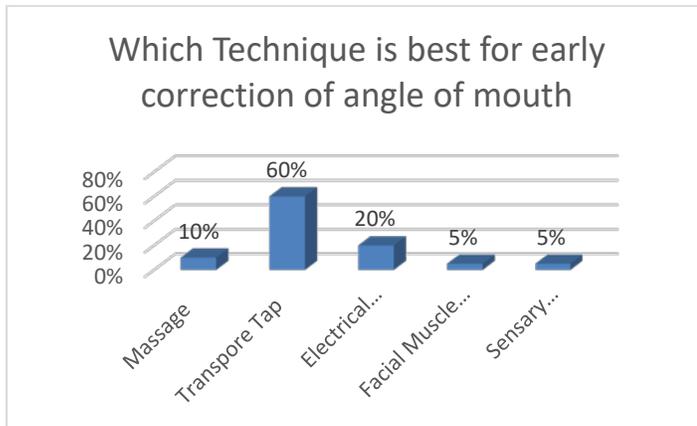
Graph: 5

Does upper and lower lips of your patient matches in position while smiling?



This graphical presentation showed that (2%) subjects' patient's lips matches in position while smiling all the time, 14% told most of time, 66% answered the question as bit of time, 16% observed that sometime their patient's lips matched and 2% subjects' experiences that the patient's lips never matched in position while smiling.

Graph: 6



Physiotherapists gave their suggestion about the best technique for early correction of angle of mouth. 60% favored Transpore tape, 20% favored electrical stimulation (10%) physiotherapists suggested massage and 5% suggested facial muscles exercise and 5% answered electrical stimulation.

III. DISCUSSION

The aim of this study was to check the attitude of physiotherapists about the effect of transpore tape in early rehabilitation of mouth deviation, eating disorder, chewing process.

Previous researchers gave different opinion regarding the treatment of facial paralysis.

Hato and his colleagues conducted prospective, randomized, placebo-controlled trials evaluating Valacyclovir and prednisolone treatment in patients with Bell's palsy. They concluded that Valacyclovir and prednisolone therapy was statistically more effective than placebo and prednisolone therapy in improving the recovery of patients with Bell's palsy. In 2010, a study was conducted on the use of electrical stimulation in sub-acute and chronic stages of facial palsy. The aim of study was to determine the safety and potential efficacy of applying electrical stimulation to the facial muscles during the early phase of paralysis.⁽⁹⁾

In 2012, a study was conducted about application of transpore tape on upper eyelid to relieve symptoms of tearing. The tape inclusively covered the horizontal length of the eyelid, correcting the overriding preseptal orbicularis. Patients were advised to remove the tape completely on its loosening. After the application of this tape, the symptoms were seen to be relieved⁽¹¹⁾.

The questionnaire contained close ended questions. Questions were asked about chewing process, liquid spilling, food accumulation lips matching. Physiotherapists were asked about best treatment options for rehabilitation of these facial palsy complications. 56% were in favor of transpore tape for increase in chewing process and 58% were in favor of transpore tape for ease of drinking water. And last question we asked about the treatment of early correction of angle of mouth. Most of the therapists were in favor of transpore tape (60%).

Previous studies showed use of transpore tape in other areas of face rather than mouth deviation correction. We considered if it could help in other areas why not in case of mouth angle correction;

So, data was collected about role of transpore tape in correction of mouth deviation. Use of electrical stimulation along facial exercises for facial palsy treatment was a traditional method used by physical therapist in Punjab (Pakistan).

Many physiotherapists used this method without considering the effectiveness of this as supportive therapy. So, we discussed this method with physiotherapists that what do they think about this tape to use it as a supportive technique in conservative treatment. More than 50% were in favor of transpore tape as supportive therapy but there were many unaware about taping process

IV. CONCLUSION

It was concluded that most physiotherapists recommended the use of Transpore tape as a supportive technique in conservative treatment of facial palsy.

As mouth deviation occurred due to paralysis of Orbicularis oris, Levator labii superior, Buccinators, Zygomaticus major and minor, Angulii oris muscles resulted in difficulty of food and water intake. Supportive therapy using Transpore tape along with other treatments helped patient in correction of mouth angle as well their functional activities and early rehabilitation.

V. SIGNIFICANCE

The findings of this study provided insight knowledge about Facial palsy, their signs and symptoms and treatments used.

The findings of this study determined physiotherapists about benefits of Transpore tape in conservative treatment of facial palsy that could help in early mouth control and to prevent further damage by excessive pulling of mouth towards normal side, as well as improved chewing process and drinking of water. Moreover, study provides physical therapy significance in conservative treatment of facial paralysis.

VI. LIMITATIONS

Hence, there exist some limitations of every study. In our study limitations were:

- Novice physiotherapists who had less experience of treatment with facial paralysis.
- Lack of personal conveyance
- Time shortage
- Financial problems
- Low access of literature and literature sites.

VII. RECOMMENDATIONS

- Investigate Transpore tape usage in other areas of Pakistan.
- It was recommended that study should be repeated by data collected from experienced physiotherapists.
- Whether Transpore tape may be supportive for deviation of mouth angle.
- Need to arrange good quality seminars regarding use of Transpore tape as supportive treatment technique in facial palsy patients.

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Effect of Diets Supplemented with Fenugreek, Garden Cress and Mung Bean on Sensory Evaluation of Broiler Chicken Breasts

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Abstract- Broiler chicken (a total of 30 birds) were fed on diets containing Fenugreek (*Trigonella foenum-graecum*), Garden Cress (*Lepidium sativum*) and Mung Bean (*Vigna radiate*) in concentrations of 0.5 – 2.5% for a period of 45 days. The birds then were slaughtered, defeathered eviscerated and cut. Breast muscle was chosen and cuts weighing about 20g were obtained, cleaned and water boiling cooked in a ratio of 1:2 w/v (meat: water) for 40 min. The cuts then were hot served for sensory evaluation. Twenty- five panelists form students and staff members of College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia were sensory evaluated the cuts for colour, taste, flavour, juiciness and overall acceptability on a 9-point hedonic scale (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely). The results revealed that all chickens fed on supplemented had significantly ($p < 0.05$) taster and juicier breast meats than control chickens fed on standard diet (no supplementation). The chicken fed with garden cress in concentration of 2.5% had the best overall acceptability followed by chicken fed with mung bean in concentration of 1.5%. Supplementation of standard diets with garden cress in the concentration of 2.5% is highly recommended for better chicken meat sensory quality.

Index Terms- Broiler chicken, Sensory Evaluation, Fenugreek, Garden Cress, Mung Bean

I. INTRODUCTION

Poultry meat production is increased in last few years all over the world. It is well recognized that the quality of poultry meat especially chemical composition as well as sensory quality characteristics such as colour, tenderness, juiciness and flavour and overall acceptability are affected by poultry diets. It was reported that when evaluating sensory attributes of chicken meat consumers or sensory panelists respond based on their perceptions [1]. There are many attempts dedicated with the objective of evaluating quality of different types of meat using various methods [2-7]. According to [8] sensory acceptance is considered as the key criterion for consumers judging the freshness of chicken meat. Especially prior to any preparation the sensory impression is the deciding factor for further processing or any form of consumption. Sensory attributes, such as taste, texture,

appearance, odor and flavor of foods detectable by human senses, are normally used to evaluate food quality. These characteristics may also serve as references during the selection of such foods [9]. It was reported that when evaluating sensory attributes of chicken meat consumers or sensory panelists respond based on their perceptions [1]. Chicken breast is considered as an important part consumers used for judging the quality of chicken meat. Chicken diets were investigated for their effects on the quality of chicken meat in several researches [10-14]. The objective of this research was to sensory evaluate broiler chicken breast cuts fed on diets formulated using selected medicinal plants with different concentrations.

II. MATERIALS AND METHODS

2.1. Feeding scheme

Broiler chickens were divided into four groups, and fed a single diet throughout the experiment for 45 days. Each group consisted of 10 chickens. Standard mixture was based on corn, crushed soybeans which bought from General Organization for Grains, Saudi Arabia. The content and nutritional value of the standard ration mixture are shown in Table 1. Group I - control (fed with standard mixture); Group II- (fed with standard mixture supplemented with fenugreek in concentration of 0.5% – 2.5%); Group III- (fed with standard mixture supplemented with garden Cress in concentration of 0.5% – 2.5% and Group IV (fed with standard mixture supplemented with mung Bean in concentration of 0.5% – 2.5%.

2.2. Preparation of samples

A total of 30 birds was slaughtered, defeathered, eviscerated and the whole carcasses was dissected in slaughter house located in the Animal Breeding Field, Qassim University, Saudi Arabia. The carcasses were transported from the breeding field to the Meat Laboratory, Department of Food Science and Human Nutrition, Qassim University and stored in a refrigerator adjusted to about 2°C for one day. Next day the carcasses were washed, cut and breast of each carcass was obtained and divided to small cuts each of them weighing approximately 25g.

Table 1: Contents and percent of standard mixture used for control diet

S. No.	Name of the item	Concentration
1	protein	20.5%
2	fat	6%
3	crude fibre	3.3%
4	ash	5.5%
5	calcium	0.9%
6	salt	0.35%
7	phosphorus	0.65%
8	vitamin A	10 mg/ g
9	vitamin D	3 mg/g
10	vitamin K	25 mg/g

2.2. Sensory evaluation

The cuts were cooked in boiled water in a ratio of 1:2 w/v (meat: water) for 40 min. and then hot served in dishes marked with random numbers. The staff members and the students of the College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia (Twenty- five panelists) who are frequently consuming chicken meat were chosen to evaluate the chicken cuts for taste, color, flavour, juiciness and overall acceptability attributes on a 9-point hedonic scale (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely). Good light was put on in sensory evaluation room and plane water was provided in between tests to remove the remaining flavor. The panelists given evaluation scores were collected and analysed.

2.3 Statistical analysis

The obtained data was then analyzed by ANOVA (Analysis of Variance) which performed using Minitab statistical software version 16. Significant differences among attributes means ($p < 0.05$) were determined by LSD (least significant difference).

III. RESULTS AND DISCUSSION

The results of ANOVA of the sensory evaluation scores conducted by 25 panellists explaining the effects of the different medicinal plants and their concentrations are shown in Table 1 and Figure 1. The breast of chicken sample fed on diet containing garden cress in concentration of 2.5% had the highest values of colour, flavour, juiciness and overall acceptability comparing to the other samples and the control one. The chicken breast fed on garden cress in concentration of 1.5% gave higher score for taste comparing to other the control and sample treated with fenugreek with the same concentration. The chicken breast fed on diet formulated using mung bean in concentration of 1.5% was taster followed by the sample fed on diet containing fenugreek in concentration of 2.5%. The same trend is given by the sample fed on garden cress in concentration of 1.5%. Control sample had the lowest value in this regard. The overall acceptability attribute was not distinguished significantly between control sample and the sample fed on garden cress in concentration of 0.5% which means feeding chickens with garden cress in this concentration might has no effect on overall acceptability of the chicken meat sample. Although the chicken breast sample fed fenugreek 2.5% gave taster and juicier chicken breast but the colour and flavour attributes of this sample had the lowest values which resulted in the lowest overall acceptability among all the evaluated sample including control. No significant effect of diets on taste or overall acceptability was determined on chicken sample fed on 1.5% of garden cress and chicken breast fed on mung bean 1.5% ($p < 0.05$) after 3 months storage, but there was a clear lower significance ($p > 0.05$) in the same mentioned attributes when chicken fed on diet containing fenugreek in the concentration of 1.5%. Generally, the chicken fed on diet containing garden cress 2.5% gave promising chicken meat in all attributes and could be the target meat.

Table 2: Values of sensory evaluation attributes of different chicken cuts

Variables and concentrations	Sensory evaluation attributes of the chicken breast cuts				
	Taste	Colour	Flavour	Juiciness	Overall acceptability
Control	6.0	6.5	6.0	5.0	7.0
Fenugreek 0.5%	7.5	5.5	5.6	6.5	6.4
Fenugreek 1.5%	6.5	5.8	5.4	6.8	6.0
Fenugreek 2.5%	7.6	5.2	5.0	7.8	5.0
Garden Cress 0.5%	6.2	7.5	7.8	6.0	7.0
Garden Cress 1.5%	7.8	7.8	7.2	7.0	8.2
Garden Cress 2.5%	7.0	8.2	7.9	8.5	8.9
Mung Bean 0.5%	7.0	7.0	7.0	7.5	8.1
Mung Bean 1.5%	7.8	7.5	7.5	7.2	8.5
Mung Bean 2.5%	7.2	7.6	6.9	7.5	8.0

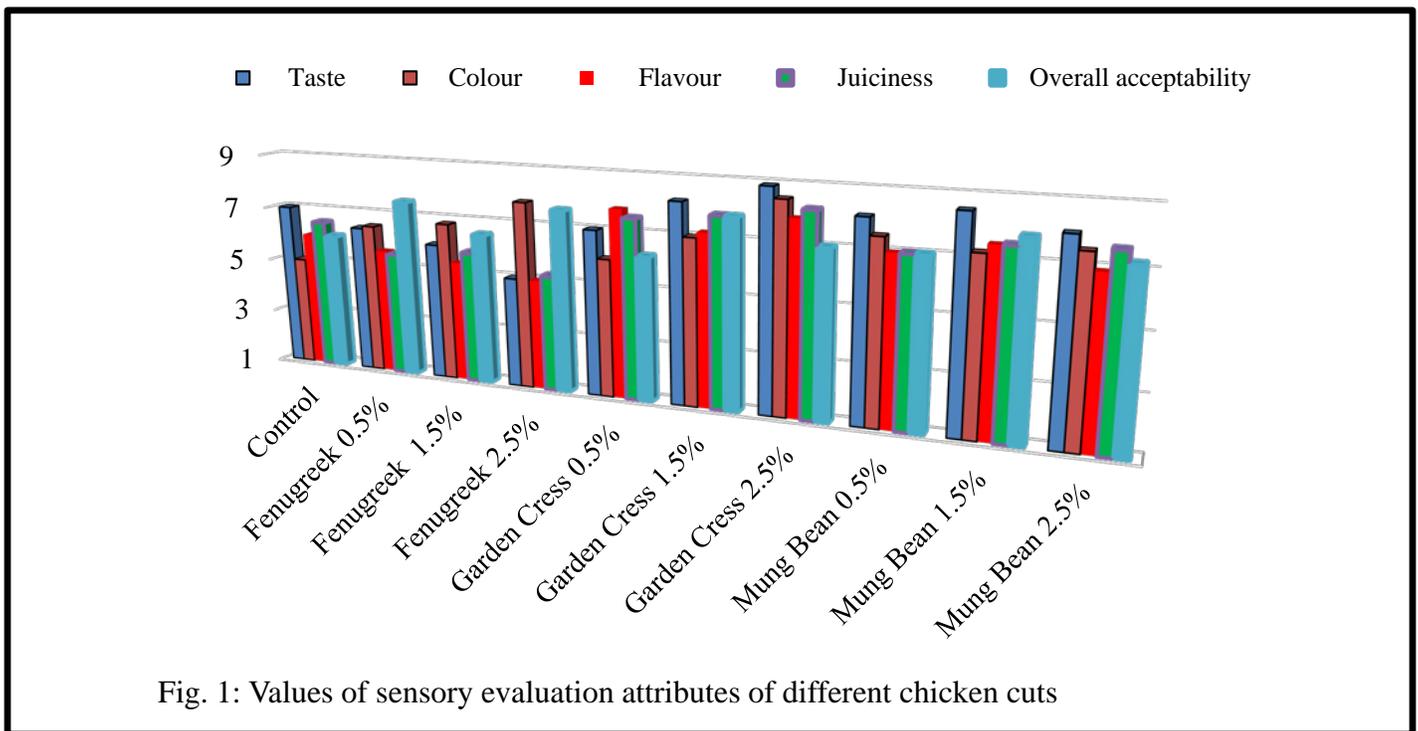


Fig. 1: Values of sensory evaluation attributes of different chicken cuts

IV. CONCLUSION

In conclusion, it was noticed feeding broiler chicken with enriched standard diet with fenugreek, garden cress and mung bean in concentrations of 0.5 – 2.5% for a period of 45 days gave good result for sensory evaluated breast chicken meat. In general, the chicken fed with garden cress in concentration of 2.5% had the best Overall acceptability followed by chicken fed with mung bean in concentration of 1.5%. Therefore, garden cress in concentration of 2.5% in this condition is highly recommended for enriching chicken diets.

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Design and Implementation Memory Module for Air Conditioners

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Abstract — This project includes the Design and Implementation Memory Module for Air Conditioners using embedded C language and its synthesis using Arduino software on a ATMEGA Microcontroller board. The implementation strategies have been designed in such a way so as to keep the functioning of the system simple yet an efficient one. The instruction set adopted here is extremely simple that complements the architecture in completing the defined task. The complete architecture has been divided into two different entities or modules. One of the module in a primitive sense resembles the control panel of an Air Conditioning unit. The LCD display shows different settings such as temperature set and timer set. The Auxiliary module contains a Microcontroller board which works in conjunction with the main module. An added feature of the system is that every unit of architecture has been well thought upon and is the most efficient one according to our knowledge. The code has been written on the Arduino IDE and the code occupies moderate amount of available memory. All the aspects of the problem statement have been completely realized and the given objective has been fulfilled without adding any significant amount of cost. Code is fairly easy to understand and is in sync with most of the functions from C++ language.

Keywords —

INTRODUCTION

In an age when technological innovations are breaking all the barriers to conventional means and causing a complete

paradigm shift, automation is one area which seems to be a clear front runner.

India happens to be a nation of massive consumption. With all the demand come all the problems associated with it. Since the older times people have tried to solve their unexpected problems using many unexpected ways and have often found considerable success. As times have changed and humanity has evolved, the type of problems may have become complex but they still are unexpected in a lot of ways. With all the increased indulging, at times people face problems, which maybe the strangest, but may affect them in lot many ways

One such problem is the loss of power. If one has to argue, then it can be clearly identified that the single largest contributor to the technology as a phenomenon has been electricity. It was only time someone identified how to store electricity and make it available when not available. But still there are many large devices who can't work on a conventional inverter/generator used for providing power backup.

An Air Conditioner or an AC as it is commonly called is one such device. Although it is being made efficient day by day/ hour by hour, it still cannot work on a conventional inverter which a family employs in their homes. Thus even if the power goes for a time as small as a second, the AC unit loses all its previous configured settings and resets to its default values. Often during the night time people tend to set the temperature to a comfortable value and might even set a timer, which decides the duration for which the system runs. Thus, as implied above during a power failure, all these settings may be lost and are irrecoverable, which may annoy the

user if the power situation is rather erratic in the area here he/she uses the AC.

Our project aims to eliminate this very problem by adding an additional self-sustaining unit which runs on its own DC power.

BASIC TERMINOLOGIES

A. General Purpose PCBs

General purpose PCBs, as their name suggests is the generalized form of PCB. By generalized we mean that we are free to make any kind of circuit as we wish using this PCB. This makes it useful for small scale production of electronic devices and also for testing out new ideas before normal production. Like a PCB, it provides a means to hold all of our components together in one place as a single unit. But it does not provide the connection between components as provided by a specific purpose PCB using tracks.

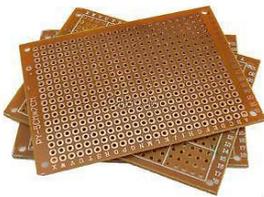
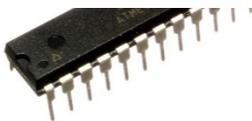


Figure 1 PCB used to implement the hardware controller



So the users have to make the connections their self- using wires or solder joints. They have holes all over it in a grid like pattern, unlike a specific purpose PCB which only have holes where required. So in a general purpose PCB, you can place components anywhere you like. The image below show both the front and the back side of a general purpose PCB



Figure 2 Micro-controller chip used as a brain of the design

B. ATmega328P Micro-controller

It is one of the most commonly used microcontrollers for industry related projects. This is a high-performance 8-bit microchip, made by ATMEL and is a RISC-based microcontroller. It combines 32KB ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed.

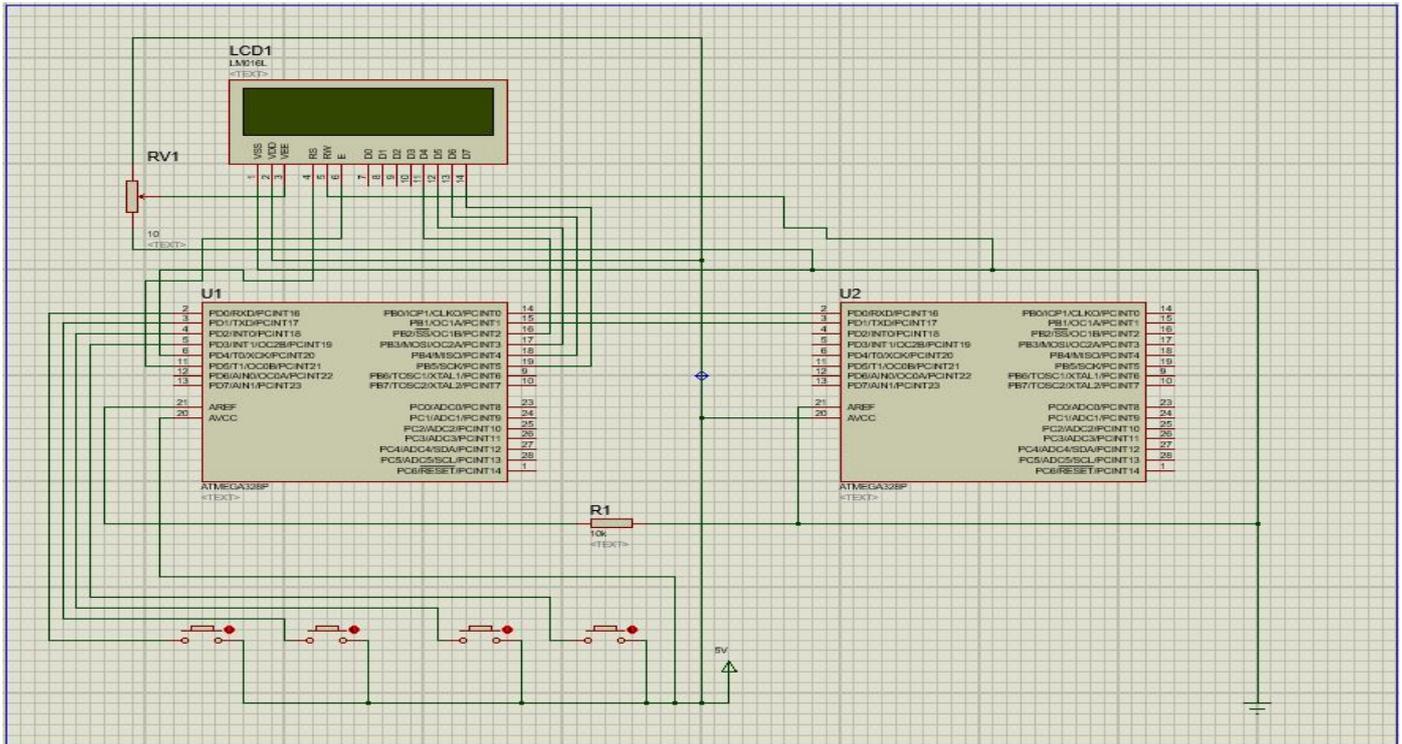
C. LCD Display

LCD (Liquid Crystal Display) screen is an electronic device used for a wide array of applications. It is a very basic module and is of the size of 16x2, very commonly used in various devices and circuits. As they are economical, easily programmable, highly efficient and have no limitation of displaying special & even custom characters (unlike in seven segments), animations, they are preferred over a conventional LED matrix segment and/ or a seven segment display..

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

PROPOSED DESIGN

Figure 3 16x2 LCD display



A. Architecture

The proposed design includes:

- A transmitter-receiver pair (in the form of Arduinos) used to exchange the setup data whenever required
- Tx and Rx pin of the micro-controllers are connected to establish a half-duplex communication protocol.
- Common ground is given to the gnd terminal of both the controllers via a resistor to avoid noise/disturbances.
- 5V power supply is given to both the Microcontroller units.

- Main unit draws its power from the A C power supply, whereas the auxiliary unit uses a DC- battery operated power source.
- 16x2 LCD for the display of readings of both the transmitter as well as the receiver
 - VSS and R/W pin of the LCD are connected to gnd terminal
 - VDD pin is connected to 5V
 - D4,D5,D6 and D7 pin of both the LCD are connected to the respective micro-controllers for data input

- Enable(E) and Reset(RS) pins are connected to the respective micro-controllers for enabling the LCDs
- Controlling Switch pad which is used to increase or decrease the temperature reading of the A.C. and also the number of hours for which A.C. is to be kept on
 - S1 is used to increase the temperature
 - S2 is used to decrease the temperature
 - S3 is used to increase the number of hours
 - S4 is used to decrease the number of hours

- Thus the system shown is a complete replica of an Air Conditioning control panel but contains an auxiliary microcontroller unit now visible to the user.



B. Working

- When the AC supply is available:
 - Main Unit of the Memory Module receives the input commands and stores the temperature data readings, number of hours and several other functionality.
 - All this data can be modified manually using the control panel provided on the top of the system.
 - For simplicity initially we decided to use two types of numeric readings, that is Temperature set and Timer value. If the user modifies these values then it can set **them** within a range: 16 C-31 C (for Temperature) and 0-15 hrs (Timer). The default values for the setup is 16 C (for Temperature) and 0 hrs for (Timer).
 - The timer value gets decreased every hour and is the correspondingly updated on the LCD panel provided.
 - The Auxiliary Unit, at all time, receives the data that is being fed to the main unit, holds it and reflects any update on the main unit, acting as a slave. It has its own power supply, which is provided by a set of batteries, which provide a DC power source.

- When the Electric Power is cut:
 - Main Unit gets switched off as it is directly AC driven. This generates a signal instantly to trigger the Auxiliary Unit
 - Auxiliary Unit, being operated using a DC battery starts to act as a master now, holding the last updated value starts sending the main unit its last updated value.
 - As soon as the Main unit starts functioning when the power arrives, it may choose to accept the data being sent by the Auxiliary unit for some time and then start functioning normally.
 - The choice of accepting the data is based on a signal which can be given by pressing a button by the user when it configures its settings.
 - This button makes the system differentiate a normal shutdown of the Air Conditioner unit from an unexpected power loss



C. Features

Following are some of the key aspects of the proposed design:

- Initially made for an Air Conditioning unit
- Easy installation
- Arduino based microcontroller system
- Dual Mode- Temperature and Timer retention
- Complete in built system with no extra hardware required
- Flexibility in terms of time until memory retention

D. OUTCOME OBTAINED

The output presents the following observations:

- All the signals represented are dynamic and can be modified by the user from the system.
- The user is able to set the configuration of the system, whether he/she wants to switch ON the special feature of memory retention by pressing a button.
- If activated, all the four LEDs on the control panel glow, during the event of a power failure.
- The user can set the values of both the parameters to whatever value within the permissible limits and is able to retrieve them even after a power failure.

FUTURE SCOPE

- Wireless Remote Access

Currently, the input to the module is designed as a wired system with a keypad with buttons to control/setup the temperature of the Air Conditioner and also to setup the number of hours and it is correspondingly reflected on the LCD display.

This module may be made completely wireless by including a Tsoy Sensor Module which acts as an IR sensor and can be interfaced with the Remotes used to control the electronics devices wirelessly.

Other efficient ways to implement remote control can also be implemented like Bluetooth, Wi-Fi, GSM etc.

- Battery for Auxiliary Unit

The Auxiliary Module currently runs on a DC battery which needs to be replaced time to time.

Later, this may be replaced by rechargeable batteries and a system may be design to charge during the idle time to

Auxiliary unit. This will not only make the system more durable but also will make it more reliable.

- Other Practical Uses

The project finds use in many other places which may need this kind of data saving system.

Some of these applications are in:

- Cars: For saving user data on the stereo or on car panel, such as cruise control, Bluetooth settings.
- Television: Here also the system can be used to save user settings regarding channel settings, recorded programs, etc.

CHALLENGES COMABTED

- Multiple Data Handling

One of the major issues with the implementation of the project was the presence of multiple data arising from multiple signals. As the main module continuously sends data to the auxiliary module, therefore the system had to be such that there was a clear distinction between the data sent and data interpreted by the receiver.

- Trigger for Auxiliary Unit

Another issue was to implement a clear trigger which acts whenever the auxiliary unit has to resend the last updated value to the main unit. The trigger had to be such that it should not get affected by the power loss and should be able to work such that the main unit accepts the data being sent by the auxiliary one when it restarts after the power loss.

- LCD Issues

LCD screen must be able to show the correct data whenever it starts. This means it should remain OFF during power loss and should have no connection with the DC power source.

RESULTS AND CONCLUSION

In an age where more and more automation is taking place, technological solutions have become complex and

simultaneously more user engaging. Systems providing smart yet efficient solutions play an important role in bridging the urban and sub-urban factions of the technological world. Everywhere we see research is being done to improve user experience and at the same time increase the functionality, security, and efficiency of the systems. With advances in technology, many researchers have tried and are trying to design systems which offer either of the following design targets – highly functional, compact, low power consumption, regularity of layout and hence less area or even combination of them in a single system thus making them suitable for various in-house appliances.

5. <https://www.engineersgarage.com/electronic-components/16x2-lcd-module-datasheet>

6. <https://electronicsforu.com> › Resources › Learning Corner

A smart and an innovative system has always been a fundamental requirement of modern technological systems. Along with it the circuit architecture should be simple and area-efficient.

In embedded systems the aim of the project is usually to develop a system which presents to you a working prototype and can be easily engulfed into a main system and yet causing a little or no interference to its functioning. Our project implementation has been on this very principle. It aims to be a small part of a very large and a highly complex system but it aims to increase the user experience manifold. By providing a self-sustaining unit which can be just plugged in, it implies we have checked most of the boxes, when it comes to implementing an embedded system.

The working model is only a small prototype and provides us with a large scope of expansion in terms of number of features, functions and other aspects of it.

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Poisonous Effects of Cadmium Chloride On Histological Variations in The Liver of South Indian Fresh Water Murrel, *Channa Striatus* (Bloch-1793)

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Abstract- The liver exposed to 96-hour LC 50 concentration of cadmium chloride was studied in a freshwater murrel *Channa striatus*. The liver is very important organs in fish to achieve the process of detoxification and biotransformation, which is considered the most suitable indicators of water pollution levels. Changes of liver morphology and histology of *Channa striatus* due to sublethal concentration of cadmium chloride (6.9 ppm) heavy metals. After the exposure of cadmium chloride, the histopathological alterations observed in the liver tissue such hypertrophy of hepatocytes, nuclear hypertrophy, necrosis, blood congestion, vacuolation, cellular degeneration, damage of nuclei, bile stagnation and congestion in the blood sinusoids.

Index terms: *Channa striatus*, cadmium chloride, Histopathology, Necrosis, Hypertrophy

I. INTRODUCTION

Toxicity testing is an important measurement of the effect and chance of toxicants in aquatic ecosystems and has been widely used to identify suitable organisms as a bioindicator and to assess water quality standards for chemicals (Adams and Rowland, 2003). Several toxic substances entering into aquatic organisms daily may be very small and therefore, often no apparent or sudden effects are noticeable. However, this may result in harmful to many internal organs thus gradually affecting fish population indirectly. Hence, it is very essential to study the effect of cadmium exposure to sublethal doses of toxicant. The problem of toxic materials in water ecosystem is presently closely connected with increased concentration of

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different types of pollutants, which enter water bodies with industrial and communal wastewaters. The persistence of toxicity test is to evaluate various abnormalities caused due to the administration of a chemical or heavy metal to fish (Shuhaimi-Othman, 2004).

The heavy metal Cadmium gets bioaccumulated in freshwater biota and affects severely. Cadmium, a toxic heavy metal which is increasingly important as an environmental hazard to both humans and wildlife (Satarug and Moore, 2012). Cadmium toxicity with special reference to aquatic ecosystems has been reported by several workers (Jayakumar and Subburaj, 2017; Prabhakar et al., 2012). Cadmium is a ubiquitous contaminant in the aquatic environment. Exposure of cadmium is known to adversely affect fish morphology and physiology of fishes. For instance, in fishes, morphological changes in the liver (Ikram and Malik, 2009; Deore and Wagh, 2012) has been reported.

A commercially and medicinal important freshwater fish *Channa striatus* were selected for the present study. *Channa striatus* (Bloch, 1793), is also known as snakehead murrel. This fish is well-known for its palate, high nutritious, curative and medicinal qualities. According to Mat Jais (1992) murrel flesh has high levels of arachidonic acid which is a precursor for prostaglandin and thromboxin, chemicals that affect blood clotting and the fusion of endothelial tissue in the process of wound healing. In the present study, an effort was made to assess the exposure effect of cadmium on the histology of liver of the freshwater fish *Channa striatus*.

II. MATERIALS AND METHODS

Channa striatus were collected from the fresh water habitat. They weighed 42 ± 2 and their length was in the range 16 ± 3 cm. The fishes were acclimated to the laboratory conditions for at least 20 days prior to the experiment in a glass aquarium (50 l) filled with dechlorinated water. Water quality characteristics were determined by using water quality analyser EUTEC, which were as follows: temperature $27.5 \pm 2.37^\circ\text{C}$, pH 7.1 ± 0.02 , dissolved oxygen 6.2 ± 0.2 mg/l, alkalinity 252 ± 2.5 mg/l as CaCO_3 , total hardness 453 ± 4.1 mg/l. The fishes were fed daily with minced fish.

The toxicity tests to calculate LC50 for 96 hrs is carried out by desired concentration of Cadmium, prepared by adding the stock solution (1000ml) of the heavy metal in distilled water. Series of different concentration grade were prepared. The ten healthy fishes were selected and tested for each concentration for 96 hrs. The experiment was started in the morning and behavioural changes were noted. The mortality and survival rate of fish were recorded after every 24, 48, 72 and 96 hrs. The LC50 values for different periods were calculated by the method of probit analysis (Finney, 1964). Then, fishes exposed in sub-lethal concentration of cadmium chloride is 6.9 ppm. The finishing of experiment the fish were selected for Histopathological studies. The liver tissue was isolated from control and experimental fish. The tissue was fixed in aqueous Bouin's solution, processed through graded series of alcohols, cleared in xylene and embedded in paraffin wax. Sections were cut at 3μ to 5μ thickness, stained with Ehrlich Haematoxylin and Eosin. The photographs at 10X and 40X magnification were taken with Leica microscope.

III. RESULTS AND DISCUSSION

The present study reveals that the liver of control fish exhibits a normal architecture and there were no pathological abnormalities. The liver of control fish consisted of polygonally shaped hepatocytes with their central nuclei, sinusoids. The hepatocytes present a homogeneous cytoplasm and a large central or subcentral spherical nucleus (Fig.1). The result of treated fish had marked pathological changes in its

liver. The histopathological appearance of the liver exposure to cadmium chloride (Fig. 2 and 3) showed important alterations comprise hypertrophy of hepatocytes, nuclear hypertrophy, blood cells are crowding in the central veins, as well as the diffusion of melanomacrophages in the parenchymal tissues of the liver. Its revealed that the increase of cadmium chloride concentration causes cytoplasmic vacuolation, cellular degeneration, damage of nuclei, bile stagnation in addition to congestion in the blood sinusoids. Similar findings were reported in *Labeo rohita* (Muthukumaravel and Rajaraman, 2013).

The severity of histopathological changes increased with 6.9 mg/l because of this dose of cadmium chloride quick cellular necrosis in the parenchymal tissues and the number of hepatocytes is decreased. The exposure of sub-lethal dose of this insecticide resulted in liver necrosis, fatty deposition at the periphery, and glycogen deposition at one of the hepatic cells and around the central vein.

Histological variations in the liver of fishes have been widely reported. (Bais and Lokhande, 2012) reported the histological lesions, necrosis and cloudy swelling in the liver of *Ophiocephalus striatus* exposed to cadmium. The. Prabhakar *et al.*, (2012); Radhakrishnan and Athikesavan *et al.*, (2006); Jabeen and Chaudhry (2013) and Nimmy and Pawlin joseph (2018) have also observed the histological changes in the liver of cadmium-treated in *Cirrhinus mrigala*, *Channa striatus* and *Oreochromis mossambicus*. They observed that the lost their polygonal shape vacuolation of cytoplasm, congestion of blood vessel, leucocytic infiltration and necrosis. The results of the present observations in *Channa striatus* exposed to cadmium were in agreement with the earlier workers especially in the distortion of hepatic tissue. Degradation of cellular hepatocytes, vacuolation, necrosis and shrinkage of nuclei were also observed in the present study in cadmium-treated *Channa striatus*. Similar changes are observed by (Pawlin and Nithya, 2016) in cadmium-treated *L. rohita*. The development of necrosis, congestion of hepatic blood vessels and vacuolization in cadmium-treated *C. Striatus* were mainly due to the large-scale accumulation of these heavy metal cadmium in the liver. The liver is the active organ for detoxification of undesirable and toxic substances. In this study, the liver is the dominant organ for the assessment of

metal accumulation in *Channa striatus*. The present study histopathological alterations in the liver. revealed that *Channa striatus* treated with heavy metals clearly

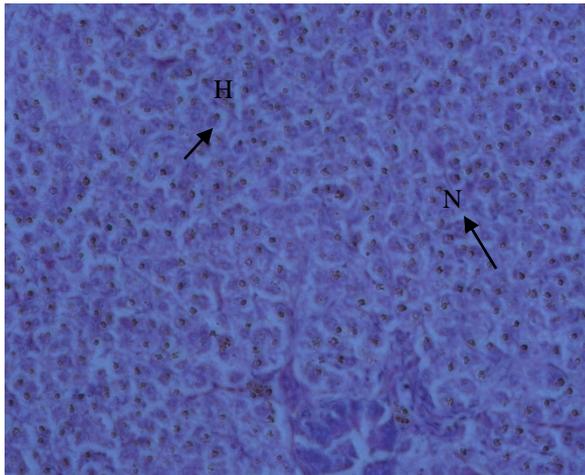


Fig 1: Photomicrograph of liver control. H- Hepatocytes, N- Nucleus (5µm thick; H&E staining; 40X).

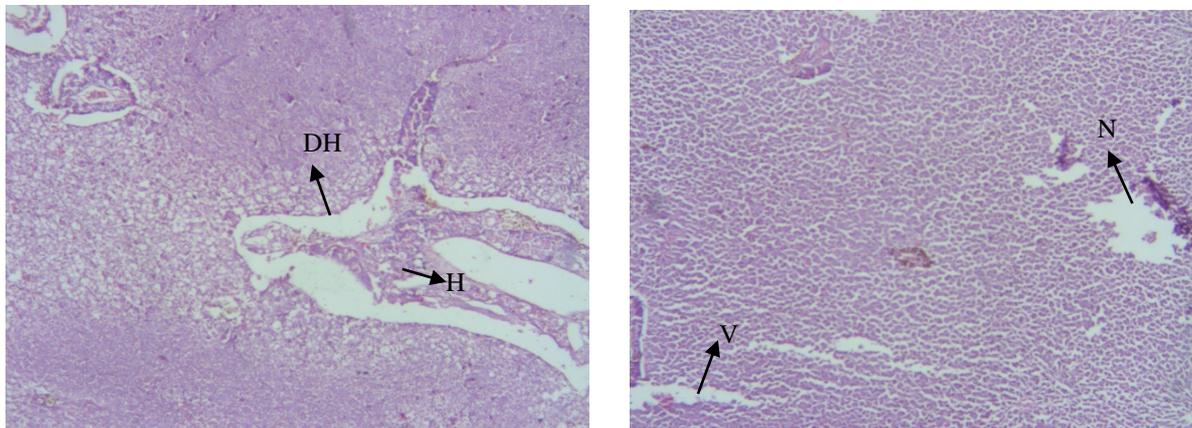


Fig 2&3: Photomicrograph of liver of fish exposed to Cadmium. Degradation of cellular hepatocytes- DH, vacuolation of cells - V, hypertrophy -H, Necrosis- N (5µm thick; H&E staining; 10X).

IV. CONCLUSION

Heavy metal toxicant leads to many pathological changes in different tissues of fish exposed to cadmium chloride. The increasing amounts of heavy metal cadmium chloride incoming to aquatic bodies can result in the amount of accumulation of contaminants increased in the fish and their consumers, which create a serious hazard to ecosystems and human health. In the last decades, the fast growth of industry and agriculture has resulted in increased heavy metals pollution, which is a significant environmental hazard for invertebrates, fish, and humans.

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Parenting Style and Task Performance of Students

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Abstract- Parenting style refers to parental strategies on how they raise up their children. This study focuses on the effects of parenting styles to the task performance of students. This aims to examine the relationship between parenting styles and mode of learning of Senior High School Students in Jagobiao National High School for School year 2018-2019. For the purpose of this study, all grade 11 and 12 students in Jagobiao National High School are required to answer the questionnaires in rating scale form. Results indicate that parenting styles is correlated with the educational achievement of students. It can be inferred that Authoritarian parents show fair parental support to their children and only support them in the area of projects but fails to give support in terms of school activities and academics. On the contrary, there has been a similarity between Permissive and Authoritative parents. It has been found out that both of these parenting styles support their children only in the area of academics and fails to give some in terms of the school activities and projects of their children. In this study, suggestions such as giving parental seminar and training are provided for future research purposes.

Index Terms- Authoritarian, Authoritative, Parenting Style, Permissive

I. INTRODUCTION

In every success of the students life there is reason behind. Hardwork is a key towards educational achievement but sometimes it is influenced by parenting styles.

Family is made up society and the communities enriched with culture, religion and ethics. It's a fact that children are affected by their environment, primarily the family which influences them more. Parenting style is defined as psychological construct that represents parent's strategies in up bringing their children. It has an important effect of all stages of human's life in preschool leading to college. (Rahimpour, Moghadam, and Hashemian, 2005). It also plays an important role in the area of social and educational development for it influences a child's success in many domains such as academic achievement and it is considered an important cause of several aspects of children's outcome. (Khan, Ahmad, Hamdan, and Mustaffa, 2014). Parenting style is a set or a system of behaviors that describes the parent and child interactions over a system of behaviors that describe the parent and the child interaction atmosphere. (Zaghedani, Rezaee, Yazdani, Bagher, and Nabeie, 2016). There are three types of parenting style namely authoritative, permissive, and authoritarian. Authoritative parenting is characterized by high levels of nurture, involvement sensitivity, reasoning, and encouragement of autonomy. Conversely, permissive parenting is characterized by making few demands, exhibiting noncontrolling behaviors, and using minimal punishment. Lastly, authoritarian parenting tends to fall at the other end of the continuum. (Turner, Chandler and Heffer, 2009).

Generally, this study aims to determine the relationship between parenting style and task performance of senior high school students.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Family is the basic unit in the society that plays a vital role in the development of one's life. Although factors like societal relationship but children are more influence by the family. The way parents influence their children's behavior through establish pattern of parental authority is what we called parenting style. Parenting style is a behavior pattern that caregivers use to interact with children. (Besharat, Hzizi, and Poursharifi, 2011). According to Javady and Mahmoudi (2015), parenting style is a set of behaviors and attitudes of parents to their children that creates parenting method, feeling, perception and evaluation of children of their educational style.

Three basic parenting styles include authoritarian, permissive, and authoritative. Authoritarian parents have a higher level of control and a lower level of trust to their children. On one hand, permissive parents have seen to have a lower level of engagement and parental control to their children. Lastly, authoritative parents reported to have a higher level of trust, engagement, monitoring behavior and child disclosure from any other types. (Aunola, Stattin, and Nurmi, 2000).

Authoritarian parenting style plays an important role in the educational encouragement of special education students. (Khan, Ahmad, Hamdan, and Mustaffa, 2013). In contrary, several researchers showed that between authoritarian parenting styles and educational

achievement of students has no significant relationship (Bhartiya and Malik, 2017; Masud and Shakil, 2016) and a negatively significant relationship. (Zahedani, Rezaee, Yazdani, Bagheri, and Nabeiei, 2016).

On one hand, a study found out that permissive parenting style and educational achievement of students has no relationship. (Masafour, 2013). Permissive parenting styles is a bad influence (Odongo, Aloka, Raburu, 2016) and negatively affects students' academic performance. (Beicus, 2014). A study found that students of permissive parents have lower academic performance. (Hong, 2012). More so, adolescents with permissive parenting styles have lower level of academic achievement (Dehyadegary, Yaacob, Juhari, and Talib, 2011), of achievement orientation and self-efficiency. (Ingoldsby, Schanevelelt, Supple, and Bush, 2004).

Authoritative parents are sensitive to their children's needs, encourage their children to express their desires and feeling, firm but nor punitive. (Ashiono and Muvoma, 2013). Several studies have showed that authoritative parenting style is a good predictor of academic performance (Tuner, Chadler and Heffer, 2009; Seth and Ghormode, 2013), and students' attitude towards leisure time reading. (Rena, Abedalaziz, and Heny, n.d.).Nyarko (2011), says that there is a positive and significant relationship between authoritative parenting style and academic performance of the students. A study found out that authoritative parenting style have higher positive influence on academic performance (Yusuf, Agbonna, n.d.) and Chaudry, 2014).

Study showed that authoritative parenting style is associated with enhanced cognitive and metacognitive strategy use, time and study management and self-efficacy. (Alnafea and Curtis, 2017). Several studies found out that students whose parents adopted authoritative parenting style have high academic achievement (Koshahu, Dibra, Osmanaga and Bushati; 2014; Borak, Kawser, Haque and Sharmin, 2016; Jaiswal and cloudhari, 2017). On one hand, students whose farher adopted permissive and authoritative parenting alternatively showed better academic achievement. (Inam, Nomaan and Abiodullah, 2016). On the other hand, authoritative maternal parenting style had a significant correlation with students' academic achievement. (Besharat, Azizi and Poursharifi, 2011).

Other styles of parenting inludes Assertive, Loving, Democratic and Communicative. Assertive parenting style highly correlates students' academic achievement. (Rahimpour, Direkvand-Moghadam, DirekvandMoghadam, and Hasmenian, 2015). Loving parenting style contributes to a better mental health of students (Perween and Dewan, 2017) while Democratic parenting style led students to better academic performance (Ibakunolu, 2013). Lastly, it was found that there was a positive relationship between communicative parenting style and academic results. (Alonso, Diaz, Woitschach, Suarez-Alvarez and Cuesta, 2017).

Generally, parenting style have a significant relationship on students' academic performance (Schmuck, 2011; Dzever, 2015), and academic performance. (Taran, Kalantari, Dahaghin and Abhari, 2015; Shute, Hansen, Underwood and Razzouk, 2011; Necsoi, Porumbu, and Beldianu, 2013).

II. WRITE DOWN YOUR STUDIES AND FINDINGS

This chapter presents the findings, analysis and discussion and interpretation of data gathered wherein the object is to know the relationship between parenting styles and task performance of Senior High School students of Jagobiao National High School.

Table 1
Level of Parental Support of Authoritarian Parents to their Children

AUTHORITARIAN	Weighted Mean	Interpretation
1. My parents support me on my school activities often.	3.89	Agree
2. My parents get upset when I didn't meet their expectations on my grades.	3.19	Neutral
3. My parents use punishment for me to do my projects.	1.99	Disagree
4. My parents only attend PTA meeting when it is really needed.	3.29	Neutral
5. My parents only contribute fees in partial amount.	3.12	Neutral
Over-all Weighted Mean	3.10	Neutral

N=228

Legend: 1.00-1.80- Strongly Disagree 1-81-2.60 – Disagree 2.61-3.40 – Neutral

3.41-4.20 – Agree 4.21-5.00 – Strongly Agree

The table above shows the weighted mean of the performance of students of authoritarian parents in terms of their school activities. The statements “My parents support me on my school activities often.”, “My parents get upset when I didn't meet their expectations on my grades”, “My parents use punishment for me to do my projects”, “My parents only attend PTA meeting when it is really needed” and “My parents only contribute fees in partial amount” have an overall weighted mean of 3.10 and interpreted as neutral implies that authoritarian parents gave only enough parental support in terms of school activities, grades, projects, PTA meetings and the school fees of their children.

Table 2
Level of Parental Support of Permissive Parents to their Children

PERMISSIVE	Weighted Mean	Interpretation
1. My parents do not really care on my school activities.	2.07	Disagree
2. For my parents, my grades on school does not really matter.	2.54	Disagree
3. My parents have totally no expectations in my school projects.	2.30	Disagree
4. My parents are not active in any PTA meeting.	2.37	Disagree
5. My parents do not care in my school contributions.	2.08	Disagree
Over-all Weighted Mean	2.20	Disagree

N=228

Legend: 1.00-1.80- Strongly Disagree 1-81-2.60 – Disagree 2.61-3.40 – Neutral
 3.41-4.20 – Agree 4.21-5.00 – Strongly Agree

The table above shows the weighted mean of the level of parental support of permissive parents to their children. The statement “My parents do not really care on my school activities”, “For my parents, my grades on school does not really matter”, “My parents have totally no expectations in my school projects”, “My parents are not active in any PTA meeting” and “My parents do not care in my school contributions” have an overall weighted mean of 2.20 and interpreted as disagree implies that students of permissive parents agrees that their parents show enough concern and support in terms of their school activities, grades, projects, PTA meetings and their school fees.

Table 3
Level of Parental Support of Authoritative Parents to their Children

AUTHORITATIVE	Weighted Mean	Interpretation
1. My parents always support me in my school activities.	3.92	Agree
2. My parents always monitor my grades.	3.55	Agree
3. My parents help me in doing my projects.	2.61	Neutral
4. My parents are always present in any PTA meeting.	3.18	Neutral
5. My parents always assure that they have already paid my school contributions before the school year ends.	3.71	Agree
Over-all Weighted Mean	3.39	Neutral

N=228

Legend: 1.00-1.80- Strongly Disagree 1-81-2.60 – Disagree 2.61-3.40 – Neutral
 3.41-4.20 – Agree 4.21-5.00 – Strongly Agree

The table above shows the weighted mean of the level of parental support of authoritative parents to their children. The statement “My parents always support me in my school activities”, “My parents always monitor my grades”, “My parents help me in doing my projects”, “My parents are always present in any PTA meeting” and “My parents always assure that they have already paid my school contributions before the school year ends” have an overall weighted mean of 3.39 interpreted as neutral implies that authoritative parents often show enough parental support in terms of school activities, grades, projects, PTA meetings and the school fees of their children.

Table 4
Students’ Performance in terms of their School Activities

SCHOOL ACTIVITIES	Weighted Mean	Interpretation
1. I like to join school based contest in line with academic activities.	3.70	Agree
2. I like to engage in extracurricular activities.	3.63	Agree
3. I do participate competition during culminating activity.	3.51	Agree
4. I am always present in seminars and symposium in schools	3.60	Agree
5. I do participate in school community activities and program like brigada eskwela.	3.92	Agree
Over-all Weighted Mean	3.67	Agree

N=228

Legend: 1.00-1.80- Strongly Disagree 1-81-2.60 – Disagree 2.61-3.40 – Neutral
 3.41-4.20 – Agree 4.21-5.00 – Strongly Agree

The table above shows the weighted mean of the performance of students in terms of their school activities. The statement “I like to join school based contest in line with academic activities”, “I like to engage in extracurricular activities”, “I do participate competition during culminating activity”, “I am always present in seminars and symposium in schools” and “I do participate in school community activities and program like brigada eskwela” have an overall weighted mean of 3.67 and interpreted as agree implies that students were participative in any activities held in school.

Table 5
Students’ Performance in terms of their Academics

ACADEMICS	Weighted Mean	Interpretation
1. I am participative in Oral Examination.	3.81	Agree
2. I like to raise my hand whatever a teacher ask a question.	3.48	Agree
3. I feel optimistic whenever a teacher gives an examination.	3.53	Agree
4. I like to do assignments and homeworks.	3.56	Agree
5. I study hard the night before examination.	3.61	Agree
Over-all Weighted Mean	3.60	Agree

N=228

Legend: 1.00-1.80- Strongly Disagree 1-81-2.60 – Disagree 2.61-3.40 – Neutral
3.41-4.20 – Agree 4.21-5.00 – Strongly Agree

The table above shows the weighted mean of the performance of students in terms of their academics. The statement “I am participative in Oral Examination “, “I like to raise my hand whatever a teacher ask a question “, “I feel optimistic whenever a teacher gives an examination”, “I like to do assignments and homeworks” and “I study hard the night before examination” have an overall weighted mean of 3.60 and interpreted as agree implies that students were participative and doing well in their studies in terms of academics.

Table 6
Students’ Performance in terms of their Projects

PROJECTS	Weighted Mean	Interpretation
1. I spend more time in doing school outputs and projects.	3.89	Agree
2. I submit projects on time.	3.56	Agree
3. I always make sure that my projects would be worth it.	2.80	Agree
4. I used less costly materials in doing projects.	3.69	Agree
5. I ask help in doing projects.	3.68	Agree
Over-all Weighted Mean	3.72	Agree

N=228

Legend: 1.00-1.80- Strongly Disagree 1-81-2.60 – Disagree 2.61-3.40 – Neutral
3.41-4.20 – Agree 4.21-5.00 – Strongly Agree

The table above shows the weighted mean of students’ performance in terms of their projects. The statement “I spend more time in doing school outputs and projects”, “I submit projects on time”, “I always make sure that my projects would be worth it”, “I used less costly materials in doing projects” and “I ask help in doing projects” have an overall weighted mean of 3.72 and interpreted as agree implies that students are doing well in the area of making and doing projects.

Table 7
Authoritarian Parenting Style in terms of School Activities

AUTHORITARIAN	X ²	Df	X ² (.05, 2)	Decision	Interpretation
School Activities	15.08	4	9.49	Reject	Not Significant

The table above shows that the computed value of school activities under authoritarian parents is 15.0849, this is greater than the critical value 9.49. Hence, the null hypothesis is rejected. Thus, there is no significant relationship between school activities and authoritarian parenting style. This can also be inferred that students of authoritarian parents do not involve themselves in any school and community based extracurricular activities, attending symposiums and seminars held in school.

Table 8
Authoritarian Parenting style in terms of Academics

Authoritarian	X ²	Df	X ² (.05, 2)	Decision	Interpretation
Academics	10.06	4	9.49	Reject	Not Significant

The table above shows that the computed value of academics under authoritarian is 10.0678, this is greater than the critical value 9.49. Hence, the null hypothesis is rejected. Thus, there is no significant relationship between academics and authoritarian parenting style. This can also be inferred that students of authoritarian parents were not performing well in their academic area such as

participating in an oral examination, raising one's hand to answer a question, liking to do assignments and homeworks and studying hard the night before examination.

Table 9
Authoritarian Parenting style in terms of Projects

Authoritarian	X ²	Df	X ² (.05, 2)	Decision	Interpretation
Projects	7.89	6	12.6	Failed to Reject	Significant

The table above shows that the computed value of projects under authoritarian is 7.8901, this is less than the critical value which is 12.6. Hence, the null hypothesis is accepted. Thus, there is a significant relationship between projects and authoritarian parenting style. This can also be inferred that students of authoritarian parents were doing well in making their outputs and projects worth it, submitting it on time and using less costly materials in making it. This further inferred that in reality, most of the parents of the students who prefer to pay money for the projects in exchange for the area of academics and school activities which their children failed to perform well in the two areas are authoritarian parents characterized by high demands and low responsiveness.

Table 10
Permissive Parenting Style in terms of School Activities

Permissive	X ²	Df	X ² (.05, 2)	Decision	Interpretation
School Activities	20.55	6	12.6	Reject	Not Significant

The table above shows that the computed value of school activities under permissive is 20.55, this is greater than the critical value 12.6. Hence, the null hypothesis is rejected. Thus, there is no significant relationship between school activities and permissive parenting style. This can also be inferred that students of permissive parents do not involve themselves in any school and community based extra-curricular activities, participation in any culminating activity, attending symposiums and seminars held in school.

Table 11
Permissive Parenting Style in terms of Academics

Permissive	X ²	Df	X ² (.05, 2)	Decision	Interpretation
Academics	8.23	8	15.5	Failed to reject	Significant

The table above shows that the computed value of academics under permissive is 8.23, this is less than the critical value 15.5. Hence, the null hypothesis is accepted. Thus, there is significant relationship between academics and permissive parenting style. This can also be inferred that students of permissive parents were participative and performing well in their academic area such as participating in an oral examination, raising one's hand to answer a question, liking to do assignments and homeworks and studying hard the night before examination.

Table 12
Permissive Parenting Style in terms of Projects

Permissive	X ²	Df	X ² (.05, 2)	Decision	Interpretation
Projects	16.16	6	12.6	Reject	Not Significant

The table above shows that the computed value of projects under permissive is 16.16, this is greater than the critical value 12.6. Hence, the null hypothesis is rejected. Thus, there is no significant relationship between projects and permissive parenting style. This can also be inferred that students of permissive parents were not doing well in making their outputs and projects worth it, submitting it on time and not using less costly materials in making their projects. This further inferred that those students who have high academic performance but is not performing well in their school activities and projects have permissive parents. Permissive parents characterized by low demands with high responsiveness show high support for their children in terms of their academics but fails to give some support in the area of school activities and projects.

Table 13
Authoritative Parenting Style in terms of School Activities

Authoritative	X ²	Df	X ² (.05, 2)	Decision	Interpretation
School Activities	14.48	2	5.99	Reject	Not Significant

The table above shows that the computed value of school activities under authoritative is 14.48, this is greater than the critical value 5.99. Hence, the null hypothesis is rejected. Thus, there is no significant relationship between school activities and authoritative parenting style. This can also be inferred that students of authoritative parents do not involve themselves in any school and community based extra-curricular activities, participation in any culminating activity, attending symposiums and seminars held in school.

Table 14
Authoritative Parenting Style in terms of Academics

Authoritative	X ²	Df	X ² (.05, 2)	Decision	Interpretation
Academics					

Academics	3.40	4	9.49	Failed to Reject	Significant
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The table above shows that the computed value of academics under authoritative is 3.40, this is less than the critical value 9.49. Hence, the null hypothesis is accepted. Thus, there is a significant relationship between academics and authoritative parenting style. This can also be inferred that students of authoritative parents were participative and performing well in their academic area such as participating in an oral examination, raising one’s hand to answer a question, liking to do assignments and homeworks and studying hard the night before examination. These findings, were consistent to the recent studies of (Koshahu, Dibra, Osmanaga and Bushati, 2014,246; Borak, Kawser, Haque and Sharmin, 2016; Jaiswal and Cloudhai, 2017, 118) who found that students whose parents adopted authoritative parenting style have high academic achievement

Table 15
Authoritative Parenting Style in terms of Projects

Authoritative Projects	X ²	Df	X ² (.05, 2)	Decision	Interpretation
	8.09	3	7.81	Reject	Not Significant

The table above shows that the computed value of projects under authoritative is 8.09, this is greater than the critical value 7.81. Hence, the null hypothesis is rejected. Thus, there is no significant relationship between projects and authoritative parenting style. This can also be inferred that students of authoritative parents were not doing well in making their outputs and projects worth it, submitting it on time and not using less costly materials in making their projects. This further inferred that in reality, authoritative parents characterized by high responsiveness and high demands only support their children in the area of academics but fails to show support in the area of school activities and projects.

The study reveals that the 3 types of parenting namely: Authoritarian, Permissive and Authoritative affects students’ educational achievement. In this study, it was found out that students of authoritarian parents were not performing well in any activities held in school and not participative in their academics. On the contrary, students from this style of parenting are doing well in terms of making and passing their projects on time. On one hand, students of permissive parents were not performing well in terms of joining any classroom or school based activities held in school, making and passing their projects. On the contrary, it was found out that students from this type of parenting were performing well in their academics. Lastly, students of authoritative parents were not also performing well in terms of joining any classroom or school – based activities held in school and making and passing their projects. On the contrary, it was found out that student from this type of parenting were performing well in their academics.

III. GET PEER REVIEWED

Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

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V. CONCLUSION

This study has examined the relationship between parenting styles and educational achievement of Senior High School students of Jagobiao National High School. Based on the results, authoritarian and authoritative parents show fair parental support to

their children in terms of school activities, grades, projects, PTA meetings and school contributions. On one hand, permissive parents show enough parental support to their children in the latter mentioned areas. Meanwhile, the three types of parenting affect students' educational achievement in terms of school activities, academics and projects. Moreso, it can also be inferred that it has been part of the Filipino culture wherein some parents used to offer payments for projects in exchange of the two areas namely academics and school activities in which their children fails to perform well. On the contrary, supporting more on the area of academics rather than the area of school activities and projects has been also a part of the Filipino culture.

APPENDIX

**APPENDIX A
 RESEARCH INSTRUMENT - A**

Name:

Instruction: Read each item carefully and rate according to your preference.

5 – Strongly Agree 4 – Agree 3 – Neutral 2 – Disagree 1 – Strongly Disagree

Authoritarian	5	4	3	2	1
1. My parents support me on my school activities often.					
2. My parents get upset when I didn't meet expectations on my grades					
3. My parents use punishments for me to do my projects.					
4. My parents only attend PTA meeting when it is really needed.					
5. My parents only contribute fees in a partial amount.					
Permissive					
1 My parents do not really care on my school activities.					
1. For my parents, my grades on school does not really matter.					
2. My parents have totally no expectations in my school projects.					
3. My parents are not active in any PTA meeting.					
4. My parents do not care in paying my school contributions.					
Authoritative					
1. My parents always support me in my school activities.					
2. My parents always monitor my grades.					
3. My parents help me in doing my projects.					
4. My parents are always present in any PTA meetings.					
5. My parents always assure that they have already paid school contributions before the school year ends.					

RESEARCH INSTRUMENT- B

Instruction: Read each item carefully and rate according to your preference.

5 – Strongly Agree 4 – Agree 3 – Neutral 2 – Disagree 1 – Strongly Disagree

I. SCHOOL ACTIVITIES	5	4	3	2	1
1. I like to join school based contest in line with academic activities.					
2. I like to engage in extra-curricular activities.					
3. I do participate competition during culminating activity.					
4. I am always present in seminars and symposiums in schools.					
5. I do participate in school community activities and program like BRIGADA.					
ACADEMICS					
1. I am participative in oral examination.					
2. I like to raise my hand whenever a teacher ask a question.					
3. I feel optimistic whenever a teachers gives an examination.					
4. I like to do assignments and homeworks					
5. I study hard the night before examination.					
PROJECTS					
1. I spend more time in doing school outputs and projects.					
2. I submit projects on time.					
3. I always make sure that my projects would be worth it.					
4. I used less costly materials in doing projects.					
5. I ask help in doing projects.					

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Determination of Some Nutritional Values, Antimicrobial Activity and Evaluation of Total Phenolic Compound from the Red Dragon (*Hylocereus polyrhizus*) Fruit

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Abstract - In this research work, the red-fleshed pitaya or red dragon fruit, *Hylocereus polyrhizus* was selected to qualify and quantify the phenols present in it. Firstly, some nutritional values of this sample were analyzed by AOAC method. Furthermore, the antimicrobial activities of this collected sample were tested by Agar-well diffusion method on six selected organisms. In addition, the fresh juices were prepared by crushing from red dragon fruits to determine the total phenolic content. Moreover, this expressed juice was checked for qualitative tests of phenols. Finally, the phenolic content of red dragon fruit could be evaluated by the spectrophotometric method using PD 303-UV visible spectrophotometer.

Index Terms- *Hylocereus polyrhizus*, phytochemical tests, nutritional values, AOAC method, Agar-well diffusion method, phenols, spectrophotometric method.

I. INTRODUCTION

Plants are the good sources for the discovery of pharmaceutical compounds and medicines. Natural products could be potential drugs for humans or live stock species and also these products and their analogues can act as intermediates for synthesis of useful drugs [1]. Plants possess many phytochemicals with various bioactivities including, carotenoids, ascorbic acid, α -tocopherol and polyphenols [2], [3], [4]. Plants are excellent sources of food, chemicals and herbal medicines. Many important drugs have been directly or indirectly derived from them [5].

Phenolic compounds are secondary metabolites that are derivatives of the pentose phosphate, shikimate, and phenylpropanoid pathways in plants [6], [7], [8]. Phenolics are antioxidants with redox properties, which allow them to act as reducing agents, hydrogen donors, and singlet oxygen quenchers [9]. They have also metal chelation properties [10]. Recently there has been an upsurge of interest in the therapeutic potentials of medicinal plants as antioxidants in reducing such free radical induced tissue injury. Besides well known and traditionally used natural antioxidants from tea, fruits, vegetables and spices, some natural antioxidant are already exploited commercially either as antioxidant additives or a nutritional supplements [11].

Dragon fruit (*Hylocereus* spp.) is a promising tropical fruit which can be cultivated in different tropical and subtropical parts of the world such as Southeast Asia, and Central and South America. The demand for dragon fruit extensively increases and the fruit today can be found on almost all exotic fruit markets around the world [12].

Dragon fruit has interesting nutritional and functional components. Dragon fruit contains significant amounts of minerals such as potassium, phosphorus, sodium and magnesium [13], [14]. Phenolic compounds in dragon fruit consist mainly of gallic acid (GA) and ferulic acid with minor amounts of other hydroxycinnamic acids [15]. Besides phenolic acids, dragon fruit also contains some flavonoid compounds [16]. Therefore, the red dragon fruit which is phenolic rich one was selected for the detail chemical analysis.

The aim of the study was to determine the some nutritional values and antimicrobial activity, as well as total phenolic compounds from the red-fleshed pitaya or red dragon fruit, *Hylocereus polyrhizu*.

II. MATERIALS AND METHODS

2.1 Sample Collection

The fruits of *Hylocereus polyrhizus*, red dragon fruits were purchased from local market, Mandalay Region in Myanmar.

2.2 Determination of Nutritional Values and Physico-chemical Characterization of Red Dragon Fruits

Nutritional values of fruit of *Hylocereus polyrhizus* were measured at Food Industries Development Supporting Laboratory (FIDSL), Yangon, Myanmar by AOAC (Association of Official Analytical Chemists) method [17].

2.3 Antimicrobial Activities of Red Dragon Fruits

Antimicrobial activities of red dragon by using n-hexane, ethyl acetate and ethanol were investigated against *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus pumilus*, *Candida albicans* and *Escherichia coli* species of

microorganisms by employing Agar well diffusion method at PFRD (Pharmaceutical Food Research Department), Insein, Yangon [18].

2.4 Preparation of Red-fleshed Fruit Juice Solution of *Hylocereus polyrhizus*

100 g of red-fleshed dragon fruit were crushed with 175 mL of distilled water by blender. These juices were squeezed, filtered and then centrifuged with 5000 rpm for 30 minutes. 215 mL of expressed juice which is the liquid product was obtained for the determination of total phenolic content in this sample.

2.5 Qualitative Test for Phenols

Group Test

The fresh juice of dragon fruit was tested by blue litmus paper. This blue litmus paper turns red.

Colour with $FeCl_3$

1 mL of fresh juice of dragon fruit was taken and a few drops of very dilute solution of ferric chloride were added. The colour changes to brown which indicates the presence of phenol [19].

2.6 Quantitative Determination of Total Phenolic Content

The amount of total phenol in extract was determined according to the Folin-Ciocalteu procedure [20].

2.6.1 Principle

Phenols in alkaline medium react with phosphomolybdic acid of Folin-Ciocalteu reagent producing a blue coloured complex.

2.6.2 Preparation of Standard Gallic Acid Stock Solution

10 mg of the standard gallic acid was taken in a test tube. 10 mL of distilled water was added to the standard compound. 1 mL of this standard solution was taken in another test tube. The volume of this solution was made up to 10 mL with distilled water.

2.6.3 Estimation of λ_{max} for Gallic Acid

To determine the absorption maximum, standard solution of gallic acid in concentration 7.5 $\mu\text{g/mL}$ was prepared. And then, 100 μL of Folin-Ciocalteu reagent and 300 μL of saturated Na_2CO_3 (20%) solution were added. After this standard solution was heated in the water bath at 40°C for 30 minutes and then cooled at room temperature. The spectrum of this solution was measured in the wavelength interval 700 to 800 nm.

2.6.4 Determination of Standard Gallic Acid

The standard gallic acid stock solution was taken by micropipette into a series of test tubes 20 μL , 40 μL , 60 μL , 80 μL and 100 μL respectively. The volume was made up to 1.6 mL with distilled water in each test tube. And then, 100 μL of Folin-Ciocalteu reagent and 300 μL of saturated Na_2CO_3 (20%) solution were added. After the each standard solution was heated

in the water bath at 40°C for 30 minutes and then cooled at room temperature. The absorbances of prepared standard gallic acid solutions were measured by PD-303 UV visible spectrophotometer at 765 nm with respect to the blank solution. The assay was carried out in triplicate.



Figure 1: Prepared standard solutions of gallic acid with different concentration

2.6.5 Determination of Total Phenolic Content of *Hylocereus polyrhizus* (Red Dragon Fruit)

The total phenolic content of expressed red dragon juice was measured with the Folin-Ciocalteu reagent. Firstly, 40 μL of expressed juice was taken in a test tube. It was made up to 1.6 mL with distilled water. 100 μL of Folin-Ciocalteu reagent was mixed, then 300 μL of saturated Na_2CO_3 (20%) was added. The mixture was heated in a water bath at 40°C for 30 minutes and then cooled at room temperature. The absorbance of this prepared sample was measured at 765 nm by using UV-spectrophotometer. The assay was carried out in triplicate. The total phenolic content of red dragon fresh juice was expressed as mg gallic acid equivalent (GAE) / 100 g FW.



Figure 2: Prepared solution of expressed red dragon fresh juice

III. RESULTS AND DISCUSSION

In this section, the results obtained from the experimental works such as some nutritional values, antimicrobial activity and spectrophotometric determination of total phenolic content in red dragon fruit were discussed.

Some Nutritional Values of *Hylocereus polyrhizus* (Red Dragon Fruit)

Some nutritional compositions of red dragon fruit such as water content, ash, crude protein, crude fiber and crude fat were determined by AOAC method and observed data are listed in Table 1.

Table 1: Results of nutritional values of the red dragon fruit

No	Parameters	Observed data
1.	Water content	86.71 %
2.	Ash	0.52 %
3.	Crude Protein	0.94 %
4.	Crude Fiber	1.14 %
5.	Crude Fat	0.22 %

According to this table, the results obtained in nutritional values are water content 86.71%, ash 0.52%, protein 0.94%, crude fiber 1.14% and crude fat 0.22% in red dragon fruit. All of the resulting data were obtained by triplicate measurements. Mean value was described for each.

Antimicrobial Activities of Red Dragon Fruits

The antimicrobial activities of red dragon fruit were determined by Agar well diffusion method on six tested organisms. The results are tabulated in Figure 3.

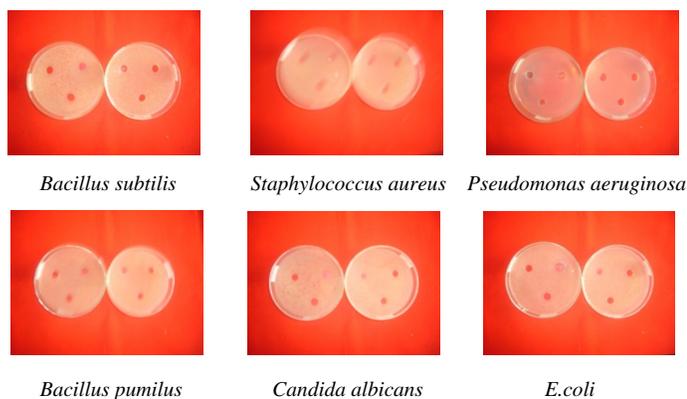


Figure 3: Antimicrobial activities of various solvent extracts of red dragon fruit

In accordance with these results, the ethyl acetate extract of this selected sample gave medium activities on *E-coli* and low activities on remaining five organisms. The ethanol extract of this selected sample gave low activities on six tested organisms. Moreover, n-hexane extract of red dragon fruit responds low activities on *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans* and *E-coli*.

Special Test for Phenol

The fresh juice obtained by crushing from the red dragon fruit was examined by using the special qualitative tests of phenol. The resulted data are tabulated in table 2.

Table 2: Special test for phenol

No	Experiment	Observation	Inference
1.	Group Test	Blue litmus paper turns red	Phenol may be present.
2.	Color with FeCl ₃	Brown color was observed	Phenol is present.

From these results, it was observed that the fresh juice of the selected sample consists of phenolic compounds.

Total Phenolic Content in Red Dragon Fruit

Determination of total phenolic content was carried out by Folin-Ciocalteu reagent method using spectrophotometer.

Absorption Maximum Wavelength of Gallic Acid

Scanning of the complex in a wavelength range from 700 nm to 800 nm showed a maximum absorbance (λ_{max}) at 765 nm as shown in Figure 4.

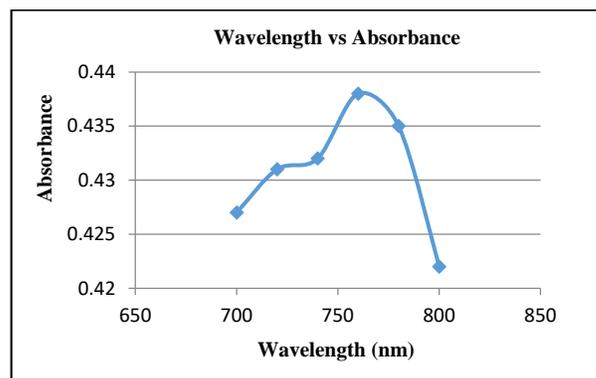


Figure 4: Maximum wavelength of standard gallic acid

Standard Gallic Acid

The standard gallic acid solutions at concentration 2 to 10 $\mu\text{g/mL}$ in distilled water were measured to know their absorbance by PD-303 UV visible spectrophotometer. The calibration curve was plotted against by using the resulting data of standard gallic acid solution as shown in figure 5.

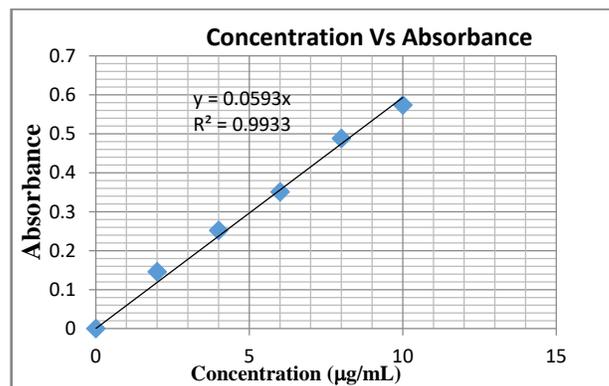


Figure 5: Concentration and absorbance calibration curve for standard gallic acid

Evaluation of Total Phenolic Content in Red Dragon Fruit

The total phenolic content of the fresh juice was carried out by spectrophotometric method using the Folin-Ciocalteu reagent. The absorbances of prepared sample solutions (40 μ L with 1.56 mL distilled water) were measured with UV spectrophotometer at 765 nm with respect to the blank solution for three times. The results are described in table 3. From these results, the amount of total phenolic content of analyzed sample was obtained by using the standard curve.

Table 3: Amount of phenolic content in red dragon fruit

No	Name of Sample	Phenol (mg/100 g)	Phenol (mg/100 g) Mean \pm Standard Deviation
1.	Red dragon	37.46	38.27 \pm 0.7
		38.81	
		38.54	

In accordance with these results, the content of total phenolic compounds of red dragon fruit was found to be 38.27 \pm 0.7 mg gallic acid equivalent (GAE) per 100 g fresh weight (FW).

IV. CONCLUSION

In this research work, one of the most commonly consumed fruits by the Myanmar population, the red dragon fruit, *Hylocereus polyrhizus* was selected for qualitative and quantitative determination of phenolic content. The nutritional values and antimicrobial activity could be detected. In accordance with the qualitative test of phenol, it was confirmed that this fresh juice contains the phenolic compounds. Moreover, the total phenolic content of fresh juice obtained from the selected sample was found to be 38.27 \pm 0.7 mg gallic acid equivalent (GAE) per 100 g FW. The results of the current investigation showed that the analyzed sample, the fruit of red dragon had the significant amount of total phenolic compounds. Phenolic compounds are secondary metabolites and plant phenolic compounds are a major group of compounds that act as primary antioxidants or free radical scavengers. Since these compounds were found to be present in the extracts, it might be responsible for the potent antioxidant capacity of red dragon fruit.

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Facilities and Care In De-Addiction Centers

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I. INTRODUCTION

The [World Health Organization](#) estimates that as of 2010 there are 208 million people with alcoholism worldwide. (4.1% of the population over 15 years of age) The National Mental Health Survey of India (2016) noted that the prevalence of alcoholic use disorder is significantly high (4.6% for alcoholic use disorder). NMHS of India (2016) reported that there is a very high prevalence of disorders due to misuse of alcohol and treatment gap is 86.3%. Alcoholism is a complex problem having medical and social ramifications which impacts all social strata. Controlling addictive disorders requires programmes like provision of treatment services, care and facilities.

More and more de-addiction centers are opened because high demand and lack of facilities. Minimum norms in these facilities are governed by state mental health rules. We examined 45 de-addiction centers regarding man power and facilities.

Karnataka is an top of the charts in drugs abuse amongst kids, followed by Andra Pradesh, Alcohol consumption and use of tobacco by children is light in Meghalaya, accordingly to a 2012 study.

II. DE-ADDICTION FACILITIES

De -addiction facility' means a place where persons diagnosed to have dependence on alcohol and other drugs are treated and cared. (Karnataka Mental Health Rules, 2012)

Addiction is an illness which is progressive, incurable and often fatal. There are psychological consequences to the disease of chemical dependency. As the need for alcohol use increases and as impairments to body organs and the nervous system occur, addicts alter the way they view themselves & others, and the rest of the world. They begin to see things as they must to live with their addictive.

Recovery from alcoholism unfolds in phases. It is a progressive movement through specific developmental periods. This means that each phase of recovery requires the completion of specific recovery tasks that must be accomplished in order to prepare the recovering person for the next phase of recovery.

III. ALCOHOLISM

The term alcoholism is commonly used amongst laypeople, but the word is poorly defined. The WHO calls alcoholism "a term

of long-standing use and variable meaning", and use of the term was disfavored by a 1979 WHO expert committee.

IV. DEFINITION

Misuse, problem use, abuse, and heavy use of alcohol refer to improper use of alcohol, which may cause physical, social, or moral harm to the drinker. The [National Institute on Alcohol Abuse and Alcoholism](#) (NIAAA) defines [binge drinking](#) as the amount of alcohol leading to a blood alcohol content (BAC) of 0.08, which, for most adults, would be reached by consuming five drinks for men or four for women over a two-hour period. According to the NIAAA, men may be at risk for alcohol-related problems if their alcohol consumption exceeds 14 [standard drinks](#) per week or 4 drinks per day, and women may be at risk if they have more than 7 standard drinks per week or 3 drinks per day. It defines a standard drink as one 12-ounce bottle of beer, one 5-ounce glass of wine, or 1.5 ounces of distilled spirits.

V. FACILITIES AND CARE TO BE PROVIDED IN DE-ADDICTION CENTERS

Substance abuse is a complex problem having medical and social ramifications which impacts all social strata. Controlling addictive disorders requires programmes like demand reduction, provision of treatment services. In patient services will need to follow guidelines as per regulations, etc.

State mental health rules-2012 was notified by government of Karnataka vide GO No.HFW 148 CGE 2012, Dated: 03/12/2012. As per the above rules de-addiction centre's are included under acute care centre as per rule 22, accordingly every de-addiction centre has to obtain valid license. Deputy Commissioners of the district are designated as licensing authority.

Following are the minimum norms to be provided in such centres as per rule 22 of KMHR 2012

(i) Staff.-

(a) Psychiatrists: patient to be 1:100

(b) Mental health professional assistant Clinical psychologist or Social worker:

Patient to be 1:50.

(c) Nurse: Patient to be 1:10.

(d) Medical practitioner with recognized M.B.B.S Degree: patient to be 1:50.

- (e) Attenders in the attendant: patient ratio of 1:5
(f) The functioning of nurses and doctors should be such that at any given time (all 24 hours) at least one doctor and one nurse are available in a ward.

(ii) Physical Features.-

- a) There will be one bed and mattress per patient along with 3 sets of bed linen (i.e. a pair of bed sheets and a pillow cover). One pillow, one blanket.
(b) The psychiatric in-patient facility should be located in a safe area
(c) The minimum distance should be maintained between the cots is 3 feet.
Living accommodation could be, double, multiple bedded or single bedroom or cottages.
(d) The accommodation shall be separate for males and females.
(e) The dormitories and multiple bedded rooms shall have Bath rooms and toilets on the following scale - one toilet for every five residents, one bathroom for every ten residents.

(iii) Support/ Facilities.-

- Adequate medical as well as non-medical modes of intervention must be available to all patients. The psychiatrists in consultation with other faculty must devise a particular schedule/regimen for each patient.
a). Each facility should be adequately equipped to look after emergencies.
b). Pro forma of case record for each patient must be maintained in form-VI. (Show)
c). A discharge summary must be given to each patient or guardian at the time of discharge, and a copy of the same must be maintained by the hospital. If families or consumer is interested in changing to another consultant, he/she must be provided with a discharge summary.
d) Adequate facilities to ensure safety of the patient should be provided.
e) Other Facilities:
f) Adequate facilities should be provided for dining, recreation and entertainment.
g) Visiting Team as per the Mental Health Act and the rules there under

While providing residential treatment programmes it is also essential to ensure quality of services provided through qualified professionals. It is also important to safe guard the human rights of subjects taking treatment in such centers.

It is also mandatory to follow provisions of mental health act 1987 section 16-30 and Mental Health Care Act 2017, Mental Health Care (State Mental Health Rules 2018) while admitting patients with substance use disorders. Knowledge of others acts like the drugs and cosmetic act 1940, the Narcotic drugs and psychotropic Substance (NDPS) act 1985 is important in running drug de-addiction centers.

VI. OBJECTIVE

- To know whether licensed de-addiction facilities have minimum norms as rules.
- To know about the psychosocial interventions in De-addiction centers

VII. METHODOLOGY

Data collected from these de-addiction centers when evaluated by inspecting officer. Facilities and care in each centre is noted in a semi structured proforma. Findings were tabulated, analyzed. Conclusions were drawn based on findings.

VIII. RESULTS

45 centers were evaluated, 73%. Of them had procured license. 44% of them had psychiatrists. 51.1 % of them Social Workers, 42.2 % of them clinical psychologists, over all 77.8% of them had one or other deficiencies.

IX. CONCLUSIONS

Private de-addiction in centers in the community have deficiencies of Infrastructure and man power. More than 1/3 had not employed social workers. There is a need for good quality studies for establishing effective of the psychosocial interventions. Valid license to de-addiction centers required. Majority of De-addiction centers had fulfilled minimum norms as per rules. There is a need for good quality studies for establishing effective of the care and facilities.

Keywords: De-addiction centers, Alcoholism, Facilities and Care

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Awareness of TMJ Pain Among Dental Students

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ABSTRACT:

This study aimed to investigate the awareness of temporomandibular disorder among dental students in private college. Other studies show only the signs, symptoms, incidence, prevalence and severity of temporomandibular disorders. This study clearly demonstrated the awareness of temporomandibular joint pain and its preventive measures among young age group. The young individuals were more aware of their health and their wellness. Eventually, this study clearly depicted the TMJ pain awareness among young individuals.

INTRODUCTION: TMJ is the name of your jaw joint, not a condition. When a TMJ is painful or not functioning properly the condition is known as temporomandibular disorder or temporomandibular joint dysfunction.

METHODS: Information about the awareness of temporomandibular disorder and signs and symptoms & prevention of TMJ were collected using self-questionnaires and statistical analysis has been made using SPSS version 21.0

RESULTS: We have evaluated 200 students from a private dental college with age of 17-21 years, 22-26years and gender of 41 males and 159 females. Among the total population, 83% of peoples are aware of TMJ pain. In comparison with the age, students of 22-26 years have better knowledge about the TMJ pain than 17-21 years student but statistically not significant. On comparison with age, students of 17-21 years had experienced pain than 22-26 years students but statically not significant.8

KEYWORDS: TMJ pain, disorders, awareness, management,dental students.

INTRODUCTION

The temporomandibular joint is a part of the musculoskeletal system responsible for a mandibular function which includes phonation, mastication, and deglutition. TMJ is a hinge joint between the temporal bone and the lower jaw. TMJ disorder is a collective term that depicts a variety of disorders involving the temporomandibular joint and masticatory muscles with symptoms including, pain, muscle tenderness, restricted and in-coordinated movements of the jaw and irregular joint sounds. 1) The clicking sound is due to disc displacement with reduction or because of hypermobility or remodeling of the jaw.2) The absence of clicking sound doesn't imply the healthy TMJ.

The causes behind this disorder are multi-factorial associated with stress, gender, age, personality, occlusal interferences, postural changes, mispositioning or loss of teeth, extrinsic and intrinsic changes in TMJ systemic problems (rheumatoid arthritis, ankylosing spondylitis). Furthermore factors such as behavioral (grinding, clenching, abnormal head posture) and emotional (anxiety, fear, frustration, anger)

Prevalence of TMJ disorder differs in different population according to their ethnicity, culture and socio-economic status.

For the assessment, a survey has been conducted regarding TMJ awareness among the dental students and statistical analysis has been made using SPSS version 21.0

MATERIALS AND METHODS:

The study sample comprised of 200 UG students studying at Dr.MGR educational and research institute - Chennai. The samples has been grouped based on the age group and gender. Their age ranges from 17 to 26 years and of 41 males and 159 females in this study.

Questionnaire:

The questionnaire was prepared and was manually distributed among UG students. The data was collected and statistically analyzed.

The questionnaire comprises of

1. Are you aware of TMJ pain?

A: Yes B: No

2. TMJ disorder is most common at the age of?

A: 40 – 60 B: 18-40 C: Below18

3. Which gender is most commonly affected by TMJ pain?

A: men B: Women

4. Do you think TMJ examination is necessary for all OP patients?

A: Yes B: No

5. Have you ever experienced TMJ pain?

A: Yes B: No

IF YES

Is your pain always present?

A: Yes B: No C: Sometimes

Does your pain wake you up at night?

A: Yes B: No C: Sometimes

6. Do you think whether TMJ pain is radiating or not?

A: yes B: No

7. Are you aware of clenching or grinding your teeth while sleeping?

A: Yes B: No C: Sometimes

8. Do you hear any clicking sound while opening or closing mouth?

A: Yes B: No C: Sometimes

IF YES

A: Mild B: Moderate C: Severe

9. Which of the following presenting sign of TMJ disorder is true?

A: Joint Clicking B: Restricted mouth opening

10. Which radiograph is better for diagnosing TMJ disorder?

A: TMJ tomography B: OPG C: CT/MRI

11. What is the most common cause for TMJ ANKYLOSIS?

A: Trauma, infections and systemic diseases

B: Impaction of third molar

C: Drugs

12. Which of the following can be termed as direct contributing factor for TMJ pain?

A: Behavioral factor B: Emotional factor

13. Do you think TMJ is alone responsible for pain (or) muscle is also affected?

A: Yes B: No

14. Which muscle palpation tell us the TMJ disorder?

A: Muscle of mastication B: Digastrics C: Buccinators

15. Have you ever thought of removal of impacted 3rd molar would relieve pain?

A: Yes B: No C: May be

16. Common medication prescribed for TMJ pain?

A: NSAID drug B: Anti- bacterial

C: Muscle relaxants

17. Do you think only drugs can be a solution for TMJ disorder?

A: Yes B: No

18. Which methods are used in Management of TMJ disorder?

A: Reassurance and Counseling

B: NSAID drug therapy

C: Splint therapy

D: All the above

RESULT:

We have evaluated 200 students in a private dental college in the age of 17 – 21years, 22 -26 years and of 41 males and 159 females. Among the total population, 83% of peoples are aware of the TMJ pain. In the study of 17-21 years 43 % were aware of the TMJ pain and 9% were not aware about the TMJ pain and in the study of 22-26 years 40% were aware of the TMJ pain and 8% were not aware of

it. In comparison with the age, students of 22-26 years have better knowledge about the TMJ pain than 17-21 years students but statistically not significant.

On a relative study of 17-21 years 17.5% had experienced TMJ pain and 34.5% have not experienced the pain. In 22-26 years 14.5% have experienced pain and 33.5% have not experienced the pain. In comparison with the age, students of 17-21 years had experienced pain than 22-26 years students but statistically not significant.

GENDER:

QUESTIONS	OPTION	MALE	FEMALE	P – VALUE
Q-1	A.YES	39	137	.020
	B.NO	2	32	
Q-2	A. 40-60	8	19	0.449
	B. 18-40	31	132	
	C. BELOW 18	2	8	
Q-3	A. MEN	25	60	.007
	B. WOMEN	16	99	
Q-4	A. YES	36	127	.244
	B. NO	5	32	
Q-5	A. YES	13	51	.964
	B.NO	28	108	
Q-5A	A.YES	0	8	046
	B.NO	9	13	
	C.SOMETIMES	8	32	
Q-5B	A.YES	1	8	.057
	B.NO	16	34	
	C.SOMETIMES	0	10	
Q-6	A. YES	29	115	.839
	B. NO	12	44	
Q-7	A. YES	16	51	.622
	B. NO	19	87	
	C. SOMETIMES	6	21	
Q-8	A. YES	18	51	.325
	B. NO	18	79	
	C. SOMETIMES	5	29	
Q-8A	A.MLD	15	54	.468
	B.MODERATE	8	20	
	C.SEVERE	0	4	

Q-9	A. JOINT CLICKING	27	100	.726
	B. RESTRICTED MOUTH OPENING	14	59	
Q-10	A. TMJ TOMOGRAPHY	27	103	.992
	B. OPG	9	36	
	C. CT/MRI	5	20	
Q-11	A.TRAUMA,INFECTION, SYSTEMIC DISEASE	24	90	.678
	B.IMPACTION OF THIRD MOLAR	15	65	
	C.DRUGS	2	4	
Q-12	A.BEHAVIOURAL FACTOR	34	122	.393
	B.EMOTIONAL FACTOR	7	37	
Q-13	A.YES	28	110	.913
	B.NO	13	49	
Q-14	A.MUSCLES OF MASTICATION	35	135	.495
	B. DIGASTIC	3	18	
	C.BUCCINATORS	3	6	
Q-15	A.YES	20	63	.558
	B.NO	8	39	
	C.MAY BE	13	57	
Q-16	A.NSAIDS	24	76	.210
	B.ANTI-BACTERIAL	3	6	
	C.MUSCLE RELAXANTS	14	77	
Q-17	A.YES	8	23	.648
	B.NO	33	135	
Q-18	A.REASSURANCE AND COUNSELLING	4	26	.303
	B.NSAID DRUG THERAPHY	9	42	
	C. SPLINT THERAPHY	8	16	
	D.ALL THE ABOVE	20	75	

AGE

QUESTIONS	OPTIONS	17	18	19	20	21	22	23	24	25	26	P.VALUE
Q-1	A.YES	1	7	4	29	45	46	25	5	3	1	.659
	B.NO	1	4	1	7	5	9	5	1	0	0	
Q-2	A.40-60	0	4	1	5	5	5	4	2	1	0	831
	B.18-40	2	6	4	29	41	48	25	4	3	1	
	C.BELOW	0	1	0	2	4	2	1	0	0	0	
Q-3	A.MEN	0	2	2	14	29	23	13	1	1	0	.205
	B.WOMEN	2	9	3	22	21	3	17	5	3	1	
Q-4	A.YES	0	4	3	29	46	49	25	4	2	1	.000
	B.NO	2	7	2	7	4	6	5	2	2	0	
Q-5	A.YES	0	1	0	15	19	15	11	2	1	0	.371
	B.NO	2	10	5	21	31	40	19	4	3	1	
Q-5A	A.YES	0	0	0	2	1	2	1	2	0	0	.098
	B.NO	0	0	0	5	11	3	3	0	0	0	
	C.SOMETMES	0	1	0	10	10	8	8	2	1	0	
Q-5B	A.YES	0	0	0	2	3	1	1	1	1	0	.535
	B.NO	0	1	0	12	17	9	9	2	0	0	
	C.SOMETMES	0	0	0	2	2	3	2	1	0	0	
Q-6	A.YES	1	6	5	25	40	39	21	4	2	1	.604

	B.NO	1	5	0	11	10	16	9	2	2	0	
Q-7	A.YES	0	2	1	9	15	29	7	2	2	0	.090
	B.NO	2	7	4	20	27	22	19	4	1	0	
	C.SOMETIMES	0	2	0	7	8	4	4	0	1	1	
Q-8	A.YES	1	5	2	16	18	18	6	1	1	1	.180
	B.NO	0	3	2	19	25	28	15	2	3	0	
	C.SOMETIMES	1	2	1	1	7	9	9	3	0	0	
Q-8A	A.MLD	2	8	2	14	17	16	6	3	0	1	.053
	B.MODERATE	0	0	0	7	5	7	7	2	0	0	
	C.SEVERE	0	0	0	1	1	0	1	0	1	0	
Q-9	A.JOINT CLICKING	0	7	5	23	31	36	21	3	1	0	.224
	B.RESTRICTED MOUTH OPENING	2	4	0	13	19	19	9	3	3	1	
Q-10	A.TMJ TOMOGRAPHY	1	6	3	20	36	38	18	5	2	1	.110
	B.OPG	0	3	1	14	13	8	4	1	1	0	
	C.CT/MRI	1	2	1	2	1	9	8	0	1	0	
Q-11	A.TRAUMA,INFECTIONS SYSTEMIC DISEASE	2	5	2	18	34	33	19	1	0	0	.000
	B.IMPACTION OF THIRD MOLAR	0	4	3	18	14	22	11	3	4	1	
	C.DRUGS	0	2	0	0	2	0	0	2	0	0	
Q-12	A.BEHAVIOUR FACTOR	1	7	4	24	42	46	23	6	2	1	.287
	B.EMOTIONAL FACTOR	1	4	1	12	8	9	7	0	2	0	

Q-13	A.YES	1	9	3	29	35	35	18	5	2	1	.614
	B.NO	1	2	2	7	15	20	12	1	2	0	
Q-14	A.MUSCLE OF MASTICATION	1	3	4	28	46	54	25	4	4	1	.000
	B.DIGASTRIC	1	7	1	5	2	0	3	2	0	0	
	C.BUCCINATORS	0	1	0	3	2	1	2	0	0	0	
Q-15	A.YES	0	3	1	15	25	25	9	4	1	0	.261
	B.NO	1	5	3	10	11	9	5	1	2	0	
	C.MAY BE	1	3	1	11	14	21	16	1	1	1	
Q-16	A.NSAIDS	0	2	3	15	28	33	15	3	1	0	.057
	B.ANTI -BACTERIAL	0	3	0	1	1	1	2	1	0	0	
	C.MUSCLE RALXANTS	2	6	2	20	21	21	13	2	3	1	
Q-17	A.YES	0	2	0	10	8	6	4	1	0	0	.131
	B.NO	2	9	5	26	42	49	26	5	4	1	
Q-18	A.REASSURANCE AND COUNCELLING	1	1	0	4	3	11	6	1	3	0	.001
	B.NSAID DRUG THERAPHY	0	7	3	13	16	6	5	1	0	0	
	C.SPLINT THERAPHY D.ALL THE ABOVE	1 0	0 3	0 2	9 10	3 28	5 33	5 14	1 3	0 1	0 1	

DISCUSSION:

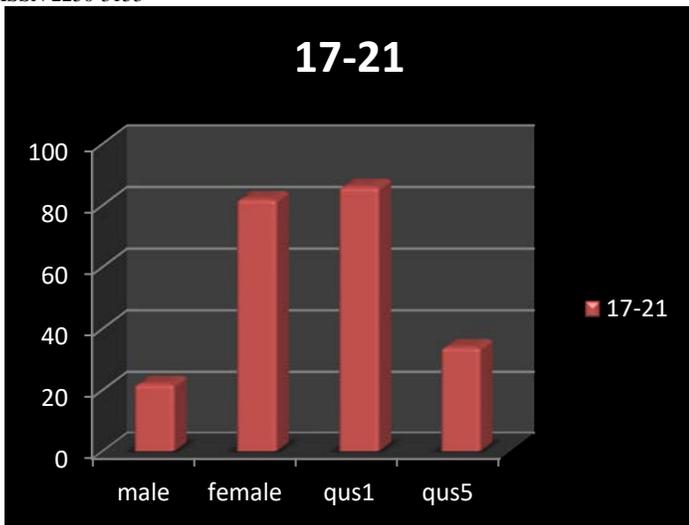


Chart 1: Dental student's age between 17 - 21

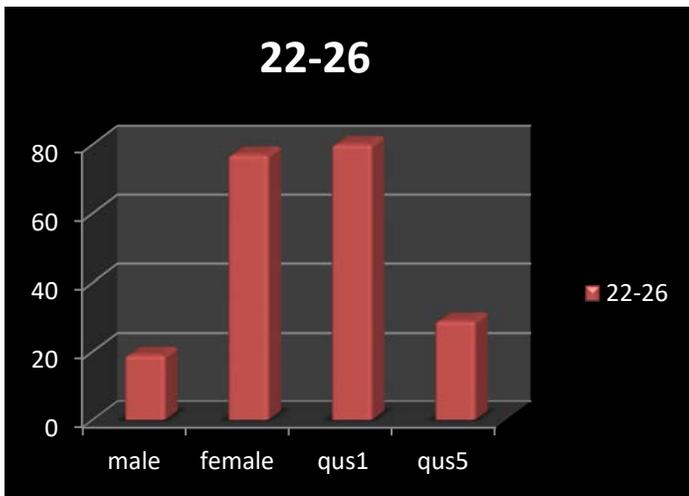


Chart 2: Dental students age between 22 - 26

The present study is to assess the TMJ pain awareness among dental students by using the self-report questionnaire-based survey. The questionnaire has a collection of good information in a relative period of time with minimal cost and better understanding. Henceforth the aim is to evaluate the TMJ pain awareness and their characteristic features among dental students. There was a good response rate for the questionnaire which was satisfactory in comparison with the other studies. Among the total population, 83% of peoples were aware of the TMJ pain. In the study of 17-21 years, 43 % were aware of the TMJ pain and 9% were not aware of the TMJ pain and in the study of 22-26 years 40% were aware of the TMJ pain and 8% were not aware of it. In comparison with the age, students of 22-26 years have better knowledge about the TMJ pain than 17-21 years students but statistically not significant.

On the relative study of 17-21 years, 17.5% had experienced TMJ pain and 34.5% have not experienced the pain. In 22-26 years 14.5% have experienced pain and 33.5% have not experienced the pain. In comparison with the age, students of 17-21 years had experienced pain than 22-26 years students but statistically not significant.

CONCLUSION:

The result of this study within the limitations as follows. Then the findings are made that most of the dental students were aware of TMJ pain and some of them had experienced about it. This study shows that most of the people were highly affected by TMJ pain during the developmental stage. More studies are required to evaluate the risk factors associated with TMJ pain and their management.

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Students, Peer Pressure and their Academic Performance in School

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ABSTRACT

Adolescent have higher tendency to experience peer pressure in school. Peer pressure is clustered in four categories such as social belongingness, curiosity, cultural-parenting orientation of parents and education, this research design used is descriptive correlation. The researchers conducted the survey among the students in the Senior High School. With 96 respondents who completed the survey. Quantitative data were processed by using chi-square. The result would show the correlation between the perceived level of peer pressure in terms of social belongingness, curiosity, cultural-parenting orientation of parents and education. Generally, students are expected to face the effects of peer pressure optimistically to cope up the negative impact of peer pressure in their studies. Students may use positive or negative approach towards peer pressure. Teacher may guide and help them in facing the problems.

Keywords: Cultural-Parenting Orientation, Curiosity, Peer Pressure, Social Belongingness

I. Rationale / Introduction

Peer pressure is often seen during the adolescence stage of a teenagers because they often seek comfort among their peers and intend to do what their peers does without knowing if it is good or bad for them. Adolescence is a period of an individual that is transitory when a child reaches the point in changing its childhood to adulthood (Adeniyi & Kolawole, 2015). Thus individuals are prone temptations in the social contextualization concepts, for example, socializing with others tend to do some activities such as napping and drinking during classes or work day (Bonein & Denont- Boemont, 2013).

Adolescence social environment could affect teenagers in their adolescence, because mostly in this period teenagers tend to communicate more by their peers. As children grow and reach adolescence, teenagers become more dependent with their peers than their family especially in making choices and enhancing their moral values in life (Uslu, 2013).

Human development is affected by its socialization with other people in the environment. Specifically the academic achievements of students are conjectured to be correlational by the support given by the parents, the teachers and the peer of teenagers that affect their level of academic performance (Chen, 2008). In general teenagers spend more time with peers. Peer pressure is described to have a positive and negative impact among individuals and even without effect to a person because peer pressure is a continuous learning (Gulati, 2017).

Peer pressure often seems to have various effects toward the student academic performance in school. It is how their peers affect them whether in a positive or negative way. Teenagers need to seek comfort from others that they found in the presence of their peers, and they are not even aware on how their peers influence them academically.

Eventually this study aimed to know the relationship of peer pressure the Senior High School Students and their academic performance.

Review of Related Literature

Studies show that the influence of peer groups among student can boost their anxiety especially pertaining to their education (Kadir, Atmowasdooyo & Salija 2018). The relationship within the group with its peers are co-related with each other, hence the direction of this particular relationship should be monitored were these relationships should go considering all possible factors correlated within the groups outcome (Wilson, 2016). Peer pressure faced by many teenagers of the society, professionals understood the concept of peer influence that could affect teenagers in a negative way which can be prevented by educating and preparing teenagers to face the negative aspects caused by peer pressure (Temitope & OgOnsakin, 2015). Similarly peer influence among teenagers does not directly affect them in a negative way but it varies in how much and how the students receive the climate of the peers coming from the group (Moshah, 2017). When a student is influenced and motivated by peers he will perform excellent at school and got good grades in mathematics (Boechneke, 2018). Getting the support needed coming from the peer group, student tend to excel and exceed its capability and concentrate more pertaining to his studies and do good in the academic tasks in school (Olalekan, 2016).

Adolescence gaining social support from its peers is an important factor to cope with different problems and illnesses by letting go of emotions by talking someone. Social support plays an important role for teenagers to lessen the effects of stressful situations and stressors through the support of the peers in the group (Esen & Gundogdu 2010). Despite the various studies conducted for understanding the effects of peer group in student's academic performance, no one has yet understood the nature of peer effects among students (Zhang, 2010). Knowing how the teenagers interact with their peers and how they interact with each other and how presence of peer group affect student's academic achievement in school plays an important role for various categories and even the whole educational system (Leka, 2015). Peer pressure is commonly described as peers encouraging other teenagers to do things (Santor, Messervey & Kusumakar, 2000). Peer pressure is also caused by parent's lack of supervision towards their children during adolescence, children tend to enjoy their peers company and spend with their peers more during the adolescence period (Puligni, 1993). There are different factors that could affects student's academic performance in school whether it's their family is giving proper guidance and motivation to their children with the healthy and harmonies interaction with their surroundings (Ezzarooki, 2016). Students interactions with its peers could help enhance their capability and increase their academic performance in school because they could seek help from their peers that could serve as a motivation than working alone (Sotinis, Mirco & Michael, 2013). Student peer group in school plays as an in socializing teenager with the peers to socialize with each other that help should the child adolescents (Uzezi & Deya, 2017). Interaction of students between its peer are likely to influence the students and can be crucial for the student to determine their choice and could affect student performance (De Giorgi ,n.d.).

Understanding peer influence towards teenagers is important for developing and understanding how to improve socioeconomic policies (Carman & Zhang, 2011). Peer among youth plays a vital role during the adolescence of a teenager. This is the time when teenagers develop deep friendship among their peers and become permanent during their adolescence (Guzman, 2017). Peer pressure towards persons behavior is said to be a social phenomenon where the members of a particular society or may not be influence negatively but majority are affected by the undesirable behavior of those people who resist what others do (Gulati, 2017). Looking to the different group of factors that influence adolescence in their completion of their academic excellence it is further hindered by developmental challenges (Chen, 2008). An individual seek emotional support towards communicating publicly and showing his private objectives or goals. Indeed through showing your emotions to others individual can get emotional benefits from it because it could help them to overcome temptation and could give them emotional benefits. (Borein & Boemont, 2013). Also, peer groups answer questions from teenager different concern from adolescence stage including physical appearance or changing bodies (Ademiya & Kolawole, 2015).

Peer pressure could easily affect the self-esteem of students that an important factor adolescence. Individual adapt attitudes towards a certain aspect that they encountered or they are aware of (Uslu, 2013). In many events student fantasizing and visualizing what they dreamed to became through with their colleagues atmosphere. Eventually, they pursue their choices through with the influence of peer pressure (Owoyele & Toyobo, 2008). The pressure among peer group among its member may engage to do undesired things or negative behavior with the presence of a particular peer group leader who engage its member to do deviant acts or promote undesirable things to the group (Dumas, Ellis, & Wolfe, 2012).

Peer group is important in the social context that plays a vital role in society and to determine the academic achievement that affect during development relatively with each other (Chen, 2008). Adaptive behavior of the development increases become broader and complex and as the age increases (Yonus, Mushtaq & Qaiser n.d.). School that the students attend to serves an institution among students that determine their learning capacity based on the school environment that gives the learning experience toward students (Korir, 2014). Thus choosing major courses within an institution are major choices a student intends to make but it is affected by their interactions among other students (Porter & Umbach, 2006). Hence, the behavior of an individual have seen similarities among the group due to the effect of their peers, it is still difficult to relate the consequences that the individual within the group are similar with each other or social to be pursuing their intentions together to have similar outcomes (Kremer & Levy, 2008). Interactions between students with their agetates appeal to enhance their learning capacity under the guidance of an adult educator (Kinderman, 2016).

Therefore, Peer Pressure cannot directly be shown to have negative or positive impact towards students' academic performance but one can realize the appropriate coping mechanism for a problem as a technique to avoid and fight peer pressure optimistically.

II. Research Elaborations

This contains the researcher design, research environment, respondents, instruments and data gathering.

Design

This research study used the descriptive correlation design of the variables covering social belongingness, curiosity, cultural-parenting orientation and education. This design used survey guide as a tool to gathered data.

Environment

This study will be conducted in Jagobiao, Mandaue City in the school of Jagobiao National High School known before as Mabini National High School which was built in 1984. By 2015, this institution recommended the k to 12 Curriculum program that recommended by Department of Education. The School consist of three Academic Tracks namely ABM (Accountancy and Business Management), HUMSS (Humanities and Social Sciences) and GAS (General Academic Strand). The student's in Jagobiao National High School suits as the respondents for this research in order to collect data.

Respondents

This survey focuses on the Grade 12 Senior High School Students in Jagobiao National High School. Consisting three sections namely ABM (Accountancy and Business Management), HUMSS (Humanities and Social Sciences) and GAS (General Academic Strand). The respondents we're chosen because they are the appropriate respondents to answer the specific questions.

Instruments

In this study, the researcher use the survey questionnaire in gathering of data, this survey design provides a quantitative description of some fraction of the population that is sample through the data collection process. Questionnaire is being use in data collection instrument for the study. In the sampling stratified sampling in being applied in this study, under the weighted mean statistics.

Data Gathering

The researchers used the survey method to find out the Effects of Peer Pressure in the Academic Performance of Students. In gathering of data, researcher will ask permission to the Administer teacher for that section and also for the students who chosen to be as respondents for the study.

In collecting data, the questionnaire given by the researcher personally and a clean sheet of paper to the respondents for the students would put their answers. The answer of the respondents were collected and it was used in order to tabulate data interpret.

Treatment of Data

The data will be treated using a chi-square. It is a testing of the relationship between the categorical variables and its null hypothesis (Ho) represents on relationship at all with the independents such as categorical variables in the population.

III. RESULTS OR FINDINGS

This chapter presents the findings, analysis, discussion and interpretation of data gathered wherein the objective is to know the Students, Peer Pressure and their Academic Performance in School.

Table 1. Level of Students Social Belongingness

Indicators	Weighted Mean	Interpretation
1. I spend much time with my peer group	3.41	Agree
2. My friends and I share problems with each other	3.79	Agree
3. My friends give me advice in my problems.	3.81	Agree
4. My friend and I do school activities.	3.57	Agree
5.I and my friends share thoughts and opinions to strengthen our	3.79	Agree

bond.		
Overall Weighted Mean	3.68	Agree

Legend: Strongly Agree(4.01-5.00), Agree(3.26-4.00), Neutral (2.51-3.25), Disagree(1.76-2.50), Strongly Disagree(1.00-

The table above shows the weighted mean of the perceived level of peer pressure in terms of social belongingness of grade 12 students. Students perceived that they agree with the term that they are accompanied by their peers in school. The table shows that student is likely to socialize among others and seeks attention with their peers. Students agree that they should belong to a particular group in school whom they could associate and share their thoughts and opinion regarding school. Overall, students agree that they need their peers and belong to a peer group, thus it could help them share their own perspective and capacity as individuals.

Table 2. Level of Students Curiosity

Indicators	Weighted Mean	Interpretation
1. I like to do something new	4.08	Agree
2. I want to explore my capabilities to do things	4.18	Agree
3. I am curious about having vices	3.14	Neutral
4. I want to explore my teenage years	4.16	Agree
5. I want to experience relationship	3.19	Neutral
6. I like starting a new activity	3.92	Agree
Overall Weighted Mean	3.78	Agree

Legend: Strongly Agree(4.01-5.00), Agree(3.26-4.00), Neutral (2.51-3.25), Disagree(1.76-2.50), Strongly Disagree(1.00-1.75)

The table above shows the weighted mean of the perceived level of peer pressure in terms of curiosity of grade 12 students. In terms of the content, the statement “I want to explore my capabilities to do things” has the highest weighted mean of 4.18, interpreted as agree. This indicates that adolescents like to explore their capabilities to do things and enjoy their life as a teenager. For the statement “I want to explore my teenage year”, “I like to do something new” and “I like starting new activity” has the weighted mean of 4.16, 4.08 and 3.92 respectively and interpreted as agree. This implies that student want to explore, like to do something new things and want to engage in starting new activity. On the other side, the statements “I want to experience relationship” and “I am curious about having vices” has the weighted mean of 3.19 and 3.14 respectively interpreted which is neutral and as adolescents are likely want experience relationship and are curious in having vices. The overall weighted mean of the perceived level of peer pressure in terms of curiosity is 3.78 which signify that adolescents agree to explore their teenage year.

Table 3. Level of Students Cultural-Parenting Orientation

Indicators	Weighted Mean	Interpretation
1. I have to ask my parent permission to do most things	3.97	Agree
2. My parent worry that I am up to something they won't like	3.79	Agree
3. My parent want me to follow their directions even if I disagree with their reasons	3.44	Agree
4. My parent encourage me to give my ideas and opinions even if I might disagree	3.30	Neutral
5. My parent warn me not to go out along with my friends at night	3.80	Agree
Overall Weighted Mean	3.67	Agree

Legend: Strongly Agree(4.01-5.00), Agree(3.26-4.00), Neutral (2.51-3.25), Disagree(1.76-2.50), Strongly Disagree(1.00-1.75)

The table above shows the weighted mean of the perceived level of peer pressure in terms of cultural- parenting of parents towards their peers of grade 12 students, the statement “I have to ask my parents’ permission to do most things” has the highest weighted mean of 3.97. This indicates that students need to ask the permission of their parents to do things they want. For the statement “ My parents warn me not to go out along with my friends at night”, “My parents worry that I am up to something they won’t like” and “My parents want me to follow their directions even if I disagree with their reasons” has the weighted mean of 3.80, 3.79 and 3.44 respectively and interpreted as agree. Implies that likely parents won’t the idea that their children go out with peers at night and likely to do things they won’t like or agree. On the other side, the statement “My parents encourage to give my ideas and

opinions even if I might disagree” has the lowest weighted mean of 3.30 interpreted as neutral which means that children whether like or disagree the reasons of their parents to give their ideas and opinion to their parents. The overall weighted mean for the perceived level of peer pressure in terms of cultural-parenting orientation is 3.67 which mean that adolescents agree to the reasons their parents signifies.

Table 4. Level of Students in Education

Indicators	Weighted Mean	Interpretation
1. My friends help me on what to do in my academic performance in school	3.73	Agree
2. My friends inspire me to work hard in my studies	3.76	Agree
3. We always help each other with academic difficulties	3.49	Agree
4. I am always focused in class with my peers	3.49	Agree
5. My friends assistance in group assisted to improve my grades	3.61	Agree
Overall Weighted Mean	3.60	Agree

Legend: Strongly Agree(4.01-5.00), Agree(3.26-4.00), Neutral (2.51-3.25), Disagree(1.76-2.50), Strongly Disagree(1.00-1.75)

Students perceived that they agreed with the term that in education they need their friends in school in order succeed and accomplish certain school works and activities. The table shows that student’s education, they need the presence of their peers to help them do their school works and inspire them to work hard pertaining in their studies. And students agree and contented by the presence they get from their peers, thus it help them achieved their goals and excel academically. Overall, students agree with presence and support given by their peers toward in school and their studies. Thus, it helped them as individuals.

TABLE 6.
 Summary of Results

Factors	X ²	Df	X ² (0.05)	Discussion	Interpretation
Social Belongingness	10.12	3	7.81	Reject	Significant
Curiosity	7.24	6	12.6	Failed to Reject	Not Significant
Cultural Parenting Orientation	16.30	6	12.6	Reject	Significant
Education	7.48	6	12.6	Failed to Reject	Not Significant

The table above shows the value of computed chi-square x^2 (10.12) in terms of social belongingness is less than the computed critical value (7.81) which reject the null hypothesis- thus, significant. This implies that social belongingness can influence the student’s level of performance in school. Social belongingness can affect students’ academic excellence pertaining in their studies. Individual displays interest in communicating to public about his personal concern and objectives. Likely, displaying emotions to others can give emotional benefits to a person thus it helps him to overcome temptation in life (Bonein & Denant-Boemont, 2013). Positive outcomes in relation to students peer association likely to occur when student environment drives the students to engage their desired activities that is motivated by their peers to continue to strive to reach possible outcome (Korir & Kipkemboi, 2014).

The value of computed chi-square in terms of curiosity x^2 (7.24) is less than the computed critical value (12.6), which failed to reject the null hypothesis, there is a significant difference. It state that there is no correlation between student’s curiosity and their level of academic performance in school relatively and it could affect their grades and academic performance. It contradicts to the statement that student’s curiosity could lead to academic failure and could have a negative impact in their studies. For instance, adolescents who commit explanation of substance abuse through engaging with their peers likely to make unhealthy decisions in their life that could interfere their life goals and make inconsistent choices (Dumas, Ellis & Wolfe, 2012). And also, peer pressure is the main indicator of teenagers into engaging drugs because they begin to adapt this kind of lifestyle among their acquaintances (Gulati, 2017).

The computed value x^2 (16.30) in terms of cultural-parenting orientation towards students by their parents is greater than the critical value (12.6). The null hypothesis is rejected therefore, significant. This entails that cultural-parenting orientation of the parents towards their children with their peers has a significant association that could affect certain views and opinion towards peer association. Parent’s relationship with their children during adolescence became wider as children perspective in relationship found their peers more suited especially in their developmental needs as a growing adult (Fulgini & Eccles, 2014). When children became

teenagers parents should realize that children will find their way to fit in a certain group in their age and the world alike (Olalekan, 2016).

The value of computed chi-square $\chi^2(7.48)$ in terms of education is less than the computed critical value (12.6), which fails to reject the null hypothesis. Thus, there is no significant difference. This implies that peer group along with student education cannot affect their studies. Therefore, peer group in student's level of academic performance in school is not associated with each other. Adolescence is a stage where children particularly seeks socialization with their age group that will exhibit different behavior and attitude which occur through their interaction, thus a child will learn more by engaging and interacting with their peers (Cuzezi & Deya, 2017). Friendship among youth will allow them to develop their necessary social skills towards other for them foster as an individual and reach future success (Guzman, 2007).

IV. Conclusion

Graduating senior high school students have encountered different factors in relation to students peer pressure in school and its association in their studies in terms of social belongingness, curiosity, cultural-parenting orientation of parents and education. The results declared that there are several factors that could affect students' academic performance in school regarding to peer pressure. This suggests that peer pressure does not give negative impact directly to student toward their peers.

Generally, students peer pressure in school affects the academic performance among students in term of various content. Furthermore, cultural parenting among parents among parents and social belongingness can affect student academic performance in school based on the result of the computation of chi-square. It had been manifested that curiosity and students level of education does not affect student academic performance. Hence, whatever the effects of student peer pressure are based their approach towards their peers.

APPENDIX A

Students Peer Pressure and their Academic Performance in school

Personal Information

Name:

Age:

Gender:

Direction: Please answer the following items with all honesty. The information that will be gathered by the researchers shall be held with utmost confidentiality.

How does peer pressure affect students in school?

Social belongingness	5	4	3	2	1
1. I spend much time with my peer group					
2. My friends and I share problems with each other					
3. My friends give me advice in my problems					
4. My friends and I do school activities together					
5. I and my friends share thoughts and opinions to strengthen our bond					

CURIOSITY	5	4	3	2	1
1. I like to do something new					
2. I want to explore my capabilities to do things					
3. I am curious about having vices					
4. I want to explore my teenage years					
5. I want to experience relationship					
6. I like starting a new activity.					

Cultural-Parenting Orientation	5	4	3	2	1
1. I have to ask my parents permission to do most things					
2. My parents worry that I am up to something they won't like					
3. My parents want me to follow their directions even if I disagree with their reasons					
4. My parents encourage me to give my ideas and opinions even if I might disagree					
5. My parents warn me not to go out along with my friends at night					

2. Educational	5	4	3	2	1
1. My friends help me on what to do in my academic performance in school					

2. My friends inspire me to work hard in my studies					
3. We always help each other with academic difficulties					
4. I am always focused in class with my peers					
5. My friends assistance in group discussion assisted to improve my grades					

Legend: Strongly Agree(4.01-5.00), Agree(3.26-4.00), Neutral (2.51-3.25), Disagree(1.76-2.50), Strongly Disagree(1.00-1.75)



Republic of the Philippines
Department of Education
Region VII, Central Visayas
Division of Mandaue City
JAGOBIAO NATIONAL HIGH SCHOOL
North Road, Jagobiao, Mandaue City



In the ___ day of August 2018

MRS. ARLINA YAP AMANTE

Principal IV

Jagobiao National High School

North Road Jagobiao, Mandaue City

Dear Mrs. Arlina Y. Amante:

The students of Accountancy and Business Management ABM-12 of Senior High School are currently conducting a research as a partial requirement of the subject Practical Research 2 Quantitative Research for the school year 2018-2019.

As a part of completing subject, we need to conduct a quantitative study titled "Students, Peer Pressure and their Academic Performance in School." In this instance, we intent to ask your permission to allow us to gather descriptive data from the Senior High School Students of Jagobiao National High School.

We are hoping for your approval.

Very truly yours,

VANGIE M.MOLDES

CHERRY LYN L. BITON

DIVINE GONZAGA

Researchers

Noted by:

Approved by:

JERALD MONEVA

ARLINA YAP AMANTE

Principal IV

KARIE ALYZA M. TROMPETA

APPENDIX C

Summary of the computation

Content	Weighted Mean	Interpretation
1. I spend much time with my peer group	3.41	Agree
2. My friends and I share problems with each other	3.79	Agree
3. My friends give me advice in my problems.	3.81	Agree
4. My friend and I do school activities.	3.57	Agree
5. I and my friends share thoughts and opinions to strengthen our bond.	3.79	Agree
Total:	3.68	Agree

Table 1. Summary of computation in Social Belongingness Aspect

Content	Weighted Mean	Interpretation
1. I like to do something new	4.08	Agree
2. I want to explore my capabilities to do things	4.18	Agree
3. I am curious about having vices	3.14	Neutral
4. I want to explore my teenage years	4.16	Agree
5. I want to experience relationship	3.19	Neutral
6. I like starting a new activity	3.92	Agree
Total:	3.78	Agree

Table 2. Summary of computation in Curiosity Aspect

Content	Weighted Mean	Interpretation
1. I have to ask my parent permission to do most things	3.97	Agree
2. My parent worry that I am up to something they won't like	3.79	Agree
3. My parent want me to follow their directions even if I disagree with their reasons	3.44	Agree
4. My parent encourage me to give my ideas and opinions even if I might disagree	3.30	Neutral
5. My parent warn me not to go out along with my friends at night	3.80	Agree
Total:	3.67	Agree

Table 3. Summary of computation in Cultural Parenting Orientation Aspect

Content	Weighted Mean	Interpretation
1. My friends help me on what to do in my academic performance in school	3.73	Agree
2. My friends inspire me to work hard in my studies	3.76	Agree
3. We always help each other with academic difficulties	3.49	Agree
4. I am always focused in class with my peers	3.49	Agree
5. My friends assistance in group assisted to improve my grades	3.61	Agree
Total:	3.60	Agree

Table 4. Summary of computation Education Aspect

Table 5. Grade level of Grade 12 Students

Social Belongingness	1.00-3.40	3.41-5.00	Total:
90-94	7	8	15
85-89	15	20	35
80-84	14	19	33
75-79	7	6	13
Total:	43	53	96

Curiosity	1.00-3.40	3.41-4.20	41.21-5.00	Total:
90-94	4	9	1	14
85-89	14	13	9	36
80-84	11	12	10	33
75-79	4	7	2	13
Total:	33	41	22	96

Cultural Parenting Orientation	1.00-3.40	3.41-4.20	41.21-5.00	Total:
90-94	6	6	2	14
85-89	16	14	7	37
80-84	12	18	2	33
75-79	9	3	1	13
Total:	43	41	12	96

Educational	1.00-3.40	3.41-4.20	41.21-5.00	Total:
90-94	8	4	2	14
85-89	15	15	5	35
80-84	13	20	1	34
75-79	7	5	1	13
Total:	43	44	9	96

	Peer Pressure
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Students	Social belongingness	Curiosity	Cultural Parenting	Education
Student 1	2	3	3.8	2.2
Student 2	2.8	3.16	3.2	2.2
Student 3	3.8	4.33	3	3.4
Student 4	2.6	4	4	3
Student 5	3.6	3.83	3.8	3.6
Student 6	3.8	3.33	4.2	3.2
Student 7	3.6	2.15	3.4	3
Student 8	3.8	2.83	2	3
Student 9	3	3.33	3.4	3
Student 10	3.2	4.16	4	3.4
Student 11	3.8	3.33	3.4	3.2
Student 12	3.6	3.36	2.8	3.4
Student 13	4.4	3.35	4.2	4.4
Student 14	4.4	4.5	4.6	4.4
Student 15	4.2	4.66	4.2	4
Student 16	3.8	4	3.4	4
Student 17	4	3	2.8	4
Student 18	4	3	2.8	4.8
Student 19	3.8	3.66	3.4	3.8
Student 20	2.8	2.66	3.6	3.8
Student 21	3.6	4	3	3.8
Student 22	4.2	4	4	4
Student 23	5	4.16	4	5
Student 24	3.8	4.5	4.6	4.6
Student 25	4.4	5	4.6	4.4
Student 26	4.6	3.5	4.8	4.8
Student 27	3.4	3.66	3.6	3.8
Student 28	3	3.83	3.8	1.4
Student 29	3.8	5	2.8	3.4
Student 30	2.8	2.66	4.8	2.4
Student 31	1.4	5	1	2
Student 32	3.4	4.16	5	3.2
Student 33	3.6	3.66	3.6	3.4
Student 34	4	4	4	4
Student 35	4.2	4	3.4	4
Student 36	4	3.5	3.6	4
Student 37	4	4.33	3.2	3.6
Student 38	3.8	3.33	4	2.6
Student 39	4	4.5	3.2	3.6
Student 40	4.2	4.33	3.6	3
Student 41	3.8	4	3.6	4.2
Student 42	4.6	4	4	4.6
Student 43	3.8	3.38	3	3.6
Student 44	4	3.33	3.6	3.6
Student 45	3.6	3.16	3.4	3.8
Student 46	3.4	3.5	3.6	3.8
Student 47	3.4	3.33	3.6	3
Student 48	4.6	3.33	4	3.6
Student 49	3.8	3.33	4	3.6
Student 50	4	4	4.4	5
Student 51	4.2	3.16	3.6	4
Student 52	4.8	4	3.2	4
Student 53	4	3.66	5	4.6
Student 54	4.2	5	4.8	4.6

Student 55	3.4	4	3	3.2
Student 56	3.4	3.66	3.6	3.6
Student 57	3.4	4.33	2.8	4
Student 58	4	3.5	4	3
Student 59	3.2	4	4	4.2
Student 60	4	4.83	4.4	4
Student 61	2.2	3.83	2.83	2.8
Student 62	3.4	3.33	4.2	3.4
Student 63	4	3.83	4.8	3
Student 64	3.6	4.33	3.6	3.6
Student 65	4	4.16	3.6	4
Student 66	3.8	3.33	3	1.9
Student 67	2.8	5	1.4	1.6
Student 68	4.4	4.17	3.6	3.6
Student 69	3.6	3.83	3	3
Student 70	3.8	4.33	4.2	2.6
Student 71	4.8	3.83	4.2	4.4
Student 72	2.4	3.67	3.4	3.6
Student 73	4.6	4.83	4.8	4.2
Student 74	3.6	3.5	3.2	4.2
Student 75	3.8	4.33	4.2	4
Student 76	4.4	4.33	4.4	4.4
Student 77	4	4.33	3.6	4
Student 78	2.8	2.33	3.4	2.6
Student 79	3.6	3.33	3.6	3.8
Student 80	3	2.5	2.5	3
Student 81	3.6	3.70	3.6	4
Student 82	4.6	4.83	3.4	4
Student 83	3.4	4	5	3.8
Student 84	2.6	2.17	3.2	3.6
Student 85	2.8	4.83	3	2.6
Student 86	3.8	3.33	4.4	4
Student 87	3.8	3.33	3	4
Student 88	3.8	4.5	4.2	4.4
Student 89	3	3.67	2.8	4
Student 90	3.2	4	3.8	3.8
Student 91	3	3.83	4	3.4
Student 92	3.6	3.5	4	3.8
Student 93	3.8	3.17	4.8	4
Student 94	3.4	3.17	4	3
Student 95	3.4	3.17	4	4.2
Student 96	3.6	4	4	3
Average:	4	4	4	4

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Effectiveness of Progressive Inhibition of Neuromuscular Structures (PINS) and Spinal Mobilization with Leg Movement (SMWLM) in Lumbar Disk Herniation with Radiculopathy: A Case Report with Two Year Follow-up

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Abstract- Background and aim: Lumbar disc herniation with radiculopathy has been one of the most difficult conditions to manage in orthopedic manual therapy. While there are many clinical studies concerning the standardization of surgical treatment, there is to date no standardized literatures for the most effective non-operative care for lumbar disc herniation with radiculopathy which suggest that extreme measures to ameliorate lumbar disc herniation with radiculopathy are urgently warranted. In this study, a 35 year old man who was diagnosed with lumbar disc herniation and was planned for lumbar surgery due to failure of medical interventions was successfully treated using non-operative management.

Method: The management of the patient included Progressive Inhibition of Neuromuscular Structures (PINS), Spinal Mobilization with Leg Movement (SMWLM) and Therapeutic exercises inform of lumbar stabilization and stretching exercises. The patient was seen three times in a week over the period of 6 weeks after which the patient was discharged home without having lumbar surgery. Patient was assessed before and after treatments and during one and two year follow-ups using; Visual Analogue Scale (VAS) in the back and leg, Sciatica Bothersome Index (SBI), Sciatica Frequency Index (SFI) and Rolland-Morris Disability Questionnaire (RMDQ) for sciatica.

Results: After six weeks of management the patient had decreased in functional limitation (from 19 to 6), back pain (from 8 to 0), leg pain (from 10 to 2), sciatica frequency (from 18 to 8) and sciatica bothersomeness (from 18 to 8). These outcomes were maintained after one and two year follow-ups.

Conclusion: Progressive inhibition of neuromuscular structures and spinal mobilization with leg movement are effective in the management of patients diagnosed with lumbar disc herniation with radiculopathy.

Implication: Progressive inhibition of neuromuscular structures and spinal mobilization with leg movement may be considered as useful therapeutic non-operative measures for patients diagnosed with lumbar disc herniation with radiculopathy.

Index Terms- Progressive Inhibition of Neuromuscular Structures; Spinal Mobilization with Leg Movement; Lumbar Disc Herniation with Radiculopathy.

I. INTRODUCTION

The term radiculopathy which commonly referred to as sciatica describes the symptoms of sciatic nerve pain radiating down the posterior leg [1]. It has also been used to describe paresthesia from the low back to below the knee or referred to the posterior thigh, calf, and foot [2]. Sciatica is strongly associated with low back pain (LBP), and it has multiple causes among which lumbar disc herniation (LDH) is one [3, 4].

Studies comparing surgical management of LDH to different forms of conservative treatment tend to favor surgery with respect to short-term outcome [5, 6]. However, there are less striking differences observed in long-term follow-up of 1 year or more [2, 7]. For this reason, there is a general consensus that treatment of sciatica should be conservative in the first 6 to 8 weeks after onset because most new cases resolve in the short term [8]. For patients failing six weeks of conservative care, the current literature supports surgical intervention or prolonged conservative management as appropriate treatment options for lumbar radiculopathy in the setting of disc herniation [9].

However, there are no standardized guidelines for appropriate non-operative care which suggest that more treatment options to ameliorate lumbar radiculopathy are urgently warranted [10]. In this study, we reported the management of a 35 year old man who was diagnosed with LDHR and was planned for lumbar surgery due to failure of medical interventions.

II. MATERIALS AND METHODS

2.1 Case reports

Two years ago, a 35 year old man (BMI=25.23kh/m²) with no history of previous back problems wakened with pain in his left buttock area. Two days after the onset of his buttock pain it spread, overnight, down the left leg with tingling into the big toe area of his left foot. Some days later the big toe tingling alternated with tingling along the lateral border of his foot and into the lateral two toes. He had undergone numerous forms of treatments for over 6 months, but without significant success. However, following lifting of a 50kg back of maize two years ago, which exacerbated his disorder he had a lumbar puncture (which proved negative) and

skeletal traction for a week. Following this, his left buttock pain increased which came with a severe low back pain. At no time prior to skeletal traction had he ever experienced worsening lower limb pain. This was so serious that the patient could not even stand or sit on the treatment bed due to unbearable pain. The MRI of the patient revealed L5-S1 diffuse annular bulge with posterior left paracentral disc protrusion and inferior migration along with a small sequestration causing spinal canal compromise and indenting the left exiting and traversing nerve roots (see Figure 1). The patient was diagnosed as having pre-cauda equina syndrome and was booked for lumbar surgery. Prior to surgery, a consult was sent to physiotherapy department requesting physiotherapists to commence pre-operative management while the patient was on a waiting list.

2.2 Examination

On more positive questioning to determine his area of pain, it was interesting to note that, although his main lower leg pain was posterior, he had what he described as a different pain in the middle of the left buttock. Standing and sitting provoked pain in his left leg, and he was unable to bend forwards because of increased leg pain. Coughing caused both back pain and left leg pain but leg pain was the most incapacitating. Passive straight leg raise (SLR) on the left was causing posterior leg pain at 35°. Passive SLR with neck flexion and ankle dorsiflexion produced severe lower leg pain. Manual muscle testing revealed weakness of the calf muscles. Tingling was felt in the big toe and lateral border of the foot. In addition, the patient reported that anything that caused his back pain also caused his leg pain but at times the pains used to come differently with leg pain being the most. Manual palpation revealed pain and tenderness around L4 through S1 coupled with left piriformis tightness. Further palpation revealed active trigger points at the central fibers of the piriformis muscle around the middle two-thirds of the left buttock. This was reported by the patient as the most painful and was considered as the primary point. The secondary point was found just above the archilles tendon around the distal part of the left leg.

2.3 Treatment

The treatment of the patient included Progressive Inhibition of Neuromuscular Structures (PINS) which was applied for 10 minutes during the first two visits. During the third visit, spinal mobilization with leg movement (SMWLM) was introduced which was given after each successful PINS application. The patient was seen three times in a week over the period of 6 weeks after which he was discharged home without having lumbar surgery. Patient was assessed before and after treatments and during one and two year follow-ups using: Visual Analogue Scale (VAS) in the back and leg, Sciatica Bothersome Index (SBI), Sciatica Frequency Index (SFI) and Rolland-Morris Disability Questionnaire for sciatica (RMDQ) [7, 8] (see Table 1). Therapeutic exercises (lumbar stabilization and stretching exercises) were given as home regimens and the patient was asked to keep coming to the hospital after every 8 weeks in order to ascertain the effectiveness of the administered interventions or should in case the therapist would encounter something manageable during follow-ups but nothing significant was obtained.

2.3.1 Progressive Inhibition of Neuromuscular Structures (PINS)

Participant Positioning: The patient was placed in a prone position.

Therapist Positioning: The therapist assumed a stride stance with the feet widely apart and facing the patient's affected lower extremity.

Treatment Procedure: The technique was performed by palpating two related points termed primary point and secondary or end point. Primary and end points are areas of most and least sensitivities respectively found along the continuum of neuromuscular structures. In this technique, a moderate ischemic compression was steadily maintained on the end point by the use of an index finger of the right hand without relieving pressure up to the completion of the technique. The index finger of the left hand was used to apply pressure on the primary point for about 30 seconds after which another sensitive point was palpated by the middle finger of same hand proximal to the end point without relieving pressure on the index finger. If the patient indicated that this latter point was more sensitive than the posterior point, then pressure was maintained on the second point and relieved on the first point without relieving the end point pressure. This was maintained for 30 seconds before the third point was identified. When the third point was identified as more sensitive than the second point, pressure was relieved from the second point and maintained on the third point for another 30 seconds. The same pattern was followed progressively along the dysfunctional neuromuscular structure (sciatic nerve) until the last point approximately 2 cm proximal to the end point is found. Pressure was then maintained simultaneously on the two points (the last point and the end point) for 30 seconds and then relieved [11] (see Figure 2).

2.3.2 Spinal Mobilization with Leg Movement (SMWLM)

Participant Positioning: The patient was placed in a side lying position.

Therapist Positioning: The therapist assumed a stride stance with the feet widely apart and facing the patient by the side.

Treatment Procedure: This technique was performed with the patient in a side lying position, with the affected leg uppermost. The patient lied on the unaffected side facing the therapist, and an assistant therapist supporting his affected leg. The therapist flexed over patient and placed one thumb reinforced over other on the spinous process of the herniated vertebra (L5 vertebra) as palpated with reference to posterior superior iliac crest. The therapist then pushed down on the L5 spinous process and maintained that pressure while the patient was asked to actively perform Straight Leg Raise (SLR) for the leg supported by the assistant therapist provided there is no too much pain. This position was maintained for 30 seconds after which the therapist released the pressure on the L5 spinous process and the patient was asked to lower his supported leg down to the couch. The patient rested for 2 minutes before another repetition was performed. On day one, three (3) repetitions were only applied and this lasted for about 10 minutes. After this was successful during the first visit then, on the subsequent visits as the patient improved, the assistant therapist applied over-pressure on the supported leg of the patients as the patient performed the SLR [12]. This was sustained for 30 seconds after which the leg was lowered to the starting position

and then without resting, the patient performed SLR again against the assistant therapist's over-pressure for another 30 seconds. The patient rested for 60 seconds after each 2 sets of consecutive mobilizations which made 1 complete repetition. 2 sets of consecutive mobilizations for 3 repetitions with 60 seconds rest period after each repetition was given to the patient within the time limit of 10 minutes (see Figure 3).

2.3.3 Therapeutic Exercises

These exercises comprised of Lumbar Stabilization Exercises (LSEs) and Stretching Exercises (SEs):

1. Lumbar Stabilization Exercises

Lumbar Stabilization Exercises in form of curl-ups, horizontal side bridge and bird-dog [13] were given as home regimens. These exercises were performed for 10 minutes, given by 8 repetitions for 8 seconds each followed by a rest period of 10 seconds between successive repetitions.

- **Curl-ups:** The patient was in supine position with hands supporting lumbar spine and both knees bent at 90 degrees and hips bent at 45 degrees. The patient then lifted up the thoracic and cervical spine as one unit maintaining rigid block position with no cervical motions (chin poking or chin tucking) and held the position for 8 counts.
- **Horizontal Side Bridge:** The patient assumed a side line position and supported his/her body weight using the ipsilateral elbow. The patient then crossed the contralateral arm against the chest and contralateral foot in front of the ipsilateral foot. The patient then bridged by lifting the hip up while maintaining the trunk straight and supporting the whole body on elbow and feet. This position was held for a count of 8 after which the patient came back to the starting position before carrying out another repetition.
- **Bird dog:** The patient was on his hands and knees (quadruped position). The patient then simultaneously rose up the contra-lateral arm and ipsi-lateral leg above the floor and stretched them out completely. After a count of 8 the patient then switched limbs and did the exercise for the same duration.

2. Stretching Exercises

Stretching exercises in form of plantar stretching, calf stretching and hamstrings stretching [14] were given to the patient. These exercises were performed for 10 minutes just like the lumbar stabilization exercises.

- **Plantar stretching:** The patient was sitting on a chair with the feet resting on the floor. He then placed a tennis ball under his foot. The patient then put weight into various parts of the plantar surface from the front of the heel out to the ball of the foot, looking for places that hurt or feel tight. The patient gave enough weight to reach that point between pleasure and pain, and sustained the pressure on each point for at least 20 seconds.
- **Calf stretching:** The patient stood erect, leaned forward and rested his forearms on the wall. The patient then stretched the lower leg section of the SBL by putting one foot back and resting into the heel. After the heel reached

the floor, then the patient flexed the knee forward toward the wall to increase the stretch on the soleus.

- **Hamstrings stretching:** The forward bends described above for calf stretching was used to lengthen the hamstring group. Swinging the upper body left and right during these bends was done to ensure that the entire hamstrings muscle group, not just one line through it, got activated and stretched.

III. RESULTS

Following PINS application, patient reported that his leg pain had reduced and was able to sit up for 2 minutes. At no time prior to PINS application had the patient ever had the chance to sit up with bearable pain. During the second visit, the patient was able to take few steps after PINS application. During the third visit, when SMWLM was introduced, the patient reported decreased in symptoms and was able to sit up for more than an hour. Since then the patient kept reporting significant improvement in symptoms up to the completion of the study which lasted for six weeks. After six weeks of management the patient had decreased in functional limitation (from 23 to 6), back pain (from 8 to 0), leg pain (from 10 to 2), sciatica frequency (from 24 to 8) and sciatica bothersomeness (from 24 to 8). All these outcomes were maintained after one and two year follow-ups (see Table 1).

IV. DISCUSSIONS

Lumbar disc herniation is a common condition that frequently affects the spine in young and middle-aged patients [15]. The lumbar intervertebral disc is a complex structure composing of collagen, proteoglycans, and sparse fibrochondrocytic cells that serve to dissipate forces exerted on the spine. As part of the normal aging process, the disc fibrochondrocytes can undergo senescence, and proteoglycan production diminishes [16]. This leads to a loss of hydration and disc collapse, which increases strain on the fibers of the annulus fibrosus surrounding the disc. Tears and fissures in the annulus can result, facilitating a herniation of disc material, should sufficient forces be placed on the disc [15, 17].

Regardless of etiology, herniations represent protrusions of disc material beyond the confines of the annular lining and into the spinal canal. Back pain may occur due to disc protrusions that do not enter the canal or compromise nerve roots [15]. The more treatable condition of lumbar radiculopathy, however, arises when extruded disc material contacts, or exerts pressure, on the thecal sac or lumbar nerve roots [15, 16]. The pain associated with lumbar radiculopathy occurs due to a combination of nerve root ischemia and inflammation resulting from local pressure and neurochemical inflammatory factors present within the disc material [15-19].

The literature supports both conservative management and surgical intervention as viable options for the treatment of radiculopathy caused by lumbar disc herniation [2, 5-7]. However, methodological drawbacks limit the effect that published RCTs can have on informing clinical practice for this condition [9]. Surgical intervention may result in faster relief of symptoms and earlier return to function [5, 6], although long-term results appear

to be similar regardless of type of management [2, 7]. Therefore, the ultimate decision regarding type of treatment should be based on a surgeon-patient discussion, in light of proper surgical indications, duration of symptoms, and patient wishes [9, 17].

In this study, we presented the management of a 35 year old man who was diagnosed with lumbar disc herniation and was booked for lumbar surgery due to the ineffectiveness of all medical interventions. After the surgical decision, the patient requested that a physiotherapist should first attend to his condition prior to having lumbar surgery. Physiotherapists were invited and following PINS and SMWLM application the patient symptoms were abolished within 6 weeks of treatment after which the patient was discharged home without having lumbar surgery.

V. CONCLUSIONS

Our finding suggests that PINS and SMWLM may be used in the management of patients diagnosed with lumbar disc herniation with radiculopathy (LDHR). Despite the limitations of the study to make cause and effect conclusions, the degree of improvement achieved over a very short period of time and after two year follow-ups should not be overlooked. It is therefore recommended that randomized clinical trials (RCTs) may be conducted to establish the efficacy of these findings.

ADVERSE EFFECT

The patient reported slight increased pain after some hours of PINS application which subsided within the first twenty four hours.

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AUTHOR CONTRIBUTIONS

PT. Danazumi developed this idea and administered the treatment to the patient. PT. Ibrahim helped with the supervision of the whole manuscript.

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Figure 1: Magnetic Resonance Imaging of the Patient.

Table 1: Study Outcomes with 2 year follow-up

Outcomes	Baseline	6 Weeks	1 Year	2 Years
RMDQ	19	6	0	0
VAS Back	8	0	0	0
VAS Leg	10	2	0	0
SBI	18	4	0	0
SFI	18	4	0	0

Key:

RMDQ=Rolland-Morris Disability Questionnaire: A 23-item scale, higher values indicate high level of disability.

VAS Back= Visual Analogue Scale for back pain: A 10-point scale, higher values indicate high level of pain.

VAS Leg= Visual Analogue Scale for leg pain: A 10-point scale, higher values indicate high level pain.

SBI=Sciatica Bothersome Index: A 24-point scale, higher values indicate increase in bothersomeness of sciatica.

SFI=Sciatica Frequency Index: A 24-point scale, higher values indicate increase in frequency of sciatica.



Figure 2: PINS application image



Figure 3: SMWLM application image

Hydraulic Fractures for Shale Gas Production

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Abstract

Shale gas, which is extracted from wells, typically exhibits a high initial peak in production rates with a successive rapid decline followed by low production rates. However, liquid accumulation is common in shale wells and detrimental on the production rates. The optimization problem is formulated using a simultaneous implementation of the reservoir model and the optimization problem with binary variables, to model on/off valves and an imposed minimal production rate, to prevent liquid loading. A reformulation of the nonlinear well model is applied to transform the problem from a mixed integer nonlinear program to a mixed integer linear program. For short term production planning, a set of optimal production settings are solved for multiple wells with global constraints on the production rate and on the switching capacity. The reformulation to a mixed integer linear program is shown to be effective on the formulated optimization problems and allows the assessment of the error bounds of the solution.

Keywords:

MWD - Measurement While Drilling

LWD - Logging While Drilling

TOC - Total Organic Carbon

AVDT - Automated Vertical Drilling Tool

Introduction

Shale gas is known as one of the most valuable energy resources found beneath the surface.

This chapter critically looks at shale gas production through hydraulic fractures. It gives a brief summary of the geological and physical properties of shale gas and the motivation for the recovery of gas from shale gas reservoirs. Emphasis is put on the challenges associated with the recovery of gas from the tight shale rock. According to the [United States Environmental Protection Agency (EPA)], hydraulic fracturing is a process that stimulates a natural gas, oil, or geothermal well to maximize extraction. The EPA defines the broader process that includes the acquisition of source water, well construction, well stimulation and waste disposal.

1. Problem Descriptions

Extraction of natural gas from sources of organic, rich and tight shales is inherently challenging.

Due to its permeability, hydraulic fracturing is performed at an initial phase during the development of shale gas reservoirs. The gas production from the well will typically decrease rapidly, demanding regular stimulation of the wells to maintain production. Several techniques exist for performing this stimulation.

In terms of shale gas, oil and coal formations, natural gas in shales were essentially formed from the remains of plants, animals and micro-organisms that lived millions of years ago. There are different theories on the origins of fossil fuels, where the most widely accepted is that they are formed when organic matter such as the remains of a plant or animal, are buried, compressed and heated in the earth's crust for long time. In the case of natural gas, this is referred to as thermogenic methane generation.

Determining the true porosity of a gas-filled formation has always been a problem in the oil industry. During the calibration process, water-filled formations are used to develop porosity algorithms, and under these conditions, a lower number of hydrogen atoms is equivalent to a lower porosity. Consequently, when a gas-filled formation is logged, which has a lower number of hydrogen atoms than a water-filled formation of the same porosity, the porosity estimate will be lower than the true porosity. The most well-established technique is to apply the hydraulic fracturing on a regular basis. Another strategy is to switch between production and well shut-ins in a cyclic manner. Well shut-ins allow recharging of fractures with gas and pressure build up in the stimulated regions of the reservoir. This second approach will be the focus of this research; assessing the potential of applying model-based optimization as a mean to maximize production and long-term recovery in particular.

The terms Measurement While Drilling (MWD), and Logging While Drilling (LWD) are not used consistently throughout the industry.

Although these terms are related, within the context of this section, the term MWD refers to directional-drilling measurement for decision support and for the smooth operation of the drilling, while LWD refers to measurements concerning the geological formation made while drilling.

MWD typically concerns measurements taken of the well-bore inclination from a vertical angle, and also magnetic direction from the north. Using basic trigonometry, a three-dimensional plot of the path of the well can be produced. A MWD down-hole tool is also (high-sided) with the bottom hole drilling assembly, enabling the well-bore to be steered towards a chosen direction in 3D space known as directional drilling. Directional drillers rely on receiving accurate, high quality tested data from the MWD operator to allow them to keep the well safe on the planned trajectory.

The [U.S. EPA] has acknowledged that toxic, carcinogenic chemicals such as benzene and ethylbenzene, have been used as gelling agents in water and chemical mixtures for high volume horizontal fracturing. Following the hydraulic fracture in high volume of horizontal fracturing, the water, chemicals and fracture fluid that return to the well's surface, called flow-back or produced water, may contain radioactive materials, heavy metals, natural salts, and hydrocarbons which exist naturally in the formation of shale rock.

The water-based drilling fluids, has overcome many of the technical challenges that could otherwise limit their application. This process reduces environmental impact and cost. These fluids also enhance electronic imaging quality for an improved ROI.

The main functions of drilling fluids includes providing hydrostatic pressure to prevent formation fluids from entering into the well bore, keeping the drill bit cool and clean during drilling, carrying out drill cuttings, and suspending the drill cuttings while drilling is paused and when the drilling assembly is brought in and out of the hole. The drilling fluid used for a particular job is selected to avoid formation damage and to limit corrosion.

The main problem of this study is to calibrate a method that will allow performing hydraulic fractures without affecting the environment possible.

2. Exploration methods

According to [World Energy Outlook 2009], vertical wells tend to access only a small volume of shale. The initial fracturing of a well may take approximately 30 days, although this varies with geography, after which the gas will be produced for many years or decades, although the well may be fractured again at a later stage to improve throughput.

There are several ways or methods that gas explorers use in order to discover the gas such as seismic, drilling and well logging. This chapter shows how these three methods are being carried out. Seismic methods are applied primarily in order to determine quasi-homogeneous zones according to parameters of fragmentation, physical and chemical weathering and deform-ability of rock masses and cohesionless soil. Applied seismic methods comprise sending impulses underground and registering the resulting refracted arrivals from subsurface interfaces on a number of receivers positioned on or near the surface.

In terms of drilling: in most shale gas resources are located at depths of 6,000 feet or more below the ground level and can be relatively thin.

According to [Rotman, 2009], the efficient extraction of gas is vertically downward until the drill bit reaches a distance of around 900 feet from the shale formation.

At this point, a directional drill is used to create a gradual 90-degree curve, so that the well-bore becomes horizontal as it reaches optimal depth within the shale.

The well-bore then follows the shale formation horizontally for 5,000 feet or more, then an amount of cement is pumped into the annulus or void space between the casing and the surrounding mineral formation. After the well-bore reaches a depth below the deepest freshwater aquifer, casing and cement are installed to protect the water from contamination due to the drilling process.

The casing surrounding the horizontal section of the well through the shale formation is then perforated using small explosives to enable the flow of hydraulic fracturing fluids out of the well into the shale, and the eventual flow of natural gas out of the shale into the well.

Well logging, also known as borehole logging, is the practice of making a detailed record of the geologic formations penetrated by a borehole to get oil, gas and some other minerals. Well logs can include visual observations or be made by instruments lowered into the well during the drilling process.

Engineers and drillers often use well logs to measure depths of formation tops, thickness of formations, porosity, water saturation, temperature, types of formations encountered, presence of oil and gas, estimated permeability, reservoir pressures and formation dip ultimately determining whether a well is commercially viable or not and whether casing, cementing and completion should be ran on a well.

2.1 Production Methods

Shale gas resources are becoming an important energy source for meeting rising energy demand that will take place over the next few decades. Development of horizontal drilling and hydraulic fracturing is crucial for the economic production of shale gas reservoirs, but, it must be performed with caution and with a multidisciplinary approach.

Commercial successes in the Barnett Shale, which is currently the largest producing natural gas field, and other shale plays in the United States, have made shale gas exploration possible and development has begun to be spread all around the world.

Shale gas wells share many of the same production characteristics, of which the rapid decline of productivity is the most dominating.

This is supported by the report [World Energy Outlook, 2009] from the [International Energy Agency - IEA (WEO, 2009 The truth about Fracking)], which provides a detailed study of its potential, the last decade's production history and current production level of shale gas.

The production profiles were observed to be remarkably similar, both for horizontal and vertical wells. To elaborate, the wells exhibited an early peak in the production before a rapid decline in the rate.

For horizontal Barnett wells, the decline in production rate is reported to be averagely 39% during the first year and 50% from the first to the third year. Vertical wells appears to have a slightly slower decline in rate.

The monthly rates are reported to decline as much as 57% over the first 12 months.

The averagely initial monthly production rate for Barnett shale horizontal wells, which is in the report from IEA, showed to be approximately 0.9 million m³. Based on this value, the maximum daily flow rate q_{max} for the base case is set to 30000 m³/d. The wellhead pressure is set to a constant value of 10 bar, [Chris 2011. The truth about Fracking].

2.2 Reservoir characteristics of Shale gas

[Medeiros et al 2007] says: "the physical process of the gas flows in shale gas reservoirs complicatedly". Simplifications and approximations are necessary to describe the flow in the complex network of fractures, and comprehensive numerical simulations are normally required to describe these flow patterns.

According to [Carlson and Mercer 1991], analytical models of the gas flow in fractured reservoirs are normally obtained by dual-porosity and mathematical models. These models have been extended to describe the gas production in tight gas and shale gas reservoirs.

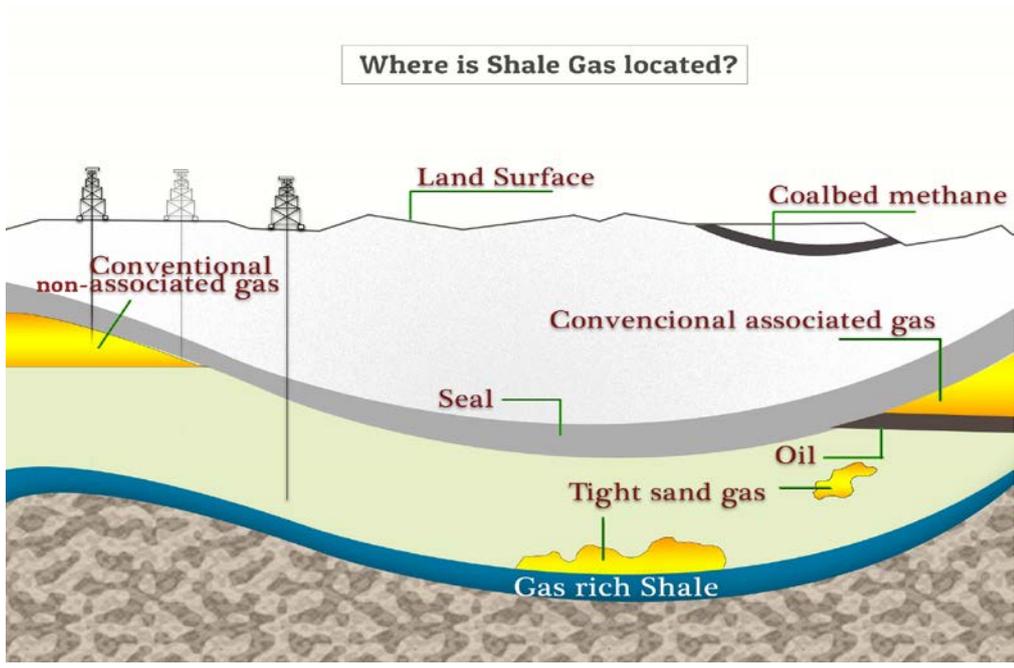
[Carlson and Mercer 1991] also says: "the shale was generally too tight for the gas to flow directly from the storage in the rock to the well".

While in conventional gas, reservoirs containing large amounts of gas flow directly from the storage pores to the well. These quantities, only last in the scale for minutes in shale gas reservoirs. [Schettler et al. 1989] says: "the gas in shales mainly consists of methane".

Due to the tightness of the shale, the gas will only travel a very short distance in the rock over a given, reasonable time span.

[Schettler et al 1989], also describes this flow through the rock itself predominately, as "a result of molecular diffusion".

The majority of the gas flowing in shales, arises from the molecules traveling the short distances from the storage in the tight rock to adjacent segments of fractures in the rock itself. The rock in this context describes a piece of tight shale rock.



The gas then flows from these small segments of fractures to larger networks of fractures in the shale.

Figure 1. Reservoir forming characteristics of unconventional natural gas resources [Nuno Ferreira, 2016].

The key characteristic of shale gas reservoirs are their low permeability.

Permeability is a measure of a materials’ ability to transmit fluids, in this context, the shales ability to transmit the gas. For shale gas reservoirs, the effective permeability may often be between the ranges of 10⁻³ mD and 10⁻⁶ mD. [Cipolla, 2009], emphasizes the difficulties and challenges of recovering gas from shales, compared to conventional viscous reservoirs. Many factors impact the gas production from shale gas reservoirs, where the most prominent is the number and the structural complexity of fracture network.

The effective conductivity of fractures and the actual permeability of the shale rock are also crucial for the productivity.

Further assumptions of reservoir models	The flow is single phase.
	The geometry of the reservoir is cylindrical.
	The geometry of the reservoir is cylindrical.
	The entire thickness of the reservoir is perforated by a well in the center of the cylindrical reservoir model.

Table 1. Presuppositions of reservoir models, [Nuno Ferreira, 2017].

2.3 Pore structure characterization of shale gas

The matrix pore structure of shale gas and tight gas reservoirs play an important role in hydrocarbon storage and transport, which is too difficult to characterize accurately because of a predominant portion of nano-pores associated with clays and organic matter. Characterization of nano-pore structure, has great importance for the percolation mechanism and reservoir evaluation study of shale gas.

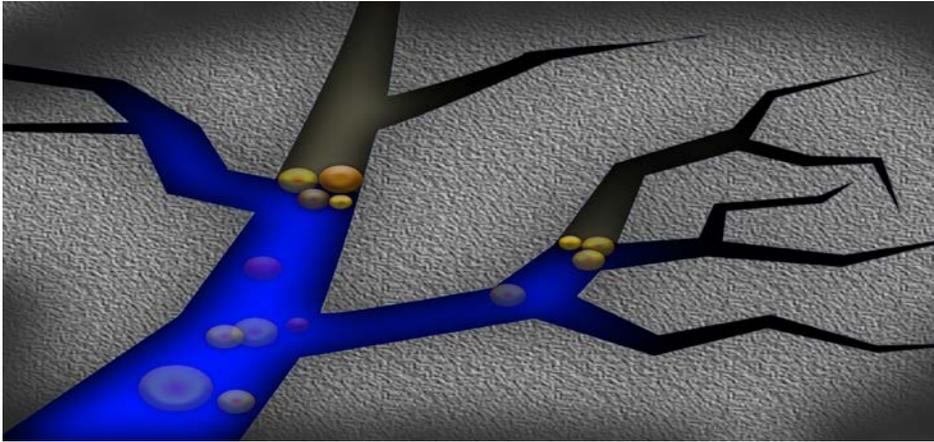


Figure 2. Conventional gas wells, shale gas well and the process of hydraulic fracturing [Nuno Ferreira, 2016].

There are two different gas reservoirs, they are: conventional and unconventional gas reservoirs. For conventional reservoirs, the Mercury Intrusion Technique is commonly used for pore structure analysis.

Meanwhile, unconventional gas reservoirs, with a much higher pressure, could be required for mercury to be injected into the nano-pores, and the High-Pressure Mercury Intrusion Technique is adopted mainly for the analysis of macro-pores (>50 nm), avoiding distortion of pore structures under high pressure.

Pore size distribution, in contrast to conventional reservoirs, gas shales have very low porosity and low permeability, shale matrix possesses ruleless pore structure and a wide pore size distribution with a significant pore volume in the nano-pore range.

Many petrophysical properties of the unconventional tight gas formations are significantly different from those of conventional reservoirs. Such formations in particular have nano-scale pores and channels, a unique pore structure, the unusual wet-ability, transport, and storage properties. These differences produce the fluid flow mechanisms which are different from those in conventional gas plays, especially when the size of the pore throats differs from the size of the saturating fluid molecules by only slightly more than one order of magnitude. Despite the practical importance of this topic, very little is known about it.

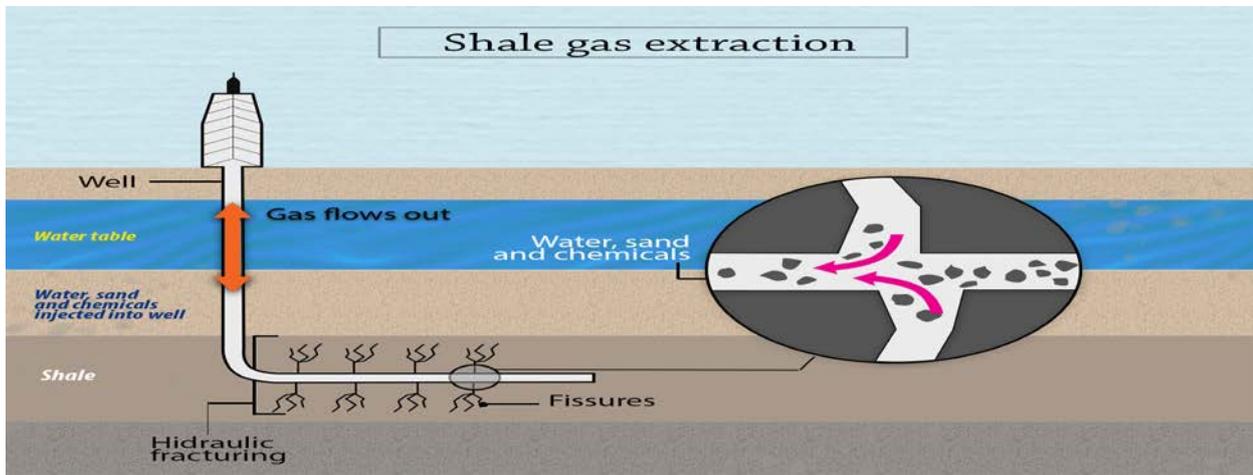


Figure 3. Illustration of shale gas extraction, [Nuno Ferreira, 2016].

3. Drilling and Completion

Drilling is mostly classified in two different terms i.e Directional and Horizontal.

3.1 Directional Drilling

Directional drilling or slant drilling is the practice of drilling non-vertical wells.

It can be broken down into four main groups: oil field directional drilling, utility installation directional drilling, directional boring, and surface in seam, which horizontally intersects a vertical well target to extract coal bed methane.

When directional drilling is combined with hydraulic fracturing some rock units which were unproductive when drilled vertically can become fantastic producers of oil or natural gas.

Wells are drilled directionally for several purposes:

- A. Increasing the exposed section length through the reservoir by drilling through the reservoir at an angle.
- B. Drilling into the reservoir where vertical access is either difficult or not possible. For instance an oilfield under a town, under a lake, or underneath a difficult-to-drill formation.
- C. Allowing more wellheads to be grouped together on one surface location allows fewer rig moves, less surface area disturbance makes it easier and cheaper to complete and produce the wells. For instance, on an oil platform or jacket offshore, 40 or more wells can be grouped together. The wells will fan out from the platform into the reservoir below.
- D. This concept is being applied to land wells, allowing multiple subsurface locations to be reached from one pad, reducing costs.
- E. Drilling along the underside of a reservoir-constraining fault, allows multiple productive sands to be completed at the highest strati-graphic points.
- F. Drilling a "relief well" to relieve the pressure of a well producing without restraint. In this scenario, another well could be drilled starting at a safe distance away from the blowout, but intersecting the troubled well-bore. Then, heavy fluid is pumped into the relief well-bore to suppress the high pressure in the original well-bore causing the blowout.

3.2 Horizontal Drilling

Horizontal oil and gas well drilling has become one of the most valuable technologies ever introduced in the business. Unlike a directional well that is drilled to position a reservoir entry point, a horizontal well is commonly defined as any well in which the lower part of the well bore parallels the oil zone. The angle of inclination used to drill the well does not have to reach 90° for the well to be considered a horizontal well. Applications for horizontal wells include the exploitation of thin oil-rim reservoirs, avoidance of draw-down-related problems such as water/gas coning and the extension of wells by means of multiple drain holes.

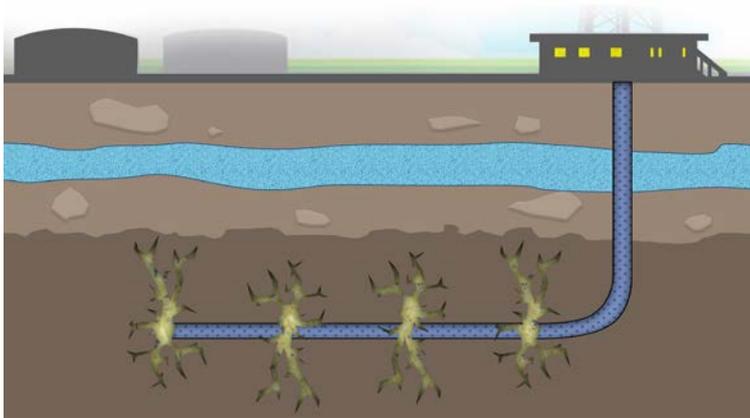


Figure 4. Horizontal drilling being performed, [Nuno Ferreira, 2016].

Horizontal wells have become a preferred method of recovering oil and gas from reservoirs in which these fluids occupy strata that are horizontal or nearly, because they offer greater contact area with the productive layer than vertical wells.

While the cost factor for a horizontal well may be as much as two or three times that of a vertical well, the production factor can be enhanced as much as 15 or 20 times, making it very attractive.

To give an idea of the effectiveness of horizontal drilling, using horizontal drilling can lead to an increase in reserves in place by 2% of the original oil in place.

The production ratio for horizontal wells versus vertical wells is 3.2 to 1, while the cost ratio of horizontal versus vertical wells is only 2 to 1.

Nowadays there are 3 main types of horizontal wells: Short Radius, Medium Radius and Long Radius.

Horizontal oil drilling can be used in many situations where conventional drilling is either impossible or cost prohibitive. This is by no means an exhaustive list, but it should get explorers thinking about the possibilities of horizontal directional drilling.

As horizontal well drilling can be used in these scenarios:

1. Under buildings, roads and other surface obstructions.
2. Under active sites where surface operations precluded drilling equipment.
3. To efficiently extract soil vapor.
4. To identify the causes of decreased well performance.
5. To place leak detection sensors beneath solid or hazardous waste landfills.
6. To install gas collection systems at landfills or similar waste dump.

7. To stabilizing hillsides for mine waste dumps or other unstable granular soil masses.
8. To install groundwater collection galleries in shallow aquifers for private or public water supply.
9. To convey fluids between vertical wells and treatment facilities.

3.3 Drilling Methodology

Most horizontal wells begin at the surface as a vertical well. Drilling progresses until the drill bit is a few hundred feet above the target rock unit.

At that point the pipe is pulled from the well and a hydraulic motor is attached between the drill bit and the drill pipe. The hydraulic motor is powered by a flow of drilling mud down the drill pipe. It can rotate the drill bit without rotating the entire length of drill pipe between the bit and the surface.

This allows the bit to drill a path that deviates from the orientation of the drill pipe. After the motor is installed, the bit and pipe are lowered back down the well and the bit drills a path that steers the well bore from vertical to horizontal over a distance of a few hundred feet.

Once the well has been steered to the proper angle, straight-ahead drilling resumes and the well follows the target rock unit. Keeping the well in a thin rock unit, requires careful navigation. Down-hole instruments are used to determine the azimuth and orientation of the drilling. These methods can multiply the yield of natural gas or oil from a well. Many profitable wells would be failures without these methods.

3.4 Disadvantages of Horizontal Drilling

Until the arrival of modern down-hole motors and better tools to measure inclination and azimuth of the hole, directional drilling and horizontal drilling was much slower than vertical drilling, due to the need to stop regularly and take time-consuming surveys, and due to slower progress in drilling itself.

These disadvantages have shrunk over time, as down-hole motors became more efficient and semi-continuous surveying became possible.

What remains, is a difference in operating costs: for wells with an inclination of less than 40 degrees, tools to carry out adjustments or repair work can be lowered by gravity on a cable into the hole. For higher inclinations, more expensive equipment has to be mobilized to push tools down the hole. Another disadvantage of wells with a high inclination was that, prevention of sand influx into the well was less reliable and needed higher effort.

Again, this disadvantage has diminished such that, provided sand control is adequately planned, it is possible to carry it out reliably. Therefore, directional drilling can be used to reach targets that cannot be drilled with a vertical well.

4. Operation Process and Methods

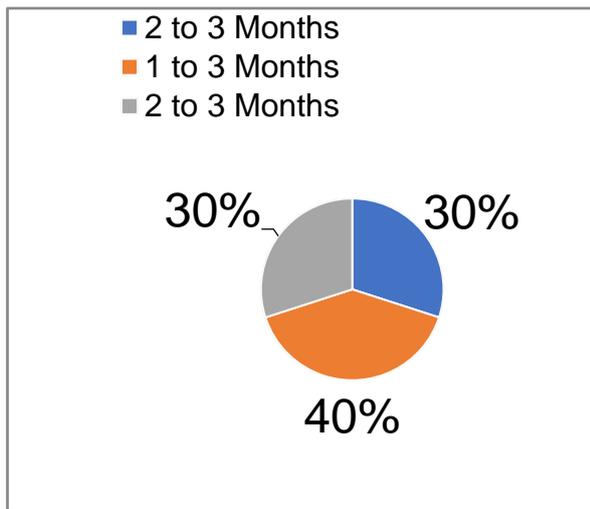
4.1 Operation Process

The operation process, involves the high-pressure injection of hydraulic fracturing fluid such as primary water, containing sand or other proppants suspended with the aid of thickening agents into a wellbore to create cracks in the deep-rock formations through which natural gas, petroleum and brine will flow more freely. When the hydraulic pressure is removed from the well, small grains of hydraulic fracturing proppants either sand or aluminum oxide hold the fractures open. This operation increases in seismic activity following hydraulic fracturing along dormant or previously active, unknown faults are sometimes caused by the deep-

injection disposal of hydraulic fracturing flow-back and produced formation brine. Fracturing rocks at great depth frequently becomes suppressed by pressure, due to the weight of the overlying rock strata and the cementation of the formation.

This suppression process is particularly significant in fractures which require the walls of the fracture to move against this pressure. Fracturing occurs when effective stress is overcome by the pressure of fluids within the rock. The minimum principal stress becomes tensile and exceeds the tensile strength of the material. Fractures formed in this way are generally oriented in a plane perpendicular to the minimum principal stress, and for this reason, hydraulic fractures in well bores can be used to determine the orientation of stresses.

- Developing the Well
- Completion and Simulation
- Operation and Production



Graphic 1. Brief summarization of the Operation process, [Nuno Ferreira, 2017].

4.2 Operation Methods

A hydraulic fracture is formed by pumping fracturing fluid into a well-bore at a rate sufficient to increase pressure at the target depth, to exceed that of the fracture gradient of the rock.

The fracture gradient is defined as pressure increase per unit of depth relative to density and is usually measured in pounds per square inch, per square foot or bars.

The rock cracks, and the fracture fluid permeates the rock extending the crack further and further, and so on.

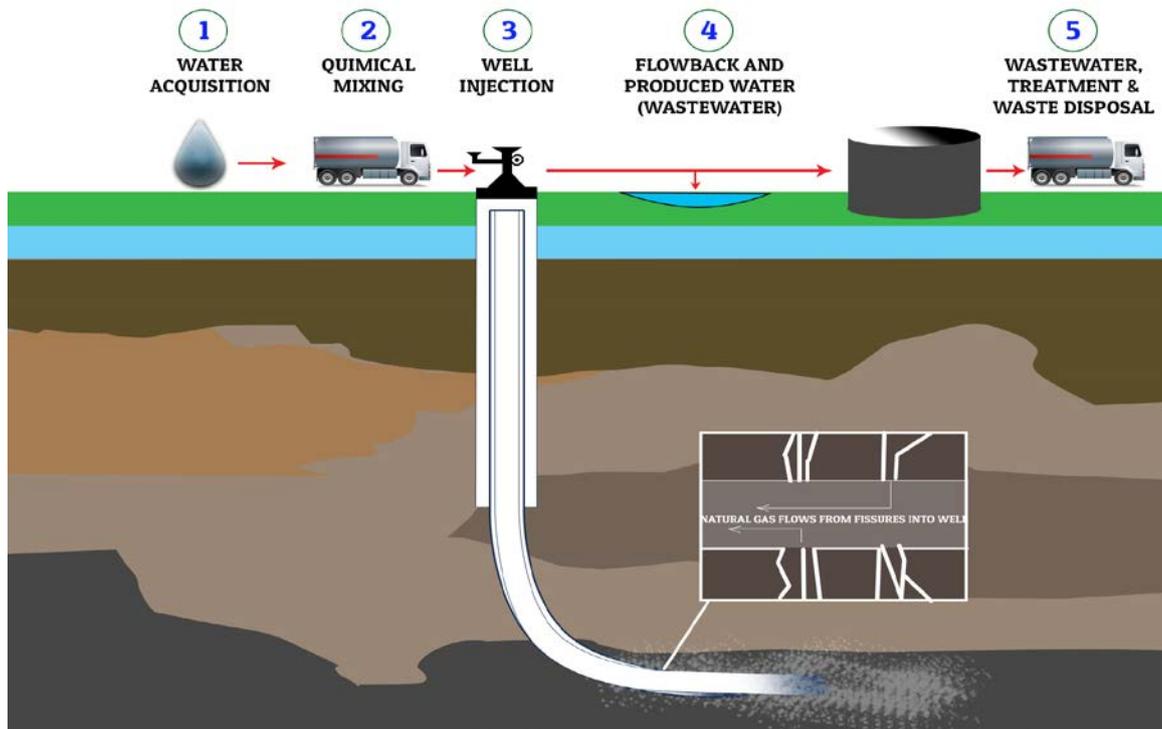
Operators typically try to maintain its decline following treatment, by introducing a proppant into the injected fluid.

Materials such as grains of sand, ceramic, or other particulate, thus preventing the fractures from closing when injection is stopped and the pressure is removed. The propped fracture is permeable enough to allow the flow of gas, oil, salt water and hydraulic fracturing fluids to the well.

During the process, fracturing fluid leak-off (loss of fracturing fluid from the fracture channel into the surrounding permeable rock) occurs.

If not controlled, it can exceed 70% of the injected volume. This may result in a formation matrix damage, adverse formation fluid interaction and altered fracture geometry, thereby decreasing efficiency.

The location of one or more fractures along the length of the borehole is strictly controlled by various methods that create or seal



holes in the side of the well-bore.

Hydraulic fracturing is performed in cased well-bores and the zones to be fractured are accessed by perforating the casing at those locations.

Figure 5. Hydraulic Fracturing being processed horizontally, [Nuno Ferreira, 2016].

4.3 Principals of Shale gas fractures

There are different principals of shale gas fractures that must be followed, not just for the economy of the country but also to prevent a negative impact on the environment.

Principals are meant to be acknowledge before exploring shale gas in an area of hydraulic fracture procedures.

Not acknowledging the principals of shale gas fractures and production may result in lives being put in danger, a negative environmental impact and other non-environmentally and economically profitable impacts.

Therefore, it is extremely important to know all the major principles before beginning the exploration of a certain area for shale gas extraction.

Principals:

1. Plan ahead of developments and evaluate possible cumulative effects before granting license;
2. Carefully assess environmental impacts and risks;

3. Ensure that the integrity of the well is up to best practice standards;
4. Check the quality of the local water, air, soil before operations start, in order to monitor any changes and deal with emerging risks;
5. Control air emissions, including greenhouse gas emissions, by capturing the gases;
6. Inform the public about chemicals used in individual wells;
7. Ensure that operators apply best practices throughout the project.

4.4 Equipment used in Shale Gas Extraction and Production

The machine mostly used to perform deep drilling is called a Drilling rig. It is able to create holes in the earth as well as in the sub-surface.

Drilling rigs are massive structures used to drill water wells, oil wells or natural gas extraction wells and are also small enough to be moved manually by one person and are called augers.

These Drilling rigs can sample sub-surface mineral deposits, test rock, soil and groundwater physical properties and can also be used to install sub-surface fabrications, such as underground utilities, instrumentation, tunnels or wells.

Drilling rigs can be mobile equipment mounted on trucks, tracks or trailers, or more permanent land or marine-based structures.

The term "rig" therefore, generally refers to the complex of equipment that is used to penetrate the surface of the earth's crust. Using these drilling rigs, can easily reach the depth hole needed by the operator and its convenient to be used as it can also be moved manually.

There are many types and designs of drilling rigs with many drilling rigs capable of switching or combining different drilling technologies as needed.

5. Opportunities and Challenges

• Strong market demand	• The lack of top-level design;
• The resources potential is big and can adopt the resources;	• Exploration and development model to guide the need to be strengthened;
• All aspects of high attention, social capital investment enthusiasm is very high;	• Geological foundation work is weak
• Shale gas exploration rights market has been liberalized;	• The core technology behind;
• Foreign technology can be used for reference, there are technical accumulation in the countries;	• Support the early development of preferential policies;

• Equipment localization and low labor costs;	• Infrastructure construction is lagging behind;
• Technology and engineering services market is huge;	• Environmental protection pressure
• More investment opportunities and financial markets.	

Table 2. Opportunities and Challenges faced during the process of exploration and production of Shale Gas, [Nuno Ferreira, 2017].

5.1 Summary of the whole process

PERIOD	ACTIVITY	METHODS	EXPECTATION-RESULTS
Two to three months	Developing the well	Drilling rigs	
One to three months	Completion and Stimulation	Fracturing Equipment	
Two to three months	Operation	Hydraulic fractures producing oil and natural gas	20 to 40 or more years of production

Table 3. Overview of the period and expected results of the exploration process, [Nuno Ferreira, 2017].

5.2 Conclusion

This research concludes that, shale gas exploration through hydraulic fractures is a great technological innovation that results in abundance of oil and natural gas.

It shows the development of the study of hydraulic fractures for shale gas production applied to shale gas wells. As the time passes, more countries are starting to extract and produce shale gas through hydraulic fractures. It is a risky exploration because during the extraction process, chemical substances are introduced into the drilling pipes to break the rocks underground, therefore once the production begins, the chemical substances must be removed out from underground so that the gas may flow out the rocks. By the time the substances are being removed, it passes through the potable water and, somehow, the chemical substances might contaminate the drinking water.

The shale gas resources are becoming an important energy source for meeting rising energy demand within the near future. The development of horizontal drilling and hydraulic fracturing is crucial for the economic production of shale gas reservoirs. It must be performed with caution and with a multidisciplinary approach.

Hydraulic fractures for shale gas production are an extraordinary field of study with many different ways and methods to extract and produce shale gas. The results obtained indicates that the entire process of developing a well, typically takes between two to three months: a few weeks to prepare the sides, four to six weeks to drill the well and then between one to three months for

completion activities which includes one to seven days of stimulation. These two to three months of investment may result in a well that will produce oil, or natural gas for 20 to 40 years or more.

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Motivation of Senior High School Students in their Studies

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Abstract- Senior High School students face different struggles pertaining on having lack of materials needed in school. In order for them to continue pursuing their studies, they must establish a strong motivation. The study was a quantitative design. This study aimed to know the different levels of motivation of Senior High School students. The researchers conducted the survey among the Senior High School with the total of one hundred respondents who are required to answer the questionnaire to complete the survey and gather the data needed. Quantitative data were processed using chi-square. The result will show the correlation between motivation and education in terms of student's profile. The study has shown the level of student motivation in terms of faith, family, economic status, friends, goals, and education in their studies. It shows that motivation is essential for the students for them to be dedicated enough on their studies. Results also show that level of motivation is not correlated with the student's profile which includes gender, grade level, and family background. It can be inferred that there is no significant association of level of motivation between student's profile.

Index Terms- Education, Motivation, Poverty.

I. INTRODUCTION

Poverty is one of the major problems in the country. It is known for not being productive for society. It made the people struggle in acquiring their basic needs such as foods, shelter, and clothes. Poverty could also lead to regression that even how diligently one works, it still drag him/her down. Poverty is a national problem that until now is even getting worse. Instead of the eradication of poverty, it increases and becomes a major problem affecting the child holistically. The institute for Public Policy and Economic Development (The Institute, n.d) states that low social economic status (SES) has a huge impact on children. In addition, low parental income can have a large effect on the psychological state of their child that leads to issues their studies because lack of necessity tools for schooling and instead the child chooses to help their parents in providing their daily needs. While some who pursue their studies will later on surrender because they cannot focus and provide their educational needs anymore. By this, they miss to attain better opportunity in the work force because of poor educational background resulting to emotional and mental distress.

On one hand, education is so important for it is one of the keys to overcome poverty and will open many opportunities leading to success. Amzat (2010) says that education is a key index of development that improved productivity, health and reduces negative features of life such as child labor as well as bringing about empowerment. Students should strive hard to surpass poverty to become a successful one. To motivate students from parents and teachers to study hard and focus on their studies. By this, it can help the children who are the hope of the nation.

Eventually, this research focused on students' motivation on education despite poverty for education. It intends to assess categories in which students shall be more inclined into the kind of motivation.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Poverty has seen to affect the child negatively (Guo and Harris, 2000). Children's lower achievements are link with poverty (Wool, Fermanich and Reichard, 2015). Children in low-income families are tend to be at risk with poor development (Beardslee, Aber and Yoshikawa, 2014). They are left behind from their studies even before starting to school (Waldfoegel, 2017). They tend to have lower chances to achieve greater academic opportunities (Duncan and Brooks-Gunn, 2017).

Due to lack of resources, they tend to struggle to achieve same level of accomplishment (Lacour and Tissington, 2011) and viewed as incompetent of academic and social success (Milner, Cunningham, Murray and Alvarez, 2017). Due to insufficient resources, poor students struggle to reach their desired goals and perform less unlike those who are rich. They do not learn the social skills and do not receive the interest that will activate themselves for school preparatory (Ferguson, Bovaird, and Mueller, 2007). According to Campbell and Ramey (2013), the child must live in a better influence environment early in his/her life for him/her to prepare for academic success. Individuals who lived in poverty have a lesser chance to graduate from their studies (Rockinson-

Szapkiw, Spaulding, Swezey, and Wick, 2014). And it would be a long term damage on economic and employment if the children will not be given the best education (Gonzales, 2009).

Education is one of the ways to eradicate poverty. It is known to be an essential process of development (Aref, 2011). It is an important foundation of socio-economic development (Turkkahraman, 2012). It is believed that education helps the economy to improve and give the people the living that supports them (Stirling, 2013). It is the key to raise the poor from poverty by increasing the value and efficiency of the labor force (Ominiyi, 2013). It molds someone's lives positively (Amzat, 2010). It enhances the potential of every individual to earn money for them to overcome poverty (Njong, 2010).

For the children to continue their studies despite the situation they are experiencing, one must possess motivation. A higher level of motivation must be developed to reach one's goals (Mazumder, 2014). Motivation is defined as a physical and psychosocial need that will motivate individuals and give them the feeling of satisfaction if one's goals are accomplished (Jafari and Mahadi, 2012). Motivation activates the desire of a person to continuously make an effort to accomplish a task (Gbollie and Keamu, 2017). This is simply why people continue to endure their situation despite poverty hinders their way in reaching their dreams but still pursue and push what they want. They are still willing and determine enough to keep moving. According to Shaheen, Perveen, Nashaba and Malikz (2003), motivation serves as a tool for student's success.

Students motivation help them to attain good grades (Ullah, Sagheer, Sattar, and Khan, 2013). Motivation plays a big role for students in attaining academic success. In its absence, the student will never make an effort to learn. Student motivation refers in which students put a lot of effort in order to achieve a successful outcome Saeed and Zyngier, 2012). Intrinsically motivated students perform in class for their own (Amzal, Ali, Khan, and Hamid, 2010).

One of students' motivation is the effective teaching methods. According to Rehman and Haider (2005), effective teaching methods create motivation to the students . In the study of Mceown and Takeuchi (2016), students' motivation in terms of the teacher's strategy used showed a significant relationship. A specific strategy is important in teaching students for them to get motivated and active in class. Educators should not limit themselves in terms of learning and teaching strategies (Jayanthi, Balakrishnan, Ching, Latiff and Nasirudeen, 2014). They can also give their students a positive feedback that can boost their self-confidence (Shousha, 2008). Strategies are necessary to ensure that they will sustain their learning throughout their life (Vibulphol, 2016).Parents can also minimized the negative effects of financial problem by providing the child's emotional stability so that they would still go after their dreams (Davis-Kean, 2005).

Thus, motivation is necessary to ensure the sustainability of the children's life. It serves as their stronghold that no matter how hard life can be, they are still persevering in order for them to attain a better life in the future. Similarly, the researchers intend to assess the level of motivation of students towards faith, family, economic status, friends, goals, and education.

III. FINDINGS

Table 1
Frequency of Respondents According to Gender

Gender	Frequency	%
Male	28	28%
Female	72	72%
Total	100	100%

N=100

The table above shows the frequency of respondents according to gender. There are 28 male respondents of 28% and 72 female respondents of 72%. With this, it can be inferred that most of the respondents are female.

Table 2
Frequency of Respondents According to Grade Level

Grade Level	Frequency	%
Grade 11	69	69%
Grade 12	31	31%
Total	100	100%

N=100

The table above shows the frequency of respondents according to grade level. There are 69 Grade 11 respondents of 69% and 31 Grade 12 respondents of 31%. This shows most of the respondents of this study were grade 11 Senior High School students.

Table 3
Frequency of Respondents According to Family Background

Family Background	Frequency	%
Single	30	30%

Married	70	70%
Total	100	100%

N=100

The table above shows the frequency of respondents according to family background. There are 30 of the respondents whose family background is single of 30% while 70 of the respondents' family background is married with 70%. This implies that mostly respondents' family background is married

Table 4
Level of Students Positivity of Poverty

Indicators	Weighted Mean	Interpretation
1. I am well focused on my studies despite the difficulties I've encounter.	3.97	Agree
2. I never let poverty hinder my studies.	4.04	Agree
3. I don't get distracted when I have financial problem.	3.42	Agree
4. I am working up to my full potential despite the hardship I am experiencing.	4.03	Agree
5. I put a lot of thoughts and efforts into my works eventhough poverty is lingering me.	3.98	Agree
6. I don't let my situation stressed me out.	3.71	Agree
7. I don't let other matters affect my studies.	3.73	Agree
8. I perform well in school eventhough I am lack of some materials needed.	3.75	Agree
9. I think on the brighter side of my situation.	3.83	Agree
10. I set poverty positively as my inspiration to success.	4.33	Strongly Agree
Overall Weighted Mean	3.87	Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The table above shows the weighted mean on how poverty affects the studies of the student regarding of their gender, grade level and family background. The statement "I set poverty positively as my inspiration to success" has the highest weighted mean of 4.43, interpreted as strongly agree. This implies that poverty strongly gives students inspiration on their studies towards their success. Meanwhile, the statement "I never let poverty hinder my studies" has the second highest weighted mean of 4.04 interpreted as agree. This means that poverty is not a hindrance to their studies. The third highest weighted mean is "I am working up to my full potential despite the hardship I am experiencing" of 4.03 interpreted as agree. This implies that despite how hard their experiences are, they still work up to their full potential. On the other hand, "I put a lot of thoughts and efforts into my works eventhough poverty is lingering me" has the fourth highest weighted mean of 3.98 interpreted as agree. This means that students put more efforts on what they did even they are struggling in life. The statement "I am well focused on my studies despite the difficulties I've encounter" has a weighted mean of 3.97 interpreted as agree. This indicates that the students do not let their situation affects their studies. The weighted mean of the statement "I think on the brighter side of my situation" is 3.83 interpreted as agree. This indicates that they set their situation positively and look for its brighter side. The statement "I perform well in school eventhough I am lack of some materials needed" has a mean of 3.75 interpreted as agree. On one hand, the statement "I don't let other matter affect my studies" has the mean of 3.73 interpreted as agree. The statement "I don't let my situation stressed me out" has the mean of 3.71 interpreted as agree. This means that they do not let poverty affect them on their studies. "I don't get distracted when I have financial problem" has the weighted mean of 3.42 interpreted as agree. This indicates that some of the students do not get distracted when they have a problem in financial matter. The overall weighted mean is 3.87 interpreted as agree signifies that poverty makes the students be optimistic and persevere in life. It implies that poverty shows significant association between students' education.

Table 5
LEVEL OF STUDENTS MOTIVATION IN TERMS OF FAITH

Indicators	Weighted Mean	Interpretation
1. Faith lifts up my confidence to face any challenges in life.	4.24	Strongly Agree

2. Faith serves as my foundation in life especially in overcoming problems in life.	4.31	Strongly Agree
3. Faith builds my determination that whatever my situation is now, I can conquer it.	4.24	Strongly Agree
4. Faith strengthen me in overcoming my problems in life.	4.29	Strongly Agree
5. Faith drives me on my firm belief that every hardship has an end.	4.29	Strongly Agree
Overall Weighted Mean	4.274	Strongly Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The table above shows the weighted mean of motivation by the faith. The statement "Faith serves as my foundation in life especially in overcoming problems" has the highest weighted mean of 4.31 interpreted as strongly agree. This implies that faith is a good foundation for students in life. The statements "Faith strengthen me in overcoming my problems in life" and "Faith drives me on my firm belief that every hardship has an end" are the second highest weighted mean of 4.29 interpreted as strongly agree. These suggest that faith is one way of strengthening student and believes that every struggles will come to an end. Lastly, "Faith lifts me up my confidence to face any challenges in life" and "Faith builds my determination that whatever my situation is now, I can conquer it" are the lowest among them of 4.24 interpreted as strongly agree. These imply that faith gives the student the determination and the confidence to face and continue even how difficult life is. The overall weighted mean is 4.274 interpreted as strongly agree implies that faith has a strong association to the students' life.

Table 6
LEVEL OF STUDENTS MOTIVATION IN TERMS OF FAMILY

Indicators	Weighted Mean	Interpretation
1. My parents provide my foods, shelter, clothings, and education.	4.55	Strongly Agree
2. They serve as my inspiration that motivates me to pursue my dreams.	4.59	Strongly Agree
3. I consider my parents as one of my motivations because they give me moral, emotional, and financial support.	4.43	Strongly Agree
4. They help me grow as a better person.	4.48	Strongly Agree
5. My parents motivate me by giving inspirational advice that lifts myself.	4.25	Strongly Agree
Overall Weighted Mean	4.46	Strongly Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The weighted mean of the table above shown is the motivation by the family. The statement "They serve as my inspiration that motivates me to pursue my dreams" has the highest weighted mean of 4.59 interpreted as strongly agree. This implies that family is a strong motivation to the student's education for they are the one why students pursue their studies despite that they are struggling in life. The second highest weighted mean is "My parents provide my foods, shelter, clothings, and education" of 4.55 interpreted as strongly agree. This conveys that their parents give them their needs. Meanwhile, "They help me grow as a better person" has the weighted mean of 4.48 interpreted as strongly agree. On the other hand, the statement "I consider my parents as one of my motivations because they give me moral, emotional, and financial support" has 4.43 weighted mean interpreted as strongly agree. This means that moral, emotional, and financial supports of parents are highly needed for the students to boost their confidence and to persevere in their studies. The lowest weighted mean among them is the statement "My parents motivate me by giving inspirational advice that lifts myself" which has 4.25 interpreted as strongly agree. This indicates that parents' advice motivates the students and gives confidence. The overall weighted mean is 4.46 and interpreted as strongly agree implies that family has a very strong association to the students for them to pursue their ambitions in life.

Table 7
LEVEL OF STUDENTS MOTIVATION IN TERMS OF ECONOMIC STATUS

Indicators	Weighted Mean	Interpretation
1. My status motivates me to strive harder in life.	4.29	Strongly Agree
2. I didn't let my status define my personalities.	4.13	Strongly Agree

3. I didn't let my status hinder my dreams in life.	4.1	Strongly Agree
4. My status inspires me to work harder.	4.32	Strongly Agree
5. I consider my situation as my motivation.	4.3	Strongly Agree
Overall Weighted Mean	4.228	Strongly Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The table above shows the weighted mean of motivation by the economic status. The statement "My status inspires me to work harder" has the highest of 4.32 interpreted as strongly agree. The second highest weighted mean is the statement "I consider my situation as my motivation" of 4.3 interpreted as strongly agree. Meanwhile, "my status motivates me to strive harder" has the third highest weighted mean of 4.29 interpreted as strongly agree. On one hand, the statement "I didn't let my status define my personalities" has 4.13 weighted mean interpreted as strongly agree. Lastly, the statement "I didn't let my status hinder my dreams" has the weighted mean of 4.1 interpreted as strongly agree. These mean that the respondents perceive economic status as one of their motivation which inspires them to make their situation as their aspiration in life. This also indicates that economic status does not really influence their studies. The overall weighted mean is 4.228 interpreted as strongly agree indicates that economic status associates with the students' education that helps them to work harder and pursue their studies.

Table 8
LEVEL OF STUDENTS MOTIVATION IN TERMS OF GOALS

Indicators	Weighted Mean	Interpretation
1. My dreams in life help me to pursue no matter how hard life it can be.	4.65	Strongly Agree
2. I set goals in order to guide me and remind me to strive harder.	4.28	Strongly Agree
3. I strive harder to achieve my dreams in life to attain a better future.	4.45	Strongly Agree
4. I consider my dreams as a driving force to continue my studies despite the situation I am facing.	4.38	Strongly Agree
5. I condition myself to devote serious effort in order to achieve my goals.	4.25	Strongly Agree
Overall Weighted Mean	4.402	Strongly Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The table above shows the weighted mean of motivation by goals. The statement "My dreams in life help me to pursue no matter how hard life it can be" has the highest weighted mean of 4.65 interpreted as strongly agree. This suggests that goals influence students' perception towards life that no matter how difficult life is, these goals help them pursue what they wanted. The second highest weighted mean is "I strive harder to achieve my dreams in life to attain a better future" of 4.45 interpreted as strongly agree. It means that dreams make the students work harder to achieve their aims in life. The statement "I consider my dreams as a driving force to continue my studies despite the situation I am facing" has the weighted mean of 4.38 interpreted as strongly agree. This implies that mostly students consider their dreams that stimulate their desire to continue their studies regardless of the situation they are experiencing. While the statement "I set goals in order to guide me and remind me to strive harder" has the weighted mean of 4.28 interpreted as strongly agree. This implies that students imprint their goals on their minds in order for them to have a constant reminder not to surrender in any struggles in life. On the other hand, the statement "I condition myself to devote serious effort in order to achieve my goals" has the weighted mean of 4.25 interpreted as strongly agree. This means that students put a lot of effort in anything they do for them to attain their goals in life. The overall weighted mean is 4.402 interpreted as strongly agree signifies that goal associates to the studies of students and the reason why they continue to study harder.

Table 9
LEVEL OF STUDENTS MOTIVATION IN TERMS OF FRIENDS

Indicators	Weighted Mean	Interpretation
1. My friends cheer me up whenever I am down.	4.11	Agree
2. My friends lift up my self-esteem.	3.81	Strongly Agree
3. My friends help me to be a better person.	3.94	Agree
4. My friends comfort me everytime I have problems.	3.97	Agree

5. My friends serve as my stress reliever.	4.06	Agree
Overall Weighted Mean	3.987	Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The table above shows the weighted mean of motivation by the friends. The statement "My friends cheer me up whenever I am down" has the highest weighted mean of 4.11 interpreted as agree. This indicates that friends somehow boost one's confidence as well as they give positivity towards their other peers. The statement "My friends serve as my stress reliever" has the second highest weighted mean of 4.06 interpreted as agree. This implies that friends can also a good source in reducing one's stress. "My friends comfort me everytime I have problems" has the weighted mean of 3.97 interpreted as agree. Meanwhile, the statement "My friends help me to be a better person" has weighted mean of 3.94 interpreted as agree. This implies that friends also help in the respondents to become a better person. On the other hand, the statement "My friends lift my self-esteem" has the weighted mean of 3.81 interpreted as agree. This implies that friends boost one's self-esteem. The overall weighted mean is 3.987 interpreted as agree implies that friends somehow associate and contribute to the well-being of the students.

Table 10
LEVEL OF STUDENTS MOTIVATION IN TERMS OF EDUCATION

Indicators	Weighted Mean	Interpretation
1. I believe that education is the way for me to escape poverty.	4.53	Strongly Agree
2. Education disciplines me by teaching me how to be a responsible individual.	4.57	Strongly Agree
3. Education serves as my training ground towards success.	4.54	Strongly Agree
4. Education serves as the way that will give me better life in the future.	4.53	Strongly Agree
5. Education serves as my stepping-stone in life.	4.46	Strongly Agree
Overall Weighted Mean	4.53	Strongly Agree

Legend: Strongly Agree (4.21-5.00), Agree (3.41-4.20), Neutral (2.61-3.40), Disagree (1.81-2.60), Strongly Disagree (1-1.8)
N=100

The weighted mean of the table above shown is the motivation by education. The statement "Education disciplines me by teaching me how to be a responsible individual" has the highest weighted mean of 4.57 interpreted as strongly agree. This implies that education helps the student to be more disciplined in all they do. While the statement "Education serves as my training ground towards success" has the second highest weighted mean of 4.54 interpreted as strongly agree. It indicates that education serves as their way in order to achieve their ambition in life. The statements "I believe that education is the way for me to escape poverty" and "Education serves as the way that will give me a better life in the future" have the weighted mean of 4.53 interpreted as strongly agree. These statements simply mean that through education, students can acquire a better way of living. On the other hand, "Education serves as my stepping-stone in life" has the weighted mean of 4.46 interpreted as strongly agree. It indicates that education serves as a pathway that helps student attain their ambitions.

Table 11
PROFILE OF STUDENTS AND PERCEIVED POSITIVITY OVER POVERTY

Positivity over Poverty	X ²	X ² (2.05)	Decision	Interpretation
Gender	0.44	5.99	Failed to reject	not significant
Grade Level	2.884	5.99	Failed to reject	not significant
Family Background	2.075	5.99	Failed to reject	not significant

N=100

The table above shows the value of computed chi-square of poverty X² (0.44) in terms of gender, X²(2.884) in terms of grade level, X²(2.075) in terms of family background are less than the computed critical value of 5.99 significant 0.05 which fails to reject the null hypothesis— hence, it is not significant. This implies that poverty in terms of gender, grade level, and family background had nothing to do with their studies. There are still factors that should be consider on academic achievement. According to Ferguson, Bovaird, and Mueller (2007), there are six factors that impact child's development. These are the incidence of poverty, the timing of poverty, community characteristics, and the impact poverty has on the child. In the study of Milner, Cunningham, Murray, and Alvarez (2017) said that student success must also focus and understand the outside-of-school-factors that shape student's learning.

Table 12
PROFILE OF STUDENTS IN TERMS OF MOTIVATION BY THE FAMILY

Family	X ²	X ² (2.05)	Decision	Interpretation
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Gender	0.228	5.99	Failed to reject	not significant
Grade Level	2.264	5.99	Failed to reject	not significant
Family Background	0.835	5.99	Failed to reject	not significant

N=100

The table above shows the value of computed chi-square of family $X^2(0.228)$ in terms of gender, $X^2(2.264)$ for grade level and $X^2(0.835)$ in family background are less than the computed critical value of 5.99 significant 0.05 which fails to reject the null hypothesis—thus, it is not significant. This implies that gender, grade level and family background had nothing to do with students' motivation which is family. Parents can also help in eradicating the negative effect of financial problem by providing their emotional aspect (Davis-Kean, 2005).

Table 13
PROFILE OF STUDENTS IN TERMS OF MOTIVATION BY THE FAMILY

Faith	X^2	$X^2_{(2.05)}$	Decision	Interpretation
Gender	1.068	5.99	Failed to reject	not significant
Grade Level	1.982	5.99	Failed to reject	not significant
Family Background	2.467	5.99	Failed to reject	not significant

N=100

The value of computed chi-square of faith $X^2(1.068)$ in terms of gender, $X^2(1.982)$ for grade level, and $X^2(2.467)$ in terms of family background are less than the computed critical value of 5.99 significant 0.05 which fails to reject the null hypothesis—thus, it is not significant. This implies that gender, grade level, and family background do not influence the students' motivation in education in terms of faith. According to Rockinson-Szapkiw, Spaulding, Swezey, and Wicks (2014), faith is responsible for where the students are today.

Table 14
PROFILE OF STUDENTS IN TERMS OF MOTIVATION BY THE ECONOMIC STATUS

Economic Status	X^2	$X^2_{(2.05)}$	Decision	Interpretation
Gender	2.336	5.99	Failed to reject	not significant
Grade Level	1.349	5.99	Failed to reject	not significant
Family Background	0.935	5.99	Failed to reject	not significant

N=100

The value of computed chi-square of economic status $X^2(2.336)$ in terms of gender, $X^2(0.935)$ in terms of family background are less than the computed critical value of 5.99= significant 0.05) which fails to reject the null hypothesis—thus, it is not significant. This implies that gender, grade level, and family background do not influence the students' motivation in education in terms of economic status.

Table 15
PROFILE OF STUDENTS IN TERMS OF MOTIVATION BY GOALS

Goals	X^2	$X^2_{(2.05)}$	Decision	Interpretation
Gender	0.129	5.99	Failed to reject	not significant
Grade Level	0.41	5.99	Failed to reject	not significant
Family Background	0.444	5.99	Failed to reject	not significant

N=100

The table above shows the value of computed chi-square of goals $X^2(0.129)$ in terms of gender, $X^2(0.41)$ in terms of grade level, and $X^2(0.444)$ in terms of family background are less than the computed critical value of 5.99 significant 0.05 which fails to reject the null hypothesis. Thus, it is not significant. This implies that gender, grade level, and family background had nothing to do with the students' motivation which is goals.

Table 16
PROFILE OF STUDENTS IN TERMS OF MOTIVATION BY THE FRIENDS

Friends	X^2	$X^2_{(2.05)}$	Decision	Interpretation
Gender	0.423	5.99	Failed to reject	Not significant
Grade Level	1.996	5.99	Failed to reject	Not significant
Family Background	5.294	5.99	Failed to reject	Not significant

N=100

The value of computed chi-square of friends $X^2(0.423)$ in terms of gender, $X^2(1.996)$ in terms of grade level, and $X^2(5.294)$ in terms of family background are less than the computed critical value of 5.99 at significant 0.05 which fails to reject the null hypothesis. Thus, it is not significant. This implies that gender, grade level, and family background had nothing to do with the students' motivation which is friends. According to Campbell and Ramey (2013), the child must live in a better influence environment early in his/her life for him/her to prepare for academic success.

Table 17
PROFILE OF STUDENTS IN TERMS OF MOTIVATIONS BY EDUCATION

Education	X^2	$X^2_{(2.05)}$	Decision	Interpretation
Gender	0.108	5.99	Failed to reject	Not significant
Grade Level	4.937	5.99	Failed to reject	Not significant
Family Background	0.007	5.99	Failed to reject	Not significant

N=100

In terms of education, the computed value of chi-square $X^2(0.108)$ in terms of gender, $X^2(4.937)$ in terms of grade level, and $X^2(0.007)$ in terms of family background are less than the computed critical value of 5.99 at .05 significant which fails to reject the null hypothesis. Thus, it is not significant. This implies that gender, grade level, and family background with the students' motivation which is education. Education is a good source of foundation that nurture the economy (Omoniyi, 2013). If the children will not be given the best education, the damage on economic and employment would be a long term (Gonzales, 2009).

III. CONCLUSION

Senior high school students have encountered different struggles of having lack of materials needed in school. In order for them to pursue their studies, they must possess motivation. In this study, it assessed the different level of motivation of senior high school students in accordance to gender, grade level, and family background. Based on the results, though the different motivations showed a high level of persistent of the students towards their studies, it was found to be not significant in terms of one's gender, grade level, and family background. Meanwhile, in terms of poverty, it showed that it has no significant association found in accordance to students' profile in terms of gender, grade level, and family background. Generally, students profile does not associate with the levels of students' motivations and as well as poverty. It inferred that whatever your gender, grade level, and family background are, it does not affect the level of motivation and one's positivity towards his/her education.

APPENDIX

RESEARCH INSTRUMENT

Motivation in Education of Students in the Poverty Level

Personal Information

Name:

Grade Level:

Gender:

Family Background:

Direction: Please answer the following items with all honesty. The information that will be gathered by the researchers shall be held with utmost confidentiality.

5-STRONGLY AGREE 4- AGREE 3-NEUTRAL 2-DISAGREE 1-STRONGLY DISAGREE

Poverty	5	4	3	2	1
1. I am well focused on my studies despite the difficulties I've encounter.					
2. I never let poverty hinder my studies.					
3. I don't get distracted when I have financial problem.					
4. I am working up to my full potential despite the hardship I am experiencing.					
5. I put a lot of thoughts and efforts into my works eventhough poverty is lingering me.					
6. I don't let my situation stressed me out.					
7. I don't let other matters affect my studies.					
8. I perform well in school eventhough I am lack of some materials needed.					
9. I think on the brighter side of my situation.					
10. I set poverty positively as my inspiration to success.					

Faith	5	4	3	2	1
1. Faith lifts up my confidence to face any challenges in life.					
2. Faith serves as my foundation in life especially in overcoming problems in life.					
3. Faith builds my determination that whatever my situation is now, I can conquer it.					
4. Faith strengthen me in overcoming my problems in life.					
5. Faith drives me on my firm belief that every hardship has an end.					

Family	5	4	3	2	1
1. My parents provide my foods, shelter, clothings and education.					
2. They serve as my inspiration that motivates me to pursue my dreams.					
3. I consider my parents as one of my motivations because they give me moral, emotional, and financial support.					
4. They help me grow as a better person.					
5. My parents motivate me by giving inspirational advice that lifts myself.					

Economic Status	5	4	3	2	1
1. My status motivates me to strive harder in life.					
2. I didn't let my status define my personalities.					
3. I didn't let my status hinder my dreams in life.					
4. My status inspires me to work harder.					
5. I consider my situation as my motivation.					

Goals	5	4	3	2	1
1. My dreams in life help me to pursue no matter how hard life it can be.					
2. I set goals in order to guide me and remind me to strive harder.					
3. I strive harder to achieve my dreams in life to attain a better future.					
4. I consider my dreams as a driving force to continue my studies despite the situation I am facing.					
5. I condition myself to devote serious effort in order to achieve my goals.					

Friends	5	4	3	2	1
1. My friends cheer me up whenever I am down.					
2. My friends lift up my self-esteem.					
3. My friends help me to be a better person.					
4. My friends comfort me everytime I have problems.					
5. My friends serve as my stress reliever.					

Education	5	4	3	2	1
1. I believe that education is the way for me to escape poverty.					
2. Education disciplines me by teaching me how to be a responsible individual.					
3. Education serves as my training ground towards success.					
4. Education serves as the way that will give me better life in the future.					
5. Education serves as my stepping-stone in life.					

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Development of a Learning Multimedia Based on Balanced Literacy Approach to Improve Critical Thinking Ability of Fifth Grade Elementary School Students

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Abstract- The low level of school literacy culture and the lack of learning activities that hone critical thinking skills are problems that must be overcome. Therefore, relevant learning facilities are needed according to the challenges of the 21st century. This study aims to develop and test the feasibility, practicality, and effectiveness of multimedia learning based on a balanced literacy approach to improve the critical thinking skills of fifth-grade students of elementary school. This study adapted the Thiagarajan research and development (R & D) model known as 4D (define, design, develop, & disseminate). The feasibility of multimedia learning is based on the results of expert validation. The practicality of multimedia learning is based on the results of observations of the implementation of learning, student activities, and student responses. The effectiveness of multimedia learning was tested by tests using pretest-posttest control group design. The results show that learning multimedia based on balanced literacy is feasible, practical, and effective in influencing students' critical thinking skills. Therefore, multimedia learning based on balanced literacy is recommended to be applied as a relevant learning media in the fifth grade of elementary school

Index Terms - balanced literacy, critical thinking, multimedia learning, elementary school.

I. INTRODUCTION

The development of information flows, communication media, science, and technology are rapidly supporting human civilization in the 21st century. For this reason, we need skills in mastering technology, information media, and innovation skills in learning. In the face of the 21st-century era, professional human resources who have the ability to innovate, compete, collaborate, and cooperate in various ways are needed [1]. This is in line with the 21st Century Partnership Learning Framework where education is expected to produce 21st-century human competence and expertise, namely: skills in problem-solving, critical thinking, and knowledge of information and media literacy [2].

Facing the changing times, especially the challenges of globalization, advances in technology and information, environmental problems, and the development of international education. The government has designed policy in the form of a set of plans and rules about objectives, content, and learning materials as a reference in the implementation of education in the 2013 curriculum. Learning in the 2013 curriculum must be well designed so as to grow and provide meaningful experiences for students, one of them through literacy. Literacy is a skill in identifying, finding out, and applying all things carefully using various language skills, including reading, writing, seeing, listening and/or speaking skills [3], [4].

To achieve these targets a comprehensive and planned strategy is needed through a balanced literacy approach. Balanced literacy is defined as an integrated approach that refers to the balance of reading and writing skills through various components of hard reading, guided reading, independent reading, joint writing, interactive writing, and independent writing [5] - [7]. Learning by using a balanced literacy approach is expected to foster a culture of literacy while giving an impact on students' critical thinking skills.

Critical thinking is the ability to think in a reflective and logical way of analyzing and making decisions on a problem based on the consideration of existing facts [8] - [11]. High-level thinking skills are the skills needed to prepare students to be able to compete and adapt to the challenges of the 21st century. For this reason, students need to be accustomed to critical thinking to be used in investigating and uncovering problems that will be faced in daily life, one of them through the use of learning media that can improve students' critical thinking skills.

Based on the reality in the field of observations and preliminary interviews with students and teachers in fifth grade at Ujung Elementary School XIII/38, it was encountered several obstacles in 2013 curriculum learning, namely: (1) low literacy abilities of students, teachers, and school culture; (2) learning that is done is not enough to explore and develop students' critical thinking skills; (3) lack of integration of Information Technology (IT) in learning; and (4) the difficulties of the teacher in preparing relevant learning media in developing students' critical thinking skills. Some of these problems have a negative impact on students in learning such as saturation, boredom, and lack of motivation in learning. These problems are in line with the results of the analysis conducted by The Program for International Student Assessment (PISA) on the ability of mathematics, science and reading literacy of Indonesian students which is still a concern. In addition to the Indonesian National Assessment Program

(INAP) study which described nationally 46.8% of Indonesian students were less skilled in literacy competencies and critical thinking skills [12].

To help overcome these problems, relevant learning facilities are needed to be tailored to technological developments in the 21st century, one of which is the use of literacy-based multimedia learning. Multimedia learning based on a balanced literacy approach is a medium or means used in generating understanding, guiding knowledge, skills, and performance tools through the use of ICTs to understand students in learning subject matter based on the balance of literacy components. Multimedia-based on a balanced literacy approach is useful for students in developing students' concrete understanding, acquiring new information, and a means of creating proactive and creative learning [13] - [15].

This study aims to (1) describe the feasibility of developing multimedia learning based on a balanced literacy approach to improve the critical thinking skills of fifth grade students of elementary school; (2) describe the practicality of the application of multimedia learning based on the balanced literacy approach to improve the critical thinking skills of fifth grade students of elementary school; and (3) describe the effectiveness of the application of multimedia learning based on the balanced literacy approach to improve the critical thinking skills of fifth grade students of elementary school.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

This research is a research development (R & D), which aims to develop products and test the effectiveness of the product (validity). The development model used is the 4D model developed by Thiagarajan [16] which consists of define, design, develop, and disseminate. To test the effectiveness of multimedia learning, the experimental design chosen was one group pretest-posttest design. This research was conducted in fifth grade Ujung Elementary School XIII / 38 Surabaya in the 2018/2019 school year. The subjects of this study were VA class students with 32 students as the experimental class and VB class with 33 students as the control class.

Data collection techniques used in measuring the feasibility, practicality, and effectiveness of learning multimedia based on balanced literacy in the form of questionnaires, observations, and tests. Then, analyzing the feasibility of multimedia learning based on a balanced literacy approach was done by converting the average results of observations into validation criteria. Analysis of the practicality of multimedia learning was obtained from the results of the average implementation of learning, activities, and student responses then converted into predetermined criteria. Moreover, the effectiveness of multimedia learning based on the balanced literacy approach can be measured based on student test results. The previously determined tests have been tested for validity, reliability, normality, and homogeneity before it was applied to the experimental class and the control class.

III. RESULTS AND DISCUSSION

The results of the feasibility test of learning multimedia based on balanced literacy were obtained from the validation sheet from media experts and material experts. Based on the results of the validation sheet, the media expert shows a very valid interpretation (feasible to be applied without improvement). The media expert suggested that the balanced literacy multimedia learning should use more complete and easy-to-understand instructions for students, improve the animation, and add explanatory images in several parts.

Furthermore, the development of learning multimedia based on balanced literacy was carried out by validating material experts. The results of the material expert validation show that the interpretation is very valid, so it is feasible to apply without improvement. The results of the validation sheet of media experts and material experts can be described in the following table.

Table 1. Results of Expert Validation

Validation	Media Expert	Categories
Media Expert (1)	83, 32%	Quite valid (with minor improvements)
Media Expert (2)	89,30%	Very valid (feasible to apply without improvement)
Material Expert	90,54%	Very valid (feasible to apply without improvement)

Source: processed secondary data of researchers, 2018

The practicality of learning multimedia based on balanced literacy can be seen from the results of observation sheets of learning implementation, student activities, and student responses. The results of the implementation of the learning obtained from the observation sheet conducted by two teachers showed very good implementation. Furthermore, the activities of students during the implementation of learning using multimedia learning based on balanced literacy based on the results of observations obtained excellent interpretation results. In addition, the student responses obtained from the practicality questionnaire of learning multimedia based on balanced literacy on product trials are included in the high criteria. The results of learning implementation observation sheet, student activities, and student responses can be explained more detail in the following table.

Table 2. Practicality of Learning Multimedia

Validation	Media Expert	Categories
Implementation in learning	88, 60%	Very good
Student activities	89,30%	Very well
Student response	90,54%	High

Source: processed secondary data of researchers, 2018

The effectiveness of multimedia learning based on balanced literacy on critical thinking skills is obtained from the results of learning outcomes tests. Before being used in research, test questions were validated to experts and then tested on 12 students using the product moment correlation formula. The results of the validity test obtained valid criteria with $r_{count} > r_{table}$,

which is 0.612. The results of the validity test show that of the 40 questions only 21 questions are valid, 20 valid items are set as 20 questions as learning outcomes test instruments. Furthermore, the reliability test using the Alpha Cronbach formula, from the results of these calculations obtained the reliability of the problem of 0,912 so that the question was said to have high reliability.

Test questions that had been tested for validity and reliability were firstly tested for normality using the chi square formula. The results of the pretest and posttest normality test obtained $\chi^2_{count} \leq \chi^2_{table}$, so that data was normally distributed according to the following table.

Table 3. Normality Test Results

Normality Test	X count	X table	Interpretations
Pretest experimental class	1,945	9,49	Data is normally distributed
Pretest control class	2,626	9,49	Data is normally distributed
Posttest experimental class	2,075	9,49	Data is normally distributed
Posttest control class	2,742	9,49	Data is normally distributed

Source: processed secondary data of researchers, 2018

Furthermore, the homogeneity test using variant formula was conducted. If the value of $F_{count} < F_{table}$, it can be said that the question has normal and homogeneous data according to the following table.

Table 4. Homogeneity Test

Homogeneity Test	F count	F table	Interpretations
Pretest	2,03	2,15	Homogeneous
Posttest	2,13	2,15	Homogeneous

Source: processed secondary data of researchers, 2018

After testing for normality and homogeneity, t-test sample relates were tested to test the effectiveness of learning multimedia based on balanced literacy in the pretest and posttest in the experimental class and the control class. Based on the results of the calculation of the t-test, the learning outcomes of students' critical thinking skills after learning activities are 2.45, where t_{count} is greater than t_{table} ($2.45 \geq 2.093$). Therefore, it can be concluded that there are significant differences between the results of learning critical thinking skills of students in the experimental class and the control class.

The application of learning multimedia based on balanced literacy in learning proved to be effective in improving the critical thinking skills of fifth grade students of elementary school. Multimedia learning based on balanced literacy is useful to improve the quality of learning and students' abilities in a more interesting, more interactive way, and can be used at any time [14]. Based on the results of the validation of media experts and material experts, the development of learning multimedia based on balanced literacy is included in a very valid category. After going through the validation stage and declared feasible to use, the learning multimedia based on balanced literacy can be continued at the small group trial stage. Based on the results of the feasibility analysis, the learning multimedia based on balanced literacy is feasible to be used to increase the critical thinking skills of students in fifth grade elementary school with material events in life.

The practicality of multimedia learning based on balanced literacy is known from the results of observations of the implementation of learning, student activities, and practicality questionnaires. Based on the results of observations and questionnaires, it was found that learning multimedia based on balanced literacy was very practical to be used to improve student learning outcomes in social studies subjects in fifth grade elementary school with material "events in life". On the other hand, the effectiveness of multimedia learning based on balanced literacy is based on student test results. Before the learning outcome test questions are given to the research subject, expert validation tests are first carried out. The results of the trials were tested for validity, reliability, normality, and homogeneity. Furthermore, to find out the effectiveness of learning multimedia based on balanced literacy, a t-test was conducted that H_0 was rejected and H_a was accepted. Thus it can be said that there is a significant difference between the learning outcomes of the experimental class students and the control class. Therefore, it can be said that learning multimedia based on balanced literacy is effective to improve students' critical thinking skills, this is evidenced by the differences in the results of learning critical thinking skills that are significant between the experimental class and the control class.

IV. CONCLUSION AND SUGGESTION

Based on the results of the research and discussion the results of the study, it can be concluded, namely: (1) Multimedia based literacy based on literacy is suitable to be used in fifth grade elementary school based on the results of media expert validation of 89,30% and material experts at 90.54% with very valid criteria . (2) Multimedia learning based on balanced literacy is practically used based on the calculation of the results of observation of learning implementation of 88.60% with very good categories, student activities at 89.30% with excellent categories, and student response questionnaires at 90.54% with high categories. (3) Multimedia learning based on balanced literacy is effectively used based on the results of the t-test, where the value of $t_{count} > t_{table}$, which is $2.45 > 2.093$. Based on this, H_0 is rejected and H_a is accepted. Therefore, it can be concluded that learning multimedia based on balanced literacy is effective in improving students' critical thinking skills, because there are significant differences in learning outcomes between the experimental and the control class.

Based on these conclusions it can be suggested that multimedia learning based on balanced literacy can be used and disseminated in learning the “events in life” theme in the fifth grade of elementary school, especially in training students' critical thinking skills.

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The Effect of Partial Replacement of Cement With Ground and Unground Sugarcane Bagasse Ash (SCBA) on Mechanical Properties of Concrete

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Abstract

This paper assesses the suitability of using sugarcane bagasse ash (SCBA) as partial replacement of cement in concrete as well as the effect of its grinding on the mechanical properties of concrete. The SCBA was ground in a ball mill for 60 minutes and 30 minutes and its physical and chemical properties determined to establish if it was pozzolanic. 0%, 10%, and 20% by weight of cement was then replaced by the ash in concrete and the physical properties of concrete determined.

The specific gravity values increased with the grinding; with 60 minutes ground SCBA having a specific gravity of 2.14 compared to a value of 1.99 for the 30 minutes ground SCBA and 1.81 for the unground SCBA. It was found that SCBA is highly pozzolanic, with properties close to those of class C fly ash. (01). The workability is improved with grinding as well as with increase in the amount of SCBA up to a certain limit with 10% replacement of cement with 60 minutes ground SCBA giving concrete with the highest workability. Density was improved with grinding and age of curing, with 10% replacement of 60 min ground SCBA giving the highest 90th day density of 2435kg/m³ compared with a value of 2408kg/m³ of the unground SCBA. The compressive strength and tensile strength also increased as the amount of SCBA was increased, as days of curing increased. Lastly, water absorption reduced with grinding and increase in number of curing, with 10% replacement of 60 min ground SCBA giving a 90th value of 0.36% compared to 0.61% of the unground SCBA.

In a nutshell therefore, it was established that 60 minutes ground SCBA and 10% replacement produced concrete with the highest performance in terms of strength, durability and workability.

Key Words: Density, Workability, Compressive strength, Tensile splitting Strength, Water Absorption, Sugar Cane Bagasse Ash (SCBA).

Introduction

There has been an increase in infrastructural works in this century, especially in developing countries in line with realization of the Millennium goals. This has led to an increase in demand and consumption of cement since it is the major constituent of concrete. In the early 20th century, the composition of concrete was primarily cement, water and aggregates (02). With time and use of technology, the scientists discovered the benefits that came with use of admixtures in the concrete production. Such benefits include; reducing the cost of concrete production, reducing the heat of hydration, increasing the workability, reducing environmental pollution among others. This research paper focuses on how sugarcane bagasse ash (SCBA) can be used to replace cement partially in order to improve the performance of concrete.

Concrete is an artificial material in which aggregates both fine and coarse are bonded together by the cement when mixed with water. The selection of the relative proportions of cement, water and aggregate is called mix design. The requirements in mix design can be summarized into; strength, workability, durability and economy.

Cement being the most expensive and the main active constituent of the ingredients of concrete, needs a thorough study to find out the optimum requirements. On the odd occasion when things go wrong and strength does not develop as expected, rightly or wrongly the cement usually gets the blame. In most cases, cement contributes directly to the problem maybe one time in three, although it's mostly one of several contributing factors. These causes can be summarized as either intrinsic or extrinsic:

- a) Intrinsic: the cement has some inherent characteristic or defect that gives rise to the problem.
- b) Extrinsic: the cement itself is not the cause of the problem; the low strength is in some way related to how the cement was used, or to the effect on the cement of other materials in the mix.

Extrinsic problems are, broadly, within the control of the concrete producer or contractor while intrinsic problems are generally for the cement manufacturer to identify and resolve. **(03)**

It is also important to note that the main constituent of cement is limestone (Calcium Carbonate). During manufacture of cement, this limestone is heated in the process of calcination and plenty of Calcium Oxide is produced, which is necessary for production of both hydraulic and non-hydraulic cement**(04)**. However, the other product of this combustion is Carbon (IV) Oxide, which is part of the green gases, responsible for pollution of the environment and the global warming, with its many negatives. Unfortunately, cement's huge contribution to air pollution is overlooked by the general public (Rosenwald, 2011).

The problems addressed above prompted scholars to try and find appropriate methods of making cement with several admixtures, to try and solve them. A contemporary popular way has been the use of ash, a good example being the construction of the Hoover Dam in 1929, in the United States in which fly ash from the steel manufacturing industries was largely used as a cement replacing material**(02)**. This was to reduce the high internal heat that was experienced when Portland cement was used alone. A lot of research has been put into the study of ash from steel manufacturing industries and this has provided a lot of information and positive steps into the replacement of cement with fly ash from the steel manufacturing industries. Much, however, remains to be researched as pertaining to the optimal use of bagasse ash as a cement replacement alternative.

Materials and Methodology

Obtaining and preparation of the bagasse ash

The SCBA was obtained from Mumias sugar factory, in western Kenya, where the bagasse had been burnt at about 1000^{0C} to produce electricity. The SCBA was then dried in the oven at 110^{0C} for 24 hours before it was ground in a ball mill for 60 minutes and 30 minutes. A sample of the SCBA was then taken for determination of the chemical properties. Specific gravity and hydrometer analysis was then done on the SCBA. Various replacements of cement with the ground and unground SCBA was then done and the resulting concrete tested for the workability as well as the various mechanical properties. Workability of the concrete was determined using slump and compaction factor. The mechanical properties were done after 28, 60 and 90 days of curing.

Specific gravity

The specific gravity was done on the unground and ground SCBA according to BS 1377-part 2-1990.

Hydrometer Analysis

This was done on the 60 minutes ground, 30 minutes ground and the unground SCBA, according to BS 1377-pt2-1990.



Plate 1. Hydrometer Analysis in progress

The Mix Design

All mixes in this study were designed in accordance with the Building Research Establishment (BRE 1992) method,**(05)** recommended by the UK Department of the Environment. The following mix was established, to be used for 60 minutes ground, 30 minutes ground and unground SCBA.

Table 1: Mix Proportions.

Item	Water(kg)	Cement(kg)	Bagasse ash(kg)	Coarse aggregate(kg)	Fine aggregate(kg)
0% Replacement	16.7	35.26	0	111.36	63.10
10% Replacement	16.7	31.73	3.53	111.36	63.10
20% Replacement	16.7	28.21	7.05	111.36	63.10
Total	50.10	95.2	10.58	334.1	189.3

Workability

Slump Test

The slump test was done according to the recommendations of BS 1881-128(1997) on the fresh concrete.(10)

Compaction Factor Test

The compaction factor test was done according to the recommendations of BS 1881-128(1997) on the fresh concrete.

Compressive test

Compressive strength was done according to specifications BS 1881: Part 111, BS 1881:Part 108 and 116 and BS EN 12390-3 on 10mm by 150mm by 150mm cubes after 28, 60 and 90 days of curing.

Tensile strength of concrete (Cylinder splitting)

The tensile splitting strength was done in line with the specifications of BS 1881 and ASTM C496. The concrete cylinders were tested after 28 day, 60 day and 90 days of curing.

Water Absorption Test

For this test, 150mm X 150mm X 150mm cubes were cast and cured for 28 days, 60 days and 90 days in ordinary water. Immediately upon curing, the cubes were removed from the curing tank, wiped dry with a tissue paper and weighed, which is the dry weight. The cubes were then immersed in water for 24 hours. Cubes were removed, patted dry with a lint free cloth, and weighed, this is the wet weight. Water absorption is expressed as increase in weight percent as shown below;

$$\text{Percent Water Absorption} = [(\text{Wet weight} - \text{Dry weight}) / \text{Dry weight}] \times 100$$

Density of Hardened Concrete Test

The Density was determined on the cubes and cylinders just before crushing them, in accordance with BS EN 12390-7.

Results and Discussions

Chemical composition of the SCBA

The following was the findings for the chemical composition of the bagasse ash;

Table 2; Chemical composition of the SCBA

No.	Chemical	Sample A (%)	Sample B (%)	Average (%)
1	Silica(SiO ₂) Soluble	16.69	16.50	16.595

		Insoluble Residue	43.87	43.81	43.84
2	SiO ₂		60.56	60.31	60.435
3	Fe as Fe ₂ O ₃		2.64	2.64	2.64
4	Alumina		10.14	10.46	10.30
5	Sulphates		1.8968	1.7562	1.8265
6	Ca as CaO		8.4	8.4	8.4
7	Mg as MgO		4.5324	3.7584	4.1454
8	Chlorides		0.1773	0.154	0.166
9	Iron and Alumina		12.78	13.10	12.94
10	L.O.I		31.48	31.81	31.645

Discussion

The chemical composition of the SCBA was found to be within the recommendations of ASTM C618 and it was found to be close to class C fly ash(01). Class C Fly Ash in addition to being a pozzolan is also cementitious.

It is however worth noting that the Loss of Ignition (L.O.I) is very high. This implies that the ash was not burnt at appropriate temperature. This means that there is high carbon content and hence workability may be lowered. The silica content was found to be 60.4%, implying that the SCBA was an effective pozzolanic material and cementitious.

Specific Gravity of the SCBA

The specific gravity of unground SCBA was found to be 1.81, 30 minutes ground SCBA to be 1.99 and 60 minutes ground SCBA was 2.14, giving an average of 1.98.

Discussion

The difference in specific gravity is brought about by the grinding which reduces the size of particles, increasing the surface area per given volume, consequently making them have a higher packing density, hence the high specific gravity in the ground SCBA.

These values were however lower than that of the cement used, which had a specific gravity value of 3.15. This implies that even the grinding did not reduce the particles to sizes comparable to those of cement as outlined below. Cement thus still had higher packing density.

This low value of specific gravity(compared to that of cement) is of economic significance because the more the percentage replacement of cement in the concrete, the lesser the overall weight of the concrete and structure at large. This would be an economic gain for the massive structures such as storey buildings and bridges. Lighter concrete would mean less logistics and costs of handling it. Lighter structures or members thereof would also result in lower reinforcement costs due to the reduction in dead load.

Hydrometer Analysis Results



Plate 2. The SCBA, before and after grinding

The grain distribution curve is represented on the semi-logarithmic scale below;

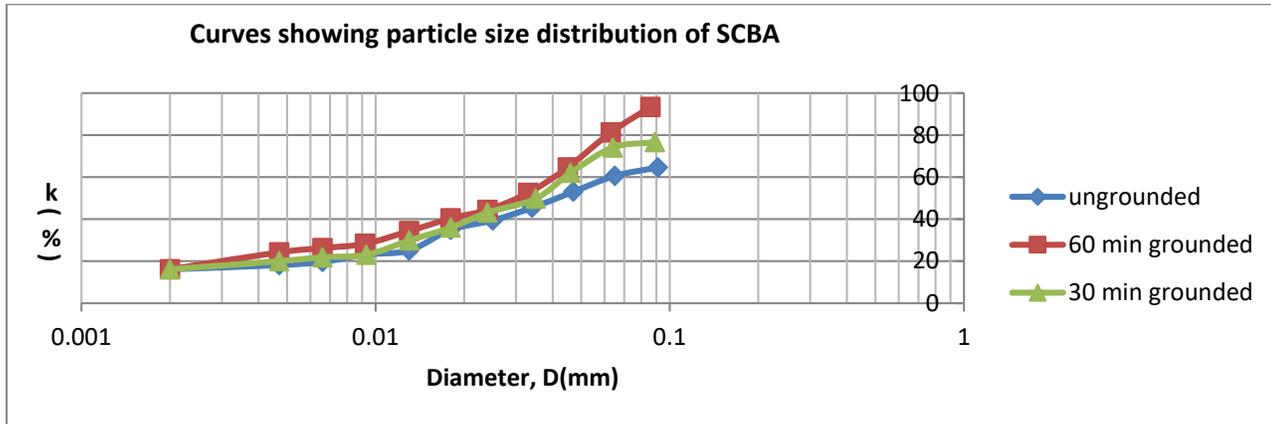


Fig 1. A graph showing particle size distribution of variously ground SCBA

Discussion

From the graph above, it can be seen that grinding reduced the sizes of the SCBA significantly. For instance, the 60 minutes ground SCBA had particles sizes ranging from 2 μ m and 78 μ m. About 95% of the particles were found to be 75 μ m and below while about 70% of the particles were found to be 45 μ m and below, which is the fineness of OPC.

For the 30 minutes ground SCBA, the particles sizes ranged from 2 μ m and 85 μ m. About 70% of the particles were 45 μ m and below.

For the unground SCBA, particle sizes ranged from 2 μ m and 92 μ m. Only about 50% of the particles were 45 μ m and below.

As outlined above, grinding was effective and the reduction in particles was a function of the time of grinding. Particles reduced as the time of grinding was increased. The reduction in particle size has an effect on specific gravity, density of concrete, strength and water absorption of the concrete as outlined elsewhere in this report.

Workability Results

Slump Results

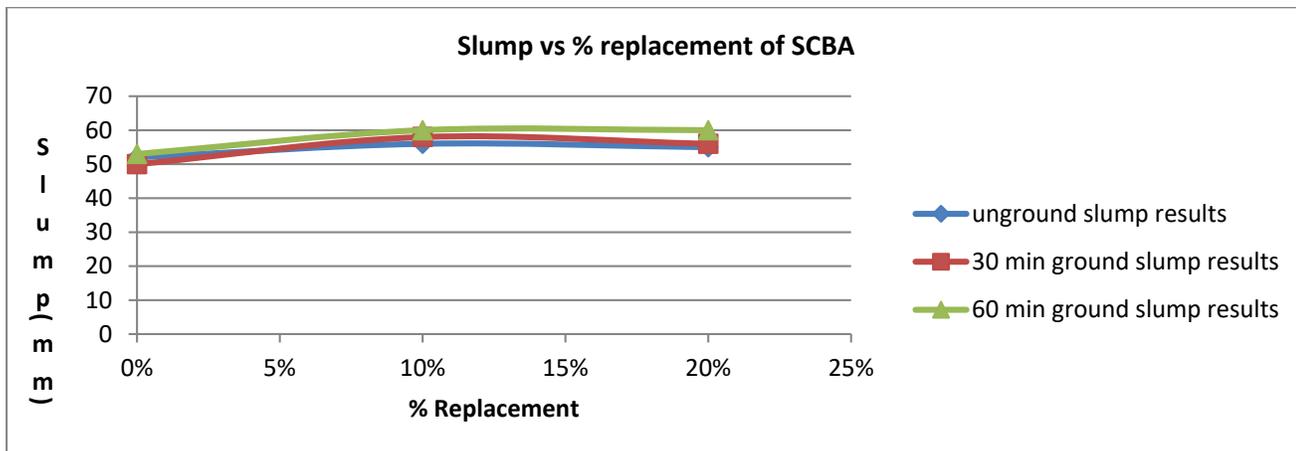


Fig 2. Slump vs % replacement of variously ground SCBA

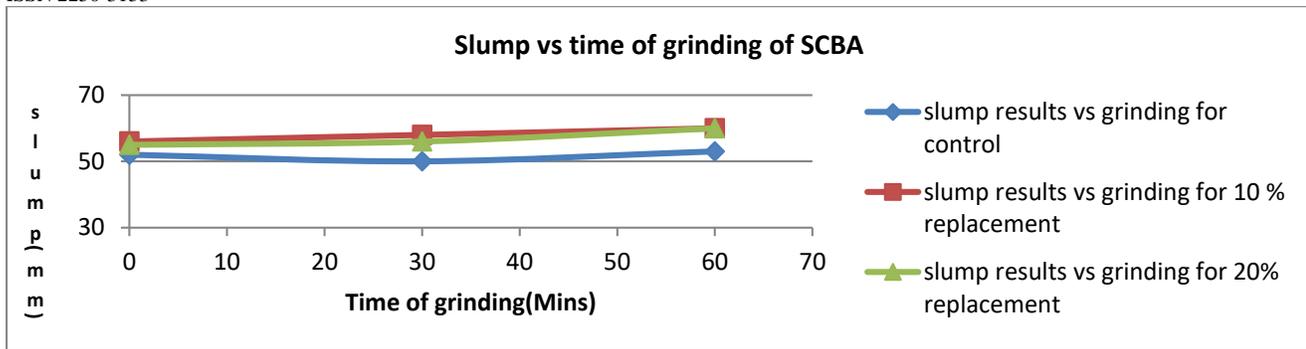


Fig 3. Slump vs time of grinding of SCBA for the various replacements.

Compaction Factor Results

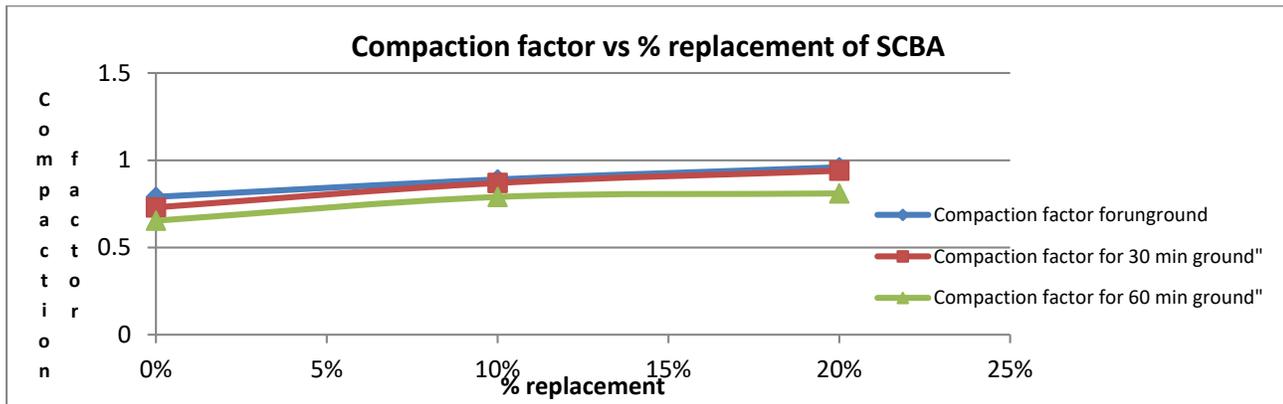


Fig 4. Compaction factor vs % replacement of SCBA

Discussion

It is evident from the above figures that slump values increased with replacement up to a certain limit and then started decreasing. 10% replacement of SCBA produced concrete with slightly higher slump value than the control, which dropped slightly when the replacement was 20%. The same observation is made with the compaction factor values.

It is also worth noting that the slump values increased with increase in time of grinding. The 60 min. ground SCBA produced concrete with the highest slump values, followed by 30 min. ground SCBA while unground SCBA produced concrete with the lowest slump values, although, the differences were very minimal.

The above observations imply that workability was improved by addition of the SCBA slightly, 10% replacement producing concrete with a slightly higher workability. This can be attributed to the fact that the SCBA particles are rounder than cement particles and hence allows water to move around them easily hence improving workability of concrete. (02) The other reason for the increase in workability is that SCBA has slightly bigger particles than cement, making them to have a lower surface area to volume ratio hence few particles that are easily wetted. Grinding improves workability slightly since as the particle sizes reduce, the roughness also reduce. (02). The reduction in workability as the SCBA increase can be attributed to the fact that as the SCBA increase, the surface area to volume ratio of the ash increase, increasing roughness and carbon content with subsequent reduction in workability.

However, the values of slump obtained are lower than those found by previous researches at the same w/c ratio. This is because of the high Loss on Ignition value-31.6%! This means that the SCBA was not well burnt hence had a high carbon content, were rougher and hence absorbed more water, leading to lower workability compared with previous studies. (06)

Density Results

I. Density Results for 60 min ground SCBA

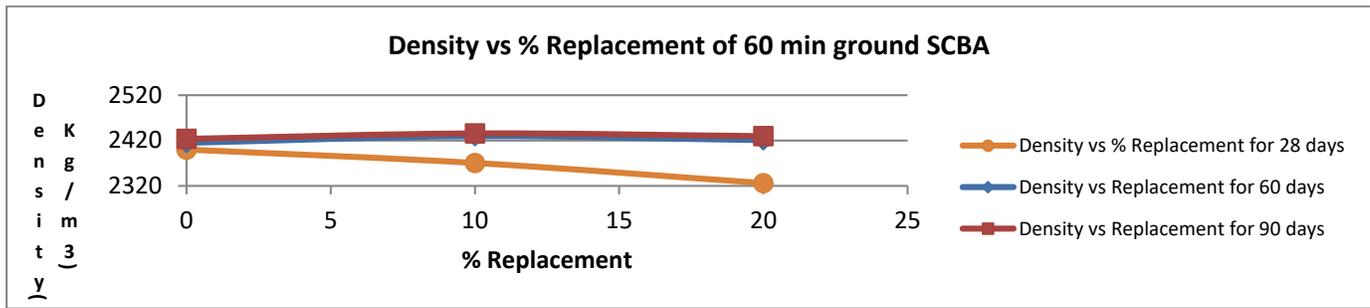


Fig 5. Density vs % replacement for various time of curing.

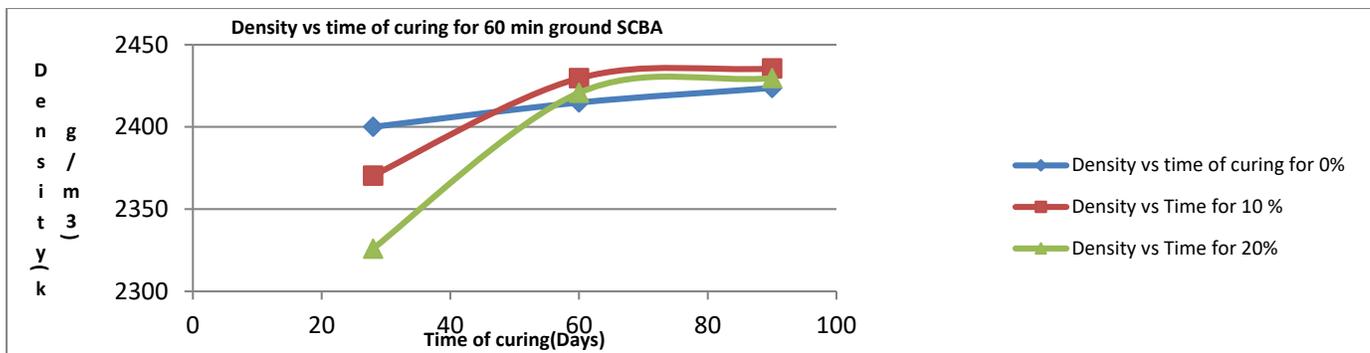


Fig 6. Density vs time of curing for the various replacements.

II. Density Results for 30 min. ground SCBA

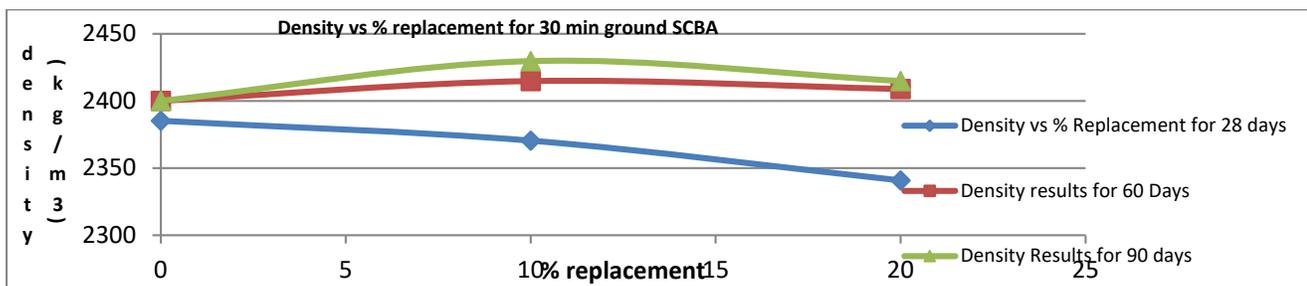


Fig 7. Density vs % Replacement of SCBA for 30 min. ground SCBA

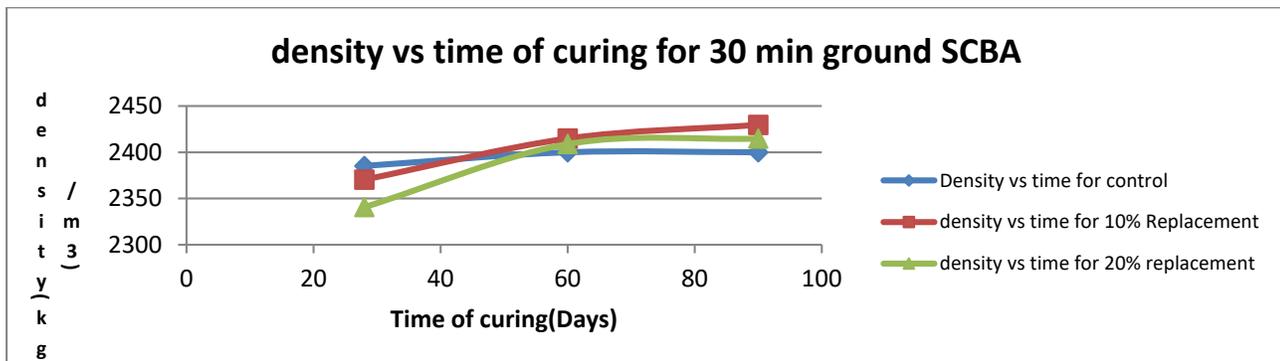


Fig 8. Density vs time of curing for 30 min. ground SCBA

III. Density Results for unground SCBA

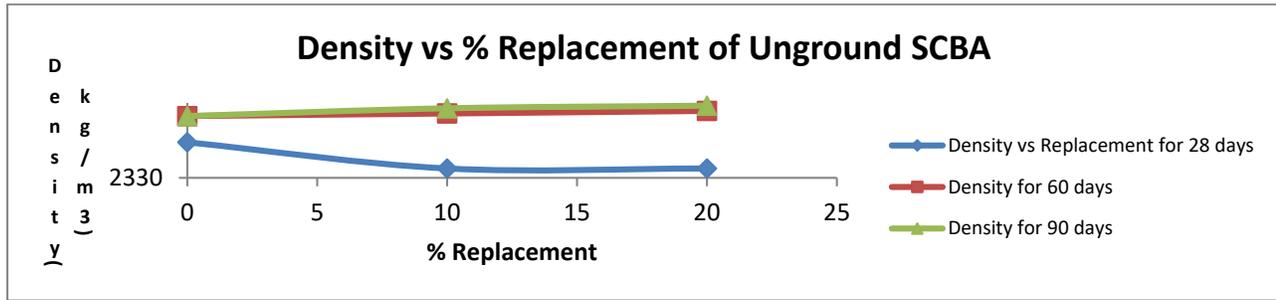


Fig 9. Density vs % Replacement of unground SCBA

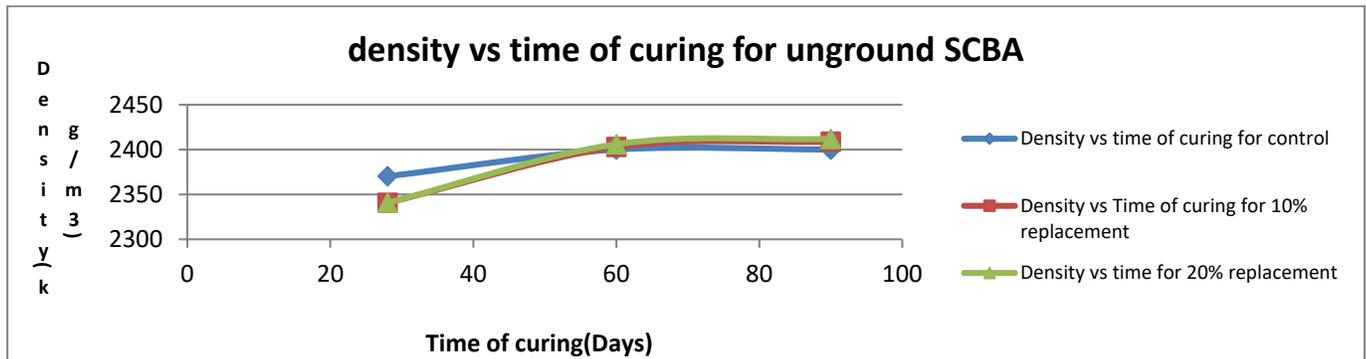


Fig 10. Density against time of curing for the unground SCBA

Discussion

From the figures above, several observations can be deduced. Firstly, at early age of concrete, the density reduces with increase in SCBA. This can be attributed to the fact that at this age, the only contributing factor to the density is the density of the constituent materials. SCBA being lower in density (1.98g/cm³) than cement (3.15g/cm³), produces concrete with lower dry density.(07)

Secondly, as the time of curing increase, the density increases with increase in SCBA up to a certain limit before starting to drop. For instance, the concrete made from 10% replacement SCBA had the highest density at 60 and 90 days of curing, followed by 20% replacement concrete and lastly the control, which increased only slightly as days of curing increased. This increase in density with increase in time of curing can be attributed to the hydration of tricalcium silicate and dicalcium silicate with water to produce calcium hydroxide and calcium-silicate-hydrate(C-S-H), which is a rigid hard and compact structure, hence the higher density. This reaction increases with increase in time of curing, hence the increase in density with time of curing. The increase in density with SCBA at later ages of curing can be attributed to the fact that in addition to the C-S-H produced above, more C-S-H is also produced from the reaction of calcium hydroxide produced above with silica from the SCBA. The slight reduction in density at 20% replacement is due to lack of Tricalcium and Dicalcium silicate hence less calcium hydroxide to react with silica, resulting in less C-S-H(08)

Lastly, it is seen that the density increased with increase in time of grinding. This is due to the increase in surface area to volume ratio and specific gravity with time of grinding as outlined above.

Compressive Strength Results

It was observed that the cubes failed in a normal and acceptable way as shown by the plate below;



Plate 3. Failed compressive strength sample

I) Compressive strength results for 60 min. ground SCBA

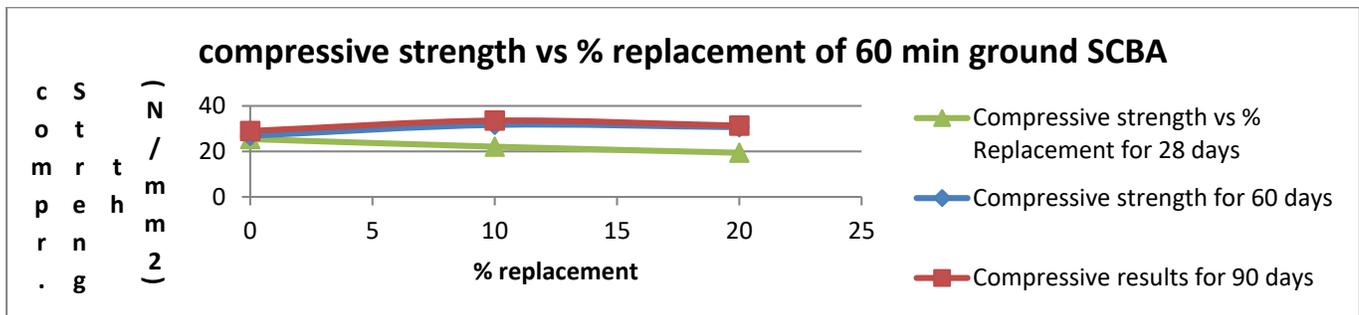


Fig 11. Compressive strength vs % replacement of 60 min ground SCBA.

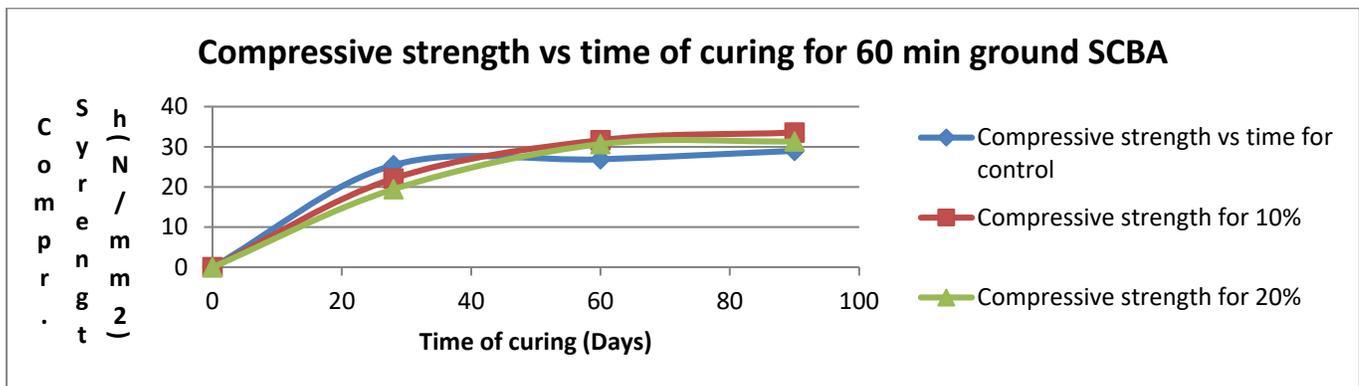


Fig 12. Compressive strength vs time of curing for the various replacements.

II. Compressive Strength for 30 min. ground SCBA

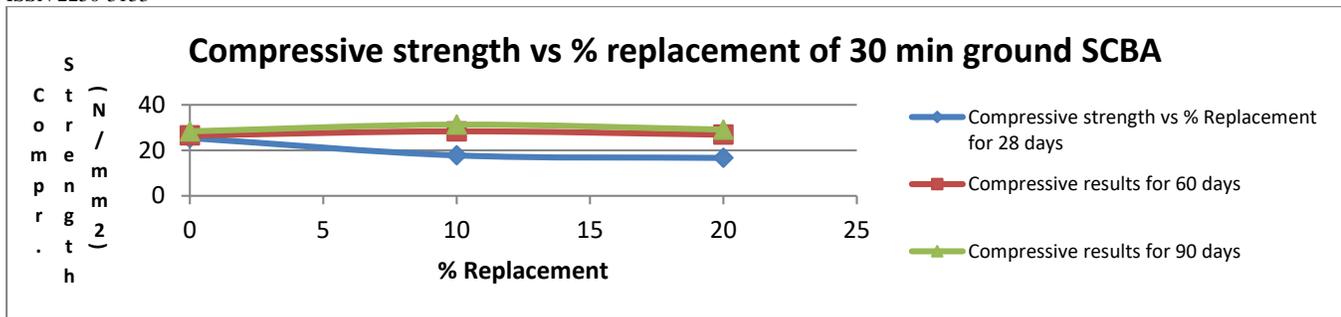


Fig 13. Compressive strength against % replacement for 30 min ground SCBA

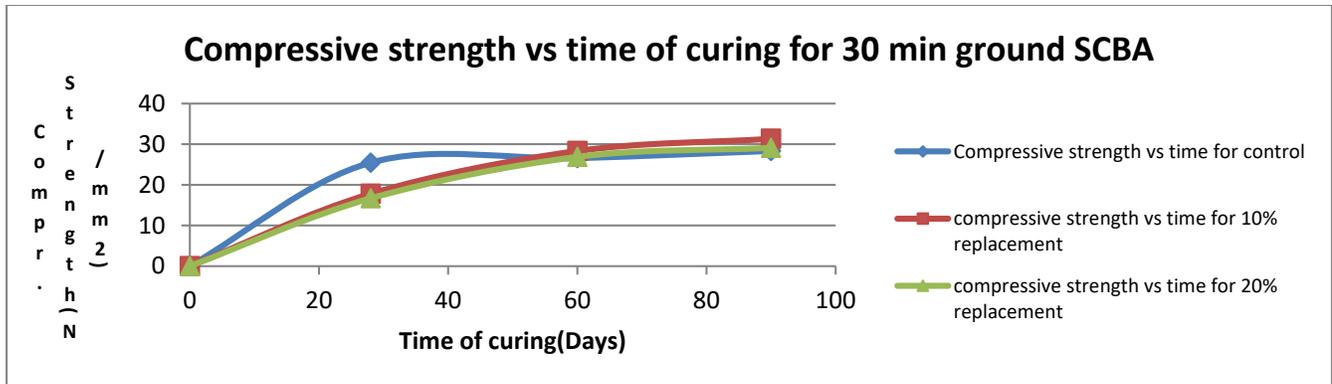


Fig 14. Compressive strength results vs time of curing for 30 min ground SCBA

III. Compressive strength results for unground SCBA

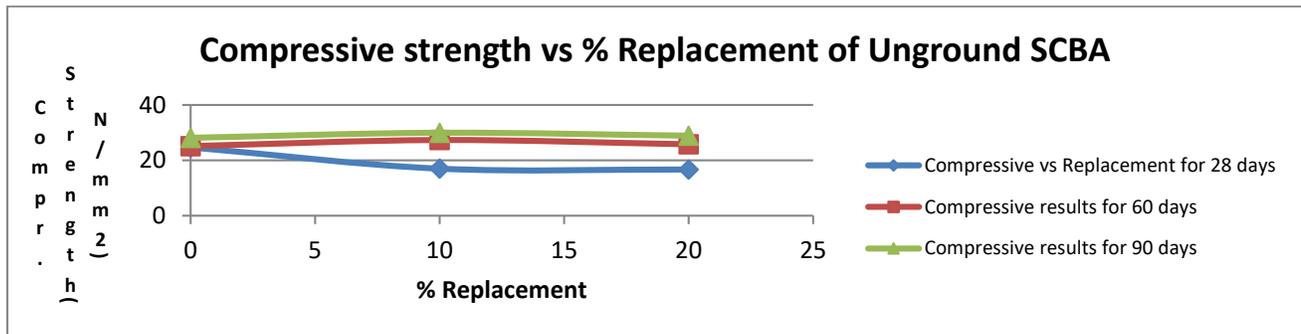


Fig 15. Compressive strength vs % Replacement for unground SCBA

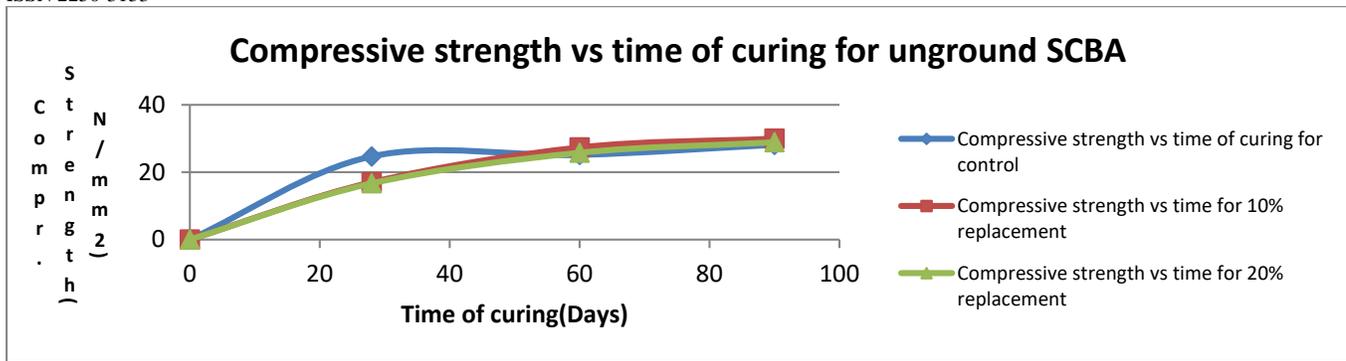


Fig 16. Compressive strength against time of curing for unground SCBA

Discussion

Firstly, it was seen that compressive strength increases with increase in days of curing. This is because hydration of cement is a continuous process that goes on forever, as long as favourable conditions are provided. With increase in time of curing, more C-S-H is produced hence the increase in compressive strength with time of curing. Also, at early age, concrete has more pores hence low strength. With increase in time, these pores are replaced with C-S-H hence the increase in strength. **(09)**

Secondly, the compressive strength for the control (0% replacement) was the highest at early ages of concrete. As time of curing increase, the concrete having SCBA had higher compressive strength values, which reduces slightly as the content of SCBA increase further. At early age, 0% SCBA concrete has the highest compressive strength because of the high Tricalcium silicate and Dicalcium Silicate hence high C-S-H than the 10% SCBA and 20% SCBA concrete. **(04)** As the time of curing increase, the 10% SCBA concrete has the highest compressive strength because in addition to C-S-H from hydration, the calcium hydroxide formed as a product of hydration contributes to strength by; i) Providing a P.H medium for reaction with Silica from SCBA, ii) Silica from SCBA reacts with it to produce more C-S-H. **(07,08)** As outlined earlier, at 20% SCBA, the strength is lower than the 10% SCBA concrete since the reduction in cement implies that there is less Dicalcium and Tricalcium silicates to form C-S-H. **(08)**

Lastly, it is observed that compressive strength increases with grinding, with 60 min. ground SCBA giving the highest compressive strength. This can be attributed to i), the higher surface area to volume ratio implying that more particles and more silica for reaction with calcium hydroxide to form C-S-H, ii) Smaller particles ensure faster reactions hence faster rate of formation of C-S-H and iii), The higher specific gravity(Density) hence more compact concrete and subsequently higher strength.

TENSILE SPLITTING RESULTS

I. Tensile results for 60 min. ground SCBA

The cylinders were observed to fail in recommended way by splitting into two halves as shown on the plate below;



Plate 4. Failed tensile split cylinder sample

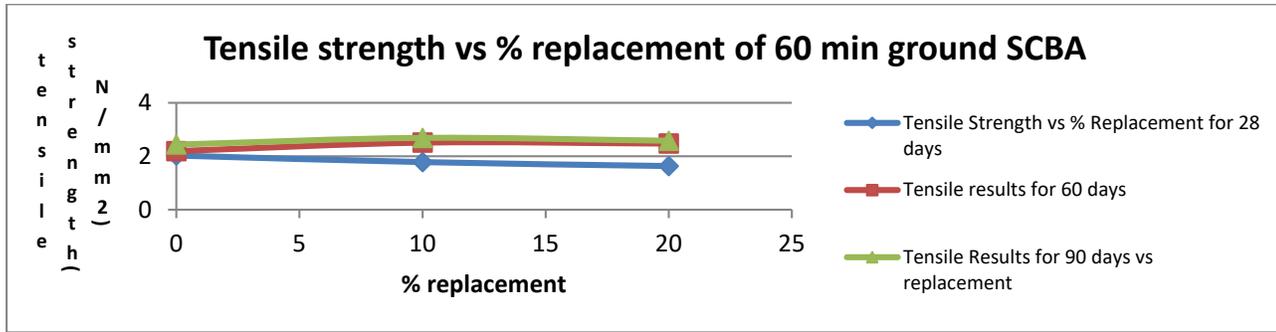


Fig 17. Tensile strength vs % Replacement for 60 min ground SCBA.

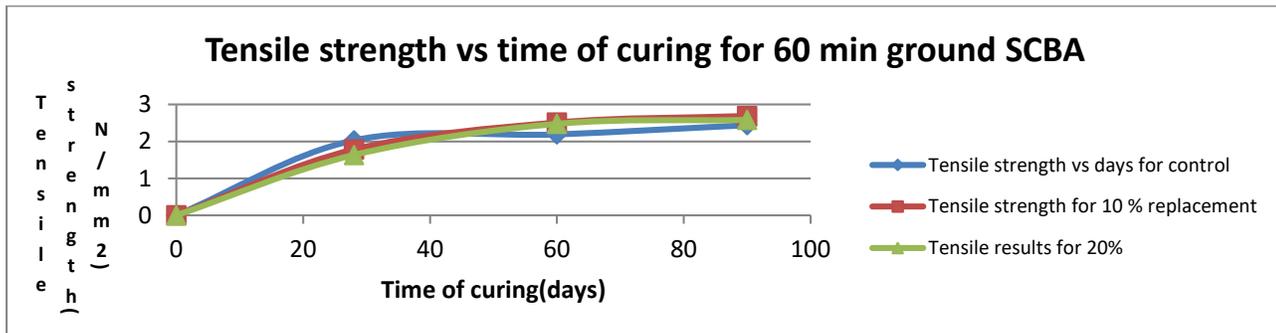


Fig 18. Tensile strength vs time of curing for 60 min ground SCBA

II. Tensile strength results for 30 min. ground SCBA

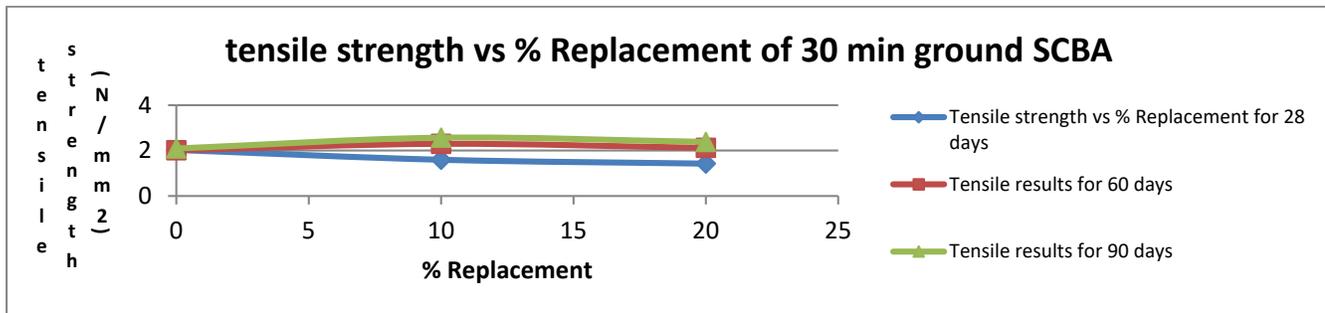


Fig 19. Tensile strength vs % Replacement of 30 min. ground SCBA

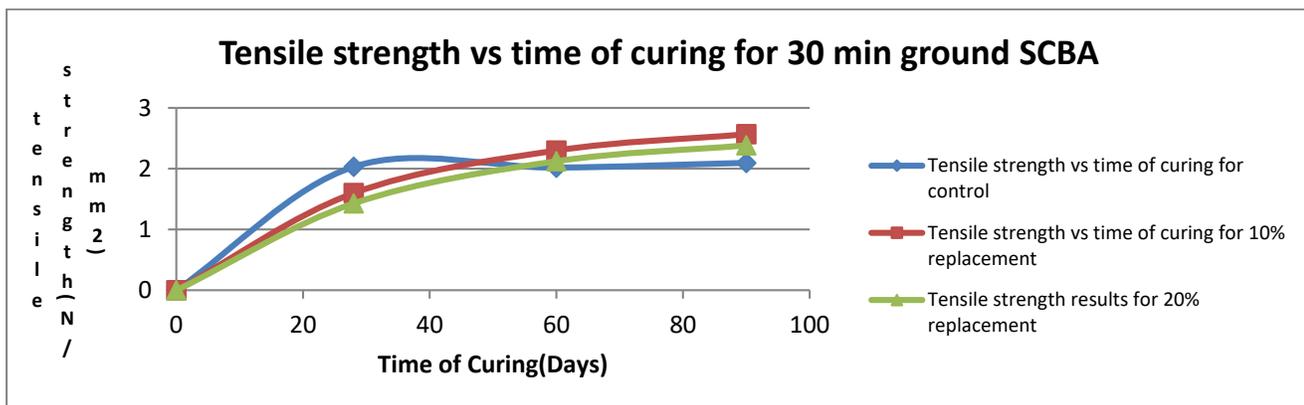


Fig 20. Tensile strength vs time of curing for 30 min ground SCBA

III. Tensile Strength results for unground SCBA

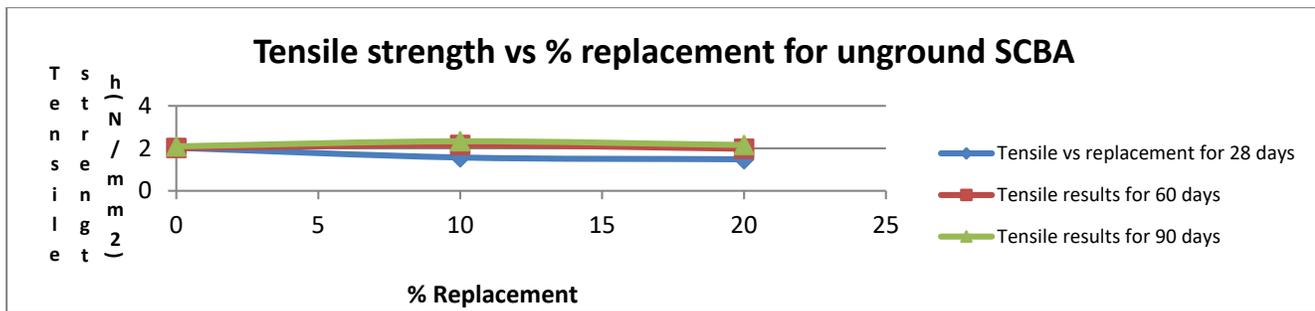


Fig 21. Tensile strength vs % Replacement for the unground SCBA

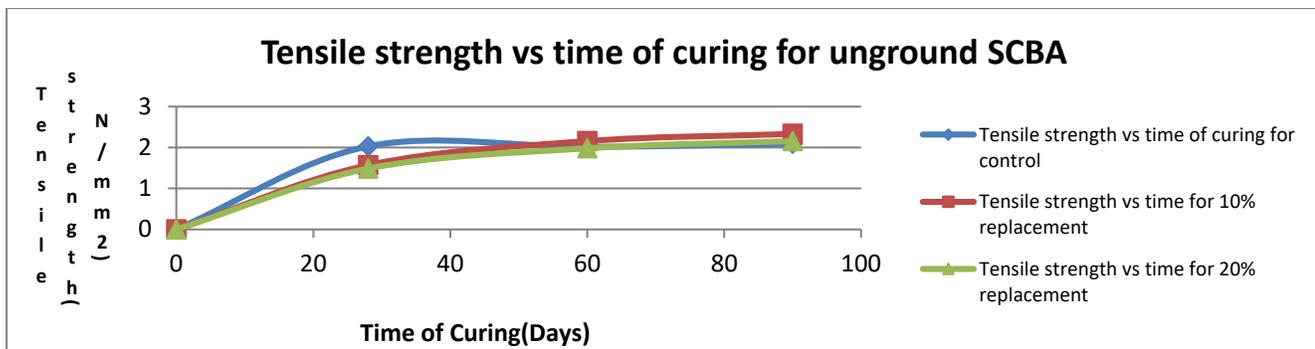


Fig 22. Tensile strength against time of curing for the unground SCBA

Firstly, it was seen that tensile strength increases with increase in days of curing. This is due to the increase in C-S-H production with time of curing as outlined above, as hydration of cement goes on. Another observation is that the values obtained were very low compared to the compressive strength. This explains why reinforcements are normally put in concrete elements subjected to tension. The values were however in the range of 1/8-1/12 the compressive strength.(04)

Secondly, the tensile strength for the control (0% replacement) was the highest at early ages of concrete. As time of curing increase, the concrete having SCBA had higher tensile splitting strength values, which reduces slightly as the content of SCBA increase further for the same reasons as explained under compressive strength.

Lastly, it is observed that tensile strength increases with grinding, with 60 min. ground SCBA giving the highest tensile strength, again for the same reasons as outlined under compressive strength.

WATER ABSORPTION RESULTS

I. Water Absorption results for 60 min ground SCBA

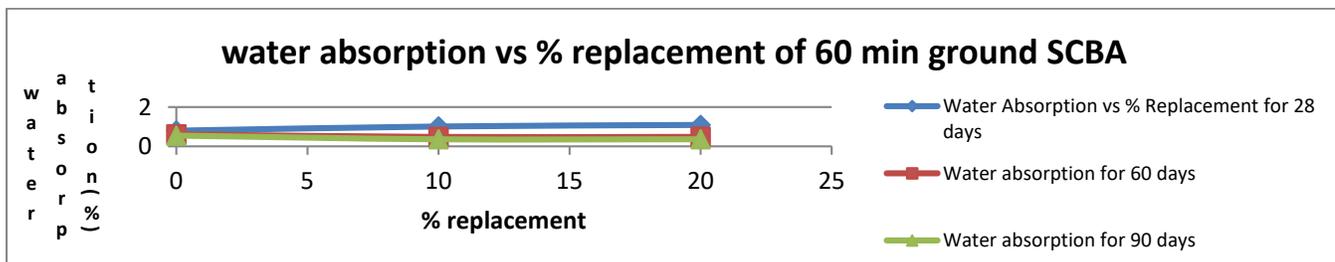


Fig 23. Water Absorption vs % Replacement for the 60 min. ground SCBA

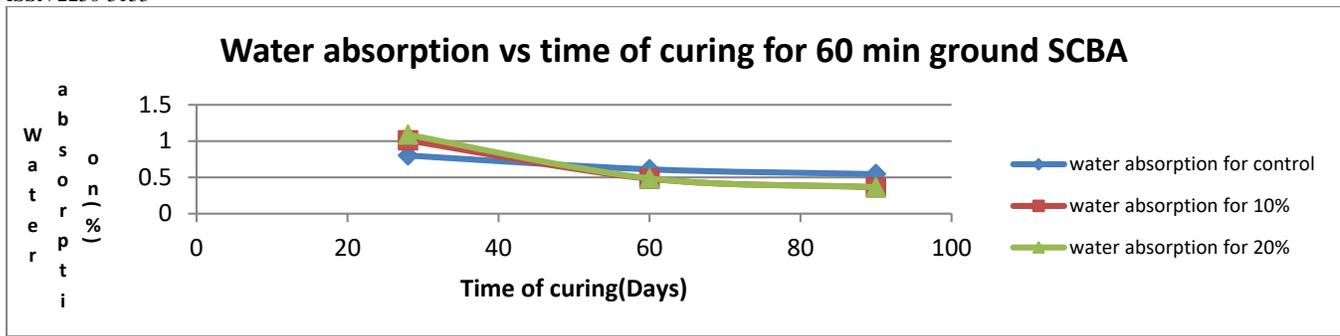


Fig 24. Water Absorption vs time of curing for the 60 min ground SCBA

II. Water Absorption Results for the 30 min ground SCBA

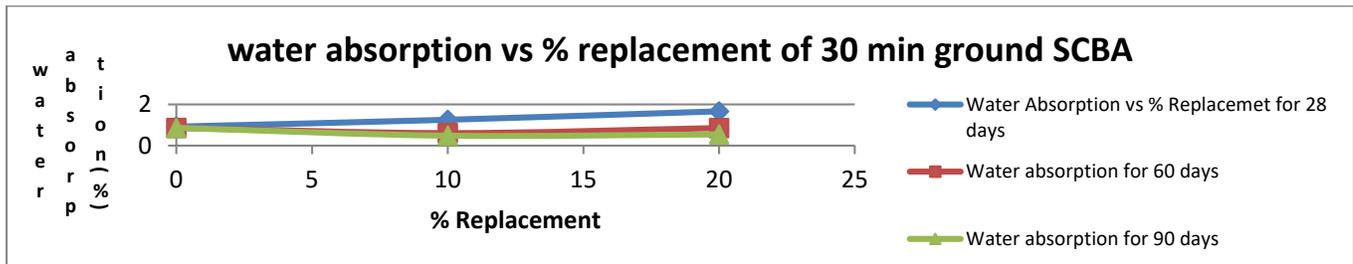


Fig 25. Water Absorption vs % Replacement for the 30 min ground SCBA

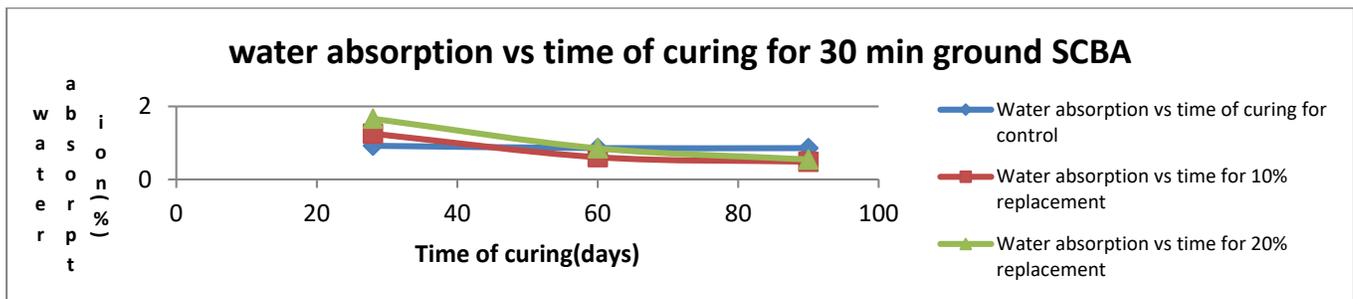


Fig 26. Water Absorption vs time of curing for the 30 min ground SCBA

III. Water Absorption Results for the Unground SCBA

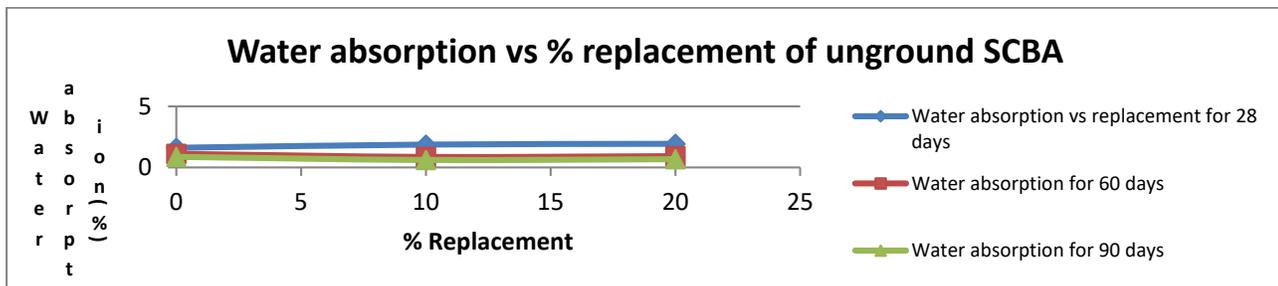


Fig 27. Water absorption vs % Replacement for the unground SCBA

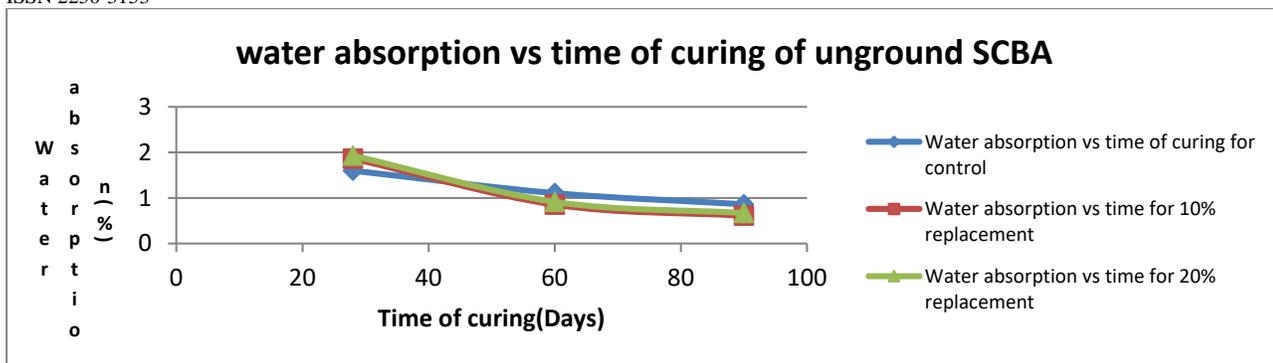


Fig 28. Water absorption vs time of curing for the unground SCBA

From the figures above, several observations can be deduced. Firstly, at early age of concrete, the water absorption increases with increase in SCBA. This can be attributed to the fact that at this age, concrete without SCBA has the highest density due to the high density of cement and higher C-S-H gel than concrete made from SCBA, as outlined earlier.(07)

Secondly, as the time of curing increase, the water absorption decreases with increase in SCBA up to a certain limit before starting to drop. This decrease in water absorption with increase in time of curing can be attributed to the hydration of tricalcium silicate and dicalcium silicate with water to produce calcium hydroxide and calcium-silicate-hydrate(C-S-H), which is a rigid hard and compact structure, hence the higher density concrete that allows only little water to go through it. This reaction increases with increase in time of curing, hence the increase in density with time of curing with consequent reduction in water absorption. The reduction in water absorption with SCBA at later ages of curing can be attributed to the increase in density with SCBA at later ages of curing due to the fact that in addition to the C-S-H produced above, more C-S-H is also produced from the reaction of calcium hydroxide produced above with silica from the SCBA. The slight increase in water absorption at 20% replacement compared to 10% replacement is due to the reduction in density at 20% replacement due to lack of Tricalcium and Dicalcium silicate hence less calcium hydroxide to react with silica, resulting in less C-S-H(08)

Lastly, it is seen that the water absorption decreased with increase in time of grinding of the SCBA. This is because density increased with increase in time of grinding due to the increase in surface area to volume ratio and specific gravity with time of grinding as outlined above.

COMPARISON OF THE MECHANICAL PROPERTIES FOR 10% REPLACEMENT FOR 60 MIN GROUND, 30 MIN GROUND AND UNGROUND SCBA

This was done to assess the effect of grinding the SCBA on the mechanical properties of the SCBA.

I. Density

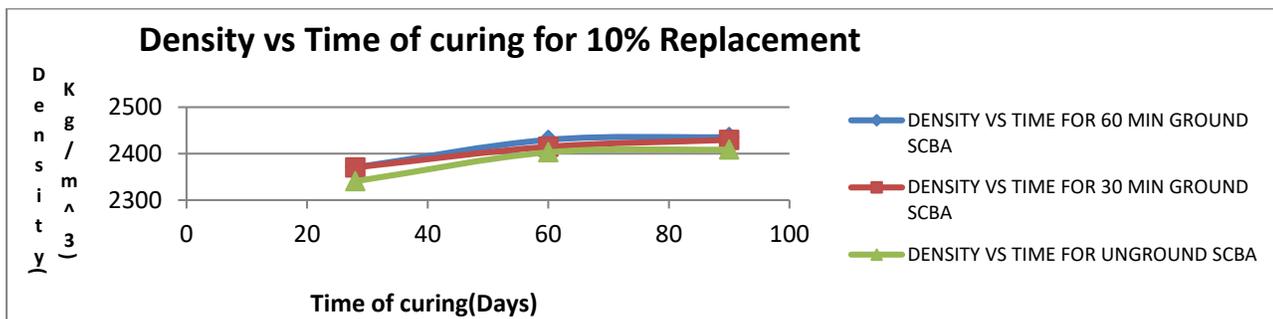


Fig 29. Density vs time of curing for 10% replacement

From the above figure, it can be seen that the density increases with with increase in time of grinding of the SCBA. This is because grinding reduces the particle sizes, increasing surface area to volume ratio hence increasing the specific gravity and consequently density of the concrete.

II. Compressive strength

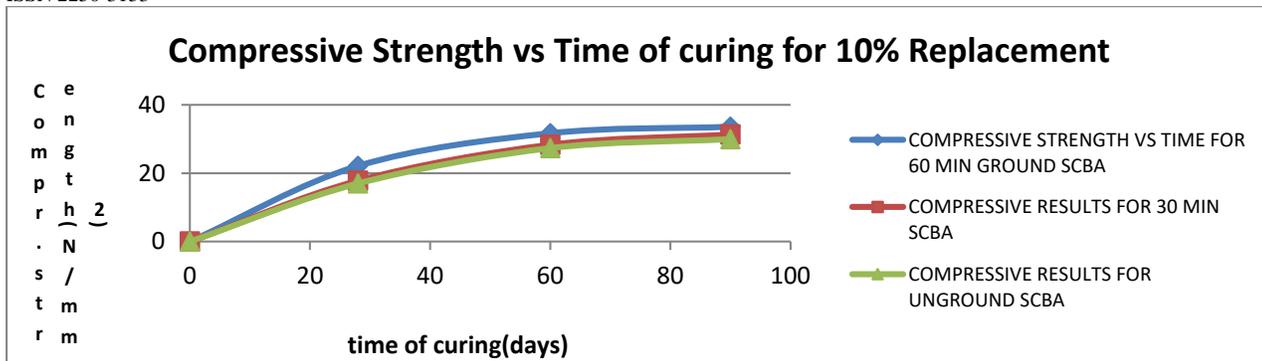


Fig 30. Compressive strength vs time of curing for 10% Replacement.

From the figure above, it is observed that compressive strength increases with grinding, with 60 min. ground SCBA giving the highest compressive strength. This can be attributed to i), the higher surface area to volume ratio implying that more particles and more silica for reaction with calcium hydroxide to form C-S-H, ii) Smaller particles ensure faster reactions hence faster rate of formation of C-S-H and iii), The higher specific gravity(Density) hence more compact concrete and subsequently higher strength.

III. Tensile strength

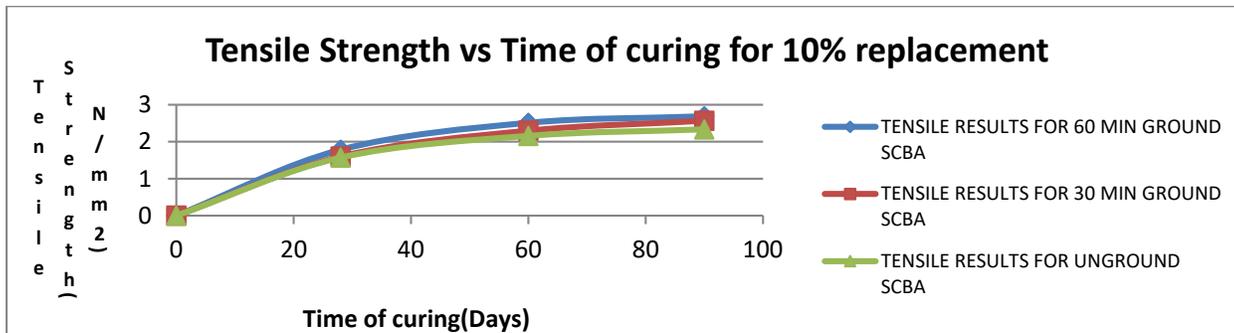


Fig 31. Tensile strength vs time of curing for 10% replacement

The tensile splitting strength from the figure above shows that tensile strength increases with grinding, with 60 min. ground SCBA giving the highest strength. This can be attributed to i), the higher surface area to volume ratio implying that more particles and more silica for reaction with calcium hydroxide to form C-S-H, ii) Smaller particles ensure faster reactions hence faster rate of formation of C-S-H and iii), The higher specific gravity(Density) hence more compact concrete and subsequently higher strength.

IV. Water absorption

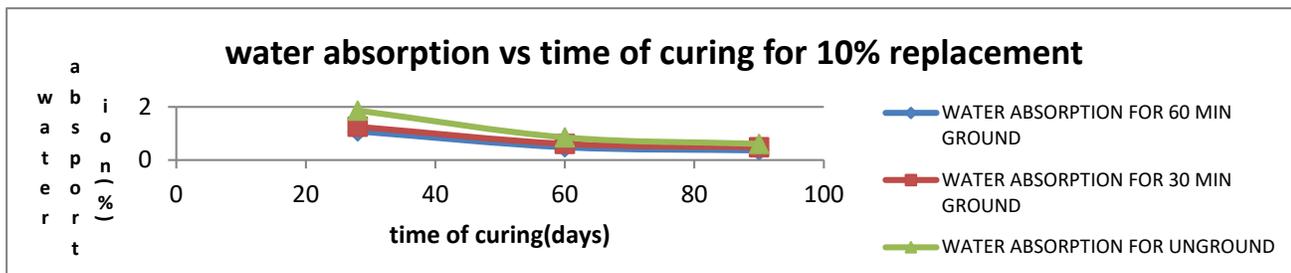


Fig 32. Water absorption vs time of curing for 10% Replacement.

It can be seen from the figure above that the water absorption decreased with increase in time of grinding of the SCBA. This is because density increased with increase in time of grinding due to the increase in surface area to volume ratio and specific gravity with time of grinding as outlined above.

Conclusions

The following conclusions can be drawn from this research;

- a) Sugarcane bagasse ash(SCBA) is highly pozzolanic, based on the chemical composition obtained, and it can be classified as class C fly ash according to ASTM C618.
- b) Use of SCBA as partial replacement of cement improves workability slightly up to a certain limit before starting to drop, with 10% replacement giving the highest workable concrete.
- c) The compressive strength and tensile strength of concrete is increased by replacing cement partially with SCBA up to a certain limit. It was found out that a replacement of 10% gave concrete with the highest compressive and tensile strength.
- d) The density of concrete is increased as SCBA replacement increases up to 10% replacement before starting to drop.
- e) Water Absorption reduces as the SCBA replacement increases up to 10% before dropping. This low water absorption and the increase in density thus means that the concrete will be more durable and the reinforcements will not rust too much.
- f) Grinding of SCBA improves the performance of concrete since at 10% replacement, 60 minutes ground SCBA gave concrete with the highest 90th day compressive and tensile strengths, highest 90th day density and lowest 90th day water absorption values.

From these findings, it can be concluded that 60 minutes ground SCBA with a 10% replacement gave concrete with the best performance.

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Improving Social Skills of Elementary School Students Through Student Team Achievement Division Learning Models

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Abstract-This study aims to describe the implementation of students' team achievement division learning model in improving social skills of students in elementary school. This study uses quantitative descriptive in the form of classroom action research which is conducted in 2 cycles. This research based on the lack of students' roles in learning process, especially on the social skills aspects of communication and cooperation. Data collection techniques are carried out by observation. Observation is used by the researcher to observe students' social skills during learning process by using the student team achievement division learning model. The results showed that students' social skills are increased. The first cycle of students' social skills was 68.90% and in the second cycle increased was 82.30%. Based on these results, it can be concluded that the implementation of student team achievement division learning model which can improve the social skills of students in elementary school.

Keyword: student team achievement division model, social skills

I. INTRODUCTION

Social science is interpreted as a combination of several concepts in scientific disciplines such as social, science, humanities, issues, and other social problems (Sapriya, 2009). Social science is a subject which learn about the relation between human and all the aspects of society life. The aim of social science is to prepare some students as good citizens who have knowledge, skills, attitude and moral value in order to they are able to solve individual and social problems. Moreover, they can make decisions and be active in community activities (Sapriya, 2009). Nasution stated that social science has a primary aim in developing knowledge competence, skills competence, and attitude so that the students are able to be good citizens in a republic of democratic (2011). Based on this regard, the social science gives the benefit of students who learn it and it becomes the provision to socialize in a social life and be good citizens.

The purpose of social science can be conducted by the teachers who are facilitators and class managers. They will build the students' knowledge, skills, attitude and moral value which is needed by the students in their social life (Sapriya, 2009). In order to achieve this goal, the teacher must create an interactive, innovative, fun learning and motivate the students in learning process which provide sufficient space for initiative, creativity and independence in accordance with their talents, interests, physical and students psychological development (Regulation of the Minister of Education and Culture of Indonesia, 2016).

Teachers are good facilitators who try and prepare a lesson plan which accordance with the students characteristic and the achievement of learning objective (Amri, 2013). Cooper (1977) stated that the effective teachers are teachers who are able to deliver students achievement in satisfying learning outcomes. Rusman (2012) declined that the teachers who have professional competence have enough knowledge about the field of study being taught and mastering the concept of knowledge about theoretical concepts and learning models that are appropriate to the material and learning objectives and be able to apply in classroom learning process.

Nowadays, in this industrial revolution era 4.0, social science faces a changing of human resources that have more effective quality empowerment in order to gets overcome in various challenges. In the 21st century, knowledge is the main foundation in every life aspects. Developing knowledge quality can not be separated from education which is the main concept in knowledge society. The observation result which is done by the researcher at Wonokromo 3 Elementary school Surabaya, Indonesia showed that the students' social skills is still low in communication, sharing and cooperation. The lacking of students activity in learning process also affect the student achievement. This case is similar with Steedly, Schwartz, Levin, & Luke (2008) which stated that the social skills possessed by students will influence the high achievement in the school and other life.

Teachers should create various learning media for getting optimum learning process. If the teachers have not creativity in learning media, the learning proess will be failed. For getting a good achievement in learning process, teachers must design learning process with various learning model which accordance with the subject and students characteristic. Amri argued that the learning model is a design of describing processes and creating learning situations that may get a changing experience or

development (2013). Therefore, it needs other model which is done by the teacher for increasing social skills and students learning achievement.

After reading several resources, the researcher found several solution to solve this problem. Kim stated Setelah membaca berbagai sumber, peneliti menemukan solusi pemecahan masalah tersebut. Kim stated that the implementation of student team achievement division can improve the relation index for the students, social interaction, social skills and communication in the class (2018). In line with this, Rianawati (2017) in her journal said that the student achievement division model could improve students' social skills in moral learning. Herjayanto, Suparno, & Rochsantiningsih (2018) stated in their journal that the student team achievement division learning model can improve students' good behavior. The application of the achievement division student team learning model was felt to be consistent with learning in the 21st century because it applied problem solving, communication, group cooperation, and the use of technology (Trilling & Fadel, 2009).

II. THEORITICAL FRAMEWORK

2. 1 Student Team Achievement Division

The student team achievement division learning model was developed by Robert Slavin and his colleagues at Johns Hopkins University. Slavin (2011) states that the student team achievement division learning model is a cooperative learning model using mix group which is characterized by team appreciation and group responsibility for individual achievement. The student team achievement division learning model is a cooperative learning model consist of heterogeneous groups, presentations of new academic information, quizzes, and group scores. This learning model introduces new knowledge information through verbal, visual media, or multimedia presentations (Arends, 2016).

Slavin interpreted the student team achievement division learning model as a cooperative learning model which has five main components, such as class presentation, group, quiz, individual progress score, and reward. Class presentations can be done with direct teaching learning process, classical discussion, or audiovisual exposure (Slavin, 2016). This study uses a group in this regard. It is a heterogeneous group consisting of various types of ethnicities, races, sexes and academic abilities. The quiz aims to identify and examine the individual abilities after class presentations and group discussion (Slavin, 2016). The team reward will be given when the group's average score reaches in certain criteria (Slavin, 2016).

The student achievement division learning model has five main elements in learning, namely class presentations conducted by teachers, groups, quizzes, individual progress scores, and team awards (Slavin, 2016).

Class presentation is the initial syntax in student team achievement division learning. Class presentations are conducted to provide new material or new information for the students in the class. The method which can be done by the teacher is, direct teacher learning, or audiovisual presentation (Slavin, 2016). Arends (2016) states that class presentations can be presented through direct teaching by the teacher, in a form of words or sentences, pictures, audiovisuals, or multimedia presentations. In the class presentation, students must be full of concentration because the material will be used in the quizzes, and the quiz scores obtained by individuals who will determine the group score (Slavin, 2016).

Grouping is a form of heterogeneous group consisting of four or five students who have differences in sex, race, ethnicity, or academic ability. The main duty of this group is to ensure and make sure that all members of this group learn and prepare the members to complete individual quizzes with good results. The quiz is held after the teacher has presented a class presentation and has finished the group discussion. Quiz aims to check the understanding of material individually and independently (Slavin, 2016).

Individual scores progress are given in order to the goals and performances that have been determined, it can be achieved by the students. Each student contributes maximum contribution points to the group use this score system. The initial score which is given for the students is the average performance of previous students when working on the same quiz. Furthermore, the points collected by students for their group are based on increasing quiz scores which is compared to the initial score (Slavin, 2016).

Table 1. Individual score progress calculation

Score progress	Quiz score
More than 10 points under the initial score	5
Ten to 1 point under the initial score of 10	10
Initial scores up to 10 points above the initial score	20
More than 10 points above the initial score	30

(Slavin, 2016)

The reward of group is given in the form of certificates or other forms of appreciation. Rewards are given if the average score is achieved by the group in accordance with certain criteria. If the Scores are obtained by the group, it will also increase the group rank (Slavin, 2016).

Suprijono (2017) states that cooperative learning model has been changed from Piaget's cognitive constructivism theory to Vygotsky's social constructivism. It is about understanding the concepts from individual to groups, social interactions, and socio-cultural activities. Piaget's constructivist theory is students construct the knowledge by using transformation, construction, organization, and reorganization of knowledge or previous information. Referring to Piaget's constructivism theory, student team achievement division learning model is very appropriate for applying in the concrete operational stage. Effective strategies can be

used for the concrete operational stage are: (1) students involve in operational tasks such as compiling and sorting; (2) students practice in organizing and grouping; (3) students make conclusions (Santrock, 2014). Moreover, the syntax is appropriate with the student team achievement division learning model, which involve in class presentation, group, quiz, individual progress score, and group award (Slavin, 2005). The class presentation syntax gives an example or the real situation in accordance with the concrete operational stage (Santrock, 2014). When the students complete the student worksheet and the students practice in composing, grouping, and making conclusion.

Arends (2016) stated that the cooperative learning model is a learning model based on Vygotsky's constructivism theory. Vygotsky states that learning is not only the way of our brain works, but also determined by several factors that influence learning such as social development and culture. It is similar with Kim's opinion (2018) in his journal stated that the student team achievement division learning model uses Vygotsky's constructivism learning theory. Suprijono (2017) stated that Vygotsky's theory supports the cooperative learning models which is found in the learning process through interactive dialogue and social interaction learning model.

Gauvin & Parke (Santrock, 2014) states that Vygotsky's theory is a social constructivism theory which emphasis on social interaction, collaboration, and activities that occur in socio-cultural life. Vygotsky believe in the concept of zone proximal development or ZPD development which influence in social and instruction of students' cognitive development. The zone of proximal development is Vygotsky's theory about completing tasks that students feel difficult to complete their own, but they need a guidance and assistance from others (teachers or experts) and other students who are mastering in this regard (Santrock, 2014).

2.2 Social Skills

Social skills are taught in learning based on Bandura's learning theory. Cartledge, Gardner, & Ford states that social skills are learning that are designed with the aim of changing student behavior in a positive direction so that it is useful in social life (Madrona, Samalot, & Kozub, 2016). Libet and Lewinsohn state that social skills are all abilities that can show behavior in both positive and negative behavior and it will be judged negatively by the social environment (Cartledge, 1975).

Merrell & Gimpel (2014) states that social skills are skills that contain the nature, abilities and behavior of humans in interaction with others. Social skills include the personality, language, attitude, and behavior of a person used in interacting in social life. Cook, Gresham, Barreras, Thornton, & Crews (2008) state that social skills are behavioral skills about how to interact with others who may someone to carry out social activity competently.

Zins, Weissbert, Wang, & Walberg defined social skills as social and emotional learning, caring for humanity and environment, social interactions, accountability for decisions that have been taken, and problem solving (Steedly, Schwartz, Levin, Luke, 2008,). Pettry (2006) states that social skills are skills that students need to interact with others.

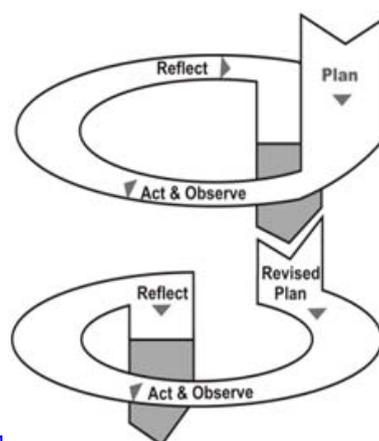
Arends (2016) defined social skills as skills that are used to build social relationships and good cooperation between individuals. Skills that can be developed by students such as sharing, participation and communication skills. Furthermore, Lynch & Simpson (2010) social skills are skills about good behavior in terms of social interactions including, participation, helping, empathy, group cooperation, communication, negotiation, and problem solving.

III. METHOD

This research is classroom action research which aims to describe the implementation of the student team achievement division learning model in improving social skills of students in elementary school. The subjects of this study were 30 students in the fifth grade of Wonokromo III Elementary School, Surabaya, East Java, Indonesia. The study was conducted from August to October 2018.

This study uses a development research model by Kemmis & Taggart which aims to improve the ability of students in the classroom and determine some solutions in classroom learning process through cyclic research. Kemmis & Taggart state that this classroom action research uses action procedures with spiral cycles. In one cycle, there are four stages consisting of planning, implementation and observation, and reflection with the following picture below (Riyanto, 2007).

Picture 1. Kemmis & Taggart Models



Data collection techniques is observation. This research instrument was the observation sheet. The observation sheet is used to find out the social skills of students by observing student activities in social science class through student team achievement division learning models.

IV. RESULT AND DISCUSSION

Based on the validation results of the expert showed that the learning design which consist of syllabus, lesson plan, student worksheets, and observation sheets of students' social skills which is a form of assessment design in categorizing of good, quite valid, and feasible to use.

Observation is done during group discussion and class presentation. The students' social skills observation were communication and cooperation skills. Students who are successful in this model, if they have implemented the student team achievement division learning model in their social skills whether it is individual or classical social skills division in a good category. The following are the observations result of social skills in cycle I.

Table 2. Observation result of social skills in cycle 1

No	Observation spect	1 st meeting	2 nd meeting
1	Active in group discussion	71	78
2	Work with group members	74	75
3	Asking and showing opinion	65	65
4	Answering and responding teacher and friends questions	61	61
5	Presentation of the result	69	70
Total score		340	349
Maximum score		500	500
Percentage (%)		68,00	79,80
Classical percentage(%)		68,90	
Criteria		Good enough	

Source: Data of observation result

Based on 2nd table showed that students' social skills at the first meeting amounted to 68.00% and increased to 79.80% at the second meeting. While the percentage of students' social skills in classics amounted to 68.90% and was in fairly good criteria. With fairly good criteria, it needs to be improved again in order to achieve good criteria or very good criteria in cycle II. Then it can be concluded that the results of the action in the first cycle have not been successful, it needs to be improved and proceed to cycle II.

Table 3. Observation result of social skills in cycle II

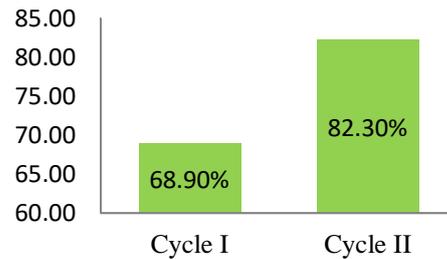
No	Observation aspect	1 st meeting	2 nd meeting
1	Active in group discussion	93	98
2	Work with group members	88	95
3	Asking and showing opinion	67	74
4	Answering and responding teacher and friends questions	69	70
5	Presentation of the result	84	85
Total score		401	422
Maximum score		500	500
Percentage (%)		80,20	84,40
Classical percentage(%)		82,30	
Criteria		Good	

Source: Data of observation result

Based on 3th table, the social skills of students in the first meeting received a percentage of 80.20% and increased to 84.40% at the second meeting. The classical percentage of social skills of the second cycle students is 82,30 and it is in goog criteria.

The Comparison of students 'social skills can be presented in a chart bar to illustrate the improvement of students' social skills in every cycle that has been carried out. The Comparison of students' social skills in cycles I and II can be presented in the following diagram.

Diagram 1. The comparison of students' social skills in cycles I and II



Based on the data in 1st diagram showed that students' social skills in the first cycle amounted to 68.90% with fairly good criteria. While the second cycle was 82.30% with good criteria so that it increases of 13.40%. Thus it can be concluded that by applying the student team achievement learning model can improve students' skills in cooperation and communication aspects.

V. CONCLUSION

Based on the results of classroom action research which has been conducted in the fifth grade of Wonokromo III State Elementary School, Surabaya, East Java, Indonesia, by using the implementation of the student team achievement division learning model in the economic business subject of social science is able to get significantly improvement of the students' social skills aspects in cooperation and communication. The improvement of students' social skills is indicated by the increasing of student's classical social skills in each cycle. The students' social skills in the first cycle was 68.90% with fairly good criteria and 82.30% in the second cycle with good criteria. The classical improvement of students' social skills by applying the student team achievement division learning model was 13.40%.

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Implementation of Cooperative Learning Model *Two Stay Two Stray* for Improving Social Science Learning Outcomes of Elementary School Students

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Abstract- Based on the observation which is done by the researcher in the sixth grade of elementary school is the lack of student activity in learning process and the lack of teachers' innovation in selecting and applying teaching learning model. It creates the learning process in less than optimal and the achievement of student learning outcomes have not been achieved with the Minimum Completion Criteria. The alternative problem solving is applying the cooperative learning model two stay two stray. This study used a classroom action research. The research instruments used observation sheets, non-test and questionnaires. The data analysis technique used qualitative and quantitative analysis techniques. The improvement of teachers' activities, students activities, student learning outcomes and student responses of learning process are the results of this learning process. The improvement occurs gradually starting from cycle I to cycle III in very good criteria. Based on the results of this study, it can be concluded that learning process by implementing a cooperative learning model two stay two stray is able to improve teacher and student activities, learning outcomes and student responses in elementary school.

Index Terms- Cooperative learning Two Stay Two Stray, Learning Outcomes, Social Sciences

I. INTRODUCTION

Learning process is one of the main components in education. The learning process has several principles, those are: 1) learning aims to develop student behavior, 2) learning based on specific needs and motivations, 3) learning is carried out by treating, associating relationships, and strengthening, 4) learning emphasizes on critical thinking, understanding and reorganizing the experience, 5) learning requires direct guidance by the teacher and indirect guidance through their own experience, 6) learning is influenced by inside and outside individual factors [4].

Learning outcomes are action patterns, values, understandings, attitudes, appreciation and skills (Agus Suprijono, 2009, p. 5). According to Sudjana [10], learning process has a function in teaching goals. There are several opinions learning process which are divided into three perspectives, those are: 1) learning is a process; 2) learning is an outcome and 3) learning as a function. In this study students are expected to be able to improve the results of their skills in their cognitive affective and psychomotor.

Social Sciences is one of the subjects at the elementary, secondary, senior high school level and bachelor degree which is generally known as "social studies" Sapriya [9]. The scope of social science in elementary schools is only limited by natural phenomena and social problems that can be reached in everyday life. Whereas according to Sapriya (9), argues that social science covers four dimensions, those are: a) the dimension of knowledge, b) the dimensions of skills, the dimensions of values and attitudes, d) action dimension. According to Nasution [6], the purpose of Social Science is to develop the competency of Citizens whether in knowledge, skills, attitudes, and applying knowledge of real studies. Transferring the knowledge and understanding the knowledge to the students about the environment conditions in the form of facts and ideas.

The observation in social science which is done by the researcher in VI B class of Simomulyo VIII state elementary school in Surabaya, showed that between teacher and students face such problem in teaching learning process. The problem comes up from the teacher include: 1) lack of teacher innovation during teaching and learning process and limited time to share some material in the classroom 2) the teacher uses explanation method; 3) teacher center; 4) lack of interaction between students and teachers. The problems arise from students in social science learning process in class VI B of Simomulyo VIII / 497 SDN Surabaya include: 1) students are only as objects in learning activities; 2) students only receive the material which is given by the teacher; 3) students get the lack of focus on receiving the material and do not pay attention to the explanation from the teacher; and 4) students are chatting

with other students.

After reflection on this class, there is a lack of learning outcomes in Social Science which is in analyzing some case in social culture (communication, production and transportation technology) from the old period to the present. The criteria of Minimum Completeness in previous year was 71 and now it increases to 75. Approximately 65 percent of all students or about 25 children score below the KKM and 13 other children get scores above the KKM. From some of the problems described above, the researcher focus on this case especially in low student learning outcomes, low student activities and the lack of learning methods that are implemented by the teacher which have not appropriate yet in social science.

The characteristics building of elementary students are at the concrete operational stage. They need real activities that can be recorded in their memories to achieve certain competencies. This characteristic requires the teachers in applying some attractive methods in their teaching learning process. One of an alternative learning model that can help students construct their own learning experiences is cooperative learning models. Many kinds of cooperative learning model can be used in learning process, but this study focus on the cooperative learning "type Two Stay Two Stray" and commonly known as TSTS.

Sanjaya [8] revealed that the cooperative learning model is a series of student learning activities in a particular group to achieve the learning objectives. Cooperative learning is not same with learning in groups [7]. There is a basic element of cooperative learning that distinguishes from group learning that is done carelessly. Implementing the principle of a cooperative learning system correctly will build the students to manage the class effectively. Suprijono [11], states that there are five basic elements in cooperative learning, such as: 1) The principle of positive dependence; 2) Individual responsibility; 3) Face-to-face interactions; 4) Participation and communication; and 5) Evaluation of group discussion.

TSTS cooperative learning model has big aim which the students are asked to work together in finding a concept. The use of the TSTS cooperative learning model will create some students to be active in discussion, question and answer, presentation and also more pay attention in peer disson. In addition, the reason for using the two stay two stray learning model is because there is a clear division of group work for each group member, students can work with their friends, impolite students during the teaching and learning process.

Based on the description above, the researcher conducted classroom action research entitle " Implementation of Cooperative Learning Model *Two Stay Two Stray* for Improving Social Science Learning Outcomes of Students in Elementary School". The researchers try to change the old tradition toward a newest method, conducive, active and communicative method.

The purpose of this study is to determine the teachers' activities in implementing cooperative learning model two stay two stray on social science in sixth grade of Simomulyo VIII state elementary school Surabaya and to find out the improvement of student learning outcomes in the application of a cooperative model type two stay two stray on social studies, to describe the response of cooperative learning model two stay two stray on social science.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

This study used a classroom action research (CAR) which used 3 cycles models. According to Kemmis and Mc. Taggart [1], the implementation of CAR involves three steps, those are: a) planning, b) actions and observations (acting and observing), c) reflecting. The subject of this study were 38 students of 6th grade in Simomulyo VIII state elementary school. They are 18 male students and 20 female students. This class action research will be conducted at 6th grade in Simomulyo VIII state elementary school in social science.

The data of this study is taken from teacher activity, student activity, student learning outcomes and student response during the learning process. Data collection techniques in this study are, 1) Observation of teacher and student activities; 2) Questionnaire which is given as a qualitative evaluation for student responses in cooperative learning models two stay two stray; 3) Test. The instruments used in this study are, 1) teacher activity observation sheet; 2) student activity observation sheet; 3) questionnaire sheet; 4) Test. Data Analysis Techniques in this study used: (1) Observation Analysis after obtaining teacher activity during learning process and student learning activities, then the data was analyzed. (2) Test Analysis use the the percentage of students' achievement in mastering the concept. Assessment of student learning completeness in learning. (3) Analysis of student responses to the learning process.

III. FINDINGS AND DISCUSSIONS

In this part, this study will be analyzed about the improvement of teacher activity, student activities, learning outcomes and student responses in learning in cycles I, II and III by using slide show media. From the description above, it can be explained in further steps, as follow:

Teacher Activity

This is a comparison table of student activities that occurs between cycle I, cycle II and cycle III.

Tabel 1. Comparison of Student Activity on Cycle I, Cycle II and Cycle III

Increasing aspect	cycle I	cycle II	cycle III	Criteria
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The average of teacher activity	76,38%	81,94%	84,72%	Increase
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The following is a comparison diagram of student activity that occurs between cycle I, II, III

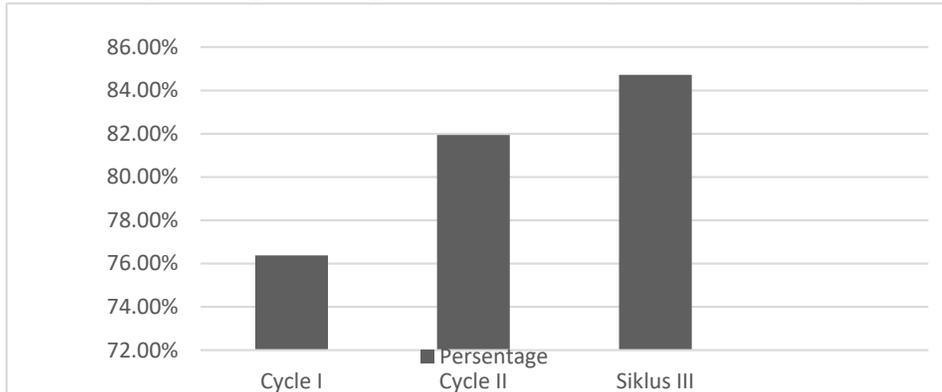


Diagram 1. Data result of teacher activity in social science based on the implementation of cooperative learning *Two Stay Two Stray*

From the table and diagram above, it can be seen that the teacher's ability has increased from cycle I, cycle II and cycle III. This research showed that the implementation of social science by applying a cooperative model two stay two stray can be implemented by the teacher. The average percentage of teacher activity in social science activities uses media time line charts which increased from the first cycle of 76.38% to 81.94% during the implementation of the second cycle of learning and 84.72% in the third cycle. The improvement of teacher activity is carried out for the reflections which is done after implementation and observation in the first cycle and second cycle.

In the first cycle the teacher's activity has not yet reached the research indicator, after reflection is done for reviewing teachers' activities, the researcher continued this activity to next cycle, it is cycle II. After learning activities in the second cycle, it turns out that the teacher's activity has reached the indicator successfully, but the researcher continued to cycle III to check the validity of the model and it is proven that in the third cycle, it still reaches the indicator and increased in percentage.

Student Activity

This is a comparison table of student activities that occurs between cycle I, cycle II and cycle III.

Tabel 2. Comparison of Student Activity on Cycle I, Cycle II and Cycle III

Increasing Aspect	Cycle I	Cycle II	Cycle III	Criteria
The average of student activity	80,50%	83,33%	84,72%	Increase

The following is a comparison diagram of student activity that occurs between cycle I, II, III

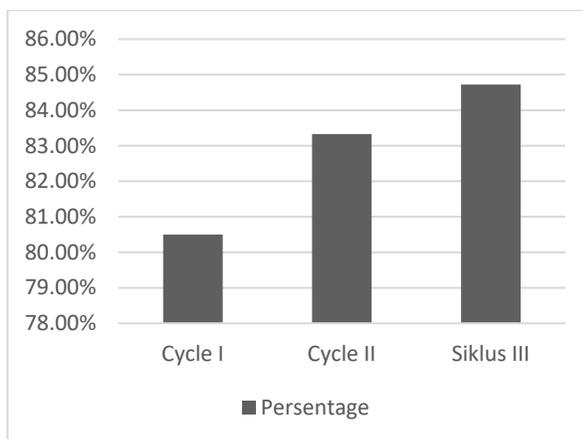


Diagram 2. Data result of teacher activity in social science based on the implementation of cooperative learning *Two Stay Two Stray*

The diagram above showed that the implementation of social science by applying the cooperative learning model two stay two stray can be implemented by the teacher. The Percentage of student activity in social science activities using media timeline charts increased from cycle I increased by 80.50% to 83.33% in cycle II and increased by 84.72% in cycle III.

The implementation of social science by applying the cooperative learning model two stay two stray in cycle I has reached the indicator. However, the students' obstacle has never had such discussions in two stay to stray, so students are still confused in carrying out each stage in this learning process. In the second cycle, the percentage of student activity has exceeded the research indicators. The same thing was found in the implementation of the third cycle which is the increasing of students' activity. This is in accordance with the statement of Suprijono [11]"by using TSTS learning model, students will also be actively involved, so that it will give the motivation to students' enthusiasm in learning process (active).

Student learning outcomes

This is the comparison of students' average score and the completeness of learning outcome in cycle I, II, III.

Tabel 3. The comparison of stuents' cognitive outcomes in cycle I, II, and III

Increasing aspect	cycle I	cycle II	cycle III	criteria
	75%	77,27%	82,60%	Increase

After the data of student completeness is presented in a table, in order to get a clear explanation from cycle I to cycle III is presented in the form of a diagram below:

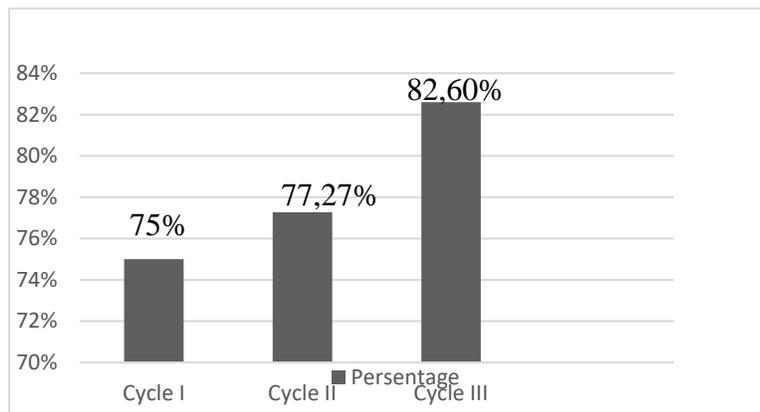


Diagram 3 Data on Classical Learning Completeness in Social Science by implementing *Two Stay Two Stray* cooperative learning model.

Based on the diagram above, the classical completeness of student learning in the first cycle of 75% has not reached the indicator. This research is considered successful if classical completeness has reached 80%. Then a reflection is made to improve the learning process that will be carried out in cycle II. However, in the implementation of the second cycle the classical completeness of student learning was 77.27% and still does not reached the indicator of 80%. In the implementation of the third cycle researchers have reflected on the second cycle to make improvements to the completeness of classical student learning model. The results of the student classical completeness percentage are 82.60% and have reached the indicator that is more or equal to 80%.

The percentage of student increasing learning outcomes and complete the minimum criteria should be more or equal to 80%. This is in line with the opinion of Trianto [12] which states that cooperative learning can improve student academic achievement, acceptance of diversity, and development of social skills.

Student Response

The result of students' response is taken from questionair which filled by the students in every cycle I,II,III and the comparison is shown in the following table:

Tabel 4 The comparison of student response in cycle I,II,III

Increasing aspect	cycle I	cycle II	cycle III	Criteria
Students' response in social science of implementing <i>two stay two stray</i>	82,14%	87,01%	87,57%	Increase

After the data of student completeness is presented in a table, in order to get a clear explanation from cycle I to cycle III is presented in the form of a diagram below:

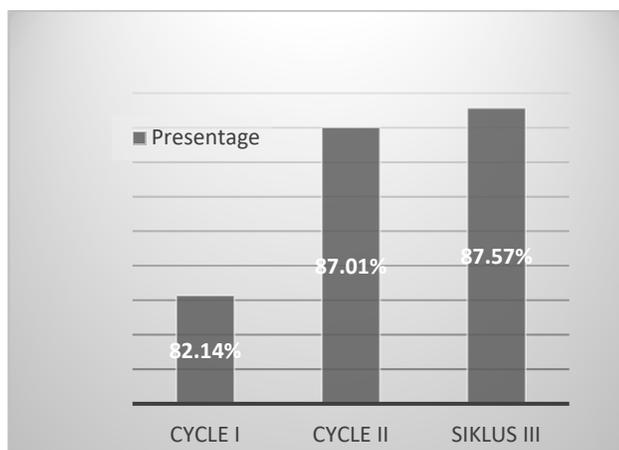


Diagram 4. Data of student response in social science of implementation Two Stay Two Stray

From the tables and diagrams above, it appears that in the first cycle the students' response was still low because the students had never used the time line chart as a learning media. The results of student responses in the first cycle of 82.14% have not reached the expected number of 80%. The response of students in the second cycle increased to 87.01%, showed good improvement and reached the indicators of this study. In the third cycle, there was an increasing result even though it was not significance. The students' response in third cycle is 87.57% and has reached the indicator which is more or equal to 80%.

From the description above showed that the cooperative learning model two stay two stray is easy for students to understand and enjoy to apply the learning material that contains information about facts, times (time) and attitude such as social science in the development of production, communication and transportation technology. In the implementation of the two stay two stray learning model, the results obtained the increasing teacher activity, increasing student activity, improving student learning outcomes and increasing student responses to learning that has been done. This is in line with the opinion of Anita Lie [5] which states that the cooperative learning model type two stay two stray can be applied to all classes / levels; student learning tendencies become more meaningful; more oriented activity; It is expected that students will be brave to express their opinions; student cohesiveness and self-confidence can be improved; students' speaking ability can be improved; increasing students' interest and learning achievement.

The implementation of the cooperative learning model two stay two stray in social science is one of the ways and variations that can be used by teachers to improve student learning outcomes, especially in cognitive competencies. In this research, it is not only focused on the improvement of children's learning outcomes in cognitive competencies but also it includes other observations, that is skills and attitude competencies

IV. CONCLUSIONS

Based on the results of this study, the implementation of social science by implementing cooperative learning models of two stay two stray in 6th grade students of Simomulyo VIII state elementary school Surabaya, can be summarized as follows: 1) the average result of teacher activity can be concluded that the implementation of social science by implementing cooperative learning model two stay two stray has increased from cycle I to cycle III; 2) the average results of student activities get the increasing from cycle I, cycle II, to cycle III; 3) the implementation of cooperative learning model two stay two stray in social science also improves student learning outcomes, this can be seen from the percentage of classical completeness in cycle I to cycle III; 4) the results of student responses can be seen in the questionnaire of cooperative learning models two stay two stray in social science. The implementation of this learning model create students' interesting and decrease a difficulty learning problem in social science.

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Assessment of Complications associated in Malnutrition among Pregnant women visiting Maternity ward of South Indian Teaching Hospital

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Abstract- Background - Maternal nutrition remain as one of the major public health problem in Hyderabad-Karnataka region even after the various developmental programs, nutritional missions, awareness camps and pilot projects by central government as well as state government.

Introduction - The development of an Offspring depends on the anabolic process of pregnancy and catabolic process of maternal Nutrients. Inadequate supply of nutrients from mother to fetus or inadequate intake of nutrients by mother at the time of pregnancy may delay the developmental process of offspring and result complications.

Objectives - The purpose of study is to assess the complications associated with maternal malnutrition.

Methodology - A Prospective Observational cohort study was carried on 164 pregnant women in GIMS Hospital Kalaburagi from October 2017 to March 2018. The assessment of Nutritional status is carried through some essential parameters – Hemoglobin range, Anthropometric details, Demographic details, Socio Economic details, USG reports and Previous History. The complications due to Malnourishment are assessed by Post-partum and Pre-partum Changes.

Results – Findings of our study revealed IUD (48), Preterm, IUGR, and LBW (88) –under Post-partum complications and Eclampsia and Pre Eclampsia (28) – under Pre-partum complications of malnourishment in pregnant women.

Conclusion – A high prevalence of Malnourishment is observed in pregnant women, further undergoing complications before and after conception. A better understanding of the relationship between Partum complications and Socio, Demo, Anthro and Economy details is critical for planning effective intervention to improve maternal nutrition and good fetal outcome.

Index Terms- IUGR, Preterm, LBW, Eclampsia, Offspring, Post – Partum.

I. INTRODUCTION

TDefinition-

The term Malnutrition is defined as “Bad Diet”. Traditionally it was assumed to refer to a diet lacking in calories, proteins, minerals, or micronutrients; in recent decades, it increasingly

applies to a diet high in fats, sugar and salt. Hence malnutrition may refer to having a poor diet – this may be having too little or too much.^[1]

Women are more malnourished than men, because of including women’s reproductive biology, low social status, lack of education and poverty.^[2] If a woman is malnourished during pregnancy or if her child is malnourished during the first two years of life, the child’s physical and mental growth and development will be slowed. This cannot be corrected when the child is older – it will affect the child for the rest of his or her life.^[3]

Classification

World health organisation (WHO) classified malnutrition into 3 broad groups of conditions :

1. Under nutrition – which includes wasting(low weight-for-height), stunting(low height-for-age) and underweight(low weight-for-age).
2. Micronutrient-related malnutrition– which includes micronutrient deficiencies (a lack of important vitamins and minerals) or micronutrient excess.
3. Overweight, Obesity and diet-related Non-Communicable diseases (such as heart disease, stroke , diabetes and some cancers).^[4]

Malnutrition commonly affects all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development. Another group of concern is pregnant women, given that a malnourished mother is at high risk of giving birth to a LBW baby who will be prone to growth failure during infancy and early childhood, and be at increased risk of morbidity and early death. Malnourished girls, in particular, risk becoming yet another malnourished mother, thus contributing to the intergenerational cycle of malnutrition.^[5]

However, approximately 303,000 women and adolescent girls died as a result of pregnancy and childbirth-related complications due to malnutrition in 2015.^[6]

As the term malnutrition generally refers both to undernutrition and overnutrition, but in our study we use the term to refer solely to a deficiency of nutrition in pregnant women.

Complication of Malnutrition at Pregnancy

1. Low Birth Weight.
2. Preterm Birth.
3. Spontaneous abortion and still birth.
4. Intra uterine growth retardation (IUGR).
5. Congenital Malformations.
6. Maternal anemia.
7. Eclampsia and Pre-Eclampsia.^[7]

Risk factors of Maternal Malnutrition

1. Adolescent Birth rate 15-19years.
2. Birth Interval < 24months.
3. Female short stature.
4. Anemia in pregnancy.
5. Female obesity.
6. Hypertension.^[8]

Objective

To assess the complications associated with malnutrition and determine the factors associated with its underlying reasons in pregnant women.

II. MATERIALS & METHODOLOGY

The study was conducted at Gulbarga Institute of Medical Sciences (GIMS), Kalaburagi, India. This 650-bed tertiary hospital draws patients of diverse socioeconomic status, from urban slums to high-income residential areas. The institutional ethical review board of GIMS Kalaburagi approved all study

procedures and a written and signed consent was obtained from each study participant at enrollment.

A. Study design

This was a prospective observational cohort study were a pregnant women considered as Malnourished, based on following parameters with an inclusion criteria - age of 17–40 years and at, 13 week of gestation to 3months age of an infant, registered for antenatal screening at the Department of Obstetrics and Gynecology in GIMS, were invited to participate in the study. As a tertiary referral hospital, pregnant women of the obstetrics clinic are a mix of normal and referral or complicated.

Therefore, exclusion criteria—such as women with multiple fetuses; with a clinical diagnosis of chronic illness such as diabetes mellitus, hypertension, heart disease, and thyroid disease; with a positive test result for hepatitis B surface antigen, HIV, or syphilis infection (venereal disease) were applied.

Although this may have resulted in a sampling bias, our intention was to study apparently the complications during pregnancies from the Second trimester to infant till 3months along with a careful characterization of the pregnancy outcome.

The data was secondary collected through interviewing the parents of the patients. The triggering points were included such as mode of eating and balanced diet knowledge. Evaluating the current practice of malnutrition in pregnant women and infants by comparing IOM, CDC and WHO guidelines.

Parameters considered as factors & cofactors for malnourishment in pregnant women –

[Table no. 01]

Maternal factors	Child factors	Socio Economic factors
Age - <18yrs	Body Mass & height of child – as per WHO guidelines	Economic status - < Poverty
Weight - <50kgs & >75kgs Per Trimestral weight as per IOM guidelines	Gestational week of child birth -< 36 gestational week	Locality- Rural/urban
BMI- <18.5 & >25		Educational qualifications- illiterate/literate
Haemoglobin- < 8gm/dl		
No. of Partitions - >3		
Duration between Parity - < 12months		
Type of delivery - LSCS/NVD		
Placental weight - <500gm		
USG reports - as per CDC guidelines		

In our study the Pregnant women is considered as Malnourished with at least 3 out of 7 factors (Age, Weight, BMI, Hb, USG reports, BM & height of child, Gestational week of child) and with at least 3 out of 7 cofactors (Multiparity, Interparity, Delivery Status, Placenta wt., and Socio Economic status).

III. RESULTS

In our study out of 164 subjects of Malnourished pregnant women in a total, among them 136 cases are reported with Post-partum complications and 28 cases are reported with Pre partum complications.

The subjects with both Pre partum and Post-partum complications are reported individually to prevent bias.

A. Post-partum – 136 cases

[Table no. 02]

S no.	Complication	Cases collected
1.	IUD (Intra uterine death)	48 cases
2.	Preterm Low Birth Weight (LBW) Intra uterine growth retardation (IUGR)	88 cases

1. Post-partum - IUD (Intra uterine death) – 48 cases

[Table no. 03]

S no.	Complication	Cases collected	Causes
1.	Placental Abruption	24 cases	Deficiency of Vit-B6,B9,B12, minerals
2.	Eclampsia & Pre Eclampsia	8 cases	Increased levels of Minerals –Na, Ca & K
3.	Inter parity malnourishment	7 cases	Less duration between each parity
4.	Anemia (low Hb)	4 cases	Deficiency of Iron & Vit B9
6.	Congenital disorders	5 cases	Deficiency of Vit-A C E

2. Post- partum - Preterm, LBW, IUGR - 88 cases

[Table no. 04]

S no.	Condition	Cases collected
1.	Full-term & Low Birth Weight	15 cases
2.	Pre-term & Low Birth Weight	40 cases
3.	Intra uterine growth retardation (IUGR)	20 cases
4.	IUGR & Pre-term & LBW	13 cases
5.	IUGR & Full-term & LBW	-

B. Pre-partum - Eclampsia & Preeclampsia – 28 cases

[Table no. 05]

S no.	Condition	Cases collected
1.	Eclampsia	22 cases
2.	Pre Eclampsia	6 cases

IV. DISCUSSION & SUMMARY

Our study was conducted in District Hospital, Kalaburagi with a total of 164 malnourished pregnant women who are considered as subjects of our study and collected there socio economic, demographic and anthropometric details respectively. As the study duration was from October 2017 – March 2018 with a Prospective Observational study, the subjects are concluded as malnourished with the data obtained from [Table no- 01].

Further, 164 subjects with malnourishment are reported with complications during the time of pregnancy and at the time of delivery which are categorized into two sections- Pre-partum and Post-partum complications with 28 and 136 subjects respectively.

Out of 136 subjects with Post-partum complications, 48 pregnant women were seen with the complication of IUD and the other 88 pregnant women with Preterm delivery, LBW child, and IUGR.[Table no:02]

Findings of our study showed that out of 48 Intra Uterine Deaths, 24 cases were reported with the complication of placental abruption, followed by 8 cases of Preeclampsia and Eclampsia and 7 cases of inter parity malnourishment [Table no.3] this is due to the deficiency of required quantity of Vitamins (B6,B9,B12) ,increased levels of sodium and potassium ,less duration between each parity respectively when further undergone with specific investigations to evaluate the cause of IUD. The Remaining 88 subjects of Post-partum complications were collectively reported with Preterm birth, Low Birth Weight, and Intra Uterine Growth Retardation (IUGR) [Table no-04].

Out of 28 subjects with Pre-partum complications, 22 cases were identified with Eclampsia and 6 cases with Preeclampsia which further investigated for determination of malnourishment.

The Parameters considered as factors of malnourishment is Primitive step in determining the malnourishment and evaluating the complications due malnourishment. This was obtained from various studies conducted by Jang Bahadur Prasad, Roland Andersson and Staffan Bergstron, Salynn Boyles, Shegufta S Sikder, Yael Baumfeld, and Kathleen Abu-Saad,

Hence the study data illustrated the importance of risk at the time of pregnancy with malnutrition and its following outcomes.

The strength of our study is that we correlated all the factors that may cause the malnutrition along with the complications reported during pregnancy and after delivery. The study strengths comprise of it being a large population based study conducted in a single center with little loss to follow up since our center is the sole Government tertiary medical center in the Mid HKE region.

Limitations of our study are lack of systematic analysis to determine the probability value by using Data analysis softwares.

V. CONCLUSION & IMPLICATIONS

We conclude that higher prevalence of Malnutrition in pregnant women is observed in Kalaburagi region, related to age, multiparity, interparity, BMI, habit, occupation, and diet resulted in complications such as LBW, preterm, stillbirth, IUD, IUGR, and congenital disorders in offspring . More large multicentre clinical trials are necessary to establish the Malnutrition as clinical involvement in human health and disease. The present study adds to current scientific information regarding prevalence of nutritional deficiency in apparently healthy pregnant women. However the study is limited considering only prevalence of nutritional deficiency and a longer and detailed follow up is required to assess the effect on maternal and neonatal outcome.

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Nutritional Status and *Angular cheilitis* in School Children at Landfill Suwung, Denpasar City

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Abstract-*Angular cheilitis* the clinical diagnosis of majority lesions affecting at the corner of the mouth. *Angular cheilitis* was an issue of global that affect children population. *Angular cheilitis* becomes a serious problem due to its rapid development, therefore there should be no delay in treatment if symptoms of *angular cheilitis* have occurred. The purpose of this research is to know nutritional status with *angular cheilitis* in school children aged 6-12 years at landfill Suwung, Denpasar City. This research was a analytic descriptive study with 32 school children between 6-12 years old who have resided at landfill Suwung. Lameshow formula was used to calculate the sample size in this study. *Angular cheilitis* status was determined based on the criteria set by Ohman (1986). Anthropometric status was determined by CDC BMI-for-age percentile growth chart. Statistical analysis of the relationship between of nutritional status and *angular cheilitis* was a chi-square test. Prevalence of *angular cheilitis* and malnutrition status were 75% and 71,9%, respectively. There are significant relationship between nutritional status with *angular cheilitis* ($p < 0,05$). Nutritional status is significantly associated with *angular cheilitis* in school children, at landfill Suwung, Denpasar city.

Key words

Angular cheilitis; nutritional status; school children

I. INTRODUCTON

Angular cheilitis is often found in school children in Indonesia. *Angular cheilitis* is the clinical diagnosis of majority lesions affecting the angles of the mouth. *Angular cheilitis* presents as an area of inflamed and cracked skin at the angles of the mounth (Partakusuma, 2016; Zaidan, 2008). One type of oral disease that often occurs in the community, especially children when there are nutritional factors is *angular cheilitis* occurs due to the condition of decreased immunity and below nutritional status (Fajriani, 2017). This disease can also be caused by vitamin B complex deficiency, blood iron deficiency, folate deficiency, denture sore mouth and other factors such as breathing through mouth, wetting lips with tongue and licking the corner of the mouth with tongue (Murray *et al.*, 2008; Park, 2011; Rakhmayanti *et al.*, 2016). There is debate about the causes of *angular cheilitis* and many factors suspected, including malnutrition and infection. This disease progression is so fast. There for should be no delay in treatment if symptoms of *angular cheilitis* occurred and very clear (Park, 2011).

WHO estimates that malnutrition children account for 181.9 million (32%) in developing countries. In Central and South East Asia, approximately half of children have a decline in growth, compared to their age (Atmarita, 2006). *Angular cheilitis* was prevalent disease of oral cavity which are found in various areas. Its prevalence from year to year was not receding. There are many etiological factor associated with the occurrence of *angular cheilitis*, among others are under nutrition, socio-economic factors and oral hygiene (Partakusuma, 2016).

The landfill of Suwung, Denpasar city was an area devoted to stockpiling any garbage originating from the city of Denpasar and surrounding areas. Based on observations and initial surveys conducted by researchers, most of the people living in the landfill of Suwung area work as "scavengers" or garbage workers. The socio-

economic life of the people is still in the middle to the bottom where the environmental and housing conditions are very concerned, there are many piles of garbage strewn, puddles that do not flow, clean water is not available, as well as less hygienic food, is it all becomes the trigger factor of *angular cheilitis*.

Based on the above, the authors are very interested to conduct research on the relationship of nutritional status with *angular cheilitis* in school children who live in the landfill of Suwung, Denpasar city.

II. MATERIAL AND METHOD

The design of this study was a analytic descriptive study, with cross sectional study approach (Notoatmojo, 2002). This research was conducted in the landfill of Suwung, Denpasar city. The time of this research was conducted from September to October 2017. The study population was all school children residing around landfill of Suwung, aged 6-12 years, based on preliminary survey amounted to 40 children. The samples in this study were children who met the inclusion and exclusion criteria. Inclusion criteria are samples willing to be examined and parental consent, able to communicate well, cooperative during the data taking and present at the time of examination. Exclusion criteria are children who are mentally retarded.

The nutritional status of children was a state of children health, determined by the physical degree of energy and other nutrients derived from food whose physical effects can be measured based on the anthropometric index (Khairina, 2012).

Lameshow formula was used to calculate the sample size in this study (Lameshow, 1990). The number of samples set in this study were 32 school children. Angular cheilitis status was determined based on the criteria set by Ohman (Ohman *et al.*, 1986). Anthropometric status was determined by CDC BMI-for-age percentile growth chart. Statistical analysis of the relationship between of nutritional status and *angular cheilitis* was a chi-square test.

Weight of each subject was measured using an electronic weighing scale to the nearest 0,1 kg and height was measured to the nearest 0,1 cm using a microtoise.

III. RESULTS

The subjects of this study was with 32 school children between 6-12 years old, who have receded in the landfill of Suwung, Denpasar city. In this study was found 24 respondents (75%) with *angular cheilitis* and 8 respondents (25%) without *angular cheilitis*. In this study found 14 respondents (43.75%) were 6-7 years age group, 5 respondents (15.63%) were 8-9 years age group, 10 respondents (31.25%) were 10-11 year age group, and 3 respondents (9.38%) are 12 years age group. Thus, most of the respondents in this study were the age group of 6-7 years (43.75%).

In this study found respondents had *angular cheilitis* and below malnutrition status were 75% and 71,9% respectively. In this study was found from 20 respondents (62.5%) who had below malnutrition status, also had *angular cheilitis*, 3 respondents (9.4%) who had below malnutrition status did not experience *angular cheilitis*. Of the 4 respondents (12.5%) who had normal nutritional status, experience *angular cheilitis*, Statistical test results using pearson chi-square showed that the significance value of 0.013. Pearson chi-square significance value for cross tabulation between nutritional status and occurrence *angular cheilitis*, smaller than probality value. Thus, it can be concluded that the nutritional status of children in landfill of Suwung, Denpasar city has a significant effect on the occurrence of *angular cheilitis*.

IV. DISCUSSION

Angular cheilitis the clinical diagnosis of majority of lesions affecting the angles of the mouth. *Angular cheilitis* presents as an area of inflamed and cracked skin at the angles of the mounth. One type of oral disease that often occurs in the community, especially children when there are factors of malnutrition. There is debate about the causes of *angular cheilitis* and many factors suspected about the pathogenitas of this state, including malnutrition and infection. Lack of nutrition can be due to lack of vitamin B₂, riboflavin, vitamin B₆, piridoksin, iron, folic acid and biotin. *Angular cheilitis* becomes a serious problem due to its rapid development (Zaidan, 2008).

The prevalence of *angular cheilitis* is quite high in Indonesia (Yusran *et al.*, 2013). This is in accordance with the results of this study was found 24 respondents (75%) there are *angular cheilitis* and 23 respondents (71,9%) there are below malnutrition. This could be due to the fact that the children are domiciled in the

landfill of Suwung area, help his parents work as “scavengers” or garbage workers. The socio-economic life of the people is still in the middle to the bottom where the environmental and housing conditions are very concerned, there are many piles of garbage strewn, puddles that do not flow, clean water is not available, as well as less hygienic food, is it all becomes the trigger factor of *angular cheilitis* (Partakusuma, 2016). Confirmed also by Atmarita that children living in very unhygienic slums correlate with nutritional deficiencies to the triggering factor of *angular cheilitis* (Atmarita, 2006). This is because children aged 6-12 years including nutritionally vulnerable groups in accordance with the WHO statement that children aged 6-12 years are among the vulnerable groups of nutrition is a group in the community most susceptible to health problems or susceptible to malnutrition (Diana *et al.*, 2015). There are several etiological factors of *angular cheilitis* such as *Candida albicans* fungal infections, nutritional deficiencies, avitaminosis, and bad habits. Candidiasis is a red and creamy mushroom infection that originally looks like a patch formed on a moist surface in the mouth and can cause pain. This condition can cause difficult to swallow and changing the sense of taste. Candidiasis is more common in children with a very low immune system (Murray *et al.*, 2008). This study concluded that the nutritional status of children in landfill of Suwung, Denpasar city has a significant effect on the occurrence of *angular cheilitis*. This is consistent with statement that malnutrition is major cause of *angular cheilitis* in the third world countries. Nutrition deficiency may lower the immune system by impairing the cellular, so it provide of opportunistic infections such as *candida albicans* for the occurrence *angular cheilitis* especially in poor oral hygienes subjects. *Angular cheilitis* occurs in children frequently because of lack of nutrition. Nutritional status of children in which the main cause of *angular cheilitis* in children is a nutritional deficiency caused by lack of protein, vitamin A, B₂, B₆, B₁₂, piridoksin, C, E, folic acid, biotin and mineral Fe, Zn (Budisuari *et al.*, 2010; Rakhmayanti *et al.*, 2016). One type of oral disease that often occurs in the community, especially children when there are nutritional factors is *angular cheilitis* (Fajriani, 2017).

In this study, it was found that in subjects with normal nutritional status experienced *angular cheilitis* were 12,5%. Similarly found in this study prevalence of respondents (9.4%) who had below malnutrition status did not experience *angular cheilitis*. This can happen because of nutritional status measurements by using CDC BMI-for-age percentile growth chart. This is in accordance with the opinion of Fajriani and Greenberg that although the child’s nutritional status is normal, the child may have vitamin B₂, B₁₂, B₆, piridoksin, folic acid, Fe, or biotin deficiency, is it all becomes the trigger factor of *angular cheilitis* (Fajriani, 2017; Greenberg, *et al.*, 2008). There is debate about the causes of *angular cheilitis* and many factors suspected about the pathogenitas, including malnutrition and infection. Any etiologic factor causing *angular cheilitis* especially nutritional deficiency correlates with slum environmental conditions. Bacterial infection and mechanical factor often occur in children with bad habits such as licking the corner of the lip and sucking finger. These will accumulate the saliva on the corner of the mouth and unwittingly provide perfect environment for infections agents in causing between *angular cheilitis* and large intake of carbohydrates has been shown, and it was assumed that a high salivary concentration of 384 glucose predispose to infection, in the angles of the mouth (Atmarita, 2006).

V. CONCLUSION

This study was found 75% respondents there are *angular cheilitis* and 71,9% respondents there are below malnutrition. Nutritional status is significantly associated with *angular cheilitis* incident in school children, in landfill of Suwung, Denpasar city.

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Educational Philosophies of Parents and Level of Diligence of Senior High School Students

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Abstract

Educational philosophies of parents can take many forms, such as being informed about their children's performance in school, knowing strength and weaknesses and providing needs of the students. This study focuses on the level of educational philosophies of parents and level of diligence of the students. This aims to examine the relationship between educational philosophies of parents and student's diligence in school. For the purpose of the study, parents themselves and students who are living with their parents are required to answer the questionnaires in rating scale form. Results indicate that the educational philosophies idealism and essentialism implies that both students and parents have high expectations when it comes to education and they also impose values and proper disciplines. While realism and pragmatism indicates that both students and parents does not believe that reality is found in the physical world that they live in and doesn't think of a practical approach to problems and situations. However the educational philosophy existentialism implies that one's existence is important from both parents and students. In this study, suggestions such as giving parental orientation about the background of education is provided for the future research purposes.

Index Terms: Essentialism, Existentialism, Idealism, Pragmatism, Realism

I. INTRODUCTION

School is an institution that provides learning to students. It has the capacity to nurture the student's capability and potential. It usually denotes to learnings, behavior and ideas. Education does not only focuses to knowledge or intelligence but the learnings itself. Students can find interest through education and engage in different organization or activities which involved in sports, academic or performing arts. Having a good education has a big impact to student's performance in his or her workplace in the future. It can make students achieve personal goals as well as the common good of others. These things will be successful with the support of the parents. (Menhere and Hooge, n.d.), points out that parents plays a part in deciding what is good for their children's success.

Educational philosophies of parents can take many forms, such as being informed about their children's performance in school, knowing strength and weaknesses and providing needs of the students. Philosophy is the study of ideas about knowledge, truth, nature and meaning of life (Merriam Webster, n.d.). While success is based on parents attitude and on how they value education. Children whose parents value education gives advantage to children who are struggling academically and socially. Tan (2006) named the five philosophies of education which are idealism, realism, pragmatism, existentialism and essentialism. Idealism teaches that idea are the only true reality. Realism is found in the physical world that a person live in. Existentialism is concerned with issues relating to one's existence. Essentialism teaches the idea of discipline and moral value. School serves as academic institutions that develop students' abilities in reasoning, observation and experimentation which implicate the real and actual situation of the society, influence the perspective of parents that can affect student's perception about education. The experiences are one of the factor that can change and manipulate the mind and perceptions of the people about education.

When the students are exposed to different technologies and peer pressure it becomes more influential. There can be changes between the actions and decisions of the students. Each parent has role to education and teach students with discipline and understanding in molding the skills and growth of an individual. Mapp (n.d) said, parents wanted their children to do well

in class in order to succeed academically. However, the students who have positive ways of thinking achieve higher academic performance than those who make minimal efforts (Anghelache, 2013). Meanwhile, the attitude of secondary level students helps in the development of their personality (Mushes, Govil and Gupta, 2016). In this regard, the researcher intends to assess educational philosophies prevalent among parents and the attitude of the students in school.

II. REVIEW OF RELATED LITERATURE AND STUDIES

Education focuses student's interest and capabilities as member of the community (Karhoff, 2003). It builds the character of every individual (Khan, Iqbal and Tasneem 2015,). It helps students to analyze and explore the broader situation of reality while encourages each learner to develop their skills and ability.

In particular cases gender and parents level of education can affect learning and children education (Tocu, 2014). Positive attitude of parents can develop positive attitude to their children's teachers (Bempechat, n.d; Berthelse and Walker, 2008,). In that matter, parents can easily interact with the teachers in regard to the performance of their children. It sometimes referring to child and parent relationship toward schooling. However, if the parents had a great experiences about education it will result to good and critical decision making. Children's life in the future channeled by their parents through education (Ardashkin, 2015). While child's academic success and achievement depends on parent's education and family interaction (Dubow, Boxer and Huesmann, 2009) by getting involved in their children's school activities (Roman and Pinto, 2015). It's a parental negligence when parents failed to participate in their children's education (Oundo, Poipoi and Were, 2014). The basic needs and features of the child must be recognized by the parents as educators (Ceka and Murati, n.d). Children will be productive when parents motivate their children to join in school activities, making their children's education pleasant and desirable (Khajehpour & Ghazvini, n.d).

Parental involvement can encourage their children to make school works inspite of difficulties (Ntekane 2018). While teachers should be diligent and responsible to someone's learning (Moore, n.d) assigning projects, providing enrichment and individualizing instruction is the role of teachers in promoting individual development (Shumow, n.d). For the involvement of parents, teachers and administrators needs to assess their own readiness in determining and utilizing the parents of the students (Cotton and Wikelund, n.d). Parents and teachers must have harmonious relationship in order to build communication (Ambrosetti and Chou, 2005). The development of children's self-concept and parent's belief system is provided during early school years (Lazarides, Harackienicz, Canning, Pesu, and Viljaranta, n.d). Parent's beliefs importantly develop their children's behavior (Dempsy and Sandler, n.d). Parent's educational background measures the level of their confidence and self-satisfaction (Dustman, 2004). The performance of parents in school has a great influence to their children's education (Mapp, n.d) and attitude particularly with the level of instruction parents had provided to their children (Candeias, Reblo and Oliveira, n.d)

Modern life needs democracy and there should be the sense of freedom to build knowledge and intelligence (Dewey, 2018). Public school is the institution where equality should be considered and the performance of the students must not be based on their background (Brecko, n.d). School is a viable source of information (Drummond and Stipeke, 2004) which is normally observed and evidently different in terms of Parental level of satisfaction and children's performance in school (Chen and Uttal, 1988). Parents kind of education are likely influenced genetically (Eccles, 2005).

The attention that was gained by the educational leaders affects on their responsibility in establishing order in school (Behabhani, n.d). Moral education is influence of the behavior and the approach to the students (Moore, n.d). In addition, morality guides individual through their behavior and attitude that children showed in school, learning and commitment (Candeias, Reblo, Oliveira and Mendes, 2010) which includes impact of homework on students to their achievement and attitudes were both having positive and negative effects (Rengma, Saikia and Sunny, n.d).

Consequently, educational philosophies broadens the parental belief system as well as their perspective towards education. Hence, parents has an influential factor in molding one's potential and capabilities.

III. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presents the findings, analysis and discussion and interpretation of data gathered wherein the object is to know the relationship between educational philosophies of parents and level of diligence of the students.

Table 1

Level of Student's Performance in School

STUDY HABITS	WEIGHTED MEAN	INTERPRETATION
1. I review my notes before the exam.	4.23	Always
2. I ask questions to my teachers if I will not able to understand his/her discussion.	3.30	Sometimes
3. I think positively when I'm studying.	3.95	Often
4. I like to study in a group so that I can ask help in terms of struggling in understanding the concept.	3.49	Often
5. I usually taking notes while reading a book or article.	3.48	Often
OVER-ALL WEIGHTED MEAN	3.70	Often

Legend: 1.00-1.80 (Never), 1.81-2.60 (Rare), 2.61-3.40 (Sometimes), 3.41-4.20 (Often), 4.21-5.00 (Always)
N=120

The table above shows the result of the weighted mean of the level of student's performance in school in terms of study habits. The statement "I review my notes before the exam", "I ask questions to my teachers if I will not able to understand his/her discussion", "I think positively when I'm studying", "I like to study in a group so that I can ask help in terms of struggling in understanding the concept", "I usually taking notes while reading a book or article" have an overall weighted mean of 3.70 and interpreted as often, implies that students were fairly doing well in terms of their study habits.

Table 2

Level of Student's Performance in School

MEMBERSHIP IN AN ORGANIZATION	WEIGHTED MEAN	INTERPRETATION
1. Joining groups does not hinder my studies.	3.40	Sometimes
2. Participating in school organization serves as an additional performance of my grades.	3.75	Often
3. My grades became high when I started to join a club or organization.	2.93	Sometimes
4. Membership helps me boost my confidence and skills.	3.79	Often
5. Membership helps me utilize my potential in dealing with others	3.88	Often
OVER-ALL WEIGHTED MEAN	3.55	Often

Legend: 1.00-1.80 (Never), 1.81-2.60 (Rare), 2.61-3.40 (Sometimes), 3.41-4.20 (Often), 4.21-5.00 (Always)
N=120

The table above shows the result of the weighted mean of the level of student's performance in school in terms of membership in an organization. The statement "Joining groups does not hinder my studies", "Participating in school organization serves as an additional performance of my grades", "My grades became high when I started to join a club or organization", "Membership helps me boost my confidence and skills", "Membership helps me utilize my potential in dealing with others" have an overall weighted mean is 3.55 and interpreted as often, implies that students were active in terms of membership in an organization.

Table 3

Level of Student's Performance in School

RELATIONSHIP AMONG CLASSMATES	WEIGHTED MEAN	INTERPRETATION
1. I help my classmates in making task or projects.	3.74	Often
2. I share my ideas to my classmates if he/she doesn't easily comprehend the lesson or discussion.	3.80	Often
3. I consider my classmate if he/she is bad mood.	3.62	Often
4. I can share my problems to my classmates.	3.44	Often
5. I respect my classmate's suggestions and decisions.	4.37	Often
OVER-ALL WEIGHTED MEAN	3.79	Often

Legend: 1.00-1.80 (Never), 1.81-2.60 (Rare), 2.61-3.40 (Sometimes), 3.41-4.20 (Often), 4.21-5.00 (Always)
N=120

The table above shows the result of the weighted mean of the level of student's performance in school in terms of relationship among classmates. The statement "I help my classmates in making task or projects", "I share my ideas to my classmates if he/she doesn't easily comprehend the lesson or discussion", "I consider my classmate if he/she is bad mood", "I can share my problems to my classmates", "I respect my classmate's suggestions and decisions" have an overall weighted mean of 3.79 and interpreted as often, implies that students do have a good relationship with their classmates by sharing and opening their ideas with them.

Table 4

Level of Student's Performance in School

RELATIONSHIP AMONG TEACHERS	WEIGHTED MEAN	INTERPRETATION
1. I approach my teachers when I have difficulties in the subject.	3.46	Often
2. I share my personal problems with my teachers.	3.48	Often
3. I consult my teachers when I have failing grades.	3.13	Sometimes
4. I greet teachers every time I meet them.	4.36	Always
5. I respect my teacher inside and out of the school.	4.70	Always
OVER-ALL WEIGHTED MEAN	3.62	Often

Legend: 1.00-1.80 (Never), 1.81-2.60 (Rare), 2.61-3.40 (Sometimes), 3.41-4.20 (Often), 4.21-5.00 (Always)
N=120

The table above shows the result of the weighted mean of the level of student's performance in school in terms of relationship among teachers. The statement "I approach my teachers when I have difficulties in the subject", "I share my personal problems with my teachers", "I consult my teachers when I have failing grades", "I greet teachers every time I meet them", "I respect my teacher inside and out of the school" have an overall weighted mean of 3.62 and interpreted as Often, implies that the students do have a good relationship with their teachers by approaching and respecting their teachers.

Table 5

Level of Educational Philosophies of Parents

IDEALISM	WEIGHTED MEAN	INTERPRETATION
1. I have high expectation in my child's academic performance.	4.32	Strongly Agree
2. I decide what's best for my child.	3.98	Agree
3. I want my child to graduate with perfect skills	4.38	Strongly Agree
4. I make decisions for my child in order to excel in class.	3.53	Agree
5. I want my child to do his/her best in academic courses in order to achieve academic excellence.	4.30	Strongly Agree
OVERALL WEIGHTED MEAN	4.10	Agree

Legend: 1.00-1.80 (Strongly Disagree), 1.81-2.60 (Disagree), 2.61-3.40 (Neutral), 3.41-4.20 (Agree), 4.21-5.00 (Strongly Agree)
N=120

The table above shows the result of the weighted mean of the level of educational philosophies of parents in terms of idealism. The statement “I have high expectation in my child's academic performance”, “I decide what's best for my child”, “I want my child to graduate with perfect skills”, “I make decisions for my child in order to excel in class”, “I want my child to do his/her best in academic courses in order to achieve academic excellence” have an overall weighted mean of 4.10 and interpreted as Agree, implies that ideal parents are the ones who decide of what is good for their child.

Table 6

Level of Educational Philosophies of Parents

REALISM	WEIGHTED MEAN	INTERPRETATION
1. I allow my child to join activities that is appropriate of his/her skills and potential.	4.40	Agree
2. I let my child to do the things that he/she thinks right.	4.18	Agree
3. I allow my child to participate outdoor activities in order to enhance his/her skills.	4.12	Agree
4. I allow my child to do the things according to his/her will.	3.98	Agree
5. I support my child's decision in his/her studies.	4.48	Agree
OVER-ALL WEIGHTED MEAN	4.23	Agree

Legend: 1.00-1.80 (Strongly Disagree), 1.81-2.60 (Disagree), 2.61-3.40 (Neutral), 3.41-4.20 (Agree), 4.21-5.00 (Strongly Agree)
N=120

The table above shows the result of the weighted mean of the level of educational philosophies of parents in terms of realism. The statement “I allow my child to join activities that is appropriate of his/her skills and potential”, “I let my child to do the things that he/she thinks right”, “I allow my child to participate outdoor activities in order to enhance his/her skills”, “I allow my child to do the things according to his/her will”, “I support my child's decision in his/her studies” have an overall weighted mean of 4.23 and interpreted as Agree, implies that realist parents do support their children in terms of their decisions in life and in joining outdoor activities.

Table 7

Level of Educational Philosophies of Parents

PRAGMATISM	WEIGHTED MEAN	INTERPRETATION
1. I support my child based on my salary income.	4.51	Strongly Agree
2. I encourage my child to take a scholarship in order to lessen the fees in school.	4.40	Agree
3. I encourage my child to use his/her skills in the field of work.	4.59	Strongly Agree
4. I teach my child to become responsible in consuming his/her allowance.	4.16	Agree
5. I encourage my child to take vocational course in order to expose himself/herself early in the field of work.	3.89	Agree
OVERALL WEIGHTED MEAN	4.31	Agree

Legend: 1.00-1.80 (Strongly Disagree), 1.81-2.60 (Disagree), 2.61-3.40 (Neutral), 3.41-4.20 (Agree), 4.21-5.00 (Strongly Agree) N=120

The table above shows the result of the weighted mean of the educational philosophies of parents in terms of pragmatism. The statement " I support my child based on my salary income.", " I encourage my child to take a scholarship in order to lessen the fees in school.", "I encourage my child to use his/her skills in the field of work. ", "I teach my child to become responsible in consuming his/her allowance.", "I encourage my child to take vocational course in order to expose himself/herself early in the field of work" have an overall weighted mean of 4.20 and interpreted as Agree, implies that pragmatist parents really taught their children on how to be more practical.

Table 8

Level of Educational Philosophies of Parents

EXISTENTIALISM	WEIGHTED MEAN	INTERPRETATION
1. I allow my child to develop his/her potential and capabilities for the preparation of his/her job in the future.	4.51	Strongly Agree
2. I support my child's decision in choosing his/her career based on demand of the economic society.	4.40	Strongly Agree
3. I let my child to socialize with other people in a respectful manner.	4.59	Strongly Agree
4. I agree with my child's suggestions and decisions according to his/her interest.	4.16	Agree
5. I let my child enjoy his/her teenage life with appropriate teenage activities	3.89	Agree
OVER-ALL WEIGHTED MEAN	4.31	Strongly Agree

Legend: 1.00-1.80 (Strongly Disagree), 1.81-2.60 (Disagree), 2.61-3.40 (Neutral), 3.41-4.20 (Agree), 4.21-5.00 (Strongly Agree) N=120

The table above shows the result of the weighted mean of the educational philosophies of parents in terms of existentialism. The statement " I allow my child to develop his/her potential and capabilities for the preparation of his/her job in the future.", "I support my child's decision in choosing his/her career based on demand of the economic society.", " I let my child to socialize with other people in a respectful manner.", "I agree with my child's suggestions and decisions according to his/her interest.", "I let my child enjoy his/her teenage life with appropriate teenage activities" has an overall weighted mean of 4.50 and interpreted

as Strongly Agree, implies that existentialist parents supports their children in terms of decision making and developing their potentials and capabilities.

Table 9
Level of Educational Philosophies of Parents

ESSENTIALISM	WEIGHTED MEAN	INTERPRETATION
1. I teach my child in doing good to his/her fellow students and teachers.	4.44	Strongly Agree
2. I observe and assess my child's behavior in school and at home.	4.27	Strongly Agree
3. I teach my child the proper discipline in an appropriate manner.	4.64	Strongly Agree
4. I impose values to my child.	4.48	Strongly Agree
5. I train my child harmoniously and respectfully.	4.64	Strongly Agree
OVER-ALL WEIGHTED MEAN	4.49	Strongly Agree

Legend: 1.00-1.80 (Strongly Disagree), 1.81-2.60 (Disagree), 2.61-3.40 (Neutral), 3.41-4.20 (Agree), 4.21-5.00 (Strongly Agree) N=120

The table above shows the result of the weighted mean of the level of educational philosophies of parents in terms of essentialism. The statement “I teach my child in doing good works to his/her fellow students and teachers”, “I observe and assess my child's behavior in school and at home”, “I teach my child the proper discipline in an appropriate manner”, “I impose values to my child”, “I train my child harmoniously and respectfully” have an overall weighted mean of 4.49 and interpreted as Strongly Agree, implies that essentialist parents teaches their children in terms of proper discipline and values.

Table 10
Level of Students Performance in School and Level Educational Philosophies of Parents

		idealism	Realism	Pragmatism	Existentialism	Essentialism
Study habits	Pearson Correlation	.343**	.094	.094	.220*	.341**
	Sig. (2-tailed)	.000	.305	.305	.016	.000
	N	120	120	120	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The table above shows the correlation between study habits and the level of educational philosophies of parents. The educational philosophies Idealism (.343) and Essentialism (.341) are moderately low which are significant, this means that both students and parents have high expectations when it comes to education and they uses proper discipline in their studies. The educational philosophies Realism (.094) and Pragmatism (.094) are very high which are not significant, this means that both students and parents does not believe that reality is found in the physical world that they live in and doesn't think of a practical approach to problems and situations. However the educational philosophy Existentialism (.220) is very low which is significant, this means that education is important to one's existence. This conclude that both students and parents have a high expectations when it comes to education and impose value in education. This findings were consistent to the study of (Tocu, 2014) that the more the individual level of education is high the more the belief and attitude towards education are progressive.

Table 11

Level of Students Performance in School and Level Educational Philosophies of Parents

	Idealism	Realism	Pragmatism	Existentialism	Essentialism
Membership in an Organization Pearson Correlation	.239**	.186*	.303**	.321**	.347**
Sig. (2-tailed)	.009	.042	.001	.000	.000
N	120	120	120	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The table above shows the correlation between membership in an organization and the level of educational philosophies of parents. The educational philosophies Idealism (.239) and Realism (.186) are very low which are significant, this means that the parents supported their children in order to excel in class and in boosting their confidence and skills in order to the things that are right which is consistent to the study of (Tan, 2006, p.24) that the knowledge is gained through reason and experience. The educational philosophies Pragmatism (.303), Existentialism (.321) and Essentialism (.347) are moderately low which are significant, this means that membership in an organization can empower students to have intelligent decisions in life and makes them feel that their existence is important. In addition, membership in an organization also taught student’s the moral values and proper discipline.

This conclude that students and parents are both value ones education. This findings were consistent to the recent study of (Khajehour and Ghazvini, n.d, p.1205) that children is productive when parents motivate their children to join in school and activities and making their children’s education pleasant and desirable.

Table 12

Level of Students Performance in School and Level Educational Philosophies of Parents

	Idealism	Realism	Pragmatism	Existentialism	Essentialism
Relationship among Teachers Pearson Correlation	.217*	.173	.233*	.242**	.340**
Sig. (2-tailed)	.017	.058	.011	.008	.000
N	120	120	120	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The table above shows the correlation between relationship among teachers and the level of educational philosophies of parents. The educational philosophies Idealism (.217), Realism (.173), Pragmatism (.233) and Existentialism (.242) are very low which are significant, this means that relationship among teachers helps the students to be more liberated and to have a practical approach in making decisions. In addition, it also encourages students to have an objective in order to exist. Meanwhile, the educational philosophy Essentialism (.340) is moderately low which is significant, this means that the relationship among teachers and essentialism broadens the importance of appraisal, sensitivity and moral values.

This conclude that students and parents have both positive approach and attitude to the teachers. This findings were consistent to the recent study of (Bempechat, n.d) that positive attitude of parents can develop positive attitude to their children’s teachers.

Table 13

Level of Students Performance in School and Level Educational Philosophies of Parents

		Idealism	Realism	Pragmatism	Existentialism	Essentialism
Relationship among Classmates	Pearson Correlation	-.113	-.048	-.053	-.049	.126
	Sig. (2-tailed)	.217	.602	.565	.594	.169
	N	120	120	120	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The table above shows the correlation between relationship among classmates and the level of educational philosophies of parents. The educational philosophies Idealism (-.113) and Essentialism (.126) are very low which are significant, this means that both students and parents have the same approach in dealing other people especially in imposing moral values. Meanwhile, the educational philosophies Realism (-.048) and Existentialism (-.049) are moderately low which are significant, this means that socializing is important for both students and parents especially the value of one’s existence. However, the educational philosophy Pragmatism (-.053) is moderately high which not significant, this means that both students and parents doesn’t think about the practical approach in making decisions. This conclude that socializing is important for both students and parents especially the value of one’s existence at the same time it taught them in terms of respecting oneself. This findings were consistent to the study of (Ardashkin, 2015) that the human itself can be altered with the development of one’s birth, life, need and communication, values, etc.

IV. FINDINGS

The study reveals that students excel in the different area. In terms of the level of students’ performance in school and study habits, membership in an organization, and their relationship among classmates and teachers, students were fairly doing well in the following area. On one hand, idealist parents were found to be the one who makes decisions for what is best for their child. Meanwhile, realist parents were also found to be supportive to their children in terms of decision making and in joining school outdoor activities. On the other hand, pragmatist parents were found to be practical in terms of raising their children. Moreso, existentialist parents were found to show full support to their children in terms of decision making, and developing their potentials and capabilities. Lastly, essentialist parents were found to teach their children in terms of discipline and values properly. The study also found out that there is a significant correlation between study habits in terms of idealism, essentialism and existentialism. Furthermore, no correlation found between study habits in terms of pragmatism and realism. On one hand, a significant correlation has found between membership in an organization and relationship among teachers in terms of idealism, realism, pragmatism, existentialism and essentialism. On the other hand, a significant correlation has found between relationship among classmates in terms of idealism, realism, essentialism and existentialism. However, no correlation has found between relationship among classmates and pragmatism.

V. CONCLUSION

This study has examined the level of educational philosophies of parents and level of diligence of students in school. Based from the results, idealism and essentialism have high expectations and impose values and disciplines to their children. On one hand, realism and pragmatism are more way too open to their children in venturing things and more practical. Also, these parents does not believe that reality is found in the physical world that they live in and doesn’t think of a practical approach to problems and situations. However the educational philosophy existentialism implies that one’s existence is important from both parents and students. Lastly, educational philosophies of parents such as idealism, realism, pragmatism, existentialism and essentialism affects students diligence in their performance in school by setting expectations, giving freedom, practical, acknowledging one’s existence and imposing values and disciplines to their children.

APPENDIX

RESEARCH INSTRUMENT-A

Direction: Answer the following questions that is appropriate of your answer. Put a check mark [/] in the following column.

5- Strongly Agree 4- Agree 3-Neutral 2-Disagree 1-Strongly Disagree

LEVEL OF EDUCATIONAL PHILOSOPHIES OF PARENTS	5	4	3	2	1
IDEALISM					
I have high expectation in my child's academic performance.					
I decide what's best for my child.					
I want my child to graduate with perfect skills.					
I make decisions for my child in order to excel in class.					
I want my child to do his/her best in academic courses in order to achieve academic excellence.					
REALISM					
I allow my child to join activities that is appropriate of his/her skills and potential					
I let my child to do the things that he/she thinks right.					
I allow my child to participate outdoor activities in order to enhance his/her skills.					
I allow my child to do the things according to his/her will.					
I support my child's decision in his/her studies.					
PRAGMATISM					
I support my child based on my salary income.					
I encourage my child to take a scholarship in order to lessen the fees in school.					
I encourage my child to use his/her skills in the field of work.					
I teach my child to become responsible in consuming his/her allowance.					
I encourage my child to take vocational course in order to expose himself/herself early in the field of work.					
EXISTENTIALISM					
I allow my child to develop his/her potential and capabilities for the preparation of his/her job in the future.					
I support my child's decision in choosing his/her career based on demand of the economic society.					
I let my child to socialize with other people in a respectful manner.					
I agree with my child's suggestions and decisions according to his/her interest.					
I let my child enjoy his/her teenage life with appropriate teenage activities.					
ESSENTIALISM					
I teach my child in doing good works to his/her fellow students and teachers.					
I observe and assess my child's behavior in school and at home.					
I teach my child the proper discipline in an appropriate manner.					
I impose values to my child.					
I train my child harmoniously and respectfully.					

RESEARCH INSTRUMENT-B

Direction: Read each item carefully and rate according to your preference.

5-Always 4-Often 3-Sometimes 2-Rare 1-Never

I. Study Habits	5	4	3	2	1
1. I review my notes before the exam					
2. I ask questions to my teachers if I will not able to understand his/her discussion.					
3. I think positively when I'm studying.					
4. I like to study in a group so that I can asked help in terms of struggling in understanding the concept.					
5. I usually taking notes while reading a book or article.					
II. Membership in an Organization					
1. Joining groups does not hinder my studies					
2. Participating in school organization serves as an additional performance of my grades.					
3. My grades became high when I started to join a club or organization.					
4. Membership helps me boost my confidence and skills.					
5. Membership helps me to utilize my potential in dealing with others.					
III. Relationship among Teachers					
1. I approach my teachers when I have difficulties in the subject.					
2. I share my personal problems with my teachers.					
3. I consult my teachers when I have failing grades.					
4. I greet teachers every time I meet them.					
5. I respect my teachers inside and out of the school.					
IV. Relationship among Classmates					
1. I help my classmates in making task or projects.					
2. I share my ideas to my classmates if he/she doesn't easily comprehend the lesson or discussion.					
3. I consider my classmate id he/she is bad mood					
4. I can share my problems to my classmates.					
5. I respect my classmate's suggestions and decisions.					

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A Study on Total Literacy Campaign Adopted by Andhra Pradesh Particularly in Guntur District

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Synapses- "Development obviously has its economic side, and important it is. But, if the human resources of a country are viewed in the same manner as the mineral and animal reserves, a grossly distorted image will inevitably ensure. Real development must depend on balanced growth of the person both as an economic and social being" (Coles 1977: 4).

Perceptions of functionaries, who worked under NLM, TLC, EFA, DPEP, SSA and NAEP, on various aspects of the administrative system adopted under the programmes were taken and these opinions on administrative aspects were classified into positive and negative categories. Many functionaries during the Focus Group Discussions and interviews revealed that the administrative structure of NAEP was well organized compared to any other adult education programme implemented in India. They opined that the government, for the first time, has institutionalized the adult education programme and created permanent structures for its implementation. In Andhra Pradesh, the structures created under NLM, TLC, EFA, DPEP, SSA and NAEP are still in existence and have blown a backbone for the successive programmes launched in India.

Index Terms- Literacy, campaign, National Literacy Mission, Total Literacy campaign, Education for all, District Primary Education Programme, Sarva Shiksha Abhiyan and National Adult Education Programme, etc

I. INTRODUCTION

UNESCO: "Define literacy as the ability to identify, understand, interpret, create, communicate complete and use printed and with materials associate with varying context literacy involves a continuous of learning in enabling individuals to achieve to their goals, to develop their knowledge and potential to participate fully in their community and with society.

The working definition of literacy in the India census 1991 is as follows:

- **Literacy rate:** The total percentage of population of an area at a particular time aged seven and above who can read and write with understanding. Hence the Denominator is the population aged seven years or more
- **Crude literacy rate:** The totally percentage of the people of an area at a particular time aged seven years or above

who can read and write with understanding taking the total population of the area as the denominator.

II. CONCEPT OF EDUCATION:

Man by nature is a social animal. Silence is unnatural in his life. He wants to have contact with his fellow beings one way or the other. He wants to gain something out of something. He becomes knowledge through different sources like books, films, radio, T.V., Newspaper, or through different contact with different persons and places. He will be a different individual from thereafter. His inquisitive mind craves knowledge and staying isolated is unnatural to man. He begins life with a cry, to know everything around him. This leads him from ignorance to light – the light of life. The continuous accumulation of knowledge from different directions is **Education**. This exterminates barricades in one's own life. This is only the means to life but not life itself. Life without proper direction will lack essence. One will lose the nectar of cultured, civilized life. He will not become what he wants to become if he is deprived of education.

III. HISTORICAL IMPORTANCE OF THE EDUCATION:

As for population is concerned, India is the largest democracy in the world. Geographically, we are a vast country spread over 329 million hectares of land supporting 1045 million people (2002 estimate) about 1.25 times the total population of Europe. During the last five decades, our number has tripled. With the birth of 48,000 children per day, 18 million are added every year to our population. This addition is more than the total population of Australia. With only 2.4 per cent of the total global land and 2 per cent of the total world's income, we bear the burden of 16.7 per cent of the total population of the world.

1. THE National Literacy Mission (NLM) :

THE National Literacy Mission (NLM) was established in 1988, with the objective of revising and strengthening the existing adult education programmes in the country and making them mass programmes. Several evaluations were conducted by the Mission, and projects like the Rural Functional Literacy Programme, the Mass Programme of Functional Literacy, the adult education programmes of voluntary agencies and state governments were revised. These efforts did not lead to a satisfactory strategy for the eradication of mass illiteracy. Defines literacy as the acquiring the

skills of reading, writing, and arithmetic and the ability to apply them to one's day to day life. The achievement of functional literacy implies.

2. The Total Literacy Campaign (TLC)

The Total Literacy Campaign (TLC) is a dominant strategy for eradication of adult illiteracy in India. This approach is a potent and viable model which helps to achieve a significant breakthrough in the literacy scene in India. It constitutes the principal strategy of National Literacy Mission (NLM). This TLC is area-specific, time bound, volunteer-based, cost effective and outcome-oriented. The thrust is on attainment of functional literacy through prescribed norms of literacy and numeracy. The learner is the focal point in the entire process. The measurement of learning outcome is continuous, informal and participative.

3. EDUCATION FOR ALL:

Ever since 1951, India has been making an all-out effort to universalize primary education. In this direction and to fulfill this ambitious plan, steps have planned — Educational facilities within easy walking distance of the child, encouraging parents towards a compulsory enrolment of children in the schools, taking due note of the drop-outs among children and to avoid such a situation in the best possible way and improving the quality of education at the primary level and making it more attractive in order to allure the child to come to the school.

4. DISTRICT PRIMARY EDUCATION PROGRAMME (DPEP).

Initiated in 1994, the District Primary Education Programme (DPEP) is under implementation in 271 districts in the country across 18 states. District Primary Education Programme is part of Social Safety Net Credit Adjustment Loan under the Structural Adjustment Programme of the World Bank to India in 1991.

5. SARVA SHIKSHA ABHIYAN:

Sarva Shiksha Abhiyan (SSA) is Government of India's flagship programme for achievement of Universalization of Elementary Education (UEE) in a time bound manner, as mandated by 86th amendment to the Constitution of India making free and compulsory Education to the Children of 6-14 years age group, a Fundamental Right.

6. NATIONAL ADULT EDUCATION PROGRAMME (NAEP).

The National adult Education Programme was launched on 2nd October, 1978. The programme aims at eradicating illiteracy among adults of the age group 15 – 35.

1.2 Literary review:

While studies concerning various aspects of adult education, both from the theoretical and empirical view point, are highly useful in coming to grips with the very process of educating the masses of varied background, it is an inevitable reality that the programmes themselves are critically assessed as to their efficacy and success or failure in terms of achieving the intended goal.

Manoharlal and Rajeswari Mishra (1982) conducted a study on Adult Education in Bihar. The objective of this study was to acquaint and assess the functioning of the NAEP through Rural

Functional Literacy Projects. It dealt with the administrative and pedagogical issues of NAEP. The findings of the study were with regard to the up gradation of functional skills and social awareness.

With the help of reputed social science institutions, the Government of India (1988) had conducted evaluation of literacy programmes under NAEP. The evaluation reports of the programme mentioned the strengths and weaknesses, which are given below.

The Strengths of NAEP were:

1. Women motivation and participation was high.
2. Coverage of SCIST was higher than the target.
3. The Project approach to management was feasible.
4. State Resource Centers have contributed significantly to the programme.
5. The quality of teaching /learning material, which was brought out by them was good.
6. The programme worked well in those States where the adult education functionaries were recruited under special section procedures.

The weaknesses of NAEP were:

1. The quality of training of functionaries was poor.
2. The monitoring system lacked credibility and there was considerable misreporting.
3. The learning environment in adult education centers was defect and lighting arrangements were poor.
4. Mass media did not provide appreciable support.
5. Voluntary agencies did not receive cooperation from the State Governments and the procedures for their involvement discouraged them.

1.3 Plan and procedure:

Statement of the Problem

The topic of research entitled, *A study on total literacy campaign adopted by Andhra Pradesh particularly in Guntur Dist.*

Scope of the Study

The main intention of the study is to analyse the approaches that are followed in Literacy programmes and to analyze the positive and negative aspects related to different strategies adopted in those programmes(NLM, TLC, EFA, DPEP, SSA, NAEP) in the Guntur, district of Andhra Pradesh, the study attempts to identify the type of relationship between different aspects (Administrative, Pedagogy, Motivational and Financial Aspects) of the selected respondents.

IV. OBJECTIVES OF THE STUDY

1. To identify the factors hindering total literacy campaign(NLM, TLC, EPA, DPEP, SSA and NAEP) in Andhra Pradesh, particularly in Guntur district.

2. To know the different schemes(NLM, TLC, EPA, DPEP, SSA and NAEP) adopted by Andhra Pradesh to eradicate illiteracy through total literacy campaign.
3. To know the administrative difficulties(NLM, TLC, EPA, DPEP, SSA and NAEP) in implementing the total literacy campaign.
4. Steps to be taken to strengthen(NLM, TLC, EPA, DPEP, SSA and NAEP) efforts of the government and other agencies in utilizing programme of total literacy campaign.
5. To suggest ways and means to make the programmes (NLM, TLC, EPA, DPEP, SSA and NAEP) of total literacy campaign successful.

3.4 Hypotheses of the study *Based on the above objectives, the following hypotheses are formulated:*

1. The samples do not differ significantly in their perception on administrative aspects in NLM in terms of personal variables (gender, age and experience).
2. The sample does not differ significantly in their perception on pedagogical aspects in NLM in terms of personal variables (gender, age and experience).
3. The sample does not differ significantly in their perception on pedagogical aspects in TLC in terms of personal variables (gender, age and experience).
4. The sample do not differ significantly their perception on motivational aspects in TLC in terms of personal variables (gender, age and experience).
5. The sample does not differ significantly in their perception on administrative aspects in EFA in terms of personal variables (gender, age and experience).
6. The sample does not differ significantly in their perception on pedagogical aspects in EFA in terms of personal variables (gender, age and experience).
7. The sample does not differ significantly in their perception on financial aspects in DPEP in terms of personal variables (gender, age and experience).
8. The sample does not differ significantly in their perception on administrative aspects in SSA in terms of personal variables (gender, age and experience).
9. The sample does not differ significantly in their perception on pedagogical aspects in SSA in terms of personal variables (gender, age and experience).

Research Methodology:

Normative Survey method

Sample:

744 samples are taken to implementation of total literacy campaign

1. Teachers of SSA, EFA, DPEP, etc.,100 members
2. Executive officers at district and mandal level. 100 members
3. Supervisors at district and mandal level. 100 members
4. Mandal Educational Officers. 100 members
5. M. L. O. 100 members

Tools and Techniques are used

The following tools and techniques are used

1. Questionnaire

Sample and sample techniques:

Random sampling among the SSA, EFA, DPEP, Executive officers at district and MEOs

V. NEED FOR THE STUDY

For accelerating the pace of economic development of the country and for transforming the society, education of the masses is absolutely essential. Literacy alone could help the citizens to participate in the development programmes intelligently and effectively. Sweden's remarkable progress can be traced to the fact that compulsory literacy was introduced. Realising this fact, the Constitution of India preambles Universalisation of Elementary Education by 1961, but even at the end of 1995 the country remained far from this target. On the contrary even after five decades of Independence, the number of illiterates in India has increased

Hence, the universalisation of elementary education through formal as well as non-formal channels is felt to be inevitable. For a long period significant per cent of the adult population has been kept isolated from the fruits of education. About fifty per cent of the illiterates in the country belong to the most productive age group of 15-35 years. This is in fact distressing and largely responsible for the low level of the country's socio-economic development.

In a major study on the factors of success in literacy, All Hamadache and Daniel Martin (UNESCO 1086), identified three major factors for the success of the adult literacy programmes In the world. They are:

1. Political factors

- a) National commitment
- b) The political and socio-economic framework

2. Technical Factors

- a) Public awareness
- b) Mobilization
- c) Planning

3. The four basic principles

- a) Functionality
- b) Participation
- c) Integration
- d) Diversification

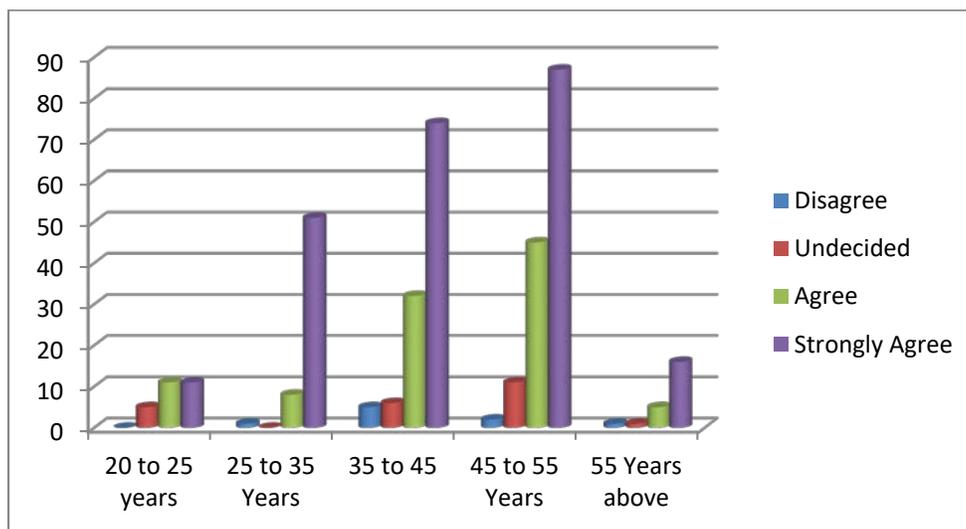
VI. STATISTICAL ANALYSIS

Table 1: Anova test between variables ‘Experience’ and ‘Whether total literacy campaign centers are aiming at 3R ie reading, writing and arithmetic’.

	Disagree	Undecided	Agree	Strongly Agree	
20 to 25	0	5	11	11	27
	0.00%	18.50%	40.70%	40.70%	100.00%
25 to 35	1	0	8	51	60
	1.70%	0.00%	13.30%	85.00%	100.00%
35 to 45	5	6	32	74	117
	4.30%	5.10%	27.40%	63.20%	100.00%
45 to 55	2	11	45	87	145
	1.40%	7.60%	31.00%	60.00%	100.00%
55 above	1	1	5	16	23
	4.30%	4.30%	21.70%	69.60%	100.00%
	9	23	101	239	372
	2.40%	6.20%	27.20%	64.20%	100.00%

From the table it can be observed that respondents with age between 20 to 25 years 18.5% are undecided, 40.7% agree and 40.7% strongly agree with the argument. Respondents of age between 25 to 35 years 1.7% disagree, 13.3% agree and 85% strongly agree with the argument. Respondents of age between 35 to 45 years 4.3% disagree, 5.1% are undecided, 27.4% agree and

63.2% strongly agree with the argument. Respondents of age between 45 to 55 years 1.4% disagree, 7.6% are undecided, 31% agree and 60% strongly agree with the argument. Respondents of age with 55 above 4.3% disagree, 4.3% are undecided, 21.7% agree and 69.6% strongly agree with the argument.



ANOVA test has been conducted between the variables ‘Age’ and ‘Whether total literacy campaign centers are aiming at 3R ie reading, writing and arithmetic’ and the results are tabulated below

		Sum of Squares	df	Mean Square	F	Sig.
B1	Between Groups	7.815	4	1.954	3.88	0.004
	Within Groups	184.798	367	0.504		
	Total	192.613	371			

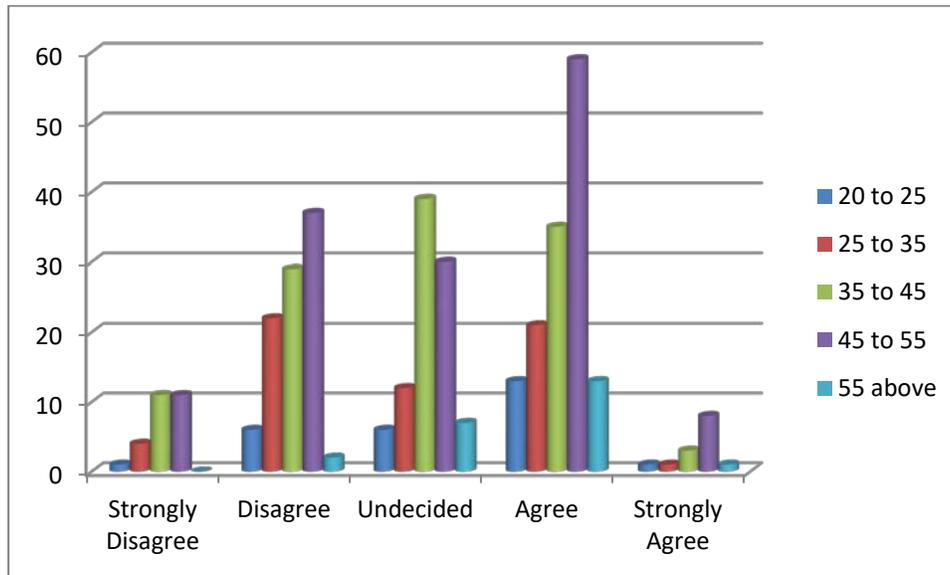
From the table it can be observed that the calculated p value is 0.004 at 5% level of significance. Since the p value is less than 0.05 null hypotheses can be rejected. So there is a significant difference between the views of the respondents according to their age.

Table 2: Anova test between variables ‘Age’ and ‘Under article 45 of the constitution facilitated free and compulsory education, Universalization of primary education’.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
20 to 25	1	6	6	13	1	27
	3.70%	22.20%	22.20%	48.10%	3.70%	100.00%
25 to 35	4	22	12	21	1	60
	6.70%	36.70%	20.00%	35.00%	1.70%	100.00%
35 to 45	11	29	39	35	3	117
	9.40%	24.80%	33.30%	29.90%	2.60%	100.00%
45 to 55	11	37	30	59	8	145
	7.60%	25.50%	20.70%	40.70%	5.50%	100.00%
55 above	0	2	7	13	1	23
	0.00%	8.70%	30.40%	56.50%	4.30%	100.00%
	27	96	94	141	14	372
	7.30%	25.80%	25.30%	37.90%	3.80%	100.00%

From the table it can be observed that respondents with age between 20 to 25 years 3.7% strongly disagree, 22.2% disagree, 22.2% undecided, 48.1% agree and 3.7% strongly agree with the argument. Respondents of age between 25 to 35 years 6.7% strongly disagree, 36.7% disagree, 20% undecided, 35% agree and 1.7% strongly agrees with the argument. Respondents of age between 35 to 45 years 9.4% strongly disagree, 24.8% disagree,

33.3% undecided, 29.9% agree and 2.6% strongly agree with the argument. Respondents of age between 45 to 55 years 7.6% strongly disagree, 25.5% disagree, 20.7% undecided, 40.7% agree and 5.5% strongly agree with the argument. Respondents of age with 55 above 8.7% disagree, 30.4% undecided, 56.5% agree and 4.3% strongly agree with the argument.



ANOVA test has been conducted between the variables ‘Age’ and ‘Under article 45 of the constitution facilitated free and compulsory education, Universalization of primary education’ and the results are tabulated below

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.629	4	2.907	2.747	0.028
Within Groups	388.4	367	1.058		
Total	400.03	371			

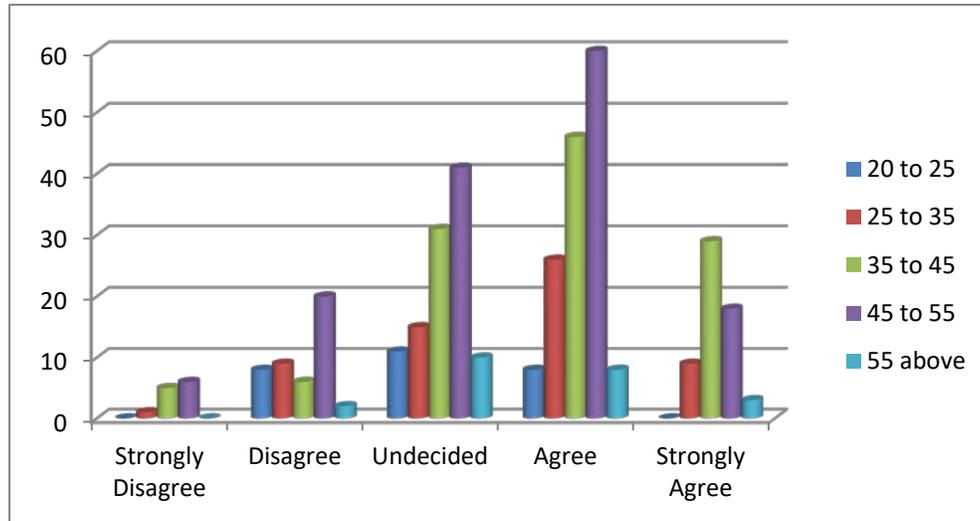
From the table it can be observed that the calculated p value is 0.028 at 5% level of significance. Since the p value is less than 0.05 null hypotheses can be rejected. So there is a significant difference between the views of the respondents according to their age.

Table 3: Anova test between variables ‘Age’ and ‘Skills for the lively hood in total literacy campaign centers should also be properly planed’.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
20 to 25	0	8	11	8	0	27
	0.00%	29.60%	40.70%	29.60%	0.00%	100.00%
25 to 35	1	9	15	26	9	60
	1.70%	15.00%	25.00%	43.30%	15.00%	100.00%
35 to 45	5	6	31	46	29	117
	4.30%	5.10%	26.50%	39.30%	24.80%	100.00%
45 to 55	6	20	41	60	18	145
	4.10%	13.80%	28.30%	41.40%	12.40%	100.00%
55 above	0	2	10	8	3	23
	0.00%	8.70%	43.50%	34.80%	13.00%	100.00%
	12	45	108	148	59	372
	3.20%	12.10%	29.00%	39.80%	15.90%	100.00%

From the table it can be observed that respondents with age between 20 to 25 years 29.6% disagree, 40.7% undecided and 29.6% agree with the argument. Respondents of age between 25 to 35 years 1.7% strongly disagree, 15% disagree, 25% undecided, 43.3% agree and 15% strongly agrees with the argument. Respondents of age between 35 to 45 years 4.3% strongly disagree, 5.1% disagree, 26.5% undecided, 39.3% agree and

24.8% strongly agree with the argument. Respondents of age between 45 to 55 years 4.1% strongly disagree, 13.8% disagree, 28.3% undecided, 41.4% agree and 12.4% strongly agree with the argument. Respondents of age with 55 above 8.7% disagree, 43.5% undecided, 34.8% agree and 13% strongly agree with the argument.



ANOVA test has been conducted between the variables ‘Age’ and ‘Skills for the lively hood in total literacy campaign centers should also be properly planed’ and the results are tabulated below

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.522	4	3.63	3.72	0.006
Within Groups	358.153	367	0.976		
Total	372.675	371			

From the table it can be observed that the calculated p value is 0.006 at 5% level of significance. Since the p value is less than 0.05 null hypotheses can be rejected. So there is a significant difference between the views of the respondents according to their age.

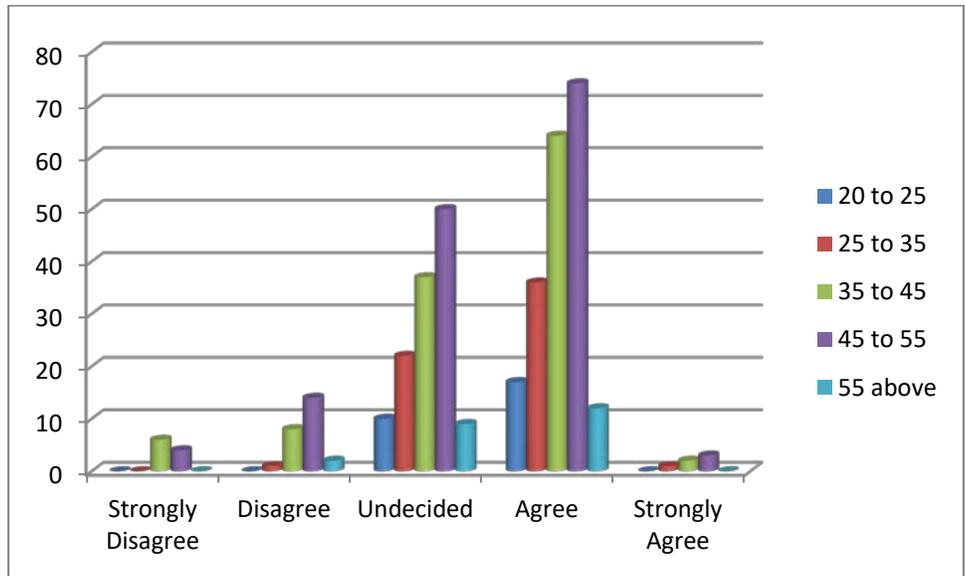
Table 4: Anova test between variables ‘Age’ and ‘To improve total literacy campaign Sarva Siksha Abiyan (SSA) was launched by the Government of India’.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
20 to 25	0	0	10	17	0	27
	0.00%	0.00%	37.00%	63.00%	0.00%	100.00%
25 to 35	0	1	22	36	1	60
	0.00%	1.70%	36.70%	60.00%	1.70%	100.00%
35 to 45	6	8	37	64	2	117
	5.10%	6.80%	31.60%	54.70%	1.70%	100.00%
45 to 55	4	14	50	74	3	145
	2.80%	9.70%	34.50%	51.00%	2.10%	100.00%
	0	2	9	12	0	23

55 above	0.00%	8.70%	39.10%	52.20%	0.00%	100.00%
	10	25	128	203	6	372
	2.70%	6.70%	34.40%	54.60%	1.60%	100.00%

From the table it can be observed that respondents with age between 20 to 25 years 37% undecided and 63% agree with the argument. Respondents of age between 25 to 35 years 1.7% disagree, 36.7% undecided, and 60% agree and 1.7% strongly agrees with the argument. Respondents of age between 35 to 45 years 5.1% strongly disagree, 6.8% disagree, 31.6% undecided,

54.7% agree and 1.7% strongly agrees with the argument. Respondents of age between 45 to 55 years 2.8% strongly disagree, 9.7% disagree, 34.5% undecided, 51% agree and 2.1% strongly agree with the argument. Respondents of age with 55 above 8.7% disagree, 39.1% undecided and 52.2% agree with the argument.



ANOVA test has been conducted between the variables ‘Age’ and ‘Skills for the lively hood in total literacy campaign centers should also be properly planed’ and the results are tabulated below

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.072	4	0.768	1.334	0.257
Within Groups	211.239	367	0.576		
Total	214.312	371			

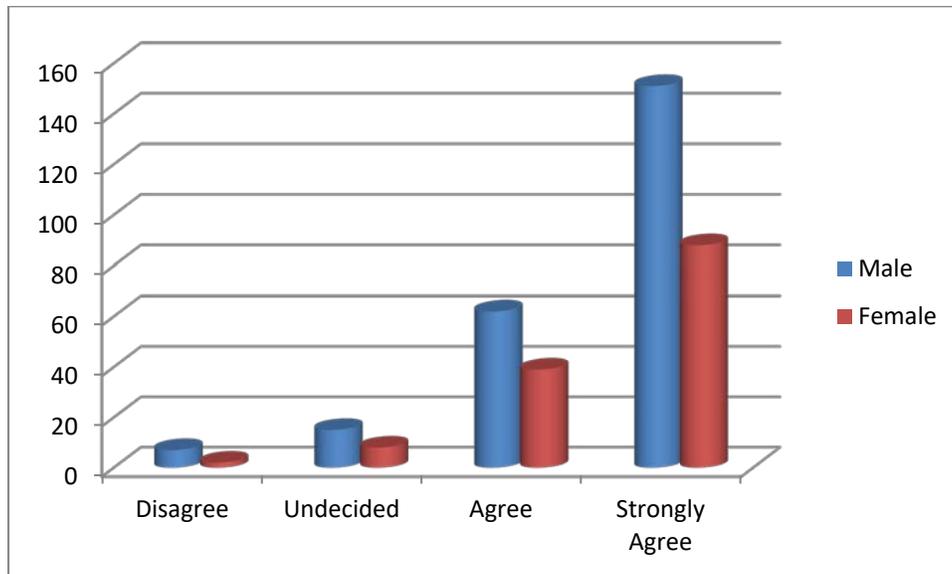
From the table it can be observed that the calculated p value is 0.257 at 5% level of significance. Since the p value is greater than 0.05 null hypotheses can be accepted. So there is no significant difference between the views of the respondents according to their age.

Table 5: Chi square test between variables ‘Gender’ and ‘Whether total literacy campaign centers are aiming at 3R ie reading, writing and arithmetic’.

	Disagree	Undecided	Agree	Strongly Agree	
Male	7	15	62	151	235
	3.00%	6.40%	26.40%	64.30%	100.00%
Female	2	8	39	88	137
	1.50%	5.80%	28.50%	64.20%	100.00%

	9	23	101	239	372
	2.40%	6.20%	27.20%	64.20%	100.00%

From the table it can be observed that among males 3% disagree, 6.4% undecided, 26.4% agrees and 64.3% strongly agree with the argument. Among females 1.5% disagree, 5.8% undecided, 28.5% agree and 64.2% strongly agree with the argument.



Chi square test has been conducted between the variables ‘Gender’ and ‘Whether total literacy campaign centers are aiming at 3R ie reading, writing and arithmetic’ and the results are tabulated below

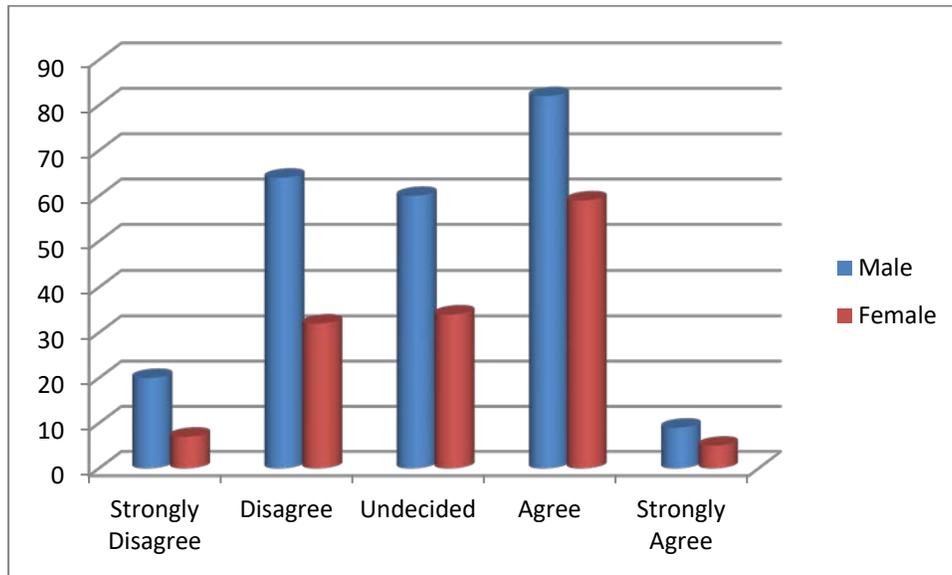
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.005 ^a	3	0.8

The calculated chi square value is 1.005 with 3 degrees of freedom and at 5% level of significance. Since the calculated value is less the table value (7.81) null hypothesis is accepted. So there is no significant difference between the views of the respondents according to the gender.

Table 6: Chi square test between variables ‘Gender’ and ‘Under article 45 of the constitution facilitated free and compulsory education, Universalization of primary education’.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
Male	20	64	60	82	9	235
	8.50%	27.20%	25.50%	34.90%	3.80%	100.00%
Female	7	32	34	59	5	137
	5.10%	23.40%	24.80%	43.10%	3.60%	100.00%
	27	96	94	141	14	372
	7.30%	25.80%	25.30%	37.90%	3.80%	100.00%

From the table it can be observed that among males 8.5% strongly disagree, 27.2% disagree, 25.5% undecided, 34.9% agree and 3.8% strongly disagree with the argument. Among females 5.1% strongly disagree, 23.4% disagree, 24.8% undecided, 43.1% agree and 3.6% strongly agree with the argument.



Chi square test has been conducted between the variables 'Gender' and 'Under article 45 of the constitution facilitated free and compulsory education, Universalization of primary education' and the results are tabulated below

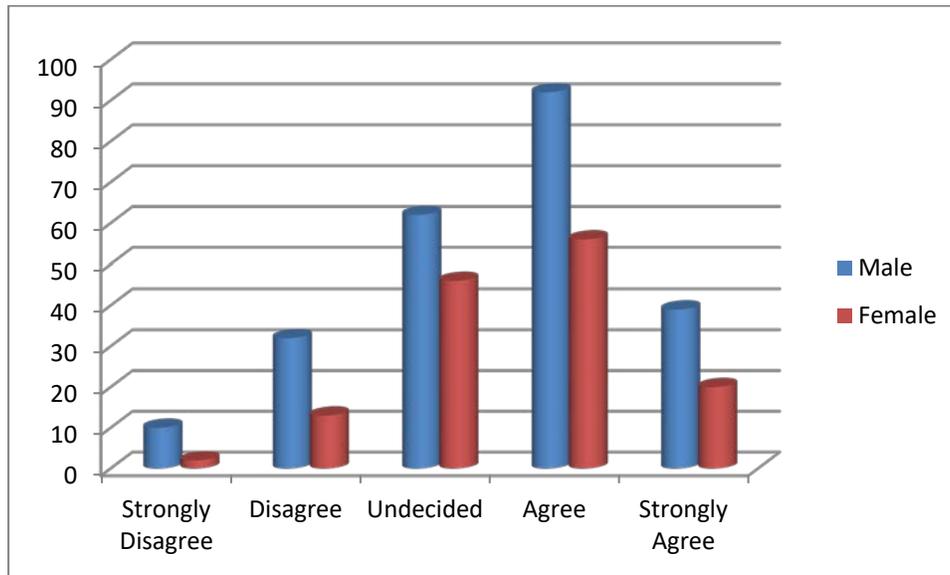
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.433 ^a	4	0.488

The calculated chi square value is 3.433 with 4 degrees of freedom and at 5% level of significance. Since the calculated value is less the table value (9.49) null hypothesis is accepted. So there is no significant difference between the views of the respondents according to the gender.

Table 7: Chi square test between variables 'Gender' and 'Skills for the lively hood in total literacy campaign centers should also be properly planed'.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
Male	10	32	62	92	39	235
	4.30%	13.60%	26.40%	39.10%	16.60%	100.00%
Female	2	13	46	56	20	137
	1.50%	9.50%	33.60%	40.90%	14.60%	100.00%
	12	45	108	148	59	372
	3.20%	12.10%	29.00%	39.80%	15.90%	100.00%

From the table it can be observed that among males 4.3% strongly disagree, 13.6% disagree, 26.4% undecided, 39.1% agree and 16.6% strongly disagree with the argument. Among females 1.5% strongly disagrees, 9.5% disagree, 33.6% undecided, 40.9% agree and 14.6% strongly agree with the argument.



Chi square test has been conducted between the variables 'Gender' and 'Skills for the lively hood in total literacy campaign centers should also be properly planed' and the results are tabulated below

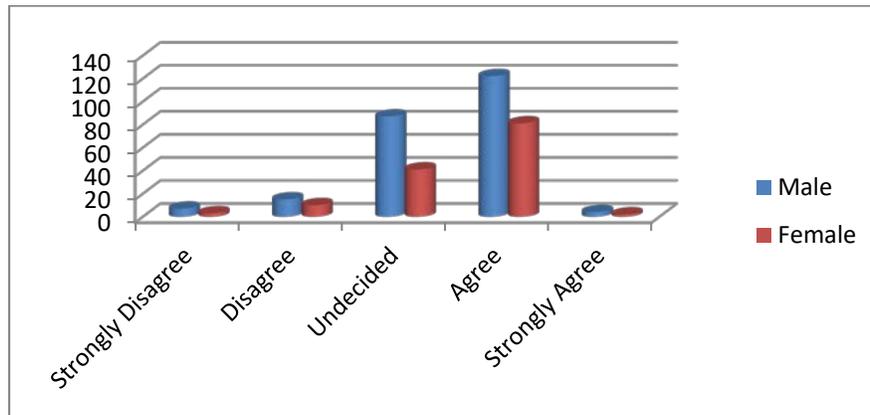
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.141 ^a	4	0.273

The calculated chi square value is 5.141 with 4 degrees of freedom and at 5% level of significance. Since the calculated value is less the table value (9.49) null hypothesis is accepted. So there is no significant difference between the views of the respondents according to the gender.

Table 8: Chi square test between variables 'Gender' and 'To improve total literacy campaign Sarva Siksha Abiyan (SSA) was launched by the Government of India'.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
Male	7	15	87	122	4	235
	3.00%	6.40%	37.00%	51.90%	1.70%	100.00%
Female	3	10	41	81	2	137
	2.20%	7.30%	29.90%	59.10%	1.50%	100.00%
	10	25	128	203	6	372
	2.70%	6.70%	34.40%	54.60%	1.60%	100.00%

From the table it can be observed that among males 3% strongly disagree, 6.4% disagree, 37% undecided, 51.9% agree and 1.7% strongly disagrees with the argument. Among females 2.2% strongly disagrees, 7.3% disagree, 29.9% undecided, 59.1% agree and 1.5% strongly agrees with the argument.



Chi square test has been conducted between the variables ‘Gender’ and ‘To improve total literacy campaign Sarva Siksha Abiyan (SSA) was launched by the Government of India’ and the results are tabulated below

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.430 ^a	4	0.657

The calculated chi square value is 2.43 with 4 degrees of freedom and at 5% level of significance. Since the calculated value is less the table value (9.49) null hypothesis is accepted. So there is no significant difference between the views of the respondents according to the gender.

VII. FINDINGS AND SUGGESTIONS

1. Factors hindering total literacy campaign can be nullified provided the actual implementation by teacher’s executive officers, supervisors all concern the implementation of the programme with genuine and committed.
2. All scheme implemented should be clearly understood by the concerned persons.
3. Administrative difficulties of finance, supervision time check should be done.
4. With total commitment and realize the objectives of total literacy campaign should be taken up very seriously.
5. Total literacy campaign adopted by the A.P will be provided successful systematic planning and administration should be done.

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Evaluation of Anti-inflammatory Activity of Ethanolic Extract of the Root of *Chamaecyparis pisifera* (Siebold & Zucc.) Endl.

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Abstract - In this research work, one of Myanmar indigenous medicinal plants, *Chamaecyparis pisifera* (Siebold & Zucc.) Endl., Myanmar name Kyauk pan was selected for chemical analysis. It was collected from Forest Research Institute (FRI) campus, Yezin, Zaeyar Thiri Township, Naypyitaw Region, Myanmar. Moreover, a potent anti-inflammatory activity of the root of *C. pisifera* was determined by carrageenan induced inflammation method. This plant showed remarkable inhibitory activity in high dose and also the activity followed by the remaining medium and low dose. High dose was found to possess significant anti-inflammatory activity, which supported the traditional application of the test plant in acute inflammatory activity.

Index Terms- Anti-inflammatory activity, Carrageenan induced inflammation method, *Chamaecyparis pisifera* (Siebold & Zucc.) Endl., indigenous medicinal plants, Kyauk pan.

I. INTRODUCTION

Inflammation is a severe response by living tissue to any kind of injury. There can be four primary indicators of inflammation: pain, redness, heat or warmth and swelling. When there is injury to any part of the human body, the arterioles in the encircling tissue dilate. This gives a raised blood circulation towards the area (redness). Vasoactive chemicals also increase the permeability (increase pore size) of these arterioles which allows blood cells, chemical substance, blood proteins and fluid to accumulate in that region. This fluid accumulation causes swelling and may compress nerves in the area resulting in pain. In addition, prostaglandins, that might also result in 'irritation' of the nerves and further contribute to pain. Most people who take anti-inflammatory drugs have no side-effects, or only minor types. When taken appropriately, the advantage usually far outweighs the possible harms. In particular many people have a short course of an anti-inflammatory for all sorts of painful conditions. However, side-effects, and also occasionally very severe possible adverse effects, can occur. There are a number of anti-inflammatory herbs that could help to achieve similar results without the harmful effect [1]. Inflammation is either acute or chronic inflammation. Acute inflammation may be an initial response of the body to harmful stimuli. In chronic inflammation, the inflammatory response is out of proportion resulting in damage to the body. Cyclooxygenase (COX) is the key enzymes

in the synthesis of prostaglandins, prostacyclins and thromboxanes which are involved in inflammation, pain and platelet aggregation [2]. Inflammatory diseases are major worldwide problem. Many researchers reported that inflammation and several human diseases including heart attack and Alzheimer's disease and cancer [3],[4],[5],[6].

Steroidal and non-steroidal anti-inflammatory drugs (SAIDs and NASIDs, respectively) are currently the most widely used drugs in the treatment of acute inflammatory disorders, despite their renal and gastric negative secondary effects [7]. NSAIDs, steroidal anti-inflammatory drugs are being used till now. As a result long term uses of these drugs cause adverse side effects and damage human biological system such as liver, gastrointestinal tract, etc. As a result of adverse side effects, like gastric lesions, cardiovascular, renal failure and gastrointestinal damage [8] [9],[10].

Now there is a need for the new safe, potent, nontoxic or less toxic anti-inflammatory drug. Plant medicines are great importance in the primary healthcare in many developing countries. According to World Health Organization (WHO) still about 80% of the world population rely mainly on plant-based drugs. In Ayurveda, Siddha, and Unani, utilizing a large number of medicinal plants were used for the treatment of human diseases [11].

Plants have the ability to synthesize a wide variety of phytochemical compounds as secondary metabolites. Many of the phytochemicals have been used to effectively treat the various ailments for mankind. World Health Organization has made an attempt to identify all medicinal plants used globally and listed more than 20,000 species. Most of the medicinal plant parts are used as raw drugs and they possess varied medicinal properties [12]. Plants have a great potential for producing new drugs and used in traditional medicine to treat chronic and even infectious diseases [13]. The medicinal plants occupied a unique place in human life. It provides more information about the use of plants or plant parts as medicine [14]. Plant-based drugs used in the traditional medicine have paid great attention because it is easily available, less expensive and also have no side effects [15].

Myanmar is rich in natural resources. Among them, plants are essential for human being. They are important sources for the preparation of natural remedies, food additives, and other

ingredients, as they contain many biologically active compounds and other very important phytochemicals. In Myanmar, the local communities of different regions have been using medicinal plants as a primary source of their health care system and in fact these medicinal plants are used to cure a large number of diseases. This practice is usually based on experiences, less scientific evidence and therefore, need proper validation on scientific research [16]. Thus, the potent anti-inflammatory activity of 95% ethanol extract of the root of *C. pisifera* (Siebold & Zucc.) Endl. was determined by carrageenan induced paw edema model in which standard drug aspirin was used. The present investigation on the root of *C. pisifera* has led to the capacity of anti-inflammatory activity.

II. MATERIALS AND METHODS

2.1 Sample Collection

The roots of *C. pisifera* (Siebold & Zucc.) Endl. were collected from Forest Research Institute (FRI) campus, Yezin, Zaeyar Thiri Township, Naypyitaw Region, Myanmar. Firstly, the root samples were cleaned. Then they were chopped into tiny pieces, and dried in shade at room temperature for about three weeks. These air dried samples were stored in a well stoppered glass bottle and used throughout the experiment.

2.2 Study on Anti-inflammatory Activity on the Ethanolic Extract of the Root of *C. pisifera* (Siebold & Zucc.) Endl. Study Design

Laboratory based experimental animals study was used in this anti-inflammatory experiment.

2.2.1 Study Period and Site of Study

This experiment was done on June to August, 2018 at Pharmacology Research Division, Department of Medical Research, Pyin Oo Lwin Branch (DMR, POLB).

2.2.2 Anti-inflammatory Activity Study

Anti-inflammatory activity study was carried out on ethanolic extract of root of *C. pisifera* (Siebold & Zucc.) Endl. using mice as the experimental model. The study protocol is give below.

- Name of the study - Anti-inflammatory activity study
- Test material - 95% ethanol extract of root of *C. pisifera* (Siebold & Zucc.) Endl.
- Animal model - Albino ICR strain mice
- Animal strain - ICR strain
- Animal produced from - Department of Medical Research, Pyin Oo Lwin Branch (DMR, POLB)
- Sex - Male and Female (Both Sexes)
- Weight of animals - Between 22 g to 40 g
- No. of dose group - Five groups
- Animals per group - 4 male and 4 female
- Standard group administration - Aspirin (Acetyl Salicylic Acid)
- Control group administration - Vehicle (Distilled water)
- Test group administration - 95% ethanol extract of root of *C. pisifera* (Siebold & Zucc.) Endl.

- Concentration of doses - 250, 500 and 1000 mg/kg body weight
- Injected material - 0.1mL of 1% Lambda (Λ) carrageenan suspended in sterile 0.9% NaCl
- Measured paw volume time interval- 1, 2, 3, 4 and 5 hour
- Calculation - Percentage of inhibition

2.3 Acute-inflammation

2.3.1 Use of Drug, Chemical and Machine

Aspirin (Acetyl Salicylic Acid) tablet were manufactured by PT Medifarma Laboratories, Indonesia, Lambda (Λ) carrageenan 22049-5G-F from Sigma Aldrich, Switzerland and Plethysmometer, Model LE 7500, Spain (Panlab).

2.4 Anti-inflammatory Activity Experimental Procedure

Anti-inflammatory activity was assessed by carrageenan induced paw edema method in mice. In this study, mice ICR (Institute of Cancer Research) were taken from Laboratory Animal Services Division, DMR (POLB). The non-fasted mice of both sexes in the weight range 22-40 g were used. Food and water were withheld during the experimental period. The screening was done on 40 albino mice. They were divided into five groups (negative control group, positive control group, three tested groups) and each group contains eight mice. The negative control group was given (vehicle) 10 ml/kg body weight orally; positive control was given Aspirin (Acetyl Salicylic Acid) in a dose of 300 mg/kg. The rest groups were treated with 95% three doses of the ethanolic extract of the root of *C. pisifera* (Siebold & Zucc.) Endl. as low dose (250 mg/kg), medium dose (500 mg/kg) and high dose (1000 mg/kg body weight) respectively. Animals were marked with marker pen at the lateral malleous. Then, basal paw volumes were measured by volume displacement method using Plethysmometer (Model LE 7500) immediately prior to the induction of carrageenan. After one hour of drug administration, freshly prepared suspension of Lambda (Λ) carrageenan 0.1 mL (1% in 0.9% NaCl) was injected into plantar tissue of the right hind paw. The volumes of paw were again measured by taking baseline volume (0 hour) and then 1, 2, 3, 4 and 5 hour (hr) time interval [17]. The volume of paw was expressed in terms of milliliter (mL). The difference of mean paw volumes between test groups and control group were evaluated for each time interval. The percent inhibition of edema was calculated by using the formula as follow.

$$\% \text{ inhibition} = [1 - (V_t/V_c)] \times 100$$

Where, V_c = Edema volume of control group

V_t = Edema volume in the drug treated group

2.5 Statistical Analysis

The data were statistically analyzed by student t-test using SPSS version 20. The results were expressed as Mean \pm Standard Error (SE). $p < 0.05$ was considered significant between groups.



Figure 1: Injection of lambda (λ) carrageenan



Figure 2: Administration of aspirin (Acetyl salicylic acid)



Figure 3: Measuring paw volume

III. RESULTS AND DISCUSSION

In acute inflammation models, the groups were orally administered with 95% ethanol extract of the root of *C. pisifera* (Siebold & Zucc.) Endl. in the dose of 250 mg/kg, 500 mg/kg and 1000 mg/kg. Paw edema volume was measured before (0 hour) and hourly up to 5 hour after injection of carrageenan by digital Plethysmometer. The paw volumes of treated groups were compared with negative control group (vehicle, 10 ml/kg). In this study, aspirin 300 mg/kg was used as a positive control group. The results of mean paw edema volume in mL after treatment with positive control (Aspirin, 300 mg/kg) were 0.16 ± 0.01 at 1 hour, 0.14 ± 0.007 at 2 hour, 0.13 ± 0.006 at 3 hour, 0.14 ± 0.004 at 4 hour 0.13 ± 0.005 at 5 hour respectively, compared to that of the negative control group (vehicle). Statistically significant decrease in paw edema volumes of mice

were found at 2 hour after carrageenan injection ($p < 0.001$) and it has same significant levels from 3 hour and up to 5 hour ($p < 0.001$).

The results of mean paw volumes after treatment with ethanolic extract of 250 mg/kg and 500 mg/kg were 0.18 ± 0.005 and 0.18 ± 0.007 at 1 hour, 0.17 ± 0.008 and 0.17 ± 0.012 at 2 hour, 0.18 ± 0.011 and 0.16 ± 0.014 at 3 hour, 0.19 ± 0.011 and 0.18 ± 0.018 at 4 hour, 0.18 ± 0.006 and 0.17 ± 0.018 at 5 hour respectively. When compared to the negative control group (vehicle) with 95% ethanol extracts of *C. pisifera* (Siebold & Zucc.) Endl., low dose (test drug, 250 mg/kg) and medium dose (test drug 500 mg/kg), significant anti-inflammatory effects were not showed from 1 hour after carrageenan injection up to 5 hour.

The results of mean paw edema volume in mL after treatment with ethanolic extract of 1000 mg/kg were 0.18 ± 0.007 at 1 hour, 0.17 ± 0.009 at 2 hour, 0.15 ± 0.013 at 3 hour, 0.16 ± 0.019 at 4 hour and 0.15 ± 0.015 at 5 hour respectively. When compared to the negative control group (vehicle) with the highest dose (test drug, 1000 mg/ kg), significant anti-inflammatory effects had showed to start at 3 hour ($p < 0.01$), 4 hour and 5 hour ($p < 0.05$) after carrageenan injection.

In the comparison between the anti-inflammatory effects of 95% ethanol extracts (test drug, 250 mg/ kg, 500 mg/ kg, and 1000 mg/ kg), more significant increase in anti-inflammatory effect had been observed with 1000 mg/ kg at 3 hour up to 5 hour than the dose of the 250 mg/kg and 500 mg/kg after carrageenan injection. Thus, it was observed that 95% ethanol extract of *C. pisifera* (Siebold & Zucc.) Endl. (test drug, 1000 mg/ kg) was found better action from 3 hour after injection of carrageenan up to 5 hour. The results of mean paw volumes of negative control, positive control and the test plant were shown in Table 1 and Figure 4.

Table 1: The mean paw volumes of negative control, positive control and the test plant in carrageenan induced mice

Treatment (Dose)	Mean paw volume (mL)					
	0 hr	1 hr	2 hr	3 hr	4 hr	5 hr
Vehicle 10 ml/kg	0.11 ± 0.002	0.19 ± 0.008	0.19 ± 0.007	0.19 ± 0.005	0.21 ± 0.01	0.19 ± 0.01
Aspirin 300 mg/kg	0.11 ± 0.006	0.16 ± 0.01	0.14 ± 0.007***	0.13 ± 0.006***	0.14 ± 0.004***	0.13 ± 0.005***
Test plant 250 mg/kg	0.12 ± 0.007	0.18 ± 0.005	0.17 ± 0.008	0.18 ± 0.011	0.19 ± 0.011	0.18 ± 0.006
Test plant 500 mg/kg	0.10 ± 0.008	0.18 ± 0.007	0.17 ± 0.012	0.16 ± 0.014	0.18 ± 0.018	0.17 ± 0.018
Test plant 1000 mg/kg	0.13 ± 0.010	0.18 ± 0.007	0.17 ± 0.009	0.15 ± 0.013**	0.16 ± 0.019*	0.15 ± 0.015*

Results were expressed as Mean ± Standard Error (SE) * $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$

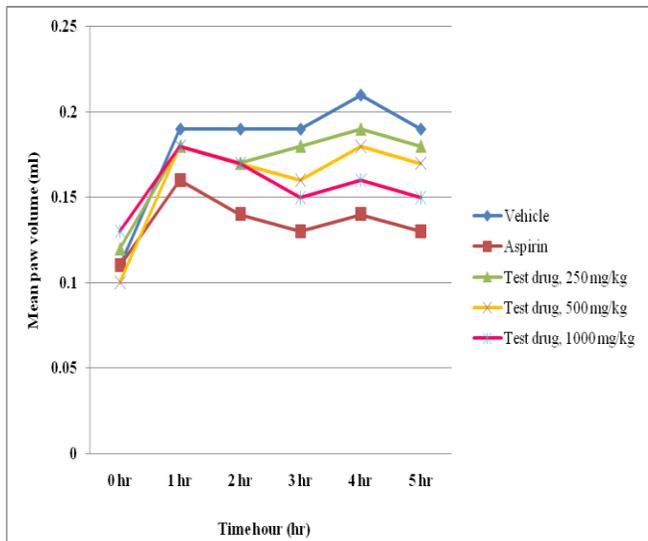


Figure 4: Effect of the root of *C. pisifera* (Siebold & Zucc.) Endl., aspirin and vehicle on mean paw volume of mice after carrageenan induced edema

Percent Inhibition of Lambda Carrageenan Induced Paw Edema of 95 % Ethanol Extract of the Root of *C. pisifera* (Siebold & Zucc.) Endl. and Aspirin

Percent inhibition of paw edema with positive control (Aspirin, 300 mg/kg) were found to be 16%, 26%, 32%, 33% and 32% inhibition for 1 hour, 2 hour, 3 hour, 4 hour and 5 hour respectively. The percent inhibition of right hind paw edema was observed at 1 hour 16% and maximal inhibition was 33 % and it was shown that at 5 hour. The results were shown in Table 2 and Figure 5.

The study of anti-inflammatory effect of 250 mg/ kg and 500 mg/kg of 95% ethanol extract of *C. pisifera* (Siebold & Zucc.) Endl. had shown that its action started from 1 hour after carrageenan injection up to 5 hour. Significant anti-inflammatory effects were not shown from 1 hour after carrageenan injection up to 5 hour. Percent inhibition of paw edema with 95% ethanol extracts of *C. pisifera* (Siebold & Zucc.) Endl. of low dose and medium dose were found to be 5%, 11%, 5%, 10% , 5% inhibition and 5%, 11%, 16%, 14%, 11% inhibition for 1 hour, 2 hour, 3 hour, 4 hour and 5 hour respectively. According to these results, the maximal inhibitions were 11% for 250 mg/kg at 2 hour and 16% for 500 mg/kg at 3 hour. Hence, low dose and medium dose of plant extract have low inhibition.

On the other hand, percent inhibition of paw edema with 95 % ethanol extract of *C. pisifera* (Siebold & Zucc.) Endl. (1000 mg/kg) were found to be 5%, 11%, 21%, 24% and 16% inhibition for 1 hour, 2 hour, 3 hour, 4 hour and 5 hour respectively. The maximal % inhibition of high dose of plant extract was 24% at 4 hour.

The percent inhibition on carrageenan induced inflammation in mice were highest in the concentration of the test sample 1000 mg/kg at 4 hour (24%). According to the present study, the test plant has high anti-inflammatory effect at high dose 1000 mg/kg at 3 hour up to 5 hour. Thus, this experiment may provide one of

the useful information in the development of Myanmar Traditional Medicine from natural plants.

Table 2: Percent inhibition of lambda carrageenan induced paw edema after treatment with aspirin and 95 % ethanol extract of *C. pisifera* (Siebold & Zucc.) Endl.

Treatment (Dose)	1 hr	2 hr	3 hr	4 hr	5 hr
Aspirin (300 mg/kg)	16%	26%	32%	33%	32%
Test plant 250 mg/kg	5%	11%	5%	10%	5%
Test plant 500 mg/kg	5%	11%	16%	14%	11%
Test plant 1000 mg/kg	5%	11%	21%	24%	16%

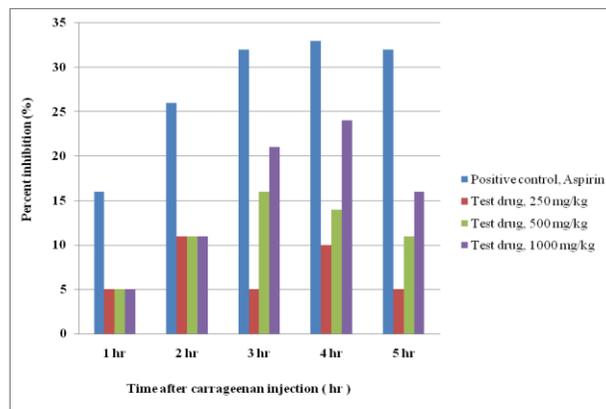


Figure 5: Anti-inflammatory effect of the root of *C. pisifera* (Siebold & Zucc.) Endl. and aspirin in carrageenan induced mice

IV. CONCLUSION

In this research work, one Myanmar indigenous medicinal plant, *C. pisifera* (Siebold & Zucc.) Endl. was chosen for chemical analysis. A potent anti-inflammatory activity was determined against carrageenan induced inflammation for the root extract sample of the test plant showed remarkable inhibitory activity in high dose and also the activity followed by the remaining medium and low dose. These results concluded that the roots of *C. pisifera* (Siebold & Zucc.) Endl. have potential for the development of the treatment against inflammatory conditions.

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Re-negotiating the Mahakali Treaty in the changing geopolitics of Nepal

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Abstract- The Mahakali treaty has created a deadlock situation on the sustainable harvest of not only the water of the Mahakali River but also in different rivers of Nepal for hydropower and other river-related projects between Nepal and India. Even after two decades of the enforcement of the treaty, there is no progress in terms of the agreement yet, rather many provisions of the treaty and the letter exchanged regarding the treaty between the Government of Nepal (GoN) and the Government of India (GoI) is highly criticized in Nepal. Thus, this paper attempt to deal with the most controversial provisions of the treaty and present the views from Nepalese perspective. It also deals with the possibilities of re-negotiating the treaty in the context of changing geopolitical dynamics with the pro-active involvement of China in Nepal.

Index Terms- Nepal-India, Mahakali Treaty, Water resources, Treaty, Geopolitics

I. INTRODUCTION

Nepal owns about 2.27% of the world's water resources, and there are around 6,000 rivers, including rivulets and tributaries (CBS, 2007). Nepal possesses enormous potential for hydropower development and India always has an interest in it (Muni, 2012; Shukla, 2006). Nepal – India water relation goes back to 1874, and there are no significant rivers left where Nepal and India have not signed the collaboration agreement in various form (Dhungel, 2009; Dixit, 2008).

The Mahakali treaty is the most ambitious and controversial treaty enacted between Nepal and India (Gyawali & Dixit, 1999; Shukla, 2006; Subedi, 2006a). It is the first bilateral water resources treaty signed after the end of the Panchayat ruling system and the establishment of Constitutional Monarchical Multiparty Parliamentary system in 1990. Many provisions of the agreement were raised continuously as an issue of debate and disagreement between different stakeholders and also within the political parties in Nepal. Even after two decades of the enforcement of the treaty, there is no progress in the agreed terms in the deal; instead, it has created a deadlock situation in Nepal-India water relations.

Thus, this paper attempts to analyze the provisions of the Mahakali treaty and the subsequent letter of exchange between the Government of Nepal (GoN) and the Government of India

(GoI) from a Nepalese perspective. The article first discusses the ratification process of the Mahakali treaty followed by a detailed discussion of the contentious issues and the conclusion. This paper is based on the literature review, interview with people directly associated with the preparation and the ratification of the treaty, concern stakeholders including representatives from Embassy of India in Kathmandu, water resource experts, and analysts.

II. MAHAKALI TREATY AND THE RATIFICATION PROCESS:

The minority government of the then Communist Party of Nepal (Unified Marxist Leninist) initiated a comprehensive negotiation on the package deal of Mahakali River and prepared a draft treaty on Mahakali Package entitled “agreement between the then Kingdom of Nepal and the Republic of India Concerning the Utilization of the Waters of the Mahakali River, April 4, 1995”. The draft treaty was discussed by GoN with GoI during the visit of Nepal's Prime Minister, Man Mohan Adhikari to Delhi in 1995 but it was never materialized (Dhungel, 2009). The CPN/UML minority government was overthrown, and the coalition government led by Sher Bahadur Deuba of Nepali Congress (NC) was formed on the support of Rastriya Prajantra Party (RPP) and Nepal Sadhvana Party (NSP). The Deuba government further continued the talk between two countries on the Mahakali River Package deal in 1995. Finally, Pranab Mukherjee, the then Minister for External Affairs, GoI visited Kathmandu on January 27, 1996, and discussed the treaty for two days. Finally, Prakash Chandra Lohani, Minister of Foreign Affairs, the then His Majesty's Government (HMG) and Pranab Mukherjee, Minister of External Affairs, GoI respectively signed the treaty entitled Integrated development of the Mahakali River including Sarada barrage, Tanakpur barrage, and Pancheshwar project, hereby called Mahakali treaty on January 29, 1996, in Kathmandu.

The Mahakali treaty was denounced in national politics, and at the same time Baburam Bhattarai, the then Chairman of United People's Front Nepal issued 40 points demand to the coalition government of Sher Bahadur Deuba to address immediately. Among 40 points demand, point number 2 was about the Mahakali treaty, which states, “The so-called Integrated Mahakali Treaty concluded on January 29, 1996, should be repealed immediately, as it is designed to conceal the disastrous Tanakpur Treaty and allows Indian imperialist

monopoly over Nepal's water resources". In spite of louder voice against the treaty at the different levels and the threat of armed struggle, Prime Minister Sher Bahadur Deuba visited India and further signed the treaty at the Prime Minister Level on February 12, 1996. The treaty was tabled by Minister of Water Resources, Pashupati SJB Rana for parliamentary discussion and ratification on September 20, 1996 and it was ratified by two-thirds majority of the Parliament of Nepal as per the provision of Sub – clause 'd' of Clause '2' of article 126 of the then constitution of Kingdom Nepal of 1990 along with the Sankalpa Prastav (Structure). The instrument of ratification of the Mahakali treaty was exchanged when Indra Kumar Gujral, Prime Minister India visited Nepal on June 4, 1997. Finally, the agreement entered into force from 5 June 1997.

III. CONTENTIOUS ISSUES:

The Mahakali treaty was highly criticized since the inception of the package deal, and the controversy flared further as a result of the differences in the interpretation of the provisions of the treaty (Gyawali & Dixit, 1999). There is a provision to review the deal after ten years and also the provision of arbitration in the event of disputes, but the treaty was neither discussed nor any of the signatory parties yet entered into arbitration in spite of enormous public pressure and criticism. Pancheshwor Multipurpose Project (PMP) is the center of attraction of the treaty, but up until now even detail project report (DPR) of the project has not been finalized which was agreed to complete within the six months of the enforcement of the treaty.

British India constructed Sarada Barrage in the Mahakali River in 1928 after getting permission from GoN in 1920. India built Tanakpur barrage on a stretch of Mahakali River without obtaining the consent of Nepal stating Tanakpur as an alternative to the Sarada barrage. The unilateral establishment of the Tanakpur barrage portrayed the hegemony of India towards smaller neighboring sovereign state at international community (Dhungel, 2009). Thus, India with a smart move brought both the barrages; Sarada and Tanakpur, under the Mahakali treaty to portray the consent of Nepal on the construction of the Tanakpur barrage. The Mahakali treaty has reestablished Sarada barrage which had already outlived its useful life and legitimized Tanakpur barrage which was unilaterally and forcefully initiated by India (Gyawali & Dixit, 1999; Pun, 2012). The most notable and highly criticized provisions of the Mahakali treaty and letter of exchange between GoN and GoI are analyzed and discussed below.

IV. ORIGIN OF THE MAHAKALI RIVER AND THE LAND OWNERSHIP OF KALAPANI AREA:

The Sugauli treaty of 1816 between Nepal and British India demarcated the boundary between Nepal and British India where the east of Kali River is Nepal and the west of Kali River as British India. The Mahakali treaty was ratified without resolving the issue on the origin of Mahakali River, of which there are three different interpretations; the stream coming from Limpiyadhura, the stream from Lepulek and artificially created a small stream from Kalapani Lake. The map published by the

Government of India in 1856 which was approved by Prime Minister Jung Bahadur Rana of Nepal clearly shows the origin of Kali river from Limpiyadhura (Dhungel & Pun, 2014). Furthermore, based on the treaty between China and Nepal of October 5, 1961, the place, triangular in position is a boundary between Nepal, China, and India at the far northwest corner of Darchula district is called Limpiyadhura (Siwakoti & Bhandari, 2006). However, India is claiming the stream coming from the artificially created Kalapani Lake as the origin of the Mahakali River without considering any historical documents (Lumsali, 1996; K. L. Shrestha, 1996).

Indian army has camped at the Kalapani since 1962, and it is one of the contested places regarding the ownership of land between Nepal and India. India has claimed that place at Kalapani as Indian Territory, whereas Nepal believes that India has encroached 19500 hectares of Nepalese territory in that area (Lumsali, 1996). Thus, both the parties should have used the Mahakali treaty as an opportunity to finalize the origin of the Mahakali River, so that the Kalapani issues could have solved. In contrast, Indian claims Kalapani as the territorial dispute, and it should be resolved separately (Iyer, 1999). However, the fate of land ownership of the Kalapani area will be determined by the origin of the Mahakali River, because the Mahakali River is the border river between Nepal and India. Thus, it would have been better to finalize the issue on the origin of the Mahakali River and also the Kalapani issue before any deal relating with such contentious issues.

V. CLAUSE '1' OF ARTICLE 2

"For the construction of the eastern afflux bund of the Tanakpur Barrage, at Jimuwa and tying it up to the high ground in the Nepalese territory at EL 250 M, Nepal gives its consent to use a piece of land of about 577 meters in length (an area of about 2.9 hectares) of the Nepalese territory at the Jimuwa Village in Mahendranagar Municipal area and a certain portion of the No-Man's land on either side of the border. The Nepalese land consented to be so used and the land lying on the west of the said land (about 9 hectares) up to the Nepal-India border which forms a part of the pondage area, including the natural resources endowment I in within that area, remains under the continued sovereignty and control of Nepal and Nepal is free to exercise all attendant rights thereto." (Mahakali Treaty, 1996)

Clause '1' of Article 2 states that "...construction of the eastern afflux bund of the Tanakpur Barrage, at Jimuwa and tying ...", However, the name of the place where GoI constructed Tanakpur barrage in Nepal side is called Bhrmhadev, not Jimuwa. Thus, the Mahakali treaty being an international treaty between two nations, the correct name should be stated.

VI. ARTICLE 3:

"Pancheshwar Multipurpose Project (hereinafter referred to as the "Project") is to be constructed on a stretch of the Mahakali River where it forms the boundary between the two countries and hence both the Parties agree that they have equal entitlement in the utilization of the waters of the Mahakali River

without prejudice to their respective existing consumptive uses of the waters of the Mahakali River..." (Mahakali Treaty, 1996).

The article 3 of the treaty states "...have equal entitlement in the utilization of the waters of the Mahakali River without prejudice to their respective existing consumptive uses of the waters of the Mahakali River...". It is one of the most controversial provisions of the treaty.

According to MoWR (1996), the then Minister of Water Resources, Pashupati Sumsher Rana interpreted the above provision as "equal entitlement to all the waters of Mahakali River" during the joint meeting of parliament. However, he interpreted the same provision as "equal half between Nepal and India on the remaining water after preserving existing consumptive use of both Nepal and India" on a different occasion. Furthermore, the point 3 of Strictures (Sankalpa Prastav) interprets the provision of article 3 as "equal rights to all the waters of the Mahakali."

Similarly, when I asked to interpret the understanding of Nepal on the provision of article 3 to Prakash Chandra Lohani, the then Minister of Foreign Affairs and the signatory of the treaty during an interview, he explained as below:

Let us assume that the total flow of the Mahakali River is 24,000 cusecs. Now, as per the statement "...without prejudice to their respective existing consumptive uses" the share of water of Mahakali River between India and Nepal will be 12000 cusecs for each country. He further describes, according to the provision of the treaty, out of 12000 cusecs share of India, India will now get only 4000 additional cusecs of water because India is using 8000 cusecs of water from Mahakali River via Sarada Canal since the time of Chandra Sumsher. He added if the water of Mahakali River is only 10000 cusecs then the share of water between Nepal and India is not 5000 cusecs each; instead India can claim 3000 cusecs of water from Nepal to maintain her existing consumptive use of 8000 cusecs. However, the water flow of the Mahakali River being 24,000 cusecs, there is no problem for Nepal.

When I further asked, whether equal entitlement indicates only on the remaining water after India's claim of existing consumptive use, Lohani replied, according to the language used in the treaty, the current existing right will get affected only if India receives less than what she is consuming before the Mahakali treaty.

The treaty was signed without a common understanding of the provisions, and it vulnerable to Nepal than India. Nepalese believe that the article 3 of the treaty has strengthened the demand of water that India has been using for irrigation not only from Mahakali River but also from all other rivers as the Precedent established by the Mahakali treaty (Pun, 2008; Siwakoti & Bhandari, 2006). According to Pun (2008) if India demands its prior existing consumptive uses of Kosi and Gandak rivers based on the Precedent established by the Mahakali treaty, then Nepal will not even get a drop of water from these rivers during the lean season. So the question arises what will happen to

the water resources of Nepal to Nepalese if India demands her existing consumptive uses based on the probable Precedent established by Mahakali treaty?

VII. LETTER EXCHANGED WITH THE MAHAKALI TREATY:

Clause 'a' of Para '3'

The DPR shall be finalized by both the countries within six (6) months from the date of the entry into force of the entry into force of the treaty. For this purpose, necessary data and reports shall be exchanged expeditiously. While assessing the benefits from the Project during the preparation of the DPR, net power benefit shall be assessed on the basis of, inter alia, saving in costs to the beneficiaries as compared with relevant alternatives available. Irrigation benefit shall be assessed on the basis of incremental and additional benefits due to augmentation of river flow and flood control benefit shall be assessed on the basis of the value of works saved and damages avoided. (Subedi, 2006b)

Clause 'a' of Para '3' of letter exchanged with the Mahakali treaty states, "...net benefit shall be assessed on the basis of, inter alia, saving in costs to the beneficiaries as compared with the relevant alternatives available..." Here concerning the provision of the treaty, GoN has stated that there are different methods of power benefit assessment; cost-plus, avoided cost of alternatives, willingness to pay, and resource use tax. Moreover, as per the interpretation of Nepal, among the above options "... relevant alternatives..." don't get matched with any options than avoided cost of alternatives. So Nepal believes that avoided cost of alternatives refers to the cost of alternatives like Thermal plant, gas turbine, etc (MoWR, 1996). However, India interprets that relevant alternatives need not to be only a thermal plant or gas turbine; instead, it could also be other hydro-electric projects (Iyer, 1999). Here, the contradicting view of GoI has ruled-out the possibility for Nepal to get benefit by selling a portion of its share of electricity generated from PMP in reasonable price to India. This provision of the letter of exchange is unclear and still needs more discussion between both the parties.

VIII. CLAUSE 'B' OF PARA '3'

"It is understood that paragraph 3 of Article 3 of the treaty precludes the claim, in any form, by either party on the unutilized portion of the shares of the waters of the Mahakali River of that party without affecting the provision of the withdrawal of the respective shares of the water of the Mahakali River by each Party under this treaty." (Subedi, 2006b)

The Clause 'b' of Para '3' states "...treaty precludes the claim, in any form, by either party on the unutilized portion of the shares of the waters of the Mahakali River of that party..." This provision prohibits Nepal's claim of royalty on use of her share of water resources by India. Former secretary of India, Iyer states that "...in particular, any doctrine of ownership of flowing water and the implied right of the upper riparian to 'sell' the water so owned to the lower riparian (who would, in any case, receive that water naturally by gravity flow) seems non-maintainable..." (Iyer, 1999). Here, the statement of the Iyer might be right before implementation of PMP, but it is not rational in the scenario after

PMP. It is so because the natural flow of the river will get regulated after constructing the dam and India will get year around water which is not possible during the lean season at a natural flow of a river. Also, Nepal will be investing in the project. Thus, Nepal should get some incentives from India for getting a regular flow of the water.

IX. CONCLUSION

The sustainable harvest of Nepal's immense water resource for different purposes; hydropower development, irrigation and river linking project is not only beneficial to Nepal; instead, it is equally beneficial to India. Nepal and India have already wasted long period, and now it is high time to work together not either in big brother-small brother relations as blamed by Nepal to India or playing China card as blamed by India to Nepal, instead, partner with equal status for the mutual benefits of both the countries.

India seems giving strategic importance to Nepal since the rise of Narendra Modi as the Prime Minister of India in May 2014. He visited Nepal on August 3, 2014, after a visit of the then Indian Prime Minister Inder Kumar Gujral in June 1997, breaking a long gap of 17 years. India pledged the most significant aid amount worth the US \$ 1 billion for post-earthquake reconstruction (Shrestha, 2015). The economic blockade of India to Nepal in 2015 has significantly eroded the mutual trust. So the cooperation of India to re-negotiate the Mahakali treaty not only initiates the Nepal-India water relations that have been inactive since a long time, but also helps to generate the positive feelings among the Nepalese on addressing the feelings of Nepal to revisit the unequal treaty.

Nepal has two-thirds majority government of Communist Party of Nepal, and the party has a long history of criticizing the Mahakali treaty. The then Communist Party of Nepal (Unified Marxist-Leninist) and the then Communist Party of Nepal (Maoist Centre) merged on 17 May 2018 after landslide leftist victory in the election and formed Communist Party of Nepal (CPN). The UML faction of the CPN always pointed Nepal Congress for the enforcement of the unequitable Mahakali treaty and the Maoist faction always used to make Mahakali treaty as a political agenda. Most importantly, one of the reasons for the initiation of the armed struggle in Nepal was due to enforcement of the Mahakali treaty. Interestingly, K. P Sharma Oli, the then coordinator of the team to study the Mahakali treaty is the current most powerful Prime Minister of Nepal. So the initiation to re-negotiate the Mahakali treaty preserves not only the nationalist image of K. P Sharma Oli, his government and the party but also the deadlock situation on the harvest of Nepal's enormous potentials on water resources for prosperous Nepal will take a forward move.

Thus, it is very high time to re-negotiate the Mahakali treaty keeping every option, even the option to scrap the existing agreement, open for discussion and begin the new initiative for the sustainable use of the water of the Mahakali River with an objective to benefit both the nation equitably.

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FACTORS INFLUENCING ON GRADE 12 STUDENTS' CHOSEN COURSES IN JAGOBIAO NATIONAL HIGH SCHOOL – SENIOR HIGH SCHOOL DEPARTMENT

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Abstract- Making a career choice is a defining phase in every students' life. Students have to consider several factors before arriving at a decision. The purpose of this research was to see the factors which affect the choice of career among students. This study assessed the influence identified factors such as decision-making and interest, peer influence, considerations about the institutions and future job opportunities on the career decisions of 90 students in Jagobiao National High School. Data was collected through a survey questionnaire – researchers used a chi-square as a research tool to formulate the collected data. The results show that the considerations about the institutions as most significant, followed by decision-making and interest, peer influence and future job opportunities.

Index Terms- : Career choice, decision-making and interest, peer influence, future job opportunities.

I. INTRODUCTION

Education is universally recognized as the answer to socio-economic problems of the world. Nations and individuals look up to education to provide a cure for poverty, ignorance, drought, excessive rainfall, mental deficiency, joblessness, bad government, poor communication system, hunger and inadequate shelter among other things. Thus, every nation of the world aspires toward quality of life and social status through good decision-making in selecting career choice especially students who are about to pursue in college.

The word career has been a derivative of French and Latin origin. According to Ahmed, Sharif and Ahmad (2017), career defined as the occupational, commercial or industrial activity that a person may adopt during his educational life or in some other part or till his death. It also clarifies career as the application of a person's cognition and capabilities, providing command over profession, timely work expertise and a basis of developing and bettering business networks. Individuals chose career planning to pursue the professional objectives, getting informed about upcoming opportunities, their results and their timely evaluations.

Hence, career selection is one of many important choices that students will make in determining future plans. It becomes one of the biggest dilemma and challenge in any student's life. It involves an interplay of many factors which are intricately intertwined. It is not a straightforward task and involves a difficult process of decision making. This issue is not confined to one aspect only but is universal in nature. For many students, choosing a college or a major is a vital decision determining their entire life plan, success, and professional career. The factors affecting their choice such as the reputation of the college, location, cost, socioeconomic status, student expectations, school size and many more might have different weight in the choice of a major. The right career choice for the students entering into the professional education is critical having high impact on their professional life and future achievement. This decision will therefore impart them throughout their lives.

It is therefore that choosing a career is an extremely important decision that impacts an individual's entire future. Career exploration is defined as the extent to which possible careers are researched and considered. Olaosebikan and Olusakin (2014) has suggested that exploring career options before committing to a career increases future career success and satisfaction. Thus, variables that influence career exploration in adolescents should be identified and acknowledged.

Consequently, career choice decision making is not an easy task, yet at one time or the other, individuals are faced with the task of making choice in career, preparing for it, starting it and making progress in it. This choice point is undoubtedly the most critical stage. This is because making a wrong career decision can make one's happiness in life as this could result to career maladjustment. Inappropriate career decision made may spell doom not only for the individual but also the entire society.

Thus, one wrong decision can change the fate of an individual. It is difficult for everyone to make a decision regarding their career. This individual action is manifested on a larger scale in the economic prosperity of a nation. Individuals who are misfits in their workplace tend to be less productive and efficient, and therefore are unable to achieve their goals. Kazi and Akhlaq (2017), in view of the foregoing, the need to equip our students with appropriate career decision skills becomes highly imperative through general orientation, seminars into the world of work through the curriculum.

Above all discussions, the researchers have observed that most of the students are lacking of confidence in one's abilities, undecided and uncertain – unsure of their decisions in selecting courses in college having with them a variety of factors that affects their choices. This prompted the researchers to conduct this study to investigate the factors that influence the students' counselors, parents, and universities in developing the career counseling and guidance programs for the students to facilitate them in making the right career choice.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

The choice of career is a delicate issue for students which requires caution and serious considerations – factors affecting their choices. The kind of career the youths pursue can affect their lives in many ways. Hence, the following studies revealed some of their factors affecting students' decision in career selection.

Shumba and Naong (2012) found out that the family is a significant factor in determining children's career choice, the ability of the learner self to identify his preferred career choice, and teachers influence career choice of their learners. These findings are consistent with the findings of other studies that have examined the influences of each parent on the career choices of their sons or daughters and have found that mothers tend to have more influence on the career decision and aspirations of their children than fathers.

Similarly Leppel, Williams and Waldauer (2001) revealed that parental education, family income, and family head's occupational status were found to be positively associated with offspring's educational achievement. Rababah (2016) family members and peers have an influence in the students' choice of the major including personal interests, gender, career opportunity and availability of jobs are some of the factors that affect the students' decision making in this matter.

Khoo, Ban, Neng, Hooi and Joan (2015) showed that college students and non-college students who were involved in this study agreed that parents are the most influential or important person when choosing their choice of college or university and course of study because parents perceive as their main source of finance and normally seek advice from them due to the perception that parents have the relevant information or experience with regards to higher education, and hence, parents are viewed as a credible source of advice.

In addition, Kaneez and Medha (2018) supported that parental influence have significant effect on the career choice of their children. Al-Rfou (2013) explored that the parents have a significant influence on the major selection, siblings and friends also consider important source to select the major, while teachers and media are the least amongst the selected factors. Umar (2014) showed that although parents have influence on the choice of career of their children so also other factors such as peer group, employer and relatives.

Identically, Dagang and de Mesa (2017) identified the results which point to the strong influence of parents on their children choice of tertiary school. It is deeply rooted in the consciousness of the Filipino people the respect for elders, hence the strong influence of parents on children decision. In a Filipino family children are financially dependent on their parents, hence their submission to their parents decision, thus explaining the moderate influence of others such as the peers, friends and relatives. Another factors were affordability of tuition, followed by scholarship.

Ibrahim (2017) revealed that family members have the highest contributions in influencing students to the profession of medical laboratory science due to the fact that family is usually who provided financial supports to them. Eremie and Okwulehie (2018) indicated that factors such as environmental, opportunity and personality can influence the choice of career among secondary school students. In terms of environmental factors, it revealed that family, socioeconomic status and peer groups have significant influence of the students' choice of career while in opportunity factors such as education and mentorship also had influence to the choice of career as well as the personality factors such as the students' interest, values and skills in choosing their courses.

Hoai, Thi and Thanh (2016) in their study factors influencing students choice of accounting as a major shows that social norm has a great influence on students choice of major including advice and orientation of

acquaintances, friends, teachers, parents which had a significant influence on their decisions in the selection of specific discipline. It also revealed some significant differences between average level of male and female students through perceptions of input scores, major pressure and suitability for the people good at math, job availability, average income and advancement opportunity.

In comparison, study of Kazi and Akhlaq (2017) an individual environment, talents, skills and academic achievements exert an influence on career choice. Olaosebikan and Olusakin (2014) indicated that parental influence will not have significant effect on adolescents' career choice, and that perception of parental occupational satisfaction will not have effect on career aspirations of adolescents based on the following intervening variables such as sex, and type of school.

Moreover, Ming (2010) stated that college or university location can be a major factor for potential students' decision to apply and enroll. Some students maybe looking for a school close to their hometown or place of work for convenience and accessibility. It is therefore concluded that location, academic programme college reputation, educational facilities, cost, availability of financial aid, employment opportunities, advertising are institutional factors that influence students' college choice decision.

Malubay, Mercado and Macasaet (2015) noticed the primary factor affecting the decision of freshmen students in taking up specified courses or programs is the economic factors that include economic stable wages and in-demand jobs.

Uyar, Gungormus and Kuzey (2011) revealed that 12 factors affecting the decision of students including career opportunities, interest in the subject, instructor, money, parents, enjoyment, previous experience, lifestyle offered because of the career, challenge, prestige, usefulness in operating a business, and other students. It also discover the top 5 reasons for choosing a major where: interest in a career associated with the major, good job opportunities, abilities, a desire to run a business someday, and projected earnings in the related career. The least selected reasons for choosing a major were the reputation of the major at the university, the perceived quality of instruction, the parents' influence, the amount and type of promotional information, and the influence of friends. Utilized factor analysis and determined the following seven main factors in deciding career choice: high earnings expectations, career expectations, job experience, knowledge and ability, family environment, social status, and education environment.

Interest in the subject, guaranteed employment, and expected earnings after graduation are the most influential factors for college major choice (Malgwi, Howe and Burnaby, 2005; Yazici and Yazici, 2010)

Ahmed, Sharif and Ahmad (2017) which revealed that interest in subject has strong and positive relationship while ease in grades, financial outcomes, and future job opportunities had minor impact on students' decision for particular field and subject. It was also stated that the career choice of the students was also influenced by the level of their social status, financial resources, affordability and future employability.

Edwards and Quinter (2011) showed that Religion was also mentioned as one of the factors that influenced students' career choices. For those with religious commitment, faith plays a critical role in important life decision such as career choice.

Okiror and Otabong (2015) revealed that students' choices were base on their perceived availability of career and scholarship opportunities in a given department and the grade point averages marks earned by the student at the time selecting the options.

Sabir, Ahmad, Sharif and Ahmad (2013) revealed that students rank university reputation, interest in subject and employment prospectus as the most important determinants, whereas, the factor of course being easy and career guidance from schools the least important factors in choosing course.

Malgwi, Howe and Burnaby (2005) revealed that the most influential factor overall was interest in the subject followed by the potential for career advancement and the major's potential job opportunities. Pascual (2014) showed that the students' first consideration in choosing a course in college is the availability of possible work.

Kusumawati (2013) presented one of the important factors that influenced Indonesian students' perceptions of their university choice process was total expenses (cost). It was stated that students took into

consideration cost and affordability which made them a rational decision by considering their social economic factor before making a choice, which is consistent with economic models of choice.

Su, Chang, Wu and Liao (2016) showed that students' career decision-making is most deeply affected by "personal factor", next are "group factor" and "career exploration factor", and "school factor" has lowest affecting level to them. Students of large-sized schools with taking household affairs courses who will be easily affected by personal factor of career decision-making.

Olamide and Oluwaiye (2013) observed that while students aim at such prestigious occupations when still in secondary school, it has not been possible for many to achieve their aims for one reason or the other. Such reasons often include among others; poor academic performance, poor choice of subjects for the school certificate examination, lack of financial support to pursue their education which makes it impossible for such boys and girls to get their required training that would qualify them for the jobs of their choice.

Ferrer and Dela Cruz (2017) revealed the significant correlations of the students' performance in Science, Mathematics and English which were found consistent from NCAE to Grades 10 and 11 is indicative of: (1) a proper career assessment conducted that guide the learners in choosing the academic track where they have better aptitude or potential; (2) a sensible screening criteria set in selecting students to be admitted in the STEM track ; and (3) an evidence of quantified judgments on the learners' academic achievements per grade level as a product of the design of the spiral curriculum.

Sidin, Hussin and Soon (2003) revealed the five factors, explaining 61% of the total variance were identified. Factors were named 'Personal', 'Academic Quality and Facilities', 'Factors', 'Campus', 'Socialization', and 'Financial aid and procedures. A ranking of means revealed that friends and schoolmates, parents and relatives were some of the sources of influence on students' college choice decision making. Gender and ethnicity are proven not likely to affect students' college choice decision while the income of the student's immediate family is likely to affect the college choice decision in terms of public-private institutions. Thus, factors such as facilities, procedures and policies and entry requirements are some of the significant factors influencing college choice.

Agarwla (2008) disclosed the means and standard deviations of the factors that influenced the career choice of Management students in India for the total sample and by gender. Management students from India rated their "skills, competencies, and abilities" as the most important career choice influencing factor, followed by "education and training" and "financial rewards in this career". In terms of gender showed that male and female Indian management students differed in the factors they rated as the most important in influencing their career choice. For male students rated "financial rewards in this career" as the most important factor in their career choice decision followed by "Quality of life associated with this career" and "skills, competencies, and abilities" while female students, "skills, competencies, and abilities" and "education and training" were the most important factors.

Soria and Stebleton (2013) studied the relationships between students' intrinsic and extrinsic motivations with choosing a major, satisfaction with educational experience, and sense of belonging. Internal extrinsic motivations positively associated with satisfaction include students' motivation to choose a major because the selected option allows time for other activities, prepares students for a fulfilling career, prepares students for graduate/ professional school, and provides international opportunities. One internal extrinsic motivation— choosing a major because it complements students' desire to study abroad—was negatively associated with students' satisfaction. Additionally, students who had external extrinsic motivations for choosing a major—because of denial of their first choice of college major, easy requirements, and parental desires for choice of major—are negatively associated with students' satisfaction. All internal extrinsic motivations for selecting a major are positively related to sense of belonging, except for choosing a major because it leads to a high paying job, which is negatively associated with students' sense of belonging.

Therefore, students choose their course in college based on their perceive exits. Students choose their courses in relation to how productive a course is and if it needed in the industry. High paying jobs too are also considered as a factor in choosing courses. On the contrary, students also have a misconception about the professions due to lack of information – it prevents from choosing them.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

Table 1.
Level of Students' Decision-Making and Interest

Indicators	Weighted Mean	Interpretation
1. I consider my desire of doing things	4.03	Strongly Agree
2. I look my ability such as knowledge and skills	4.12	Strongly Agree
3. I choose a course based on what I feel about it	4.09	Strongly Agree
4. I decide based on my preferences for instance, family background	3.84	Agree
5. I prefer things to do what I like the most	4.12	Strongly Agree
6. I expect my potential in looking for a job	3.81	Agree
7. I am focused based on my interest	3.84	Agree
8. It is my passion that helps me to pursue the course or career to take	4.03	Strongly Agree
9. I rely on my abilities	3.81	Agree
10. I depend based on self-testing	3.90	Agree
Overall Weighted Mean	3.96	Agree

Legend. Strongly Agree (4.09-5.00), Agree (3.26-4.00), Neutral (2.51-3.25), Disagree (1.76-2.50), Strongly Disagree (1.00-1.75)
N=90

Table 1 shows above the weighted mean of the level of influence in choosing courses in terms of decision-making and interest of graduating students. For the content, the statement "I look my ability such as knowledge and skills" and "I prefer things to do what I like" got the highest weighted mean of both 4.12 wherein, it is interpreted as strongly agree – it indicates that the learners depend on their knowledge, skills and what they are like to the most the prefer. For the statements "I choose a course based on what I feel about it," "I consider my desire of doing things," "It is my passion that helps me to pursue the course or career to take" got a weighted mean of 4.09 for the first statement and 4.03 for the second and the third statement which interpreted as strongly agree – it implies that the learners will consider their desire, what they feel about a course and passion to pursue in tertiary level.

For the statement "I depend based on self-testing" has a weighted mean of 3.90 and interpreted as agree – it explains that students' decision in choosing courses will depend on self-testing, they want to explore more. For another statement "I am focused based on my interest," "I decide based on my preferences for instance, family background" got a weighted mean of both 3.84 were it interpreted as agree which means that they also based of their preferences and interest in making decision in choosing courses. For the last statements "I expect my potential in looking for a job," "I rely based on my abilities" have a weighted mean of 3.81 interpreted as agree – it indicates that the graduating students make decisions based from their abilities and the potential in looking for a job. Lastly, the overall weighted mean of the level of influence in terms of decision-making and interest is 3.96 – it signifies that graduating students agree to explore their decision making process.

Table 2.
Level of Students' Peer Influence

Indicators	Weighted Mean	Interpretation
1. My peers inspire me to choose what I like to take	3.47	Agree
2. My peers encourage me to do things to achieve my goals	3.77	Agree
3. My peers' advice to learn more about what I like to choose to do	3.60	Agree
4. My peers' informal talk leads me of what I should plan to choose	3.41	Agree
5. I prefer to my peer group in selecting a course	3.13	Neutral
Overall Weighted Mean	3.48	Agree

Legend. Strongly Agree (4.09-5.00), Agree (3.26-4.00), Neutral (2.51-3.25), Disagree (1.76-2.50), Strongly Disagree (1.00-1.75)
N=90

Table 2 shows the weighted mean of the level of influence in choosing courses in terms of peer influence of graduating students. Graduating learners perceived that they agree that they are accompanied by their peers in making a decision in their courses because their peer helps, give an advice or and encourage them to achieve their course. Overall, the graduating learners agree that they need peers because it will help them to enhance their capacity as a person in order to have an idea and to decide easily.

Table 3.
Level of Students' Considerations about the Institution

Indicators	Weighted Mean	Interpretation
1. I consider on a distance of travel from the house to school and home	3.56	Agree
2. I believe the stories of my acquaintances about the school	3.53	Agree
3. I learn the affordable tuition of the university in college institution	3.58	Agree
4. I rely on a scholarship grants	3.64	Agree
5. I look forward to fulfilling the job demands after studies, graduation or completion	3.92	Agree
6. I look for a low tuition fee in college or university	3.93	Agree
7. I consider on the location of the university	3.90	Agree
8. I am attracted the facilities and amenities in looking for a job	3.69	Agree
Overall Weighted Mean	3.71	Agree

Legend. Strongly Agree (4.09-5.00), Agree (3.26-4.00), Neutral (2.51-3.25), Disagree (1.76-2.50), Strongly Disagree (1.00-1.75)
 N=90

Table 3 shows the weighted mean of the level of influence in choosing courses in terms of considerations about the institution of graduating students. "I look for a low tuition fee in college or university" this statement got the highest weight mean with the total of 3.93 interpreted as agree it indicates that one of the factors in choosing courses is to look for a lot tuition fee. For the statements "I look forward to fulfilling the job demands after studies, graduation or completion," "I consider on the location of the university," "I am attracted to facilities and amenities in looking for a job" and "I rely on a scholarship grants," "I learn the affordable tuition of the university in college institution" and "I consider on a distance of travel from the house to school and back" have a weighted mean of 3.92, 3.90, 3.69, 3.64, 3.58 and 3.56 respectively which means that they choose their courses based on job demands, considering their location, the facilities amenities in looking for a job and even in scholarship grants. Overall, the graduating learners agreed that consideration about the institutions really affects in choosing courses.

Table 4.

Level of Students' Future Job Opportunities

Indicators	Weighted Mean	Interpretation
1. I find the course I choose convenient in looking for a job in the future	3.97	Agree
2. I can expect for the good salary	3.93	Agree
3. I prefer for the stability status for the job	3.89	Agree
4. I favor the tenureship of the job	3.74	Agree
5. I expect the availability of the job that suits me	3.92	Agree
Overall Weighted Mean	3.91	Agree

Legend. Strongly Agree (4.09-5.00), Agree (3.26-4.00), Neutral (2.51-3.25), Disagree (1.76-2.50), Strongly Disagree (1.00-1.75)
 N=90

Table 4 shows the weighted mean of the level of influence in choosing courses in terms of future job opportunities. "I find the course I chose convenient in looking for a job in the future" got the highest weighted mean of 3.97 and interpreted as agree – it indicates that it depends on the convenience in looking for a job in the near future when it comes in course selection. For another statements "I can expect for the good salary," "I can expect the availability of the job that suits me" and "I prefer the stability status for the job" got a weight means of 3.93, 3.92 and 3.89 respectively were interpreted as agree – it explains that the students' decision in choosing courses really matter of the stability status of the jobs, the availability of the jobs that suits them and they expect a good salary. For the last statement "I favor a tenureship of the job" got the lowest weighted mean of 3.74 and interpreted as agree which means it also affect on their decisions. Overall, the graduating students agree that they totally based on their future job opportunities in choosing their courses.

Table 5.

Level of Influence in Choosing Courses associated with Statistics and Probability Subject

Variables	X ²	df	X ² _(0.05)	Discussion	Interpretation
Decision-making and Interest	2.77	4	9.59	Failed to reject	Not Significant
Peer Influence	1.42	6	12.59	Failed to reject	Not Significant
Considerations about the Institution	6.41	4	9.59	Failed to reject	Not Significant
Future Job Opportunities	4.08	6	12.59	Failed to reject	Not Significant

The table above with regards under Statistic and Probability shows the result of chi-square computed values in different factors influencing students' course selection with. For the decision-making and interest the X²_{comp} is 2.77; for peer influence, X²_{comp} = 1.42; for consideration about the institution, X²_{comp} = 6.41; and lastly, X²_{comp} = 4.08.

For decision-making and interest, the computed value is 2.77 while its critical value is 9.59 it implies that there is no significant association between decision-making and interest and student considerations of performance in the subject Statistics and Probability because X²_(0.05) = 9.59 > X²_{comp} = 2.77 which means H₀ is fail to reject. Wherein it implies that it does not affect of one's decision in choosing courses in college, Kaneez and Medha (2018) found that interest is a less impact in course selection.

There is also no significant difference between peer influence and Statistics and Probability because the computed value (1.42) is lesser than its critical value (12.59). Therefore, H_0 is fail to reject – it means that peer influence is less impact in course selection as support to the study of Kaneez and Medha (2018) noticed that peer influence is less affect in choosing courses.

In terms of considerations about the institution, the computed value is 6.41 while its critical value is 9.59 where it inferred that there is no significant association between the considerations about the institution and Statistics and Probability because $X^2_{(0.05)} = 9.59 > X^2_{comp} = 6.41$ therefore, H_0 is fail to reject.

The computed value when it comes to future job opportunities is lesser than the critical value $X^2_{comp} = 4.08 < X^2_{(0.05)} = 12.59$ it reveals that there is no significant association between future job opportunities and Statistics and Probability because the null hypothesis is fail to reject and it supported by the study of Ahmed, Sharif and Ahmad (2017) said that future job opportunity had less association in choosing a course in college.

Table 6.

Level of Influence in Choosing Courses associated with Physical Science Subject

Variables	X^2	df	$X^2_{(0.05)}$	Discussion	Interpretation
Decision-making and Interest	8.31	6	12.59	Failed to reject	Not Significant
Peer Influence	6.67	6	12.59	Failed to reject	Not Significant
Considerations about the Institution	13.65	6	12.59	Reject	Significant
Future Job Opportunities	3.22	6	12.59	Failed to reject	Not Significant

The table above with regards under Physical Science shows the result of chi-square computed values in different factors influencing students' course selection. For the decision-making and interest the X^2_{comp} is 8.31; for peer influence, $X^2_{comp} = 6.67$; for consideration about the institution, $X^2_{comp} = 13.65$; and lastly, $X^2_{comp} = 6.41$

It reveals that there is no significant association between the decision-making and interest and Physical Science since the computed value is 8.31 is lesser than its critical value which is 12.59. Therefore, H_0 is fail to reject, decision-making and interest inferred that it does not affect of one's decision for tertiary education as supported of the study of Malubay, Mercado and Macasaet (2015) also revealed that decision-making and interest only have less impact in choosing courses.

For peer influence, the $X^2_{comp} = 6.67$ is lesser than $X^2_{(0.05)} = 12.59$. Therefore, H_0 is fail to reject. It implies that there is no significant difference between peer influence and Physical Science that means in choosing courses, advice from peers does not affect on one's decision as supported by the study of Kaneez and Medha (2018) that does not totally influence in their career decision,

The computed value of X^2 (13.65) when it comes to consideration about the institution under Physical Science is greater than its $X^2_{(0.05)}$ which is 12.59 wherein it explain that there is a significant association since the H_0 is reject and it was a consistent studies showed such as Shumba and Naong (2012) and Ming (2010) that institutions is the most influential among the students.

The H_0 is fail to reject when it talks about future job opportunities since the computed value (3.22) is lesser than its critical value (12.59) – it signifies that there is no significant difference between future job opportunities and Physical Science – future job opportunities only have less impact to their decision (Ahmed, Sharif & Ahmad, 2017).

Table 7.

Level of Influence in Choosing Courses associated with English Academic for Professional Purposes Subject

Variables	X^2	df	$X^2_{(0.05)}$	Discussion	Interpretation
Decision-making and Interest	4.43	6	12.59	Failed to reject	Not Significant
Peer Influence	3.81	6	12.59	Failed to reject	Not Significant
Considerations about the Institution	4.35	6	12.59	Failed to reject	Not Significant
Future Job Opportunities	4.79	6	12.59	Failed to reject	Not Significant

The table above shows the result of chi-square computed values in different factors influencing students' course selection with regards under English Academic for Professional Purposes. For the decision-making and interest the X^2_{comp} is 4.43; for peer influence, $X^2_{comp} = 3.81$; for consideration about the institution, $X^2_{comp} = 4.35$; and lastly, $X^2_{comp} = 4.79$.

It inferred that there is no significant association between decision-making and interest and English Academic for Professional Purposes since the critical value is greater than its computed value ($X^2_{(0.05)} = 12.59 > X^2_{comp} = 4.43$). Therefore, H_0 is fail to reject wherein it portrays that it cannot influence in making decision for higher education as supported to the study of Malubay, Mercado and Macasaet (2015) that interest does not affect in course selection.

For peer influence, the computed value is 3.81 and the critical value given is 12.59, it is clearly explain that there is no significant association between peer influence and English Academic for Professional Purposes – which means that it is not the variable in making decision of one's career for tertiary education. Thus, it has a consistent result to the study of Kaneez and Medha (2018) supported that peer influence have the least influence in choosing courses.

The computed value is 4.35 when it comes to consideration about the institution and its critical value is 12.59. Therefore, H_0 is fail to reject which means there is no significant association between consideration about the institution and English Academic for Professional Purposes.

It implies that there is no significant association between future job opportunities and English Academic for Professional Purposes because the H_0 is to reject and its critical value is greater than the computed value ($X^2_{(0.05)} = 12.59 > X^2_{comp} = 4.79$) and it was also revealed on the previous study of Ahmed, Sharif and Ahmad (2017) as stated that it has less correlated in choosing courses.

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VI. CONCLUSION

This study attempted to see the fundamental variable that impacts the choices of courses of the students in relation to the different factors. The Grade 12 Senior High School Students encountered the different factors that influence in their selection of course which includes decision-making and interest, peer influence, considerations about the institution and future job opportunities. These factors gave an impact towards the graduating learners in selecting a course in college. But much with more importance to the considerations about the institution. Institutional factors that influence students' college decision includes location, educational facilities, cost and employment opportunities.

APPENDIX

FACTORS INFLUENCING ON STUDENTS' CHOSEN COURSES OF GRADE 12 STUDENTS JAGOBIAO NATIONAL HIGH SCHOOL SENIOR – SENIOR HIGH SCHOOL DEPARTMENT

Personal Information

Name:

Grade & Section:

Gender:

Age:

Direction: Please answer the following items with honesty. The information that will be gathered by the researchers will be serve as confidential.

Decision-Making and Interest	5	4	3	2	1
1. I consider my desire of doing things					
2. I look my ability such as knowledge and skills					
3. I choose a course based on what I feel about it					
4. I decide based on my preferences for instance, family background					
5. I prefer things to do what I like the most					
6. I expect my potential in looking for a job					
7. I am focused based on my interest					
8. It is my passion that helps me to pursue the course or career to take					
9. I rely on my abilities					
10. I depend based on self0testing					

Peer Influence	5	4	3	2	1
1. My peers inspire me to choose what I like to take					
2. My peers encourage me to do things to achieve my goals					
3. My peers' advice to learn more about what I like to choose to do					
4. My peers' informal talk leads me of what I should plan to choose					
5. I prefer to my peer group in selecting a course					

Considerations about the Institution	5	4	3	2	1
1. I consider on a distance of travel from the house to school and home					
2. I believe the stories of my acquaintances about the school					
3. I learn the affordable tuition of the university in college institution					
4. I rely on a scholarship grants					

Future Job Opportunities	5	4	3	2	1
1. I find the course I choose convenient in looking for a job in the future					
2. I can expect for the good salary					
3. I prefer for the stability status for the job					
4. I favor the tenureship of the job					
5. I expect the availability of the job that suits me					

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Development of an Audio Transmission System Through an Indoor Visible Light Communication Link

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Abstract- This study presents an approach to develop an indoor visible light communication system capable of transmitting audio signal over light beam within a short distance. Visible Light Communication (VLC) is a pretty new technology which used light sources to transmit data for communication. In any communication system, both analog and digital signal transmission are possible, though, due to having the capability of providing a faithful quality of signal regeneration after the transmission process, digital communication system is much more popular than the analog one. In the current project, digital communication process was adopted also. To convert the analog audio signal into the digital transmission signal and vice versa, Pulse Width Modulation (PWM) was used as the signal encoding strategy. As the light emitter, white Light Emitting Diodes (LEDs) were used and as photo sensor, a solar cell was used instead of a photodiode to obtain greater signal power and sensitivity. In the system, the carrier signal for transmission was chosen to have a frequency of 50 KHz. At the receiving end, a 4th order Butterworth lowpass filter having a cutoff frequency of 8 KHz was used to demodulate the audio signal. Using only 2 white LEDs, the indoor transmission range of this visible light communication system was found to be 5 meters while reproducing a satisfactory quality audio.

Index Terms- Visible Light Communication System; Analog; Digital; Pulse Width Modulation; Solar Cell; Photodiode; Carrier Signal; Butterworth low pass Filter; Cutoff Frequency.

I. INTRODUCTION

Visible light communication (VLC) is a wireless data communication system which uses the visible light spectrum between 400 and 800 THz (780–375 nm) as the data carrying medium. Visible light spectrum is a part of the total electromagnetic spectrum, which is visible to human eyes and harmless like other high frequency electromagnetic waves. Basically, any visible light communication system transmitter modulates light from a light source with the desired data and throws it onto a distant receiver whereas, in the receiver, this

modulated data is decoded again to reconstruct the desired signal. Applications of VLC in our day to day life include transmitting various kinds of data along with room lighting system, HD video streaming, access to internet, making computer LANs, wireless printing, wireless surround sound speaker system etc. Pairing and communicating with high speed digital data between two or more digital devices via light is known as Li-Fi [1].

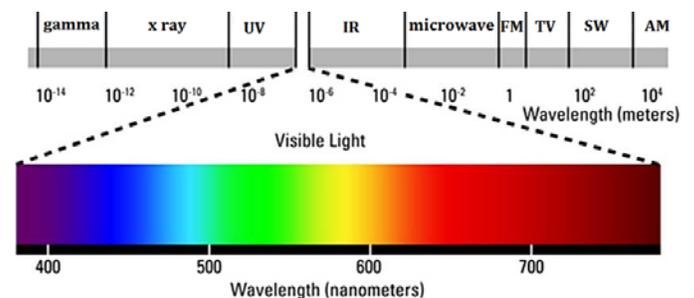


Figure 1. The Electromagnetic Spectrum.

Most of the modern wireless communication systems nowadays use very high frequency electromagnetic waves (usually between 300 MHz and 300 GHz) which is also called 'Microwave' and these high frequency waves can cause serious health hazards for humans and other living being [2].

With the increasing number of users, the wireless communication provider companies are setting up more high power transmitter towers in localities. High frequency microwave radiations are thought to be a primary cause of different types of cancers. On the other hand, light, which is also electromagnetic wave, is not harmful for living being though its frequency range is much higher than microwaves. Also, being higher frequency wave, light can potentially carry more data having a higher bandwidth. Moreover, being safe for human being, visible light communication could be the next generation worldwide communication system.

II. VISIBLE LIGHT COMMUNICATION

The main purpose of a visible light communication is to use same device both for lighting an area and for data

communication. The basic idea is to modulate the emitted light from a lighting source with the desired signal to be transmitted. This can be done by means of electronic circuits. If the receiver is on the path of light radiation, then, with the help of a suitable photo sensor, the incident modulated light can be captured, converted into the equivalent electrical signal and from that, the desired transmitted message signal can be reconstructed again. To modulate the light at the transmitter side, at first a relatively high frequency pulse train (also called the carrier signal) is modulated with the low frequency audio or message signal. Then this pulse train is used to drive a high speed lighting source, such as Light Emitting Diodes (LEDs). Usually, white LEDs are used because of the lighting purpose, but LEDs of other colors can be used also. Because of these LEDs being driven with the modulated signal, the light emitted from them flicker according to the modulated signal at a very high rate. Due to the 'Persistence of vision' of human eyes, this flickering can't be observed [3]. Thus, this communication system is fully comfortable for human eyes. At the receiver, received signal from the photo sensor is processed and demodulated to recover the message.

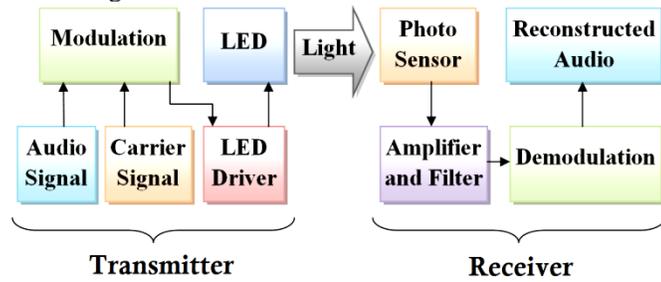


Figure 2. Basic Block Diagram of Visible Light Communication.

A. Advantages of VLC

Visible light communication system has some advantages over radio wave wireless communication system. This system uses

III. PULSE WIDTH MODULATION

Pulse Width Modulation or PWM is a signal modulation technique that manipulates the width of any particular state of a given pulse, based on modulator signal information, usually according to the amplitude of it. In PWM encoding, the frequency of the modulator signal is much lower than the frequency of the pulse being modulated. Pulse width modulation uses a rectangular pulse wave whose high-low width is modulated while keeping the period unchanged. This results in the variation of the average value of the waveform. If we consider a pulse waveform $f(t)$ with period T , low value y_{min} , a high value y_{max} and a duty cycle D , where D equals the time for the pulse being high over the time period of the pulse, the average value of the waveform is given by the equation:

$$\bar{y} = \frac{1}{T} \int_0^T f(t) dt \dots \dots \dots (1)$$

As, $f(t)$ is a pulse wave, assuming its value is y_{max} for $0 < t < D$ and y_{min} for $D.T < t < T$, the above expression then becomes:

visible light to transmit data which is harmless for human being unlike the harmful high frequency radio waves. Due to having higher frequency than microwave, light has a relatively higher signal bandwidth. VLC system can be cost effective in the sense that, it can combine both indoor lighting and data transmission in a same device. Visible light communication system is efficient also. It can work satisfactorily while consuming very less electrical power, comparing to most of the radio wave based wireless communication systems.

B. Disadvantages of VLC

Visible light communication system also comes with some disadvantages. As VLC systems use visible light which can't pass through opaque substances, the transmitter and receiver has to maintain straight line of sight to each other. Also the transmission range is very low comparing to radio wave technologies. As VLC is a relatively new technology, it still needs extensive development to be applicable in various communication systems. VLC receivers need high speed photo sensors that are still very expensive comparing to the typical antennas used in radio receiver circuits.

C. Signal Modulation

For reliable data transmission, every communication system needs some sort of modulation scheme. Modulation can be defined as the process of varying one or more properties of a relatively high frequency periodic signal, called the carrier signal with a relatively low frequency modulating signal which typically contains the desired information to be transmitted. Signal modulation can be done both in analog way and in digital way. Though analog modulation schemes are relatively easier to implement but, to ensure high speed reliable data transmission, digital modulation techniques are superior, as digital signals get less distorted in a noisy channel than analog signals [4]. For the current system implementation, Pulse Width Modulation (PWM) was chosen because it can be easily implemented using cheap and common discrete electronic parts.

$$\bar{y} = \frac{1}{T} \left(\int_0^{DT} y_{max} dt + \int_{DT}^T y_{min} dt \right) \dots \dots \dots (2)$$

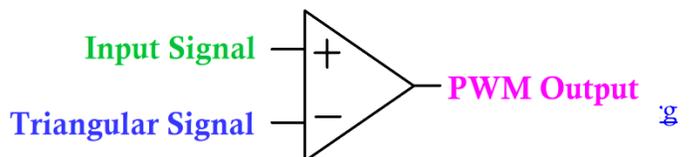
The last expression can be simplified in many cases where y_{min} becomes zero and thus, the final equation becomes:

$$\bar{y} = D \cdot y_{max} \dots \dots \dots (3)$$

From this equation, it is clear that the average value of the signal $f(t)$ is directly dependent on the duty cycle D . Thus, by PWM encoding, the average value of a given signal at every sampling point is converted into a proportional duty cycle of the carrier pulse. When decoding, this average values at every sampling points can be obtained again from the PWM encoded pulse train which will reconstruct the previously given signal.

A. PWM Encoding

The easiest way to encode a given message or audio signal into a



PWM signal is to compare it with a high frequency sawtooth or triangular waveform. This is done with an electronic device called comparator which is nothing but an Operational Amplifier (Op Amp) without any feedback [5].

Figure 3. Pulse Width Modulation with a Comparator.

At every rising and falling slope of the triangular wave, the comparator compares the signals and generates the corresponding PWM signal. If the audio or message input is applied at the non inverting terminal of the comparator and the triangular wave is applied at the inverting terminal, the comparator will generate the PWM output signal as a pulse train of square wave having its duty cycle proportional to the amplitude of the input audio or message signal.

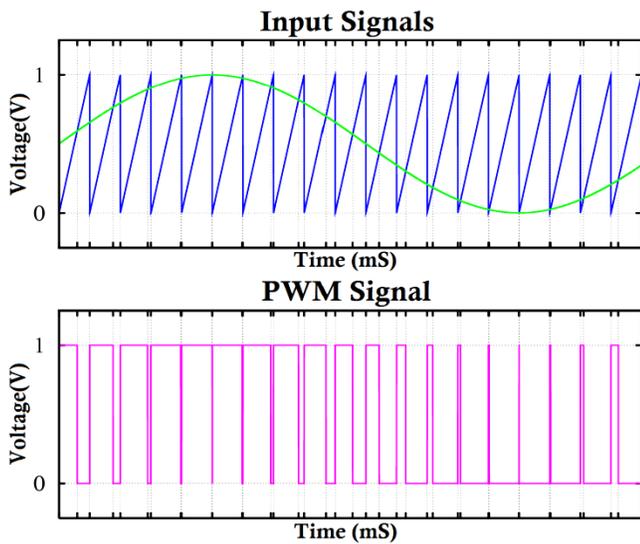


Figure 4. Input and output signals in a Pulse Width Modulation process.

B. Frequency Spectrum Analysis

In an electronic system involving PWM, usually, the desired input signal has a lower frequency bandwidth while the carrier triangular wave has much higher frequency components in it. However, frequency spectrum analysis showed that, after the PWM encoding process, the output PWM signal contains frequency components both from the low frequency input signal and from the high frequency triangular signal as shown below.

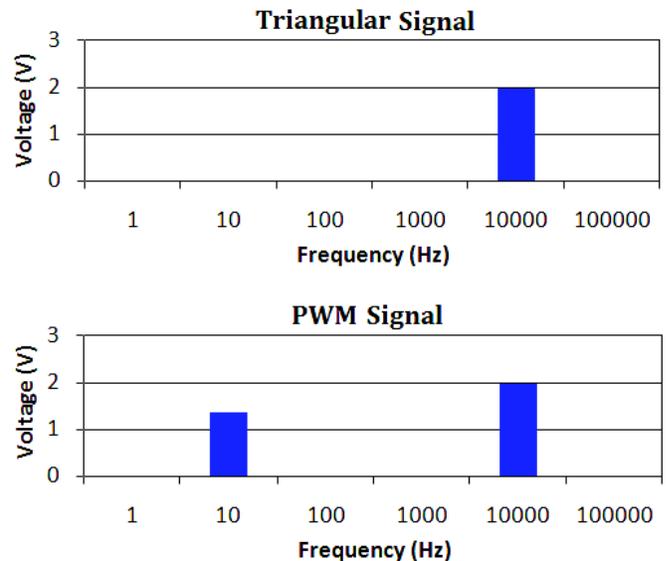
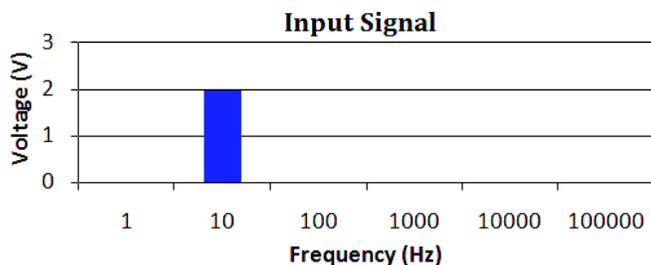


Figure 5. Frequency spectrum of input and output signals throughout various stages of a PWM process.

C. PWM Decoding

It is obvious from the frequency spectrum analysis depicted above that, to decode the PWM signal and thus obtain the desired low frequency message or audio signal, one lowpass filter is enough. Choosing a lowpass filter with a suitable cutoff frequency will remove the high frequency component in the PWM signal leaving only the desired low frequency signal.

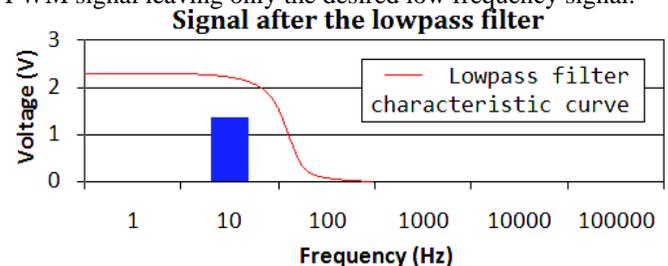


Figure 6. PWM decoding process with Lowpass Filter.

Humans are capable of listening from 20 Hz up to 20 KHz of audio [6]. But, the hearing response decreases with the increasing frequency. Also, human voice and most of the musical instruments produce audio signals which can be confined pretty much in the frequency range of 30 Hz~12 KHz. Thus, to implement an audio transmission system, a lowpass filter having cutoff frequency around 10 KHz would be enough to cover most of the audio frequencies to which human ears are the most sensitive.

IV. DESIGN METHODOLOGY

The total system of audio transmission using a visible light communication link can be divided into 3 essential sections.

1. The transmitter circuit
2. Transmission channel
3. The receiver circuit

A. The Transmitter Circuit

The transmitter circuit in current project is capable to deal with only single channel audio. It takes a stereo audio input from any standard music player like MP3 player, PC, Laptop etc. and converts it into mono i.e. single channel audio. The transmitter includes a triangular wave generator. Using this triangular wave and a comparator, the circuit then encodes the input audio into a corresponding PWM signal and drives two bright white LEDs with it. Thus, the emitted light also gets modulated and contains the information of the input audio.

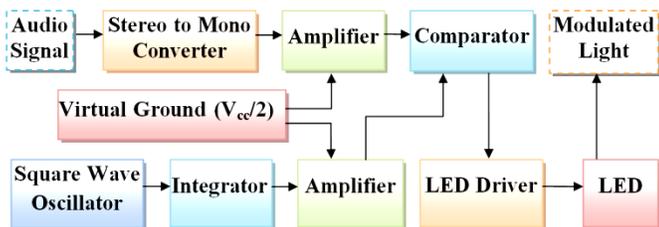


Figure 7. Functional Block Diagram of the Transmitter.

The stereo to mono converter uses 3 resistors to mix the 2 input audio channels into a single one. Then the audio gets amplified by an amplifier based on a collector feedback biased 2N2222A NPN transistor configuration. To generate the triangular wave, the circuit uses an integrator followed by a square wave generator, because, it is easy than direct generation of triangular wave. The square wave generator is based on a 4011 NAND gate IC with a couple of resistor and capacitors [7]. This circuit generates a square wave of 53.26 KHz frequency. Then, the integrator circuit integrates the square wave and turns it into a triangular wave. After that, this triangular wave gets amplified by a TL082 Op Amp and is fed to the comparator for PWM generation.

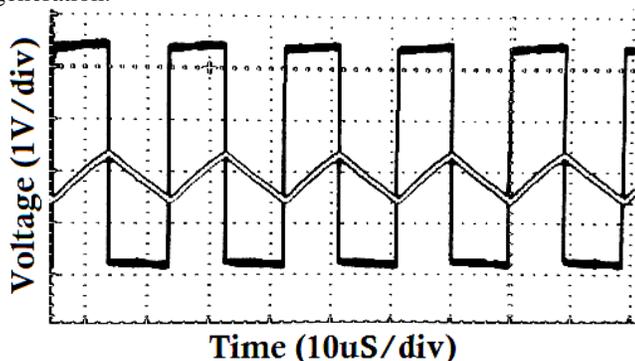


Figure 8. 53.26 KHz square wave with the integrated triangular wave.

For PWM signal generation, the transmitter uses a TL082 Op Amp with no feedback thus, working as a comparator. TL082 is a dual package dual power rail amplifier IC but, the current system uses only a single DC power supply. For this reason, all the input signals to TL082 must be pre-biased at half the power supply voltage [8]. The transmitter uses an LM358 Op Amp buffer circuit followed by a resistive voltage divider to generate this voltage. This voltage node is referred to as the virtual ground in the block diagram because, it acts the same way as the ground node in a dual power supply configuration.

After amplification, both the audio signal and the triangular signal are biased at the virtual ground node and then fed into the

comparator. The LED driver circuit consists of a BD135 NPN medium power transistor followed by a resistive biasing circuit. The output LEDs are connected between the positive power supply rail and the collector of BD135.

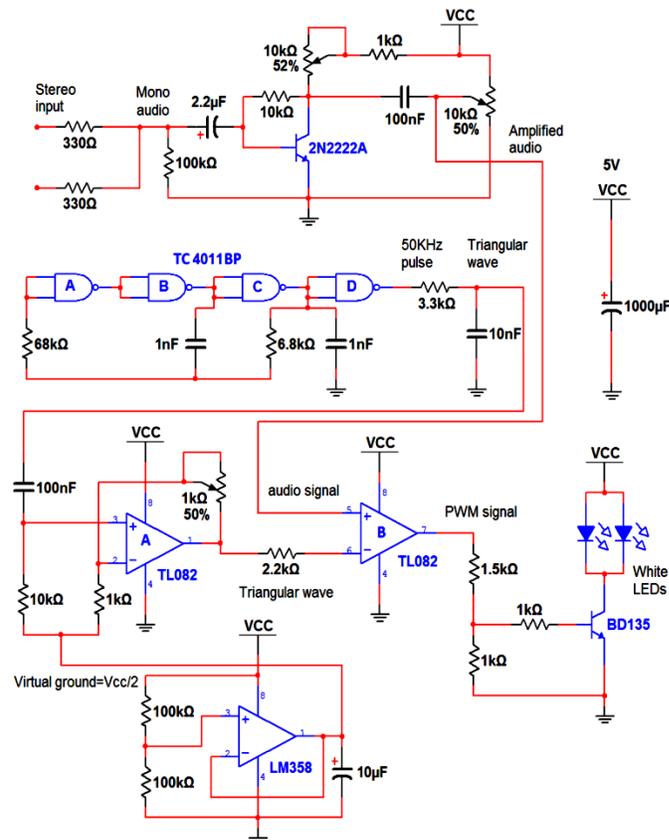


Figure 9. Circuit Diagram of the Transmitter.

Noise Removal

Scanned documents often contain noise that arises due to the accessories of printer or scanner, print quality, age of the document, etc. Therefore, it is necessary to filter this noise before processing the image. This low-pass filter should avoid as much of the distortion as possible while holding the entire signal [1, 8].

B. Transmission Channel

The transmission channel for a visible light communication system is nothing but the air in the surrounding environment. As the current project is intended to be used indoor, the possible indoor noise sources in this VLC audio transmission system channel should be considered. Usual indoor noise sources are fluorescent lamps, tungsten bulbs and CFL bulbs as they flicker at the power line frequency or other frequencies according to their driving circuitry [9]. Any kind of signal attenuation caused by the transmission channel is practically negligible in case of short range indoor transmission but the noise sources might induce some high frequency disturbances which should be filtered out at the receiver.

C. The Receiver Circuit

The receiver circuit is capable of sensing the transmitted modulated light with a light sensitive device called a photo sensor. Solar cell is an example of a photo sensor. Solar cell is a kind of transducer which converts the incident light into its

corresponding electrical signal [10]. The receiver amplifies the electrical signal coming from photo sensor and demodulates it to obtain the original audio signal transmitted. After demodulation, power of this audio signal is amplified to make it strong enough and capable of driving a low impedance loudspeaker. This loudspeaker can be directly connected at the output of the receiver circuit to hear the audio.

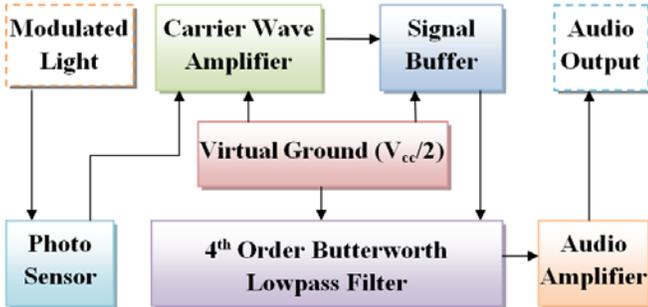


Figure 10. Functional Block Diagram of the Receiver.

The Photo Sensor Module consists of a little solar cell as the light sensing element and a convex lens. They are mounted in a tube made with hard paper where the solar cell is at the focal point of the convex lens. This lens focuses the incident light coming from long distance onto the solar cell which gives maximum possible received signal strength.

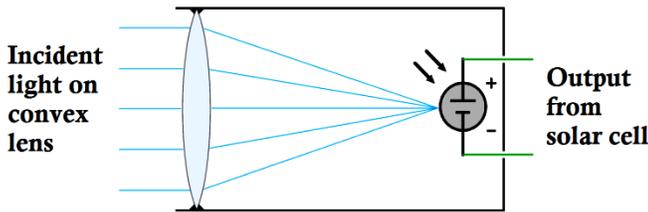


Figure 11. The Photo Sensor Module.

Sensitivity of the Photo Sensor shown above, decreases with increasing frequency. So, it can't capture higher frequencies very well. Amplitude of the generated signal is very low so, amplification is needed.

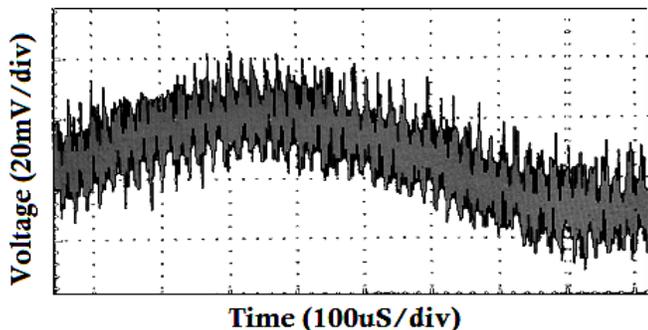


Figure 12. Electrical signal generated by the Photo Sensor.

After obtaining electrical signal from the Photo Sensor, the receiver circuit amplifies it with a 2N2222A NPN transistor based amplifier. Due to having low strength, this signal can't tolerate further loading. That's why it goes through a common collector buffer stage made of another 2N2222A transistor[11]. Then it gets biased at half the power rail voltage and is fed to the

next stage. This stage is obviously a PWM demodulator which recovers the transmitted audio. As said before, a lowpass filter can do this job. The current circuit uses a 4th order Butterworth Lowpass Filter having a cutoff frequency of 8 KHz [12]. This covers most of the frequency components a human ear is highly sensitive to. At 53.26 KHz, the employed filter design has attenuation of 68dB. So, the high frequency carrier signal gets highly suppressed which induces less noise into the audio.

The 4th order Butterworth Lowpass Filter used in the receiver consists of two Op Amps from a TL082 IC. Thus, they also need a virtual ground node just like in the transmitter circuit. This node biases the signal at different stages of the receiver circuit. It has the same construction as in the transmitter circuit.

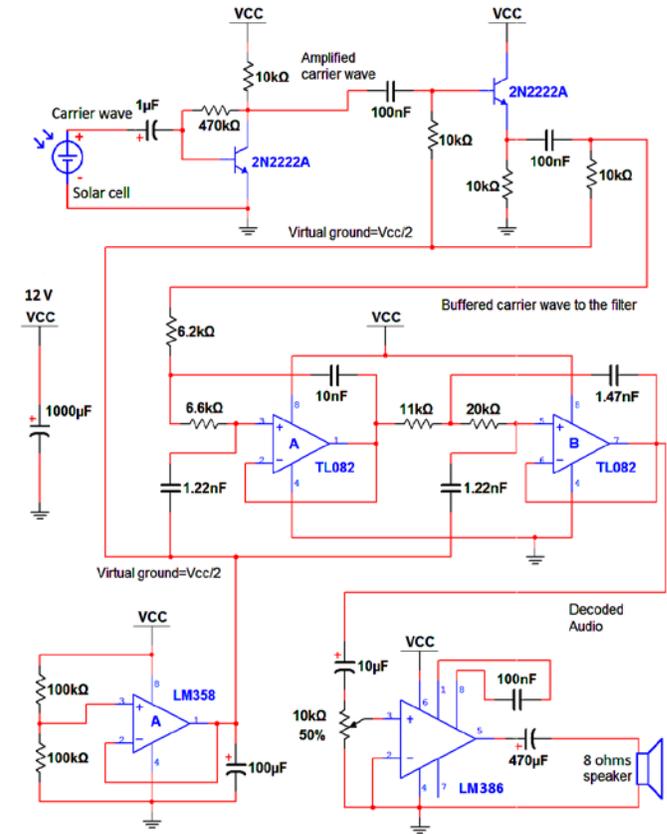


Figure 13. Circuit Diagram of the Receiver.

Audio power amplification stage is based on an LM386 audio amplifier which can drive one 8 ohm speaker while delivering power near 1 Watt without noticeable distortion.

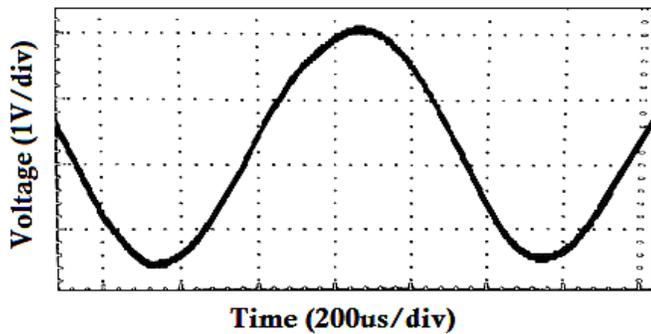


Figure 14. 1 KHz demodulated sine wave from receiver output.

D. Circuits on Printed Circuit Board

The pictures below present actual circuits of the transmitter and the receiver on Printed Circuit Board (PCB).



Figure 15. Transmitter Circuit on PCB with the output LEDs.

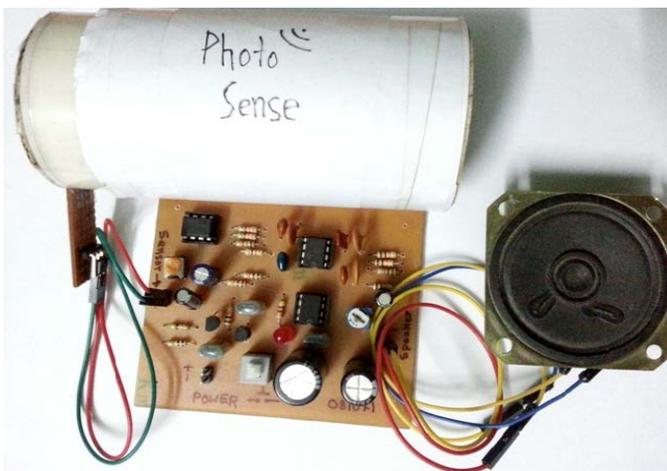


Figure 16. Receiver Circuit on PCB with the Photo Sensor and the Speaker.

V. CONCLUSION

The VLC Audio Transmission System discussed in this document is capable of transmitting single channel audio signal with a satisfactory quality within a short range. Both of the transmitter and the receiver circuit can operate from +5V to +15V DC power supply. As, the 4th order Butterworth lowpass

filter is capable of suppressing the carrier signal by 68dB, the receiver provides with a nice quality sound. During testing, two big white LEDs having a diameter of 10mm were used. The tested indoor transmission range of this VLC Audio Transmission System with satisfactory audio quality was found to be 5 meters.

The currently implemented system has scopes to be developed further. The transmission range of this system can be increased while maintaining the audio quality. The receiver can be made more sensitive so that, it can gather information from scattered or reflected less intense modulated light. Output power of the transmitter can be increased to increase the transmission range. The system can be modified to make it capable of transmitting multi channel audio and high speed digital data.

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Portfolio - An Alternative Form of Assessment in EFL Context

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Abstract: *For long time, the use of standardized language test has dominated the language assessing practice. Assessment has focused on measuring how thoroughly students have mastered knowledge and skills. However, traditional standardized tests have been criticized for removing the human element and restricting communication between students and teachers; for eliminating the opportunity for students to draft and to revise their work; and for not allowing students to participate in choosing work that would better represent their abilities. The changes in education objectives lead to a change in assessment. Performance based assessment seems to be well suited in reflecting what a person can do. In contrast to measuring what they know, as found in formal measures, performance assessments measure how students can apply the knowledge they have acquired rather than what they perform in a test. This paper tries to raise the appropriateness of portfolios as a form of assessment that can allow students to see their own improvement over time, resulting in a sense of accomplishment as well as establish learning goals and to identify their strengths and their weaknesses.*

Key words: standardized test, portfolio assessment, performance based assessment, students' performance.

I. INTRODUCTION

1.1. Rationales

The term assessment in education is viewed as a process of gathering data about students by observing, describing, collecting, recording, scoring, and interpreting information to make decisions about placement, promotion, retention, or graduation. Traditionally, assessment has focused on measuring how thoroughly students have mastered knowledge and skills. Black (2002) generates three main purposes of assessment: to confirm students' achievement for certification or transfer to the next process; to provide accountability to public stakeholders, and to improve students' learning. Others include motivating students (Earl, 2003) and preparing students for the future (Irons, 2007).

However, traditional standardized tests have been criticized for removing the human element and restricting communication between students and teachers; for eliminating the opportunity for students to draft and to revise their work; and for not allowing students to participate in choosing work that would better represent their abilities (Black, Daiker, Sommers, & Stygal, 1992; Maeroff, 1991). Sheppard (1989) admitted that "...accountability testing in the 1980's is having a pernicious effect on education. Standardized tests have always been fallible, limited measures of learning goals" (p. 9). Wiggins (1992) considered that traditional testing over-assesses student knowledge and under-assesses student know-how with knowledge. Hart (1994) elaborated on the following drawbacks of standardized tests: (1) their results are "often inconsistent, inaccurate, and biased" (p. 6); (2) there is doubtful validity (how well the test measures what it purports to measure) of some tests; (3) they mostly measure students' test-taking abilities; and (4) they inflict damage on the nature of teaching and learning by emphasizing the recall of information, implying that there is only one single and acceptable answer to every question, turning student into passive recipients of information, by forcing teachers to teach to the test. Having mentioned many limitations, the traditional standardized assessments should be replaced by other forms of assessment for a better performance of language learners. That is more than measuring students' achievement, assessment can improve students' learning, motivation and preparing them for the future.

1.2. Formative and summative assessment

Assessment is often divided into formative and summative. However, the division is not strictly clear (Airasian & Russell, 2007; Freeman & Lewis, 1998). It is agreed widely that summative assessment is often carried out at the end of a learning process, such as a project or a term, to judge the overall success of that process (Airasian & Russell, 2007; Boyle & Charles, 2013; Freeman & Lewis, 1998). Conversely, formative assessment focuses more on providing reflective information to improve student learning during the process (Black & Wiliam, 1998). Indeed, summative assessment may also be formative if it provides clear, detailed information, including feedback for students to improve their learning (Bennett, 2011; Irons, 2007). Therefore, the distinction between summative and formative assessment is fuzzy (Sambell, McDowell & Montgomery, 2013).

Despite the divergence of perspectives on summative and formative assessment, it is undeniable that, for decades, summative assessment has dominated all levels of education including higher education (Stiggins, 2002). Formative assessment has only gained more attention in both education practice and research after the review of classroom assessment practice by Black and Wiliam (1998). The review emphasises that formative assessment can improve students' learning, especially for low achievers (Black & Wiliam, 1998), whereas summative assessment is seen as a tool for providing a snapshot of student learning without effectively and instantly affecting instruction (Stiggins, 2005). Although the review reflects mainly assessment practice at school, it is still helpful to identify the importance of formative assessment in education. Recent emphasis on the acquisition of competences rather than ranking students required teachers to use more formative assessment activities to enhance student learning, develop their competencies throughout a course, this called for a balance of summative and formative assessment to maximise the benefits of assessment for students (Stiggins, 2005). It should be noted that formative and summative assessment complement (rather than replace or compete with) each other.

The changes in the objectives of education make changes in the assessment practice. With rapid production of new knowledge in modern society, the goals of education should expand to include developing learners' skills, such as problem-solving skills and professional skills in real-life contexts. One of the most important goals of education is to develop learners' capacities for lifelong learning to ensure that they can build up knowledge and skills throughout their lives (Boud, 1995, 2000). Therefore, assessment in education is expected to equip students with the ability to undertake assessment of learning tasks throughout their lives, by checking their performance against assessment standards and seeking feedback from people in their environment to improve their learning (Boud, 2000; Boud & Soler, 2015)

1.3. Alternative assessment

In terms of testing, alternative assessments are classified as criterion-referenced assessments, where an individual's performance is compared to a specific learning objective or performance standard and not to the performance of other students nationally or locally. As such, alternative assessments provide "a much needed conceptual framework for thinking about the types of performance-based and so-called authentic assessment that are currently being promoted" (Linn, 1994, p. 12). Alternative assessment generally refers to new assessment techniques in contrast to traditional approaches, e.g., multiple choice or short answer tests. According to Worthen (1993), alternative assessment is a more generic term for such types of assessments as direct assessment, authentic assessment, and performance assessment.

Direct assessment of performance may include judging performance in music and athletics, hands-on assessment in vocational practices, competency testing in medical field, and language proficiency testing in conversation and translation (Worthen, 1993). Authentic assessment is a term used to describe meaningful tasks that require students to perform and produce knowledge rather than simply reproduce information others have discovered. Wiggins (1989) offered two criteria of assessment authenticity: that an assessment reflects the challenges, work, and standards engaging practicing professionals, and that it involves a student with opportunities for dialogue, explanations, and inquiry. LeMahieu (1992) considered assessments to be authentic when "they represent behavior or accomplishments that have real meaning and value" (p. 52). This assessment of student performance is relevant not only to class assignment, but it is also "relevant to life outside of school" (Worthen, 1993, p. 445). As Case (1992) stated, "... authentic assessment refers to measuring the real, actual, or genuine [experience] as opposed to measuring a poor substitute" (p. 19). Performance assessment, according to Burke (1999), "is the process of gathering data by systematic observation for making decisions about an individual" (p. ix). Ryan and Miyasaka (1995) considered performance assessment and portfolio assessment to be parts of authentic assessment.

II. A REVIEW OF RELATED LITERATURE

2.1. Definitions of portfolios

The Longman dictionary of language teaching and applied linguistics defines portfolio as "a purposeful collection of work that provides information about someone's efforts, progress or achievement in a given area. (p. 443). Portfolio is a "flat portable case" or a "large heavy envelope" for carrying paper or drawings as well as designs. Portfolio is created to give protection to works of the architect, fine artist, graphic and textiles designers. The works kept are usually two dimensional works. The portfolio protects the drawings and designs from effect of negligence, weathering and aging. It also stores all paper drawings or painting and design of any media (Ifeagwu, 2005). In Hancock (1994, p. 238), a portfolio is defined as the collection of a learner's work assembled for the purpose of determining how much has been learned. Hancock wrote that the portfolio may include examples of the learner's completion of tasks such as reports, (both oral and written), creative projects such as artwork, contributions to group projects, and student writing (e.g., essays, poems, and written homework). The items chosen for inclusion in the portfolio can be selected by the learner, the teacher, or both, depending on the instructor's purposes. Dalheim described portfolios as longitudinal in nature, diverse in content, and collaborative in their selection and evaluation. Portfolios, Dalheim continued, emphasize strengths, development of skills, and improvements, as well as personal reflections and expectations. Dalheim noted that teachers expect portfolios to provide a broad picture of a student's achievement by showing the unfolding of skills over time something that a one-time performance on a test cannot do. Teachers also use portfolios to encourage students to take partial responsibility, for their own learning, through selection and reflection about portfolios.

Pat Belanoff & Peter Elbow first introduced portfolio assessment at Stony Brook University of New York in 1983. They implemented the use of the portfolios in place of a writing exit exam. In her article *Portfolios and Literacy: Why?* Belanoff explains:

Our initial portfolio use at Stony Brook grew from the need to meet objection raised by timed, self-contained assessment of writing, recognition that process pedagogy is undermined by such testing and a growing awareness of the contextuality of all language use.

Portfolios have been one of the most pervasive innovations recommended by educational reformers of the 1980s and 1990s. In 1990, for example, the Association for Supervision and Curriculum Development identified portfolios as one of the nation's top three curriculum trends. O'Malley & Valdez Pierce (1996) state that "an assessment portfolio is the systematic collection and evaluation of student work measured against predetermined scoring criteria, such as scoring guides, rubrics, checklists, or rating scales". Portfolios can provide a continuous picture of student progress, rather than a snapshot of student achievement that single-occasion tests provide. Depending on school or district requirements, portfolios can include performance-based assessments, such as writing samples that illustrate different genres; solutions to math problems that show problem-solving ability; lab reports demonstrating an understanding of a scientific approach; or social studies research reports demonstrating the ability to use multiple sources. In some cases, multiple drafts of student work showing improvements are included.

Portfolio assessment is the procedure used to plan, collect and analyze the multiple sources of data maintained in the portfolio. The process includes student participation in the selection of work, in criteria, goal setting and through self-assessment. Students and teacher collaborate in assessing and evaluating students learning from evidence in portfolio collection, then use the information to make plan and set goals for further learning. That means, the assessment is not unilateral. Portfolio assessment contain guidelines for content, criteria for evaluating process and product as well as evidence of students' reflection (MacLeod & Erlandson, 2012).

Portfolios, like most types of performance-based assessments, are considered tools to guide instructional practice. If a portfolio assessment system is correctly implemented, instruction should be expected to: (1) pay more attention to the process of learning, (2) lead teachers to think, evaluate, and modify their own practices, (3) change students' traditional role from a passive one to one in which they take charge of their own learning and the evaluation of that learning, (4) be guided by current theories of development and the process of learning, and (5) make explicit what content is valuable for both teachers and students. Gitomer and Duschl (1995) indicate that good portfolio practice requires fundamental changes in conceptions of (scientific) knowledge, teaching, learning, and assessment.

2.2. Performance-based assessment

A growing number of business and education leaders recognize the importance of the kinds of assessments that are used to evaluate student learning. Fadel, Honey, and Pasnik (2007), for example, have suggested that the workplace of the 21st century will require "new ways to get work done, solve problems, or create new knowledge"(p.1), and that how we assess students will need to be largely performance-based in order to evaluate how well students are able to apply content knowledge to critical-thinking, problem-solving, and analytical tasks. David Conley, in his book, *College Knowledge* (2005), reports that higher education faculty valued "habits of mind" even more than content knowledge, including the ability to think critically and analytically, to independently draw inferences and reach conclusions, and to solve problems. Performance-based assessments require students to use high level thinking to perform, create, or produce something with transferable real-world application. Research has also shown that they provide useful information about student performance to students, parents, teachers, principals, and policymakers (Matthews, 1995; Koretz et al., 1996; Vogler, 2002). Research on thinking and learning processes also shows that performance-based assessments propel education systems in a direction that corresponds with how individuals actually learn (Herman, 1992).

The term performance-based assessment is often used when referring to a broad spectrum of assessment types. Among those are alternative assessments and authentic assessments. However, some important distinctions in terminology between these terms should be noted. Authentic assessment can be defined as a special kind of performance assessment conducted in an authentic context as part of regular classroom learning rather than as contrived, intrusive assessment tasks (Gipps, 1994). Alternative assessment, as characterized by Aschbacher (1991) requires problem solving and higher level thinking, involves tasks that are worthwhile as instructional activities, uses real-world contexts or simulations, focuses on processes as well as products, and encourages disclosure of standards and criteria. What is important to note is that although performance-based assessment can be authentic, it is not necessarily so (Meyer, 1992) and performance based assessment does not inherently include all the characteristics of alternative assessment. Performance-based assessment then, is a general term encompassing many aspects of both authentic assessment and alternative assessment.

Performance-based assessments typically consist of tasks designed to have students actively solve problems and apply knowledge. One purpose is to observe the strategies that students use to solve problems rather than merely seeing the right answer asked for on a test. A good performance task allows for the examination of challenging content as well as the use of particular skills and an assessment of overall performance. These tasks can include science experiments, oral presentations, essays, video

documentations of performances, and so on. The essence of a performance task is that the skills and knowledge being assessed are contextualized, and the performance requires the student's active, rather than reactive, participation.

Portfolios are a form of performance assessment which involves the systematic collection of student work products over a specified period of time according to a specific set of guidelines (AERA et al., 1999). Research has substantiated that artists, photographers, writers, and others have long used portfolios to represent their exemplary work. In education, portfolios have become increasingly popular in the classroom as an alternative assessment tool to show individual academic progress. As specifically applied in schools and higher education institutions today, portfolios may best be conceptualized as a systematic way of collecting, organizing, and evaluating attainment of core curriculum. As such, portfolios can conceivably serve as the basis for evaluating students' achievements and providing feedback to the students (Reynolds, et al., 2006).

2.2. Characteristics of portfolios assessment

A portfolio has several essential characteristics. First, a portfolio is purposeful. There is a clear reason why certain works would be included and how the portfolio is to be used. Second, rather than reflecting a haphazard collection of samples, the portfolio represents a systematic and well-organized collection of materials that make a sample, not a comprehensive or exhaustive collection, of student work. Third, pre-established guidelines are set up so that it is clear which materials should be included. Fourth, students are engaged in the process by selecting some of the materials and by continually evaluating and reflecting on their work. Fifth, based on clear and well-specified scoring criteria, progress is documented with the evaluations. Finally, feedback is held between teacher and student to review progress, identify areas that need further improvement, and to facilitate student reflection.

Portfolios may include performance tasks and a variety of other student work samples, along with observations and evaluations of student learning from the student and peers as well as the teacher. They provide multiple sources of information about a student's development over time. One important feature of most portfolios is that the student plays a major role in developing and selecting work to include in the portfolio, particularly where the portfolio includes a student's self-selected "best work" along with versions of a piece of work over time. The active participation of the student in his/her own self-assessment process, with the teacher's (and sometimes peers') facilitation, brings a metacognitive element to this approach, helping students learn to evaluate how and what they are learning and to develop their own internal standards. Like an artist's portfolio, a portfolio for assessment purposes is a collection of a student's work that demonstrates his/her achievements, growth, and efforts in many areas or media. It provides documentation of the student's work that displays command of skills and content as well as insight into the learning process over time. As contrasted with the snapshot view of a student provided by a test, portfolios offer opportunities for longitudinal assessment. This supports a developmental view of learning and a keener understanding of each student's own path toward competence. Both portfolios and performance-based assessments are consistent with contemporary developmental and constructivist learning theories. These assessments ask learners to actively synthesize knowledge and apply it in open-ended ways. Skills, knowledge, and reasoning are integrated rather than fragmented when a student is asked to construct his/her own performance or portfolio. The boundaries between assessment, the curriculum, and learning become more permeable while the process of learning becomes more coherent.

2.3. Types of portfolios

The purpose of the portfolio determines its content and influences its organization. The different types of portfolios can overlap conceptually; components from one may be included in another. All types of portfolios focus on students' and are used to benefit students. The four commonly used types are;

Evaluative. The purpose of an evaluative portfolio is to enable the teacher, in collaboration with school personnel and family members, to evaluate a student's progress relative to program goals, objectives, or standards. Teachers select various items for each student's portfolio. These may include, but are not limited to, samples of a student's work (either in-progress or finished products), anecdotal records, reading/writing logs, checklists, rating scales, test data, conference notes, and parent surveys or comments. The portfolio will be full of items documenting progress, providing a basis for determining individual student's strengths and areas of need, and will be used for reporting to administrators and for ongoing curriculum development. Evaluative portfolios can be used for either formative or summative evaluation.

Working. The purpose of a working portfolio is to enable the teacher and the student to assess and evaluate progress together. Both the student and the teacher select samples to demonstrate growth and learning. Friends may also contribute related products resulting from the students' endeavors outside of school. Items highlight the ongoing process of learning, not just finished products. Included in this portfolio are samples of the student's work, teacher's comments and evaluations, collaboratively prepared progress notes, and plans for future work. This portfolio is an evolving repository of a student's thoughts, ideas, growth, and accomplishments. Working portfolios provide a method for formative evaluation.

Showcase. A showcase portfolio shows only the student's best work. Work in progress is not included. It is intended to motivate the student to develop completed projects that show best or favorite work. Both student and teacher can participate in selecting, over a period of time, the contents for this type of portfolio. Students may share their portfolios with relatives or participate in

conferences that focus on their portfolios. This portfolio does not, however, give enough information to guide instruction, because it lacks evidence of daily performance. Rather, it is a form of summative evaluation.

Archival. The purpose of an archival portfolio is to give the student's next teacher a comprehensive "snapshot" of the student's developing abilities (Puckett & Black, 1989). Items for this portfolio are selected because they provide a summative data record of the student's accomplishment during the year. Items may include both in-process or finished pieces of a student's work, checklists, rating scales, and anecdotal records. Informal evaluations, teacher analyses or comments about a student's work, and conference reports should be included, as well. This portfolio is forwarded to the student's next teacher so that appropriate instruction can be planned for the coming year.

III. BENEFITS AND DRAWBACKS OF PORTFOLIOS

3.1. Benefits

Many researchers have indicated benefits and drawback of using portfolio as a form of assessment (Brown & Hudson, 1998; Fox, 2008; Hung & Huang, 2012; Yin, 2013). Brown and Hudson (1998) identified the advantages of portfolio assessment and assembled them into three main categories including: (a) enhancing student learning; (b) informing teachers; and (c) facilitating the assessment process. Two main benefits of portfolio assessment are authenticity and positive washback. Authenticity refers to the natural, contextualized, meaningful, and real-world qualities of language assessment (Brown, 2003). Authenticity can be seen as both the ends and the means of portfolio assessment. In fact, Fox (2008) notes that some scholars even "equate authenticity in alternative assessment with both reliability and validity" (p. 101). Burner (2014) in his systematic review of the potential benefits of portfolio assessment on ESL/EFL writing devotes an entire section to authenticity. Portfolio assessment, according to Burner, (a) creates opportunities for authentic and sophisticated language use; (b) responds to the multifaceted nature of language/ multi-domain learning; (c) generates anxiety-free effects from time-constrained tests and exams; (d) increases students' motivation and time-on-task; (e) promotes interaction in and out classroom; and (f) facilitates communication and sharing of texts online, enhancing ecological validity.

3.2. Drawbacks

Researchers also show common disadvantages of portfolio assessment in terms of design decision, logistics, interpretation, reliability and validity. Yin (2013), drawing on the recent empirical studies, validates the benefits of portfolio assessment with the claim they do the following: (a) antagonize traditional tests and correspond to curriculum goals; (b) enhance language abilities, particularly writing skills; (c) augment students' self-reflection, autonomy, metacognition, and motivation. She points out the challenges of portfolio assessment and characterizes the reality of portfolio assessment implementation by elaborating the macro and micro level decisions for teachers and stakeholders. Additionally, Hung and Huang (2012) add that the most cited benefits of portfolio assessment are its tendencies to cultivate a sense of authorship or ownership and a sense of community. In terms of portfolio assessment weaknesses, their main concerns are still with logistical, reliability, and validity issues. Reliability and validity are the most important and controversial issues in language assessment and portfolio assessment. Reliability is "precondition for validity" (Brown, 2005, p. 220), that is, the assessment must be reliable to be valid. Nevertheless, meeting reliability demands for portfolio assessment is not impossible. In one empirical study, the reliability of portfolio assessment was confirmed, as Song and August (2002) concluded: "when carefully conducted with clear evaluation standards, portfolio assessment can be relied upon as a basis for making judgments about the writing proficiency of ESL students" (p. 63). Despite the questionability of the instruments (the fact that they were teacher-made tests and the manners in which portfolios were assessed) in this report, consistency in portfolio assessment can be reached with carefully planned implementation. The issue of portfolio assessment validity has been gradually addressed. Mai, Nguyen, and Griffi (2011) are among the first researchers to study and affirm the validity for portfolio writing assessment in a long-term project. They worked with a group of teachers and students from a research-based institution in Vietnam to develop the assessment criteria for portfolio assessment. Strictly following the instrument development procedures (drafting, panelling, piloting, trialling, and finalizing), the researchers reviewed the literature in second language writing and portfolio assessment, and then incorporated the local teachers' expertise to validate the construct. As a result of the first two stages, a portfolio writing assessment instrument of two domains, six capabilities, 36 indicators, and 138 criteria were designed which was both theory-driven and context-relevant. The authors concluded that "designing an empirical instrument for a formal assessment of portfolios is a feasible task for concerned researchers and teachers" (p. 175)

IV. CONCLUSIONS

Having discussed the portfolio related issues in language teaching in general and language assessment in particular, it is clear that portfolio can be seen as a good alternative form of assessment for teachers at all educational levels. The implementation of portfolio assessment can have long term effects rather than assessing students with standardized tests in terms of motivating and monitoring learners' autonomy and better performance in their studying.

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Wildfire effect on soil Microarthropod abundance in the subtropical forest ecosystem of Koubru Hills, Manipur (North-East India)

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Abstract: Wildfire is the most dominant natural large scale disturbance factor in many of the world's ecosystems including forests. A 115-year old mixed forest in Manipur (North-East India) was disturbed by wildfire in January 2010. The ground vegetation and the litter layer were completely consumed during the fire. Soil microarthropods that depend on those resources for food are therefore expected to be sensitive to fire. The study investigated the post-fire soil microarthropod abundance in this disturbed forest ecosystem. Approximately three months after the fire event, soil microarthropod sampling from the burned and unburned areas was started at monthly interval and continued for a period of 1 year. The soil animals were sampled from three soil depths (0-5, 5-10 and 10-15 cm) using soil corers 5 cm diameter × 5 cm high). Microarthropods were then extracted from the soil corers following the Tullgren funnel extraction technique. This was followed by the assessment of microarthropods extracted from the burned and unburned soils. For statistical analysis, repeated measures ANOVA was used to detect the variation in soil microarthropod abundance between the burned unburned areas. The analysis showed that wildfire had a significant effect on soil microarthropod abundance which was found to be lower in the burned area compared to the adjacent unburned area.

Keywords: soil microarthropods, wildfire, Tullgren funnel, forest ecosystem.

Introduction

Soil microarthropods form a major fraction of the mesofauna. More than 90% of the microarthropod population is constituted by mites (Acari) and springtails (Insect order Collembola) and other groups viz proturans, pauropods, diplurans, dipteran larvae, small spiders, pseudoscorpions, some homopterans and coleopterans, and thrips make up less than 10% (Coleman et al., 2004). As mites and Collembola comprise the majority of microarthropods, emphasis is usually given on them in most microarthropod related studies around the world. Mites occupy a diversity of functional groups, including predators, herbivores, fungivores, and detritivores while most collembola are generalist fungivores and detritivores, with some herbivores (Barratt et al., 2006). However, a research using stable nitrogen isotope ratios has revealed that Collembola occupy a range of trophic niches (Chahartaghi et al., 2005)

Soil organisms including microarthropods, in close interaction with each other and their environment, are responsible for organic matter decomposition in ecosystems. Microarthropods constitute an important part of the soil food web contributing to important ecosystem services like litter decomposition and nutrient release (Seastedt, 1984; Blair et al., 1992; Scheu and Schaefer, 1998). Microarthropods also influence microbial populations, directly by feeding on bacterial and fungal biomass, and indirectly by fragmenting litter in such a manner as to increase surface area for microbial colonization (Lussenhop, 1992). They also release nutrients held within fungal standing crops and contribute to soil structure and humus formation (Wallwork, 1983; Norton, 1985). Soil microarthropods are connected with primary decomposers through complex bottom-up and top-down effects (Marshall, 2000; Neher et al., 2012). The distribution of soil arthropods often reflects soil quality such as moisture, pH, humus, organic matter and other soil properties (Gill,

1969; Andre et al., 1982; Bengtsson, 1994). Although the relative contributions of microarthropods to decomposition and nutrient cycling have not been specifically quantified, reductions in microarthropod abundance, resulting from a disturbance as wildfire, may be detrimental to soil processes. Because primary decomposers or microbes ultimately mineralize most of carbon and nutrients from decaying organic matter, the contributions of other decomposer animals including microarthropods might have been evaluated to be low or even insignificant (Peterson and Luxton, 1982). Many studies, however, have demonstrated the important roles played by soil fauna in decomposition and nutrient cycling (Anderson et al., 1985; Persson, 1989; Setälä, 1990; Blair et al., 1992 ; Scheu and Schaefer, 1998). Soil fauna also constitute a huge, often disregarded, reservoir of biodiversity (Farska et al., 2014) and microarthropods being the most abundant and diverse group among soil fauna are considered to be efficient tools for assessment of biodiversity (Deharveng, 1996).

Forest ecosystems can be affected by different kinds of disturbance including wildfire. Fires often lead to alterations in the environment, biomass, species diversity, and ecosystem function (Peterson et al., 1998; Bengtsson et al., 2000). Overall, the effects of fire are complex, ranging from the destruction of above ground parts of vegetation and litter layer to affecting the physical, chemical and biological components of soil ecosystems. Forest fires are almost invariably started by people (Frost, 1996) deliberately, for instance, by livestock owners who seek to promote a green flush for their animals, rodent hunters (Ajayi and Kwesiga, 2003), people creating firebreaks around their homesteads, people clearing land for cultivation, people smoking out beehives or making charcoal in the forest (Pearce, 1986).

According to the ecological classification of fire effects put forward by De Lillis (1995), the fire affecting only the lower layers (litter, herbs and bush) of the woodland is classified as “superficial type”, while that which also burnt the high trees is referred to as the “canopy type”. The “superficial type” is commonly regarded to have a minor impact, compared to the “canopy type” which entirely destroys both flora and fauna. However, for soil dwelling invertebrates, a “superficial type of fire may also produce major impacts. Forest fire could influence soil microarthropod assemblages, directly by killing them from heat exposure and indirectly impact them by changing the species composition of forest vegetation and foliar characteristics, reducing the litter layer, and modifying soil moisture and temperature (Mitchell, 1990). Destruction of the litter layer and other organic residues can be detrimental to soil microarthropods as they serve as the major food resource. Fire can result in increased soil pH, and greater fluctuations in temperature and moisture, influencing vegetation composition (Haimi et al., 2000). These fire induced effects can subsequently lead to habitat loss of soil microarthropods and ultimately affect their abundance.

The present study examined the effects of forest wildfire on microarthropod abundance at three soil depths (0-5, 5-10 and 10-15 cm) in the subtropical forest ecosystem of Koubru Hills, Manipur (North- East India). Taking into account the severity of the wildfire, we hypothesized that following the fire event, soil microarthropod abundance would be greatly reduced in burned area compared with unburned area. Changes in soil environmental measures, such as temperature, moisture, bulk density and organic matter content were also expected to result from the wildfire.

Materials and methods

Site description

The research was carried out for a period of one year from April 2010 to March 2011 in the subtropical forest ecosystem of Koubru Hills, Manipur (North- East India). The site lies at 24°55'N latitude and 93°48'E longitude. The site is elevated at approximately 1294 m above mean sea level on an average. Average annual precipitation is about 1428.49 mm with the wet season between June and August. Average annual relative humidity is 75.99% and average annual air temperature is 21.14°C. These data are based on long term records from the Indian Council of Agricultural Research (ICAR) located nearby the study site. The soil at this site is sandy loam in texture. Vegetation is dominated by *Cinnamomum zeylanicum* and some species belonging to the genus *Litsaea*.

Soil sampling and soil environmental measurements

Soil sampling was carried out at monthly intervals for a period of one year (April 2010-March 2011). Sampling was done approximately three months after the occurrence of the forest wildfire. Two representative plots (with an area of 6000 m² per plot) were taken, one each in the burned and adjacent unburned areas. Each plot was equally divided into fifteen sub-plots with one sub-plot covering an area of 20 × 20 m². Following the random number table method of Fisher and Yates (1975), ten sub-plots were randomly selected from amongst the fifteen sub-plots. Soils were sampled using 5 cm × 5 cm soil cores from three depths (0–5, 5–10 and 10–15 cm) in each of the randomly selected ten sub-plots of burned and unburned areas. Thus, both burned and unburned soil samples were taken in 10 replicates from each depth. While sampling, only fresh leaf litters were removed from the soil surface meaning decaying leaf litters were included in the soil sample. Two sets of soil samples were collected on each sampling date: one set for microarthropod extraction and the other set for soil environmental measurements. In total, 60 soil samples were taken for microarthropod extraction from 2 experimental plots: 30 samples from burned plots and 30 from unburned plots. Additional set of 60 samples were subjected to soil environmental measurements. Soil moisture was calculated as a difference between weights of fresh and dried soil samples (dried at 105°C). Soil organic carbon was determined using H₂SO₄-K₂Cr₂O₇ oxidation method (Nelson and Sommers, 1996). By convention, the soil organic matter content was estimated by multiplying the soil carbon content by a factor of 1.72. Soil temperature was measured at all the three soil depths (0-5, 5-10 and 10-15 cm) with a soil thermometer at the specific points where and when the soil samples were taken.

Soil microarthropod extraction

Microarthropods were extracted from the soil samples using modified Berlese-Tullgren funnels with 25W bulbs as the heat source. The wall of each funnel is lined with a screen the mesh size of which is large enough to let through the largest microarthropod. Extraction was carried out for 3-5 days depending on the moisture contents of the samples and the extracted animals were preserved in 1:9 glacial acetic acid solution (1 part glacial acetic acid and 9 parts of 10% ethanol) until counts were carried out. The microarthropods were counted and sorted out into order levels under a binocular microscope. In our study, the extracted microarthropods were grouped into three broad categories: Acarina (mites), Collembola (springtails) and “Others”. Here, we refer “Others” to all the other microarthropods in the soil (e.g., Protura and Diplura) excluding Acarina and Collembola.

Statistical analysis

A two way ANOVA was performed to examine the effects of wildfire (burned and unburned) and sampling date on soil microarthropod abundance at three different soil depths. The test was done separately for Acari, Collembola and “Others”. $P \leq 0.05$ was considered to be statistically significant. Data analysis was carried out using Microsoft Excel 2007.

Result

Soil microarthropod abundance

Abundances of soil microarthropods in burned and unburned areas during 2010- 2011 are graphically presented (Fig. 1A, B & C, 2A, B & C, 3A, B & C, and 4A, B & C). A total of 775438 microarthropods were recorded from unburned area and 523107 microarthropods from burned area of the forest ecosystem. Collembola was the most abundant group followed by Acari and “Others” in both burned and unburned areas. As already mentioned “Others” include microarthropods not belonging to Collembola and Acari. Acari and Collembola consisted of 44.3% and 45.2%, respectively in total numbers while others constituted about 10% of the total population.

A two way ANOVA test showed that fire reduced mite abundance in the surface layer (0-5 cm) varying significantly ($P < 0.001$) between burned and unburned areas (Unburned > Burned, Fig. 1A, Table 1) and over the sampling months ($P < 0.05$). Mite abundance also varied significantly ($P < 0.001$) between burned and unburned areas (Unburned > Burned, Fig. 1B & C, Table 1) in the sub-surface layers (5-10 and 10-15). Significant variation was also observed among the sampling months ($P < 0.05$). Collembola living in the surface layer (0-5 cm) as well those residing

in the deeper layers (5-10 and 10-15 cm) also suffered the negative effects of fire as evident from the lower numbers recorded in burned area. Collembola abundance varied significantly ($P < 0.01$) between burned and unburned areas (Unburned > Burned, Fig. 2A, B & C, Table 1) and among the sampling months ($P < 0.05$) as confirmed by two way ANOVA. Microarthropods other than Acari and Collembola grouped into the category of "Others" in our study also showed reduction after the fire event. Fire-induced decline occurred in all three soil depths (0-5, 5-10 and 10-15 cm). As indicated by two way ANOVA, the abundance of other microarthropods differed significantly ($P < 0.001$) between burned and unburned areas (Unburned > Burned, Fig. 3A, B & C, Table 1). Significant monthly variation ($P < 0.05$) in abundance was also observed over the duration of the study.

Discussion

The wildfire in our study could be classified as being high in severity the entire understory vegetation and the litter layer being completely consumed during the fire event. Forest fires have the potential to produce a whole gradient of effects depending on the nature and severity of the fire; in case of severe fires, very few survivors are left among ground-dwelling arthropods (Paquin and Coderre, 1997; Wikars and Schimmel, 2001). A population decline in soil dwelling animals after fire is generally expected because fire destroys the major part of the resources and habitat of soil organisms, i.e. the above ground parts of the vegetation, litter, other organic residues, and the uppermost humus layer, or if the fire is severe, the entire humus layer. Organic matter that accumulates on the forest floor serves as both food and structurally complex habitat for arthropods. Food resources provided by litter benefits fungivores and detritivores (Johston and Crossley, 2002; Sayer, 2006), whereas the structural complexity provided by litter would benefit organisms that thrive in areas where an insulating layer moderates temperature and moisture at the soil surface, reduces soil compaction, and adds architectural complexity to the habitat (Ginter et al., 1979; Sayer 2006)

We found that soil microarthropods were negatively impacted by the wildfire, abundances of the microarthropod groups being significantly lower in burned area compared to adjacent unburned area at all sampling dates as confirmed by the ANOVA tests. The results obtained in this study correspond well with those from several other studies (Sgardelis and Margaris, 1993; Paquin and Coderre, 1997; Wikars and Schimmel, 2001; Moretti et al., 2004; Buddle et al., 2006; Kim and Jung, 2008; Malmstrom et al., 2009; Gongalsky et al., 2012; Rutigliano et al., 2013). One possible explanation for this fire-induced reduction is direct mortality from heat exposure during the fire event. Soil temperatures can be considerably increased during fire, often upto several hundred centigrades at the surface, and elevated temperatures have been measured at 15-30 cm soil depth (DeBano et al., 1998). According to Malmstrom et al. (2008), many species may actually suffer from moderate but lethally high temperatures during fire. They reported that almost all microarthropods are killed at temperatures around 40°C. Soil microarthropods may also be negatively affected indirectly through changes in habitat availability and quality (Swengel, 2001). Indirect effects of fire due to loss of above-ground vegetation, removal of litter layer, and release of nutrients can be greater than the direct effects caused by heat (Webb, 1994; Sgardelis et al., 1995). It is known that the higher the severity of a wildfire the greater the alterations in the environment and, consequently, the greater the alterations in the soil arthropod community. Destruction of litter and other organic matter accumulating on the forest floor may lead to the depletion of food source for soil microarthropods since most of them are decomposers of organic materials in the forest floor and their associates (Kim and Jung, 2008). Seastedt and Crossley (1981) reported positive correlation between microarthropod abundance and standing crop of undecomposed organic matter on the forest floor. Nutrients are abruptly mineralized from the vegetation and organic matter on the forest floor during fire and the decrease in food sources may affect soil invertebrates. Fire may cause large flux of nutrients leaving the ecosystem through volatilization and rapid mineralization, losses of nutrients through accelerated erosion and leaching (Neary et al., 1999). Other effects induced by fire which may indirectly impact soil microarthropods include adverse changes in hydrology, degradation of soil physical properties, losses in microbial populations and associated processes (Neary et al. 1999). Wildfire in our study also had effects on a broad range of soil properties, some of which could influence microarthropod abundance. Soil moisture is one the important factors for the distribution of microarthropods. We found significant post-fire increase in soil temperature and bulk density but decrease in moisture. Reduced plant and litter cover after fire exposed the soil surface directly to sunlight thereby increasing soil temperature and also allowed increased evaporation resulting in lower moisture content in the burned

area, which in turn, may have affected the microarthropod abundance. A burned area is more exposed to fluctuations in temperature and moisture compared to a non-burned area (Huhta et al., 1967). Seastedt and Crossley (1981) attributed reduced microarthropod abundance to less favourable conditions of increased temperature and decreased moisture. Post-fire changes in soil structure, like increased bulk density observed in our study can be responsible for further reduction of soil microarthropod abundance. Increased bulk density reduce the soil pore space inhabited by microarthropods (Startsev et al. 1998). Lindo and Visser (2003) reported a significant negative relationship between microarthropod abundance and soil bulk density. Further mechanisms by which fire may negatively impact soil microarthropods include qualitative changes in organic substrates and production of toxic chemicals. In fact, Kim et al. (2003) reported the production of toxic compounds such as polychlorinated dibenzo-p-dioxins and dibenzo-furans, and polycyclic aromatic hydrocarbons following fire. The indirect effects of fire appear to prolong the reductions in microarthropod abundance following fire activity. Dress and Boerner (2004) concluded that the overall effects of fire are not only due to the fire itself, but also due to fire-induced alterations in the environment.

In this study, we found that fire lowered the numbers of all microarthropods and recovery of populations in burned area to the levels in unburned area did not occur over the duration of our study. This indicates that it is not simply the fire itself that reduces microarthropod abundance, but also the fire-induced changes to the soil environment that subsequently feeds back upon microarthropod population dynamics.

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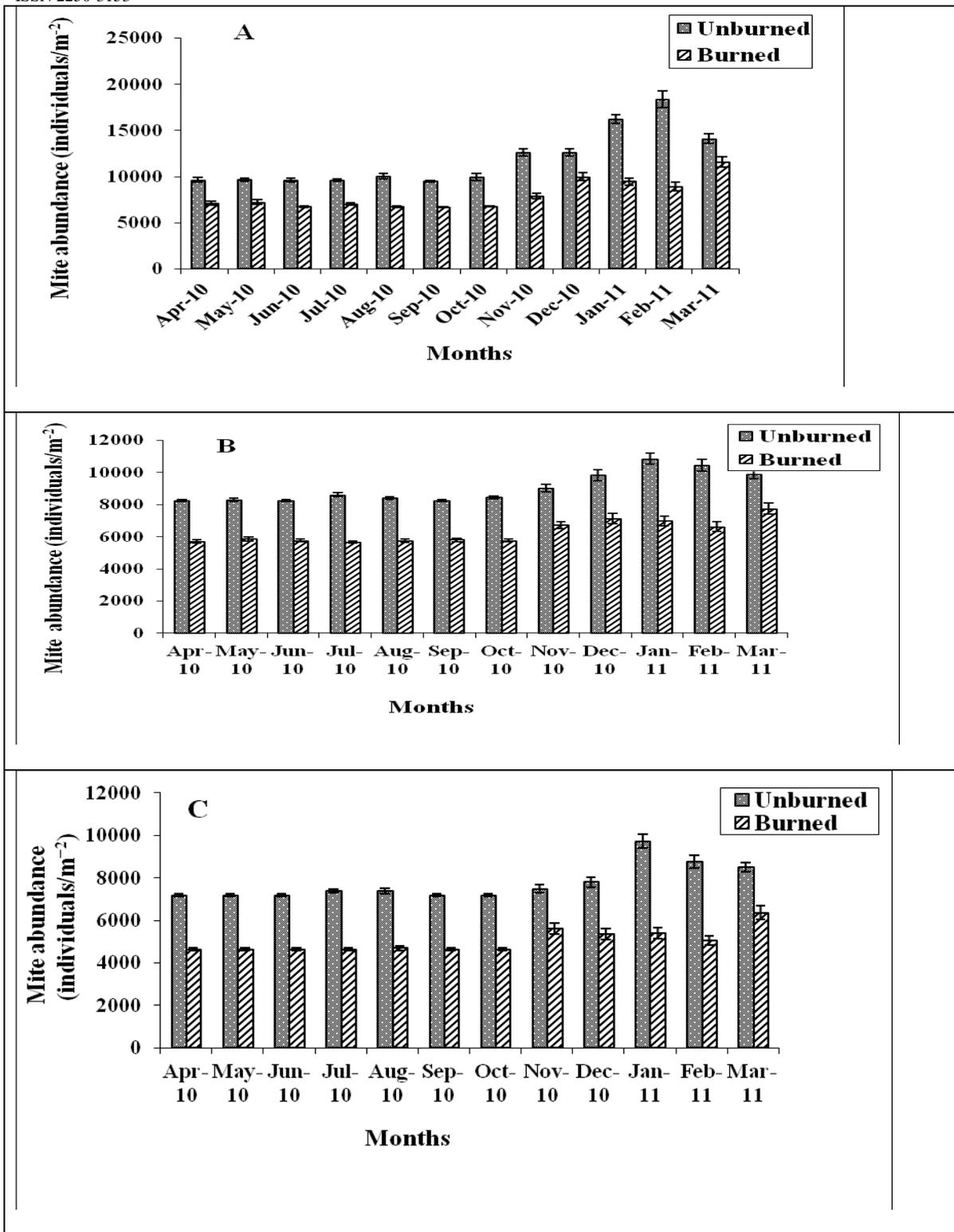


Fig. 1.

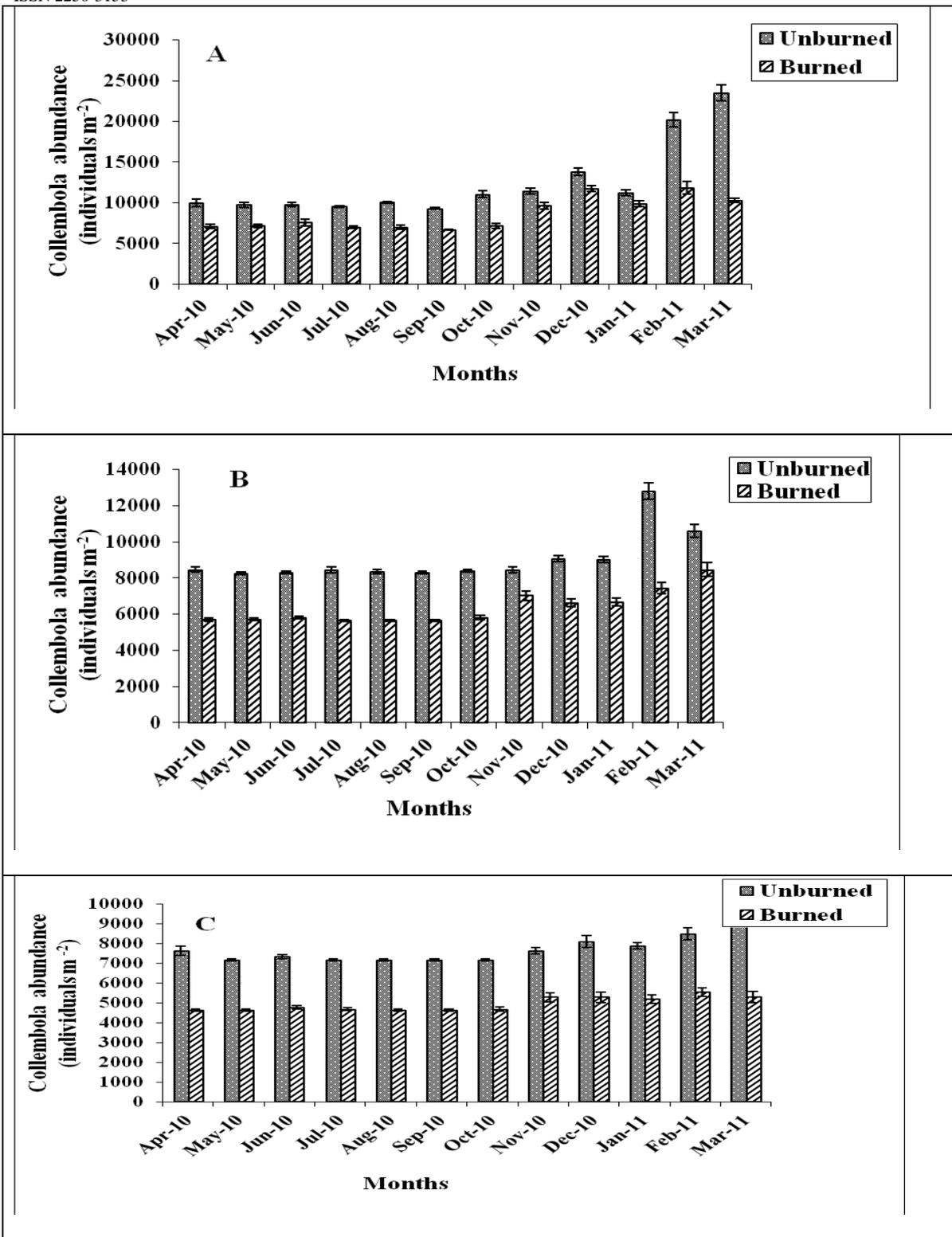


Fig. 2.

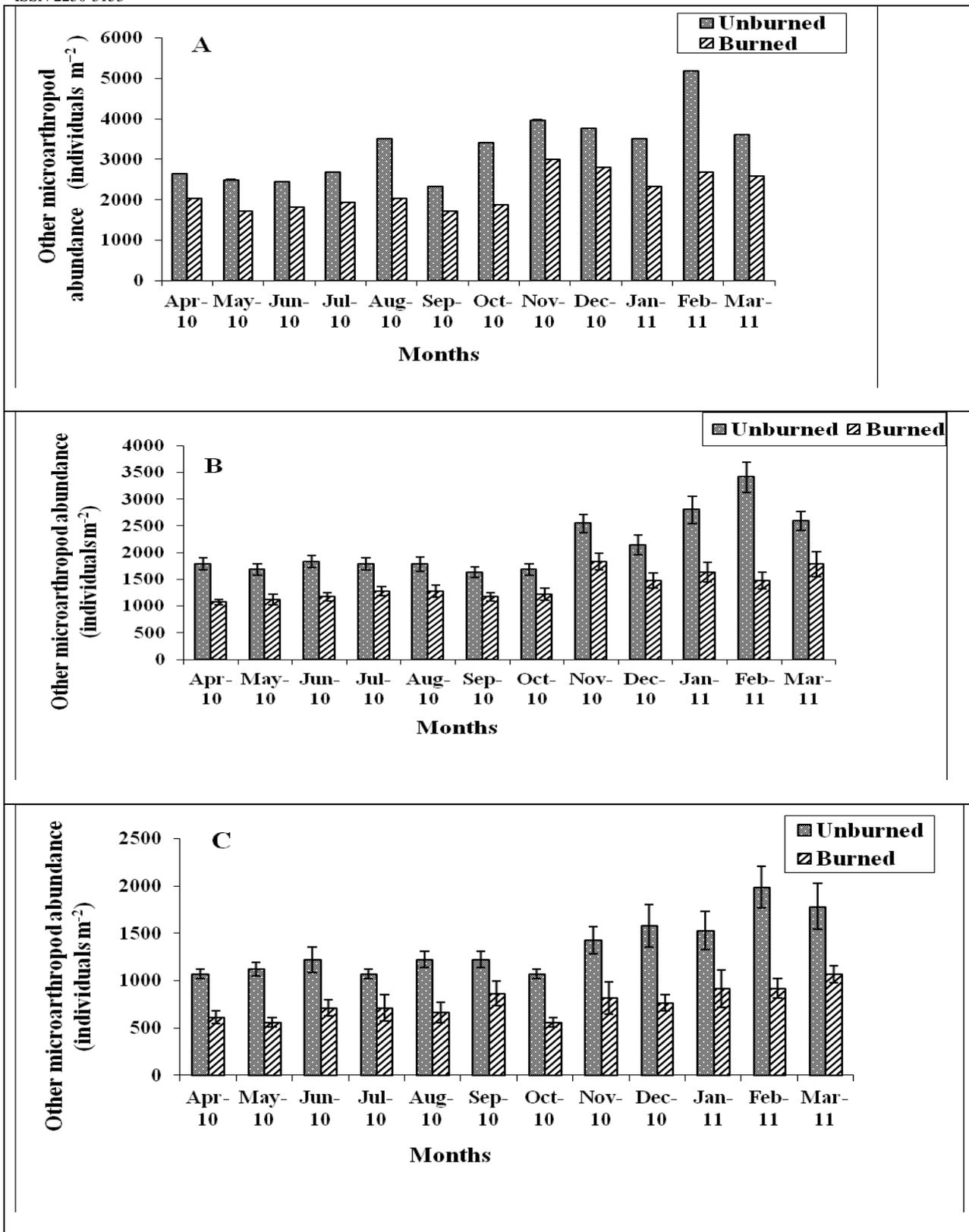


Fig. 3.

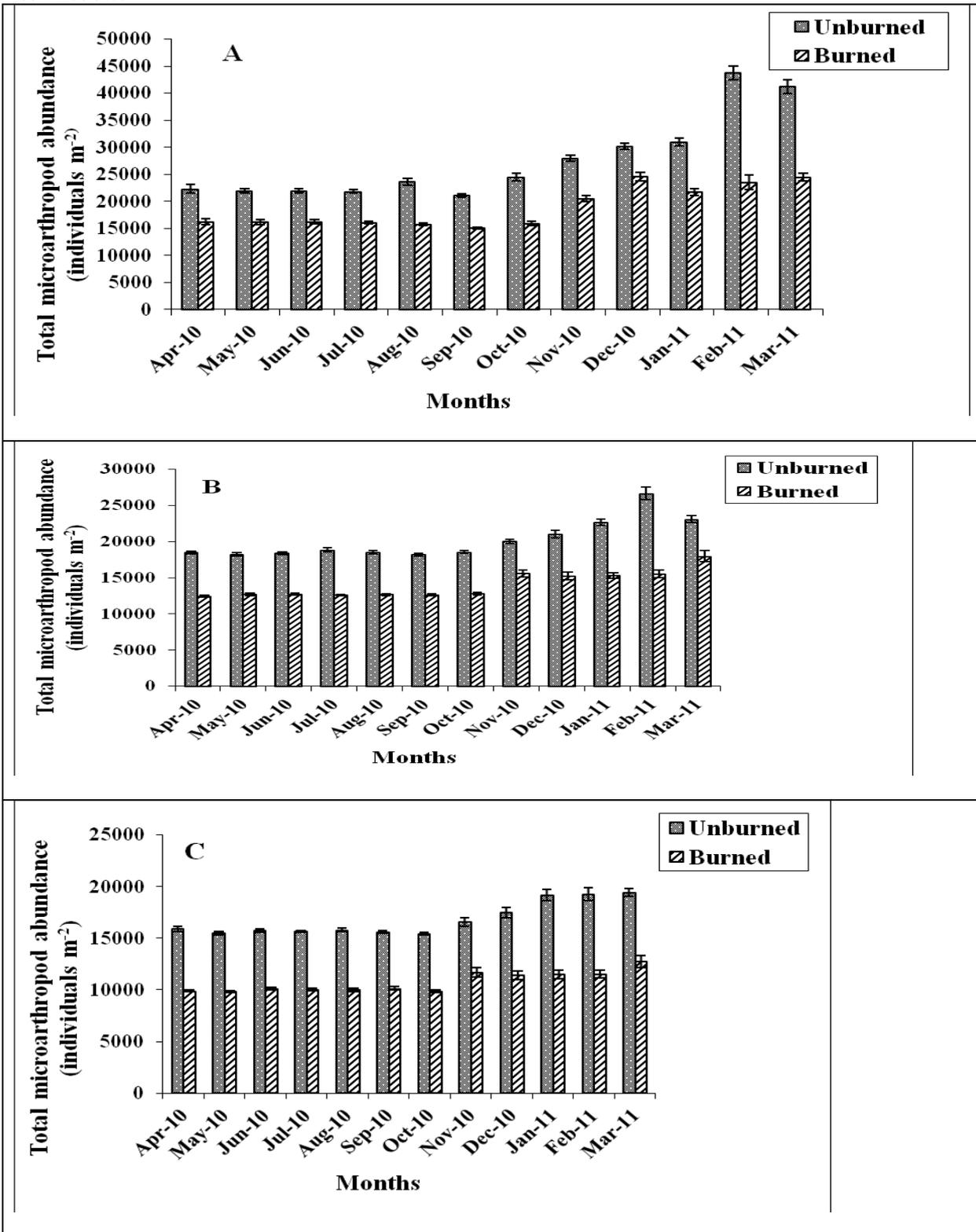


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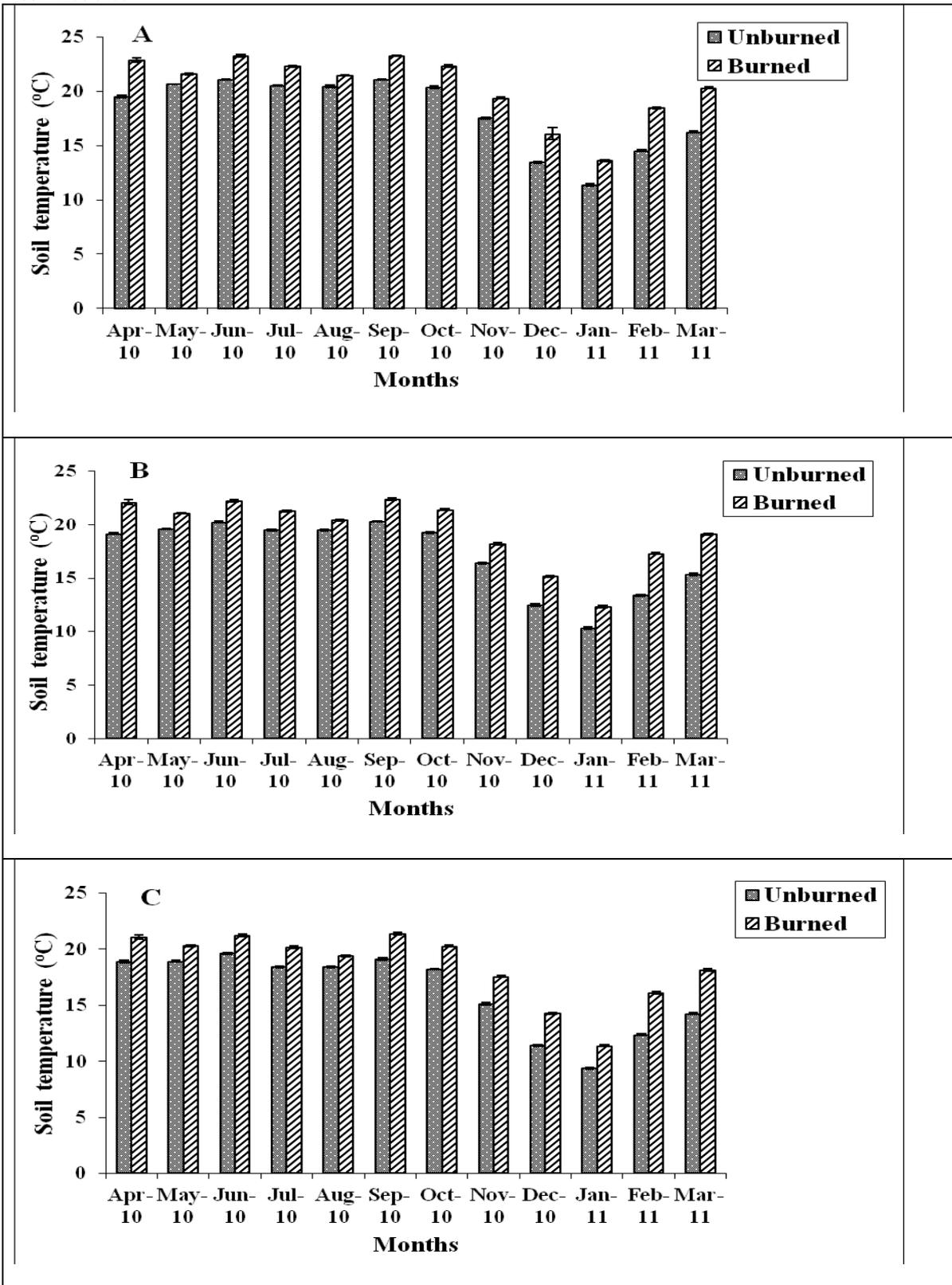


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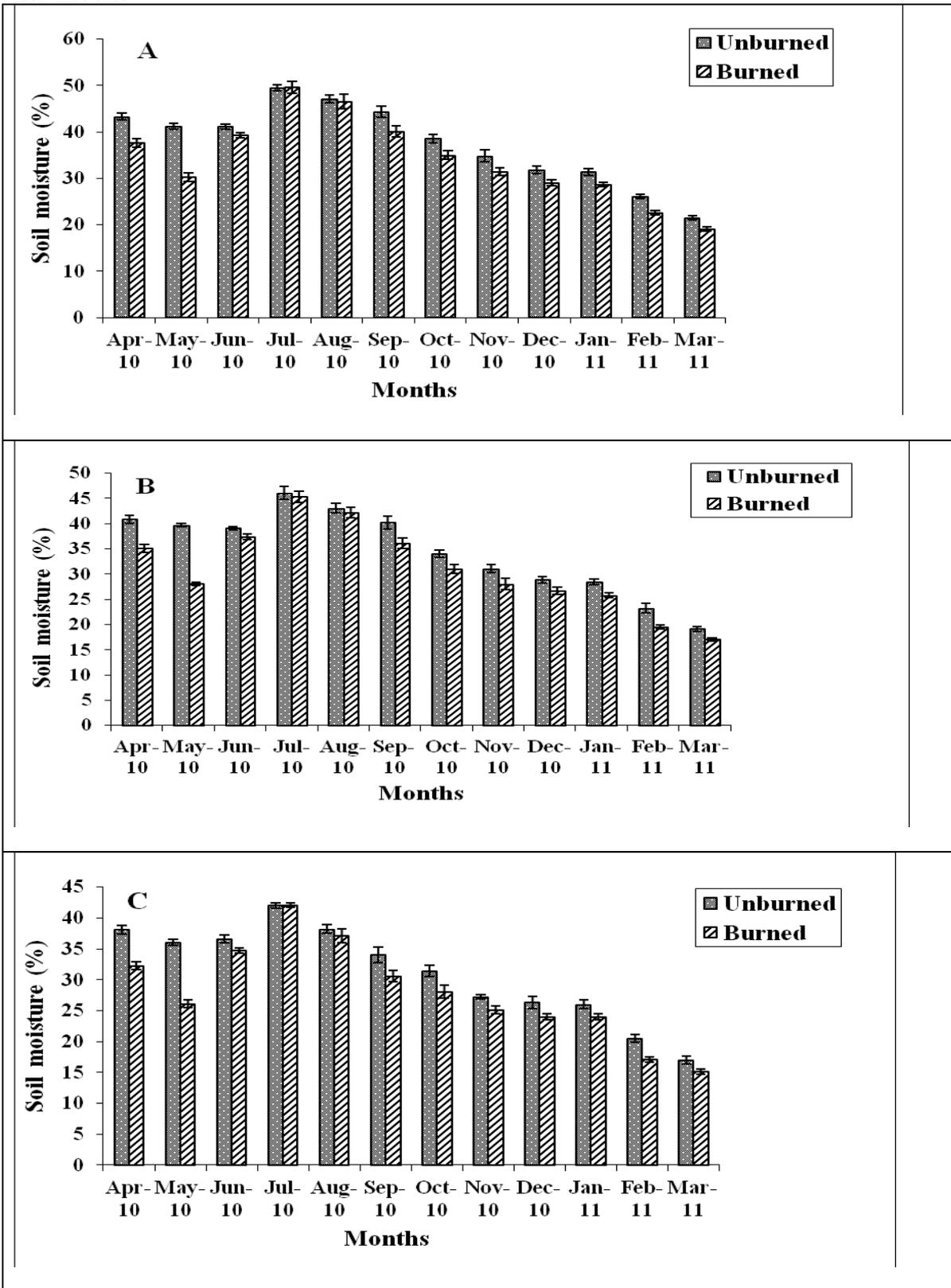


Fig. 6.

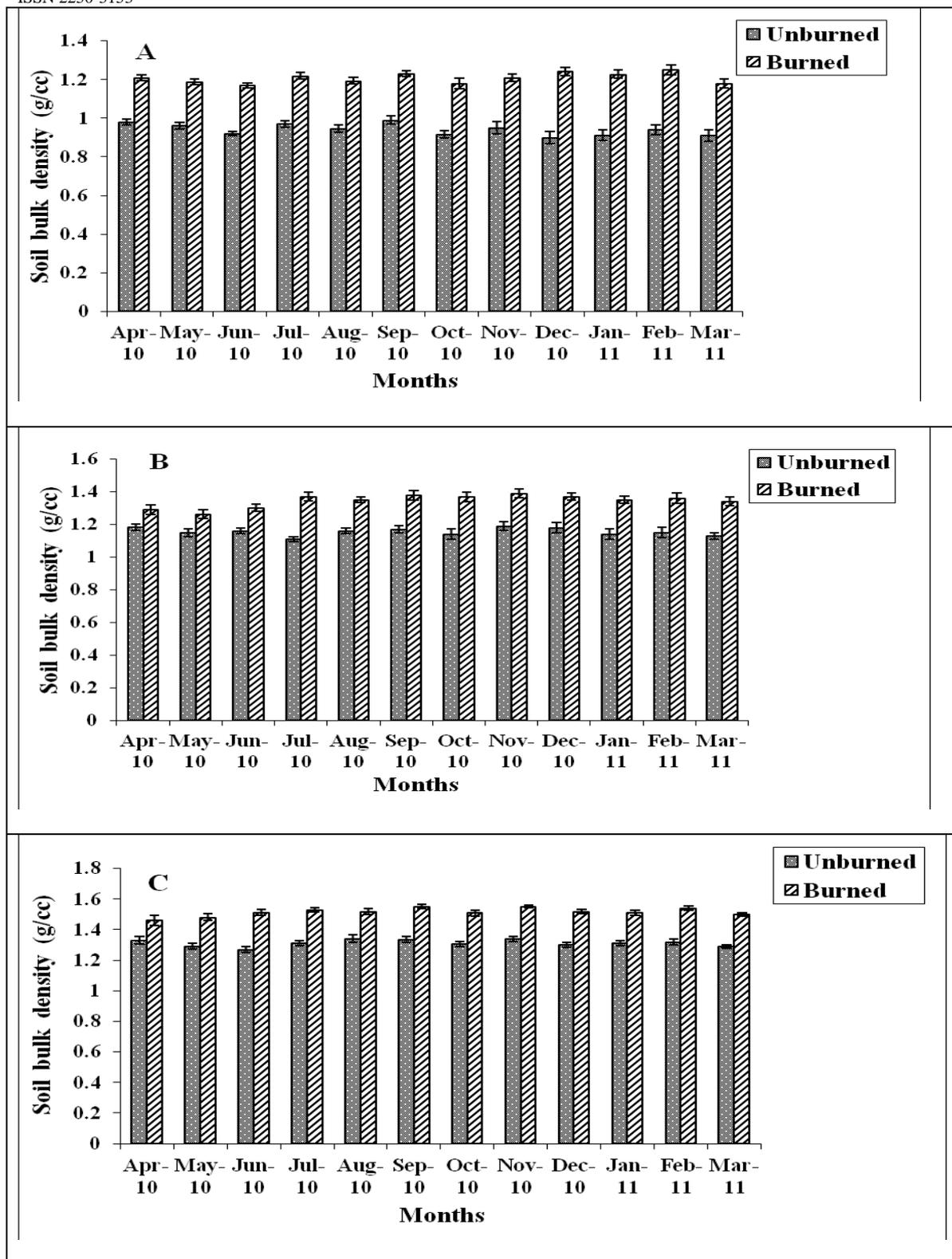


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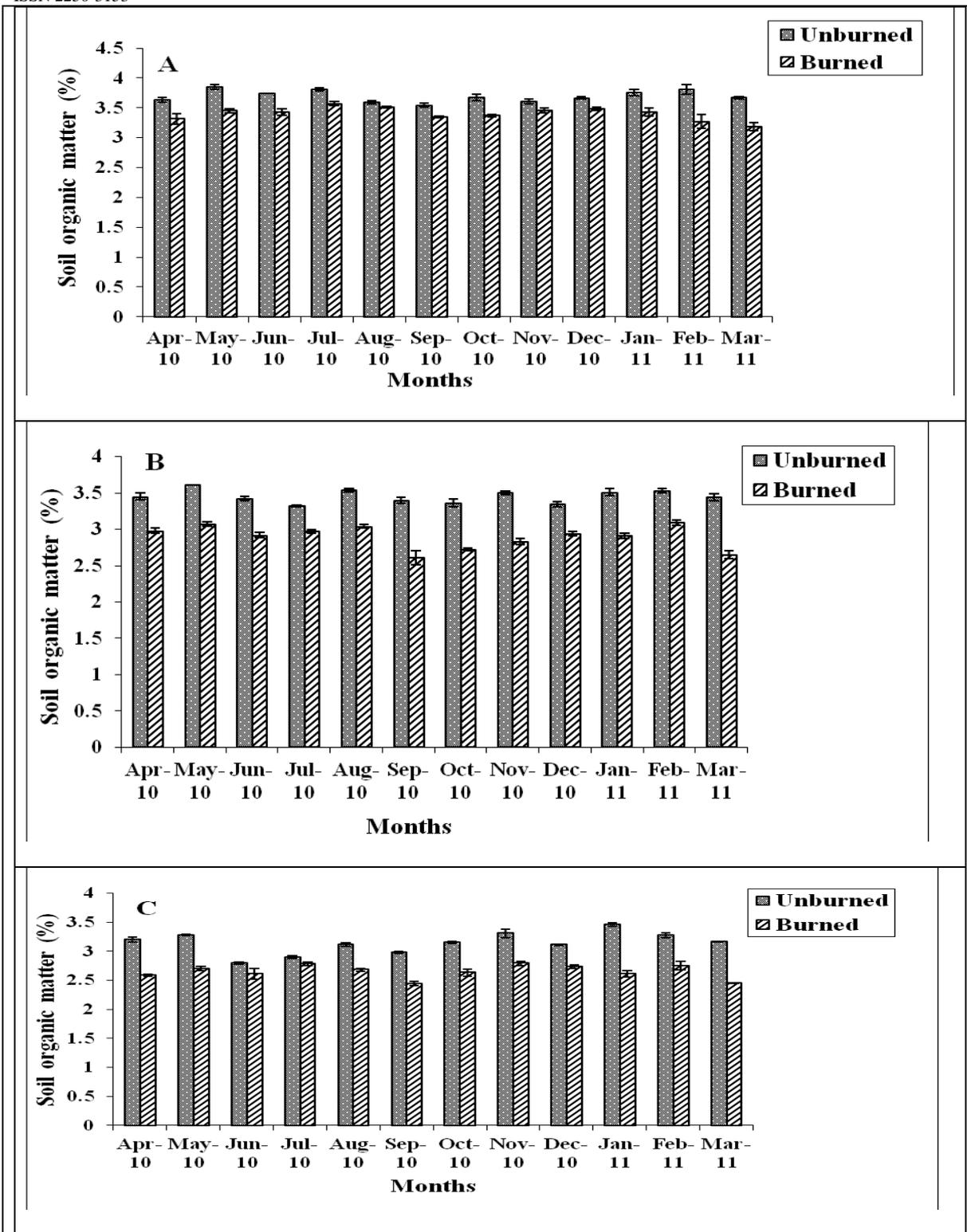


Fig. 8.

Table 1. Results of F tests based on two way ANOVA for Acari, Collembola, Others and total microarthropods at 0-5, 5-10 and 10-15 cm soil layers. Fire effect (F) and sampling date effect (E); *, **, *** statistically significant at $P \leq 0.05, 0.01, 0.001$ respectively.

Microarthropods	0-5 cm		5-10 cm		10-15 cm	
	F	E	F	E	F	E
Acari	37.02***	3.95*	300.48***	8.31***	202.14***	3.48*
Collembola	15.08**	3.22*	103.22***	5.32**	541.50***	5.38**
Others	47.44***	4.99**	40.02***	3.50*	106.51***	4.91**
Total	40.27***	5.51**	161.61***	6.28**	567.20***	8.17***

Table 2. Results of F tests based on two way ANOVA for soil environmental measures (Soil temperature, moisture, bulk density & soil organic matter) at 0-5, 5-10 and 10-15 cm soil layers. Fire effect (F) and sampling date effect (E); *, **, *** statistically significant at $P \leq 0.05, 0.01, 0.001$ respectively.

Soil measures		0-5 cm		5-10 cm		10-15 cm	
		F	E	F	E	F	E
Temperature	(°C)	64.82***	39.84***	79.19***	54.36***	80.89***	57.60***
Moisture	(%)	17.97**	38.45***	16.65**	32.40***	16.92**	34.53***
Bulk density	(g/cc)	636.86***	1.36	202.72***	0.98	607.55***	1.98
Organic matter	(%)	54.09***	1.28	185.66***	2.32	73.59***	1.33

FIGURE LEGENDS

Fig. 1. Mite abundance at 0-5 (A), 5-10 (B) and 10-15 cm (C) soil layers. Data show mean \pm SE (n=10).

Fig. 2. Collembola abundance at 0-5 (A), 5-10 (B) and 10-15 cm (C) soil layers. Data show mean \pm SE (n=10).

Fig. 3. Abundance of other soil microarthropods at 0-5 (A), 5-10 (B) and 10-15 cm (C) soil layers. Data show mean \pm SE (n=10).

Fig. 4. Abundance of total soil microarthropods (individuals m^{-2}) at 0-5 (A), 5-10 (B) and 10-15 cm (C) soil layers. Data show mean \pm SE (n=10).

Fig. 5. Soil temperature (°C) at 0-5 (A), 5-10 (B) and 10-15 cm (C) soil layers. Data show mean \pm SE (n=10).

Fig. 6. Soil moisture (%) at 0-5 (A), 5-10 (B) and 10-15 cm (C) soil layers. Data show mean \pm SE (n=10).

Fig. 7. Soil bulk density (g/cc) at 0-5 (**A**), 5-10 (**B**) and 10-15 cm (**C**) soil layers. Data show mean \pm SE (n=10).

Fig. 8. Soil organic matter (%) at 0-5 (**A**), 5-10 (**B**) and 10-15 cm (**C**) soil layers. Data show mean \pm SE (n=5).

Stress Levels Among the Senior High School Students in Practical Research 2

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Abstract

Stress is something that causes anxiety or depression, it comes from schooling, church, or even at home. It is the reaction of one's body and mind to something that causes a change in the balance. Although senior high school students may encounter common stressors in secondary level, perceptions of what are considered as academic stressors may differ.

The study is entitled; "Stress Levels of Senior High School Students in Practical Research 2." This study was in a quantitative design. This study aimed to know the level of stress experienced by senior high school students in Practical Research 2. For the purpose of the study, all grade-12 students in Jagobiao National High School are required to answer the questionnaires in rating scale form.

Results indicates that causes of these stress levels is correlated with the three categories the researchers created— gender, strand and economic status of students. It can be inferred that there is a significant association of stress levels between gender and the content of students. It was also found that there is no significant association of stress levels between gender and the skills and attitude of students. Moreover, there is no significant association of stress when students are categorized according to strand by content, skills/performance and attitude. Lastly, with regards to economic status, content and attitude was found to be significant among students. However, skills has no significant association with economic status of students.

Confounding factors, such as sample size, are addressed. Suggestions for the future research are provided.

Index Terms- *Stress, Stress Level, Gender, Strand, Economic Status*

I. INTRODUCTION

Stress is something that causes anxiety or depression, it comes from schooling, church, or even at home. Porwal & Kumar (2014) stated that there are lot of stress related to studies, home works, test and other academic competitions. The students also faces a lot of stress due to imbalance of academic, social performances and time management for extra-curricular activities from education. Academic stress in the students who are unable to maintain balance between their academic activities, social, emotion and family. [133].

Stress is the reaction of one's body and mind to something that causes a change in the balance. The level of difficulties inherent in the coursework and exams may present different stress levels to the students. (Rafidah, Azizah, Norzaidi, Chong, Salwani & Noraini, 2009, 37). Stress is a common aspect of many different emotions like anxiety, frustration, anger, worry, fear, sadness and despair. Some reasons for stress during adolescence are because of disturbed family dynamics, peer pressure, inability to cope with studies, drug abuse and lack of competence. (Ghatol, 2017, 38). Stress is also highly correlated with social and financial stress. (Pariat, Rynjah, Joplin, & Kharjana, n.d., 40). It is a result of a wide range of issues, including test and exam burden, a demanding course, a different educational system, and thinking about future plans upon graduation. (Ramli, Alavi, Mehrihnezhad, & Ahmadi, 2018, 1). Stress can really change an individual feelings or emotions. (MyersDG, 2005, 86). Shastri (2016) explained that some individuals are more sensitive or prone to some stressor than others, stress is caused by environmental and internal demands that need to be adjusted continuously. [72].

Stresses can cause an individual to become stressful, feel distress and emotional while on the other hand, stresses gives motivation and evoke an individual to be more upholding and persistence in the study in order to reach the optimum target and achieve further success. (Singh, Sharma, & Sharma, 2011, 152-153).

Although senior high school students may encounter common stressors in secondary level, perceptions of what are considered as academic stressors may differ. As such, the purpose of this study is to determine the stress levels of the Senior High School Students particularly the Grade 12 students of Jagobiao National High School. Thus, this study needs to embark.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Stress is normal in one's life, everybody experiences stress. It may come from different situations that causes one feel frustrated, angry or anxious. Stress could be positive as well as negative. When an individual is doing his/her work properly and systematically then it is because of positive stress or eustress but when one lose rhythm for same work, it is negative stress or distress. So, stress is good in one way and bad in other way. (Khan, Lanin, & Ahmad, 2015, 166). Stress level can be high or low. Having a low stress level can be good. Stress motivate and help one to become productive. However, experiencing or responding too much stress can be harmful so that, it may have a negative effect on the functioning mind and learnings of students. It can also affect student's grades, health and personal adjustment. (Akande, Olowonirejuano & Okwara-Kalu, 2014, 24).

Stress, anxiety, depression are commonly found among the students in present days (Wani, Sankar, Rakshantha, Nivatha, Sowparnika, & Marak, 2016, 51). Academic stress, social stress, emotional stress and financial stress are some of the common stresses that are experienced by students. (Pariat, Rynjah, Joplin, & Kharjana, n.d., 42-43.) According to Porwal and Kumar (2014), some sources of student's stress are their academics, family, friends, and other social performances that was not able to be managed and well treated while handling it. Hence, Academic stress adversely affects overall adjustment of students. [136]. (Hussain, Kumar & Husain, 2008, 72). There are stressors among students like difficulty in understanding subject that have been learnt, too much homework, and school schedules was too packed. (Shahmohammadi, 2011, 395). Participation in a particularly academically demanding curriculum is associated with increased perceptions of stress in fact, the manner in which students cope with stress appears to be related to their emotional well-being. (Suldo, Shaunessy & Hardesty, 2008, 288). Stress occurs when aspects of the environment overwhelm an individual, when too much is expected from and individual cannot meet their expectations. (Wani, Sankar, Rakshantha, Nivatha, Sowparnika & Marak, 2016, 48).

Delayed academic stress decreases students' academic performance it hinders his ability to study efficiently and better time management. (Khan & Kausar, 2013, 149). In general, the components of academics are curriculum and instruction, teamwork and placement, and among these aspects curriculum and instruction aspects were found to be largely responsible. (Nandamuni & Ch, n.d, 39-40).

There are stages of stress that was identified. The first stage is an alarm stage or an awareness that stressors exist, resistance stage or second stage is to shoulder the stress and use coping strategies, the third stage or the exhaustion stage or better known as burnout or breakdown stage. (Robinson, 1989, 78).

According to Khan (2013), stress affects some areas like students' performance, gender, age and educational level.

Student performance shows that the less the students have their course period but are required to accomplish many modules, leads them to stress. The higher the stress, the lower the academic achievement of the students. Talib and Zia-ur-Rehman (2012), implies that the higher the stress perceived by the students, the lower is their performance. High and low academic performance differed significantly on educational, miscellaneous and overall sources of stress. (Shastri, 2016, 79).

Stress can vary in gender. It depends whether the student is a male or female. Stress is much higher in female students compared to male students. Females are more likely to experience a high level of stress due to their nature of being emotional than males. (Akande, Olowonirejuano & Okwara-Kalu, 2014, 35). Gender may be associated with stress burnout. (Antoniou, Polychroni, & Vlachakis, 2006, 688). In contrary in a higher stress level due to the high expectation of their parents of the students, and male perceived higher academic stress from conflict whereas women displayed greater behavioural and psychological reaction to stress. Hence, the expectation from parents are more among boys than girls. (Pormal & Kumar 2014). Women reportedly higher levels of psychological distress than men. (Nerdrum, Rustoen, & Ronnestad, 2006, 95).

Another is age, one of the basis of how much stress is being perceived by the students. Academic stress in higher younger students than older students for younger students are not much oriented on managing their own stress. Effects of age on performance were stronger than those of either gender or stress. (Matthews, 1999, 1009).

Stress depends on the level of education of students. It is higher in junior students than senior students because they are less-experienced and has a low-level of maturity. Stress can also affect ones degree, for instance medical students are much in risk, depression and anxiety due to perceived stress by students which could be high or low. Generally, stress is rigid for it can decrease student's performance can hinder the students' ability to study efficiently and better time management which may differ on its intensity: high moderate and low.

Learner's improvement of academic performance is one of the main objectives of educational centers, because academic performance is essential for success and progress. Different factors such as individuals learning styles and studying skills can influence academic performance. (Mashayekhi, Rafati, Mashayekhi, Rafati, Mohamadisardoo & Yahaghi 2014, 182). According to Bayram and Bilgel (2007), students who were satisfied with their education had lower depression, anxiety and stress scores than those who were not satisfied. Stress arises when there are burden on the person which exceed his available assets. (Khan & Kausar, 2013, 146). Majority of students' perceived education as more stressful. (Shastri, 2016, 71). When stress affects the brain, with its many nerve connections, the rest of the body feels the impact as well. So it stands the reason that the body feels better, so does the mind. (Kumar & Bhukar, 2013, 10). Students with high and moderate stress performs better than the students having less stress.

On the contrary stress does not always correlate with academic achievement negatively and stress and academic achievement are not mediated by gender. (Kumari & Gartia, 2012). However, stress manifests itself in one of three ways in terms of attitude, physical well-being, and performance. (Robinson, 1989, 79). There is no significant effects found between relationship of stress and performance, this implies that regardless of stress level, students can still achieve academic excellence. (Gbettor, Atatsi, Danku, & Suglo, 2015, 90). In fact, Shastri and N (2016) were emphasizing that stress is correlated to academic achievement. Gunuc (2014)

stated that cognitive, emotional and behavioural engagements had a strong relationship with academic achievement, and it is important to increase students' cognitive and behavioural engagements. [226]. Ghatol (2017) explained that a supportive and stimulating atmosphere is very necessary for the student to progress in their academic life and for reaching their aim or goal. [38]. The amount of stress experienced by the students are desirable in attaining good academic results, it is equally important to identify what constitute good and bad stress and how good stress can be enhanced and bad stress can be eliminated. (Rafidah, Azizah, Norzaidi, Chong, Salwani & Noraini, 2009,46). Students should recognize the various symptoms associated with stress and know how to alleviate them. (Keady, 1999, 50).

III. WRITE DOWN YOUR STUDIES AND FINDINGS

This chapter presents the findings, analysis, discussion and interpretation of data gathered wherein the objective is to know the stress levels of Senior High School students of Jagobiao National High School in the course of Practical Research 2.

Table 1. Stress Level of students in terms of content according to gender

I. CONTENT	MALE		FEMALE	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I need time to think or understand on how to make the introduction of our research study.	3.34	Very High	3.53	Very High
2. I do not feel that I really understand what my teacher is trying to explain.	2.38	Average	2.59	High
3. I am afraid to ask questions.	2.46	Average	2.92	High
4. I am having a hard time in making a review of related literature.	3.05	High	3.12	High
5. I think I cannot attain my academic goals.	2.59	High	2.49	Average
OVER-ALL MEAN	2.77	HIGH	2.93	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows the weighted mean of the stress level of grade 12 students according to gender, male and female. In terms of **content**, the statement "I need time to think or understand on how to make the introduction of our research study" has the highest weighted mean of 3.34 and 3.53, interpreted as very high. This indicates that both male and female students is experiencing high level of stress in thinking or understanding how to make an introduction of a research study. For males, the statement "I do not feel that I really understand what my teacher is trying to explain" has the lowest weighted mean of 2.38 which is interpreted as average. This implies that students is experiencing an average level of stress in understanding what their Practical Research teacher is explaining. On the other side, the statement "I think I cannot attain my academic goals" has the lowest weighted mean of 2.49 interpreted as average for females also suggests that female students are experiencing an average level of stress in thinking that they cannot attain their academic goals. The overall weighted mean for both gender is 2.71 for male and 2.93 female which signifies that the level of stress in both male and female is high under content.

Table 2. Stress Level of students in terms of skills/performance according to gender

II. SKILLS/PERFORMANCE	MALE		FEMALE	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I do not seem to have enough time to do my assignments and other written outputs that needs to be done.	2.46	Average	2.82	High
2. I can read books, journals or other academic materials for more than an hour and not remember anything I had read.	2.39	Average	2.46	Average
3. I am unable to perform tasks well, as well as I used to, my judgment is clouded or not as good as it was.	2.69	High	2.55	High
4. I have to bring works at home.	2.54	High	3.06	High
5. I am not that literate enough to use computer for academic purposes like printing and encoding.	2.21	Average	2.38	Average
OVER-ALL MEAN	2.46	AVERAGE	2.65	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows the weighted mean of the stress level of grade 12 students according to gender in terms of **skills/performance**, in which females got the highest weighted mean in the statement “I do not seem to have enough time to do my assignments and other written outputs that needs to be done” which is 2.82 that falls under high. This suggest that female students are experiencing high level of stress and have a high difficulty in managing their time in doing the assignments or outputs that needs to be done. The statement “I am unable to perform tasks well, as well as I used to, my judgment is clouded or not as good as it was” has the highest weighted mean of 2.69 in males, which is interpreted as high, this suggest that male students are experiencing high level of stress in performing their tasks well. Lastly the statement “I am not that literate enough to use computer for academic purposes like printing and encoding” has the lowest weighted mean of 2.21 for male and 2.38 for female which are interpreted as average, for both males and females respectively, this suggest that both gender is experiencing an average level of stress in taking being illiterate in computer like printing and encoding for academic purposes negatively. The overall weighted mean for male is 2.46 which is interpreted as average, which indicates that male students take skills/performance in their levels of stress averagely. On one hand, female students got an overall weighted mean of 2.65 which is interpreted as high and also implies that female students take skills/performance in their levels of stress as high.

Table 3. Stress Level of students in terms of attitude according to gender

III. ATTITUDE	MALE		FEMALE	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I am always late for classes.	3.21	High	2.78	High
2. I agree to do things I don't really want to do.	2.68	High	2.48	Average
3. I find that I don't have time for many interests in our course.	2.54	High	2.64	High
4. I underestimate how long it takes to do things.	2.51	High	2.48	Average
5. I frequently have guilty feelings if I relax and do nothing.	2.29	Average	2.38	Average
6. I have a strong sense of commitment.	2.27	Average	2.39	Average
OVER-ALL MEAN	2.58	HIGH	2.53	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows the weighted mean of the stress level of grade 12 students according to gender in terms of **attitude**, both gender got high as an interpretation of the weighted mean 3.21 for male and 2.78 for female in the statement “I am always late for classes.” It can be inferred that both male and female students admit that they are always late in class and this causes high level of stress in terms of their attitude. Male students got the highest weighted mean for the second statement “I agree to do things I don't really want to do” which is 2.68 and is interpreted as high, which suggest that male students agree to do the things they don't really want to do that causes high levels of stress for them. The third statement “I find that I don't have time for many interests in our course” got the same interpretation for both gender which is high, 2.54 for male and 2.64 for female students this suggest that both gender don't have time for many interests in their course that would lead them in having high level of stress. The statement “I have a strong sense of commitment”, got the same interpretation for both gender, 2.27 for male and 2.39 for female students which is interpreted as average which suggest that both gender take having a strong sense of commitment averagely. The overall weighted mean for both male and female students got the same interpretation which is 2.58 for male and 2.53 for female students respectively which is interpreted as high, this implies that both gender are experiencing high level of stress under the category of attitude.

Table 4. Result of Chi-Square

GENDER	X ²	X ² _{critical value}	Decision
CONTENT	5.46	3.84	Significant
SKILLS	0.76	3.84	Not Significant
ATTITUDE	0.75	3.84	Not Significant

Table 4 shows the result of chi-square of the different categories above with regards to gender. For the three categories namely: content, skills, attitude, the x^2_{comp} (5.46, 0.76, 0.75) respectively. The computed value of x^2 in the categories of skills and attitude are lower than x_{crit} (3.84) these values failed to reject the null hypothesis and the computed value of x^2 under the category of content is higher than the x_{crit} (3.84) this value succeeded to reject the null hypothesis.

It can be inferred that there is a significant association of stress levels between gender and the content of students. It can also be noticed that there is no significant association of stress levels between gender and the skills and attitude of students. In similar to the

findings of Azila-Gbettor, Atatsi, Danku, and Soglo (2015), the causal factors for stress categories have been mixed and the level of stress was found to be not significant between stress and skills/performance.

Table 5. Stress Level of students in terms of content according to strand

I. CONTENT	ABM		GAS		HUMSS	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I need time to think or understand on how to make the introduction of our research study.	2.89	High	3.19	Very High	3.51	Very High
2. I do not feel that I really understand what my teacher is trying to explain.	2.58	High	2.56	High	2.46	Average
3. I am afraid to ask questions.	2.34	Average	2.73	High	2.52	Very High
4. I am having a hard time in making a review of related literature.	2.40	Average	3.09	High	2.94	Very High
5. I think I cannot attain my academic goals.	2.79	High	2.61	High	2.45	Average
OVER-ALL MEAN	2.60	HIGH	2.84	HIGH	2.77	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows the weighted mean of the stress level of grade 12 students according to strand. In terms of **content**, the statement “I need time to think or understand on how to make the introduction of our research study” both strands of Humanities and Social Sciences (HUMSS) and General Academic Strand (GAS) got the highest weighted mean of 3.19 and 3.51 respectively. This suggest that the students under these strands have a very high level of stress in understanding or thinking how to make an introduction on their research study, while on the other hand the Accountancy Business and Management (ABM) strand got a weighted mean of 2.89 which is interpreted as high, which suggest that the students under this strand is experiencing a high level of stress in understanding or thinking how to make an introduction in their research study. Both ABM and GAS got the same interpretation in second statement “I do not feel that I really understand what my teacher is trying to explain” 2.58 for ABM and 2.56 for GAS which is interpreted as high. This indicates that the students under these strands are having high level of stress in understanding what their teacher is trying to explain. Likewise, the statement “I think I cannot attain my academic goals” both GAS (2.61) and ABM (2.79) strands got the same interpretation which is high, which also suggest that the students under these strands are experiencing stress in thinking that they cannot attain their academic goal. It was shown in the table that the overall weighted mean in terms of content is 2.60 in Accountancy, Business, and Management (ABM); 2.84 in General Academic Strand (GAS); and 2.77 in Humanities and Social Sciences (HUMSS) this signifies that all strands has a high level of stress in terms of content in Practical Research 2.

Table 6. Stress Level of students in terms of skills/performance according to strand

II. SKILLS/ PERFORMANCE	ABM		GAS		HUMSS	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I do not seem to have enough time to do my assignments and other written outputs that needs to be done.	2.76	High	2.61	High	2.57	High
2. I can read books, journals or other academic materials for more than an hour and not remember anything I had read.	2.16	Average	2.62	High	2.51	High
3. I am unable to perform tasks well, as well as I used to, my judgment is clouded or not as good as it was.	2.85	High	2.45	Average	2.55	High
4. I have to bring works at home.	2.67	High	3.02	High	2.71	High
5. I am not that literate enough to use computer for academic purposes like printing and encoding.	2.19	Average	2.29	Average	2.41	Average
OVER-ALL MEAN	2.52	HIGH	2.60	HIGH	2.55	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows that the three strands got the same interpretation under the first statement “I do not seem to have enough time to do my assignments and other written outputs that needs to be done”, 2.76 for ABM, 2.61 for GAS and 2.57 for HUMSS and these weighted mean are interpreted as high, which suggest that the students under these strands are experiencing high level of stress in not having enough time to do their assignments and other written outputs. The statement “I am unable to perform tasks well, as well as I used to, my judgment is clouded or not as good as it was” has the highest weighted mean of 2.85 in the strand of Accountancy, Business, and Management (ABM) which is interpreted as high which implies that the students under this strand are experiencing high level of stress in performing their task well. The statement “I have to bring works at home” has the highest weighted mean of 3.02 in General Academic Strand (GAS) and 2.71 in Humanities and Social Sciences (HUMSS) where both of them are interpreted as high this also implies that the students under these strands are having high level of stress caused by bringing works at home. Meanwhile, the statement “I can read books, journals or other academic materials for more than an hour and not remember anything I had read” has the lowest weighted mean of 2.16 in the strand of Accountancy, Business, and Management (ABM) which is interpreted as average which suggest that the students under this strand is experiencing average difficulty in not remembering anything that they had read. Furthermore, the statement “I am not that literate enough to use computer for academic purposes like printing and encoding” in the strand of General Academic Strand (GAS) and Humanities and Social Sciences (HUMSS) has respectively the lowest weighted mean of 2.32 interpreted as high and 2.41 as average which implies that the students under the academic strand of GAS are experiencing high level of stress in being illiterate in using computer for academic purposes and the students under HUMSS are experiencing average level of stress in being illiterate in using computer for academic purposes. In terms of skills and performance, it was shown in the table that all the strand has a high level of stress based on their overall weighted mean of 2.53 (ABM), 2.60 (GAS), 2.55 (HUMSS), in totality this implies that the students under these strands are experiencing high level of stress in terms of skills/performance.

Table 7. Stress Level of students in terms of attitude according to strand

III. ATTITUDE	ABM		GAS		HUMSS	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I am always late for classes.	2.89	High	3.06	Very High	3.04	High
2. I agree to do things I don't really want to do.	2.58	High	2.57	High	2.59	High
3. I find that I don't have time for many interests in our course.	2.34	Average	2.85	High	2.58	High
4. I underestimate how long it takes to do things.	2.40	Average	2.58	High	2.49	Average
5. I frequently have guilty feelings if I relax and do nothing.	2.79	High	2.09	Average	2.13	Average
6. I have a strong sense of commitment.	2.58	High	2.15	Average	2.27	Average
OVER-ALL MEAN	2.60	AVERAGE	2.55	AVERAGE	2.52	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows that General Academic Strand (GAS) got the highest computed weighted mean of 3.06 and is interpreted as very high among the two other strands in the statement “I am always late for classes” which suggest that the students under this strand is having high level of stress caused by always being late for classes. Among the three strands GAS got the highest weighted mean in the statement “I underestimate how long it takes to do things” with a mean of 2.49 which falls under the interpretation of high which suggest that the students under this strand is experiencing high level of stress by underestimating how long it takes to do things. The statement “I frequently have guilty feelings if I relax and do nothing” got a highest computed weighted mean of 2.79 and is interpreted as high in Accountancy, Business and Management (ABM) strand, which implies that students under this strand is experiencing high level of stress caused by frequently having guilty feelings of doing nothing. Lastly the last statement “I have a strong sense of commitment” has the highest computed weighted mean of 2.58 and is interpreted as high still in strand of ABM, which suggest that the students under this strand has a strong sense of commitment which might lead them to high level under attitude. The GAS and ABM strand got the same interpretation for the overall weighted mean, 2.60 for ABM and 2.55 for GAS which falls under the interpretation of average, this signifies that these two strands are experiencing average level of stress for all the statement under attitude. On the other hand the strand HUMSS got a weighted mean of 2.52 which suggest that the students under this strand is having high level of stress for all the statement under attitude.

Table 8. Result of Chi-Square

STRAND	X ²	X ² _{critical value}	Decision
CONTENT	1.95	5.99	Not Significant
SKILLS	3.27	5.99	Not Significant
ATTITUDE	1.72	5.99	Not Significant

The table above shows the result of chi-square in different categories with regards to the strand of students. For the content, its $x^2_{comp} = 1.95$; for skills, it has $x^2_{comp} = 3.27$; and for attitude it has $x^2_{comp} = 1.72$. The computed value of x^2 is lesser than its critical value which is 5.99. So, it failed to reject the null hypothesis.

It shows that there is no significant association of stress levels when students are categorized according to strand in terms of content, skills/performance and attitude.

Table 9. Stress Level of students in terms of content according to economic status

I. CONTENT	5000 – 10000		10001 - 15000		15001 – 2000	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I need time to think or understand on how to make the introduction of our research study.	3.42	Very High	3.31	Very High	3.42	Very High
2. I do not feel that I really understand what my teacher is trying to explain.	2.50	High	2.51	High	2.28	Average
3. I am afraid to ask questions.	2.68	High	2.81	High	2.38	Average
4. I am having a hard time in making a review of related literature.	3.09	High	3.15	High	2.87	High
5. I think I cannot attain my academic goals.	2.57	High	2.42	High	2.30	Average
OVER-ALL MEAN	2.85	HIGH	2.84	HIGH	2.65	HIGH

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

The table above shows the result of the weighted mean by economic status. The findings present that the overall weighted mean of all the economic status are as follows: P5000-P10000 is interpreted as low, P10001-P15000 is interpreted as average and P15001-P20000 is interpreted as high. The three indicators of economic status have the same interpretation in the statement “I need time to think or understand on how to make the introduction of a research study” with a computed mean of 3.42 for P5000-P10000, 3.31 for P10001-P15000 and 3.42 for P15001-P20000 which suggest that the students’ who are under each indicators of economic status are experiencing high level of stress due to the factor of their economic status. Also with the statement “I am having a hard time in making a review of related literature” the students under each indicators of economic status have the same interpretation which is high, which implies that economic status is also one factor that causes the students to have a hard time in making a review of related literature and this causes them in experiencing high level of stress. Furthermore, the overall computed weighted mean for the three indicators of economic status have the same interpretation 2.85 for P5000-P10000, 2.84 for P10001-P15000 and 2.65 for P15001-P20000 which are interpreted as high, this signifies that there is a connection between the economic status and the level of stress among the students under the category of content.

Table 10. Stress Level of students in terms of skills/performance according to economic status

II. SKILLS/ PERFORMANCE	5000 - 10000		10001 - 15000		15001 - 2000	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I do not seem to have enough time to do my assignments and other written outputs that needs to be done.	2.63	High	2.71	High	2.42	Average
2. I can read books, journals or other academic materials for more than an hour and not remember anything I had read.	2.37	Average	2.43	Average	2.68	High
3. I am unable to perform tasks well, as well as I used to, my judgment is clouded or not as good as it was.	2.58	High	2.54	High	2.58	High
4. I have to bring works at home.	2.80	High	2.88	High	2.47	Average

5. I am not that literate enough to use computer for academic purposes like printing and encoding.	2.30	Average	2.24	Average	2.18	Average
OVER-ALL MEAN	2.54	HIGH	2.56	HIGH	2.47	Average

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

In terms of skills/performance, the table above presents that the students whose economic status that falls under the indicators of P5000-P10000 (2.54) and P10001-P15000 (2.56) have an interpretation of high which implies that the Grade-12 students under these economic status are experiencing high level of stress in performing their tasks well in school due to their economic status and the indicator P15001-P20000 has a weighted mean of 2.47 and is interpreted as average which suggest that the Grade-12 students under this economic status are experiencing an average level of stress in term of skills/performance.

Table 11. Stress Level of students in terms of attitude according to economic status

III. ATTITUDE	5000 – 10000		10001 - 15000		15001 - 2000	
	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION	WEIGHTED MEAN	INTERPRETATION
1. I am always late for classes.	2.89	High	2.83	High	2.95	High
2. I agree to do things I don't really want to do.	2.56	High	2.47	Average	2.83	High
3. I find that I don't have time for many interests in our course.	2.53	High	2.46	Average	2.95	High
4. I underestimate how long it takes to do things.	2.45	Average	2.47	Average	2.77	High
5. I frequently have guilty feelings if I relax and do nothing.	2.39	Average	2.22	Average	2.75	High
6. I have a strong sense of commitment.	2.40	Average	2.15	Average	3.15	High
OVER-ALL MEAN	2.53	High	2.44	AVERAGE	2.90	High

Legend: Very high (3.26-4.00), High (2.51-3.25), Average (1.76-2.50), Fair (1.00-1.75)

In terms of attitude, the table above presents the overall computed weighted mean for grade 12 students whose economic status that falls under the indicators of P5000-P10000 and P15001-P20000 are interpreted as high which suggest that students under these economic status is experiencing high level of stress in terms of attitude due to their economic status. The indicator P10001-P15000 got a computed mean of 2.44 and is interpreted as average, which implies that students under this economic status are experiencing an average level of stress in terms of attitude.

Table 12. Result of Chi-Square

ECONOMIC STATUS	X ²	X ² _{critical value}	Decision
CONTENT	11.73	5.99	Significant
SKILLS	0.08	5.99	Not Significant
ATTITUDE	7.87	5.99	Significant

The table above shows the result of chi-square in different categories of the course Practical Research 2 with regards to student's economic status. For the content, $x^2_{comp} = 11.73$; for skills, $x^2_{comp} = 0.08$; and for attitude $x^2_{comp} = 7.87$.

It can be inferred that there is a significant association between content and economic status. Since the computed value of x^2 in content (11.73) is greater than its critical value which is 5.99. Therefore, the null hypothesis is accepted. The computed value of x^2 in skills/performance (0.08) is less than its critical value. Therefore, the null hypothesis is rejected, this means that there is no significant association between skills/performance and economic status. It can also be noticed that attitude has a significant association between economic status, since the computed value is greater than its critical value. On one side, the computed value of x^2 attitude under economic status is greater than its critical value which is 5.99 which signifies that there is a significant association of stress levels between students' economic status and the content.

FINDINGS

The study reveals that majority of Grade-12 Senior High School students experience stress at High and Average level of stress in terms of content, skills/performance and attitude. This is in line with the findings of Akande, Olowonirejuaro and Okwara-

Kalu (2014) which indicated that looking at the present situation under which secondary education is taking place one would have expected a higher level of stress among secondary school students in terms of their academic performance.

The more specific objective of the present study was to find out if there is any significant association between the student's stress levels in terms of content, skills/performance and attitude categorized to gender, strand and economic status.

The study also shows that there is a significant association of stress levels between gender and the content of students. This signifies that gender has something to do with the stress levels of senior high school students in Practical Research 2. Furthermore, there is no significant association of stress levels and the skills and attitude of students categorized to gender. With this it can be inferred that gender has nothing to do with the stress levels of students in terms of skills/performance and attitude.

The second objective of the present study is to determine the possible stress factors that the students perceived which may contribute to their stress levels. Some of these factors show substantial percentage of stress that causes the student's to experience average and high level of stress in terms of content and skills/performance according to strand.

The study also reveals that there is no significant association of stress levels when students are categorized according to strand in terms of content, skills/performance and attitude. On one hand, there is a significant association of stress levels between students' economic status and the content and skills, while on the other hand there is no significant association of stress levels between attitude and the economic status of the Grade-12 students.

IV. GET PEER REVIEWED

Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

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VI. CONCLUSION

This study has assessed the stress levels of senior high school students. Based on the results, the content was found to be significant and in contrary, skills and attitude was found to be not significant in accordance to the gender of the students. Meanwhile, in terms of strand, it was found to be insignificant in three categories: content, skills, and attitude. Lastly, in accordance of economic status, it shows that it has a significant association with the content and attitude of the students; then, skills has found to be not significant in association of stress levels of students.

Generally, gender affects the level of stress among students in terms of content. Furthermore, skills and attitude is not affected by the gender of students based on the result of the computation of chi-square. It can also be inferred that whatever strand the students take up, it does not affect its stress levels in content, skills, and attitude in Practical Research 2 subject. Hence, whatever the economic status of the student, it does not affects its skills in Practical Research 2.

APPENDIX

**APPENDIX A
RESEARCH INSTRUMENT-A**

Name: _____

Age: _____

Grade: _____

Strand: _____

Economic Status: (Income of the Family)

P5000-P10000

P10001-P15000

P15001-P20000

Instruction: Rate each question according to your preference.

4-VERY HIGH 3-HIGH 2-AVERAGE 1-FAIR

I. CONTENT	4	3	2	1
1. I need time to think or understand on how to make the introduction of our research study.				
2. I do not feel that I really understand what my teacher is trying to explain.				
3. I am afraid to ask questions.				
4. I am having a hard time in making a review of related literature.				
5. I think I cannot attain my academic goals.				
II. SKILLS/PERFORMANCE	4	3	2	1
1. I do not seem to have enough time to do my assignments and other written outputs that needs to be done.				
2. I can read books, journals or other academic materials for more than an hour and not remember anything I had read.				
3. I am unable to perform tasks well, as well as I used to, my judgment is clouded or not as good as it was.				
4. I have to bring works at home.				
5. I am not that literate enough to use computer for academic purposes like printing and encoding.				
III. ATTITUDE	4	3	2	1
1. I am always late for classes.				
2. I agree to do things I don't really want to do.				
3. I find that I don't have time for many interests in our course.				
4. I underestimate how long it takes to do things.				
5. I frequently have guilty feelings if I relax and do nothing.				
6. I have a strong sense of commitment.				

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Municipal Solid Waste Management in Juba City: A Case Study of Juba city, South Sudan

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Abstract: There are excellent opportunities for Juba city (South Sudan) to provide a wide range of urban services including waste management in the informal settlement, which have a direct positive impact on resident's health, creation of employment, and poverty reduction. This study shows how government involves the community in the solid waste management in order to solve the problem of uncollected waste after the failure of the municipal council to do so. The study examines the performance of the existing solid waste collection and disposal practices, resident's willingness to participate, and identifies problems relating to the solid waste management system of Juba. Methods used in the study are, questionnaires, interviews and observations. It has been found that there is illegal dumping of waste and over 90% of the people participates the questionnaire refuse paying collection fees. The success of people-based solid waste management depends on the participation of the residents and has a great relation with its local economy. The findings from this study could be used in preparing an improved solid waste collection process.

Key words: Government, Municipal solid waste management; Public participation, Questionnaire, Urban service

1. Introduction

Solid wastes are non-liquid wastes that arise from human and animal activities and are discarded as useless or unwanted. These include both organic and inorganic fractions such as kitchen refuse, product packaging, grass clippings, cloth, bottles, paper, paint cans, batteries, etc. Solid waste generated in the municipality, encompasses heterogeneous and homogeneous wastes from urban, peri-urban regions. Municipal solid waste management (MSWM) is associated with the control of waste generation, its storage, collection, transfer and transport, processing and disposal in a manner that is in accordance with the best principles of public health, economics, engineering, conservation, aesthetics, public attitude and other environmental considerations.

There has lots been said and demonstrated about the inadequacies in solid waste management and its associated problems. A research conducted by (Gebriil and al 2010) concluded that population growth, rapid urbanization, and industrialization resulted in

increasing problems of solid wastes in Benghazi City. (Jin, al et al. 2013) reported that the disposal and handling of waste lead to environmental degradation, damage of the ecosystem and pose great risks to public health in Pabna City. The study shows that there is a significant link between the improper management of urban solid wastes and the environmental pollution. In this research, it pointed out that Pabna was facing serious environmental degradation such as land, water, and air pollution and public health risk such as skin disease, asthma, diarrhea, and even skin diseases, etc., due to uncollected disposal of wastes on streets and other public areas, drainage congestion by haphazardly dumped wastes, and contamination of water resources near uncontrolled dumping site. A study by Abel (2007) provided an information base to plan for the equipment required for the collection and transport of waste in a City of Ogbomoso, Nigeria. The study was aimed at making decisions on possibilities for waste reduction through sorting and recycling, and disposal methods. It highlighted a very high proportion, more than three quarters, of organic waste in total waste flows of the city. Saha (2013) reported that the disposal and handling of

waste lead to environmental degradation, damage of the ecosystem and pose great risks to public health in Pabna City. The study shows that there is a significant link between the improper management of urban solid wastes and the environmental pollution.

(Goel 2008) had critically reviewed MSW practices in India and found that the major problem was underestimation of generation rates and, therefore, underestimation of resource requirement, lack of technical and managerial inputs, lack of reliable and updated information, and for this approach to waste management resulting in inefficient utilization of resources. (Chandra and Devi 2009) studied problems and prospects of municipal solid waste in Mysore City. Their findings showed the current system of municipal solid waste management in Mysore City was not adequate as per municipal solid waste (management and handling) rules. (Tadesse and al 2008) analyzed the factors that influence household waste disposal decision making. Results showed that the supply of waste facilities significantly affect waste disposal choice. Inadequate supply of waste containers and longer distance to these containers increases the probability of waste dumping in open areas and roadsides relative to the use of communal containers. In their study, (Bekin and al 2007) noted that in the absence of appropriate institutional structures, it becomes difficult to ensure solid waste reduction at an individual level. They continue to emphasize that waste reduction may only be viable in a community with some control over production and consumption of some items (Bekin and al 2007). This kind of arrangement is bound to give power to the existing structure to operate in a manner within their own choice of means. In Bangladesh, (Hai and Ali 2005) studied the solid waste management system of Dhaka City Corporation (DCC) and found that DCC was not able to offer the desired level of services with the existing capacity and trend of waste management. (Zubrugg and Ahmed 1999) stated that problem areas in developing countries include: (i) inadequate service coverage and operational inefficiencies of services, (ii) limited utilization of recycling activities, and (ii) inadequate landfill disposal. (Vidanaarachchi and al 2006) conducted a study in Sri Lanka on the problems, issues, and challenges of solid waste faced in the country's Southern Province, and they found that only 24% of the households had regular access to waste collection and that in rural areas it was less than 2%. They also found that a substantial number of households in areas without waste

collection expected local authorities to collect their wastes. (Sharholy and al 2008) presented a comprehensive review of the characteristics, generation, collection and transportation, disposal and treatment technologies of municipal solid waste practiced in India. The study is concluded with a few suggestions for the efficient management of such waste such as involvement of public and private sectors through NGOs, increasing the public awareness, proper timing and scheduling for collection of waste from house to house, proper design and placing of collection bins, proper maintenance of transport vehicles for such wastes.

There are also some researchers who had documented how an adequate legal framework contributes positively to the development of the integrated waste management system (Abdelnaser and al 2007), (Asase and al 2009) while the absence of satisfactory policies (Mrayyan and Hamdi 2006) and weak regulations (Seng and al 2010) are detrimental to it. With regard to the pricing for disposal, (scheinberg 2011) noted that there are indications that high rates of recovery are associated with tipping fees at the disposal site. High disposal pricing has the effect of more recovery of waste generated that goes to the value chains or beneficial reuse of waste. Also, (Pokhrel and viraraghavan 2005) mentioned that insufficient financial resources limiting the safe disposal of waste in well-equipped and engineered landfills and absence of legislation are also factors contributed to the pricing for disposal. In addition, (chung and poon 2001) agreed that having a clear structure of charges for waste collection and disposal in place may even work as an incentive for waste reduction.

They believe that there is need to change the approach for waste reduction from the “command-and-control” to the use of economic incentives and “polluter-pays” (chung and poon 2001). This can be a step in involving the public in solid waste management and also forms an impetus for innovative thinking to devise cheaper and more convenient ways of managing solid waste. Another supportive study by (Parrot 2009) discussed the statutory, financial, and physical aspects of MSW management in the City of Yaounde’, the capital of Cameroon. They identified transportation distances, infrastructure quality, and accessibility as decisive factors on waste collection considerations in this city. In relation to recycling, (Omran 2009) investigated attitudes of households toward recycling solid waste in the state of Kedah in Northern Malaysia. They conclude that simple improvements at bring sites could significantly increase recycling rates. If dwellers and shopkeepers are given waste storage containers of a standard size and collection is done regularly, then people are less likely to throw waste onto roadsides (Omran and al 2009). In Thailand, (Suttibak and Nitivittananon 2008) investigated the factors that In the developed countries, solid waste management (SWM) belongs to prominent thrust areas for pursuing research (Shehdar 2009). High population growth rates, rapidly varying waste characterization and generation patterns, growing urbanization and industrialization in developing countries (Troschintz and Mihelcic 2009) are the important reasons for paying attention towards MSWM as more area is required to accommodate waste (Idris, Inane et al. 2004). Several studies suggest that reutilizing of solid waste is not only a viable option to MSWM (Kasseva, Mbuligwe et al. 2000) but also desirable—socially, economically, and environmentally One of the significant problems in urban India is almost no segregation of MSW and disposal of construction and demolition debris (C&D), plastic wastes, commercial and industrial refuses, and e-waste

(Buenrostro, Bocco et al. 2003). Annually, about 12 million tons of inert waste are generated in India from street sweeping and C&D waste and, in the landfill, sites, it occupies about one-third of total MSW. In India, MSWM is governed by Municipal Solid Waste (Management and Handling) Rules, 2000 (MSWR) and implementation of MSWR is a major concern of urban local bodies (ULBs) across the country. Minghua et al. (2009) stated that in order to increase recycling rates, the government should encourage markets for recycled materials and increasing professionalism in recycling companies. Factors like poor and inefficient coverage and operation of services, inadequate or missing recycling strategies and activities, limited or unproductive management of wastes were mentioned by some scholars as factors contributing to poor solid waste systems in any country (Henry et al. 2006; Vidanaarachchi et al. 2006; Omran and Gavrilesu 2008; Longo and Wagner 2011). Other factors mentioned by other researchers are financial support for recycling projects and infrastructures (Nissim et al. 2005; Moghadam et al.2009), recycling companies in the country

The Republic of South Sudan became a new nation and Africa's 54th country on July 9th, 2011, after a peaceful secession from the Sudan through a referendum in 9, January 2011. As a new nation, South Sudan has the dual challenge of dealing with the legacy of more than 50 years of conflict and continued instability, along with huge development needs. Formal institutions are being built from a very low base and the capacity of government to formulate policy and implement programs is limited but growing. The main objectives of this paper are to identify types and quantity of solid waste accumulation in the studying area; and evaluate the role of the government and community in solid waste management processes at household levels.

2. Materials and Methods

The primary data were collected through interviews with the government officials, questionnaires with the citizens and observations based on the field visit. The secondary data were collected through literature reviews such as research studies and reports in books, journal articles, internet sources, and government reports. Questionnaires, interviews and observations have been used in this study to obtain important information about solid waste collection. Each item in the questionnaire was developed to address specific objective of the study including examining the performance of the existing solid waste collection. Structured or closed ended and unstructured open-ended questionnaires were formulated for the purpose of this study. Self-administered questionnaires were distributed to the heads of households. This was done so to make sure there is proper understanding of the questions and return of all questionnaires. Structured and unstructured interviews were another source of primary data collected. Interviews were conducted with local government leaders including solid waste management inspectors of Juba city council Munuki Block. Observation was done by several visits' residential areas, business places, markets, restaurants, streets, dumping site. Another method used to collect secondary data used was literature review. Review of different materials including books, articles, policies, internet, previous research studies. Once the questionnaire has been administered, the masses of raw data collected were systematically organized in a manner that facilitated analysis. Both descriptive and statistical analysis was anticipated; therefore, the responses in the questionnaire were assigned numerical values and analyzed.

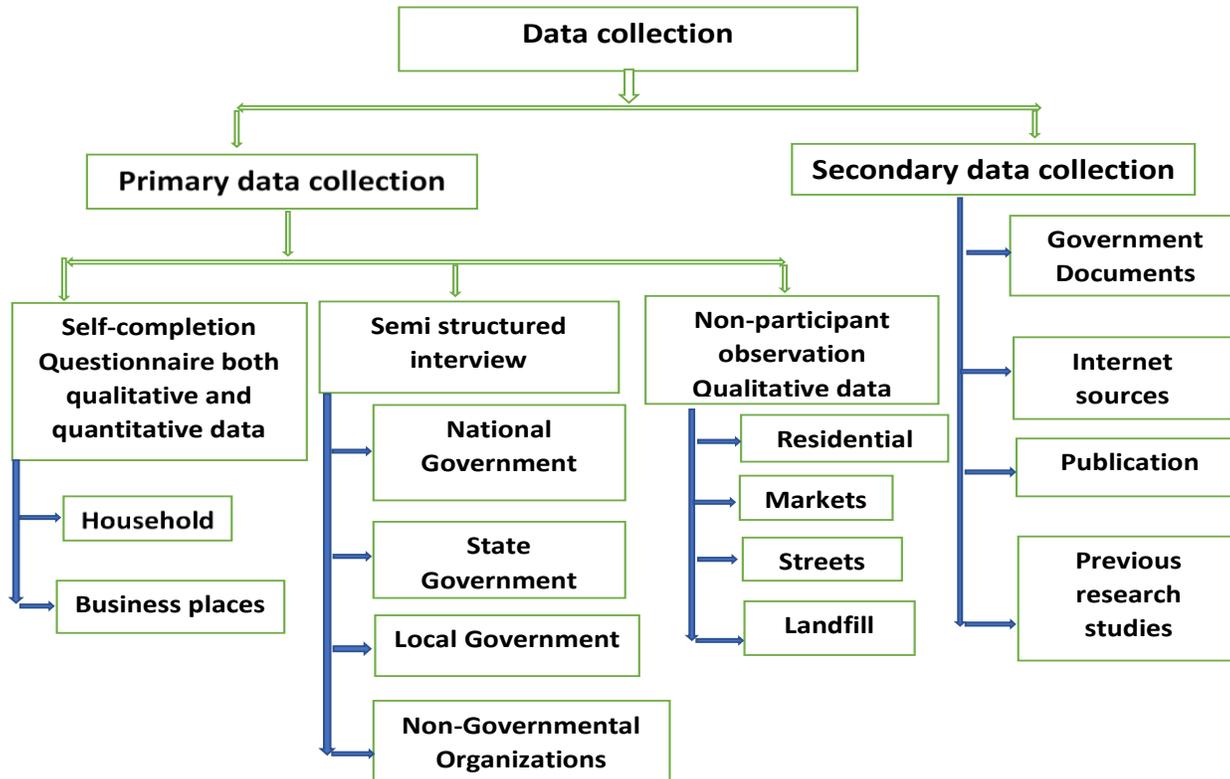


Figure 1: Schematics of the data collection methods.

3. Municipal Solid Waste Management Currently Practices in Juba City

3.1. Solid Waste Generation

Solid waste in Juba city is managed by the department of Environment and sanitation of Juba city council, solid waste quantities which are produced in the City of Juba are large and increasing with the growing affluence and improved standard of living. Municipal waste generation average rate reaching 0.5720kg/per person/day (source Juba city council 2017), the population of Juba city is 1.500.000 such population generate approximately 942 tons of waste per day. Rain season is a higher waste generation rate. Solid waste generation changes per day in addition to the recurring seasonal variations. Collection frequency also affects waste generation; in general, a more frequent collection produces more MSW. Increasing the urbanization is one of the affects in the overall rate of solid waste generation in many countries (Pokhrel, Viraraghavan et al. 2005). The quantity of generated waste is a socioeconomic indicator and a function of the degree of a nation’s development. The difference in waste production between cities in developed countries (1.5–2 kg/person/day) and those in developing countries (generally less than 1 kg/inhabitant/day) is noteworthy (Guermoud and al 2009). This significant difference is due to consumption modes, as industrialized countries consume more products and use more packaging.

Table 1. The amount of waste generated from households in three Blocks (Districts) Juba city (estimated in tons/day) (source: Juba city council record 2017).

Juba city council	population	Unit (kg/per person/day)	Waste amount (ton/per)
Munuki block	675,000	0.572 (kg)	386 (ton)
Juba block	450,000	0.571 (kg)	257 (ton)
Kator block	375,000	0.798 (kg)	299 (ton)
Total	1.500.000	0.654 (kg)	942 (ton)

3.2. Solid Waste Sources and Compositions

This section provides composition data for MSW produced in three (3) Block or (Districts) of Juba City Council Municipal Solid Waste core components are food waste, plastics (bag and bottle), metals, paper, aluminum, textiles, garden waste. It contains mixed composition of waste including both degradable and non-degradable materials, and the wastes are usually collected without sorting. Compositing is one of the ways of recycling biodegradable wastes. Most of the non-degradable wastes are potentially recyclable materials, whereas the degradable materials can be composted. Plastics mainly come from water and fruit juice bags and containers (source Juba city council).

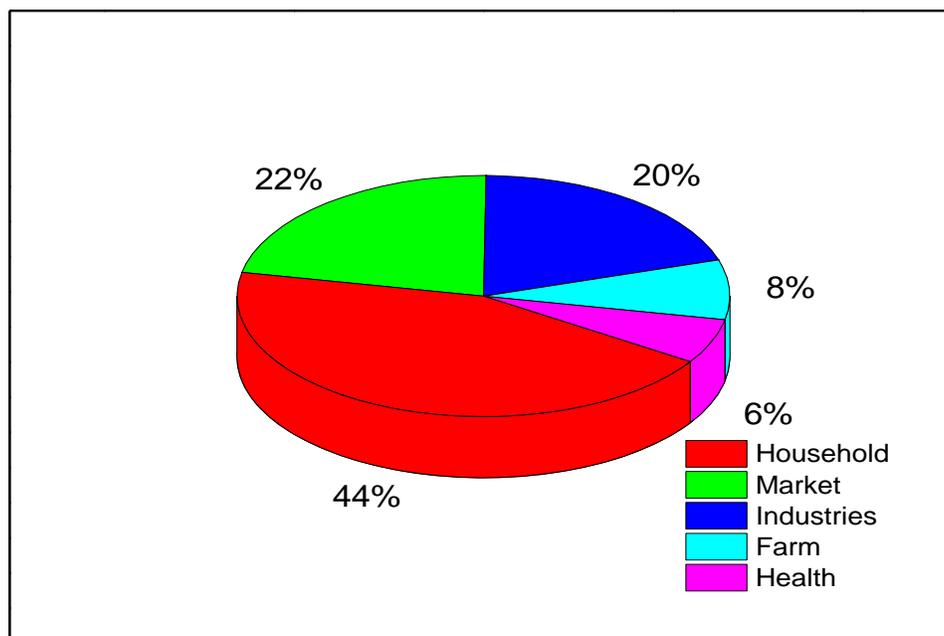


Figure 2. sources of municipal solid waste in Juba city (source: field survey).

At first, it is critical to identify the sources of the municipal solid wastes. Based on the data we collected, most of the waste comes from household and considerable amount of daily waste needs to be treated and follow by the market and industries. Farm and health facilities discarded little amount of waste.

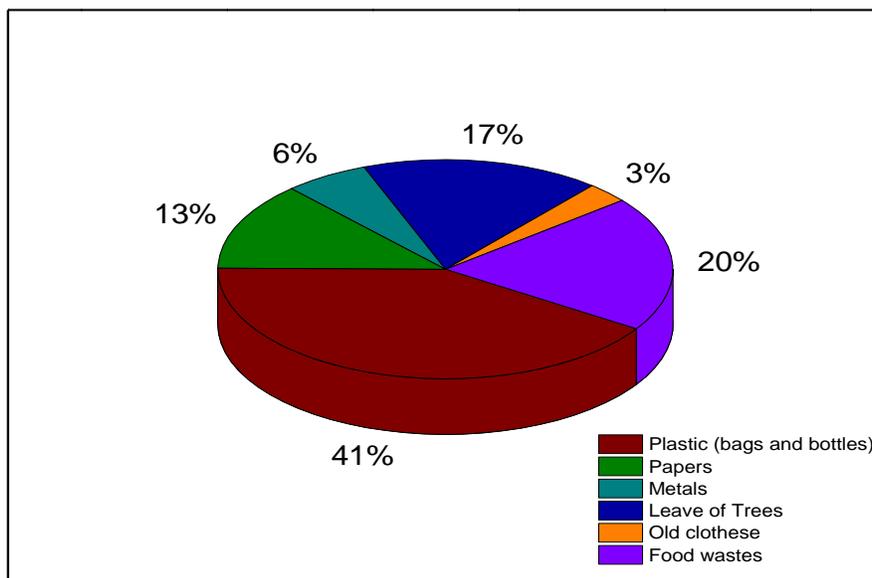


Figure 3: solid waste compositions in Juba city (source: field survey).

There are different types of waste depending on the number of the family and standard of living. Components of Municipal Solid Waste during the field survey it was generally observed that plastic (Bags and Bottles) are the common wastes which comes from the city as shown on (Figure3) 41% according to respondents, this poses high risk to the environment. In the absence of appropriate waste management most of these wastes are burned and possibly produce a considerable amount of VOC (Volatile Organic Compounds) in addition to this when it is buried it may stay non- degradable in the soil for along years about (30 years). Food waste (organic wastes) is the second large waste produce after plastics (bags and Bottles) if its 20% as shown on the (Figure 3), follow by Garden wastes 17%, and papers 13%, metals 6%, Textile (Clothes) 3% very little waste discarded according to (Figure 3) in the study area.



Figure 4: Picture components of solid waste at uncontrol landfill (source: field survey).

3.3 Solid Waste Collection, Transportation, Disposal and Recycling

Juba city council, department of Environment and sanitation is a body in charge of management all waste types within three Blocks (Districts) of Juba city but only the garbage collection just limited to the markets and business places, restaurants and road, main streets and in some areas like first- and second-class residential areas the collection is just covering small area and the rest of residential areas without collection services due to lack of fund, facilities e.g.; tipper/compactor trucks to collect the garbage's, lack of private companies to take over residential areas in garbage collection. Juba city council department of Environment and sanitation has five zones all lies within the area map of Juba city administration managed by a zonal coordinator together with environmental officers and public health officers, rate collectors, supervisors. Operates on a centralized system where all the garbage trucks are sent from head office to the zones no containers provide by the city council.

Collection and transport are of significant importance in reducing waste accumulation, Solid waste collection and transport are often conducted in the morning's hours. Lack of funding and inadequate maintenance causes a shortage of vehicles for waste collection, Juba city council ability to maintain waste collection is low and the 10 vehicles owns by Juba city council are broken out of three compactors provided by UNICEF in September 2016, one has already broken and not operational. Efficient solid waste collection depends on the proper selection of vehicles, which should be enforced with a consideration of road conditions, and availability of spare parts, servicing requirements, and haulage distances.

A cause for serious concern is that most localities dispose of, and sometimes burn, their waste in random open dumps that do not adherence to health and safety requirements. Local authorities use the burning method for volume reduction or for financial

reasons. The budget for disposal is very small and does not cover further treatment. Thus, localities perform waste disposal services according to the available resources from the collection fees. In turn, collection services deteriorate because the localities have highly limited financial resources.

The gathered information indicates that Juba does not employ and sorting or recycling processes for waste. Sorted recyclable wastes from households are also uncollected. In addition, specific containers for waste segregation are unavailable. People throw away materials as waste regardless of their possible benefits. These types of waste mainly include iron, aluminum, pipes, plastic bags, plastics, magazines, and newspapers.

3.4. Challenges Facing Solid Waste Management in Juba city

Lack of fund from government for garbage collection, Lack compactor Trucks to collect the garbage, higher rate of renting trucks for garbage disposal. Garbage collection is limited to the business places and in first and second-class residential areas leaving out quarter councils. Lack of private companies to take over residential area in garbage collection. Most of the staffs are not trained in the field of waste management another thing is Impassable roads in some residential areas. Unwillingness of some business owners in paying garbage collection fees, Low salaries for the cleaners. Deteriorating economy has made things difficult in the markets, etc.

3.5. Economy and Regulations for Waste Management

The perennial economic crisis that characterizes the waste sector in the City of Juba needs to be addressed to improve waste management in the city. In this regard, the central government can significantly improve its fund allocation to municipal governments in a softer way and fixed schedule in order to avoid delay payments for waste who require funds to meet the operational costs of solid waste collection. At the same time, the municipal governments can be supported to improve revenue mobilization from local sources. Such support can be achieved by attracting qualified finance and accounting staff professionals who can identify additional sources of funds, such as taxes on properties and business. Employing such qualified persons can also improve the financial management practices of the assemblies by plugging leakages and preventing corruption. Additional revenue can also be raised from clients of waste disposal services.

It is clearly known that finance is an important resource for sustainable solid waste management. However, in case of Juba city it can be stated that most of the municipal corporations do not have many resources due to various constraints and priorities. One of these constraints are due to the absence of transparency in financial regulations by incorporating the double-entry system such as existing fiscal incentive to public private partnership projects that provide a capital incentive for solid waste management alternatives or encouraging the private-sector participation, grants of soft loans, subsidies, and exemption from taxes.

Laws, policies, and regulations are important tools for managing solid wastes in any country. However, the lack of proper legislation on the solid waste management has been one of the major issues for illegal dumping. The shortage of sufficient legislation makes it difficult to allocate clear authorization to urban sector institutions associated with solid waste management. There is a

shortage of public compliance with waste disposal and dumping laws. This lack of implementing the laws regarding the waste disposal produces a public lack of respecting the laws as well as encouraging ineffectual waste handling practices such as wasting and dumping of waste in drains and at roadsides.

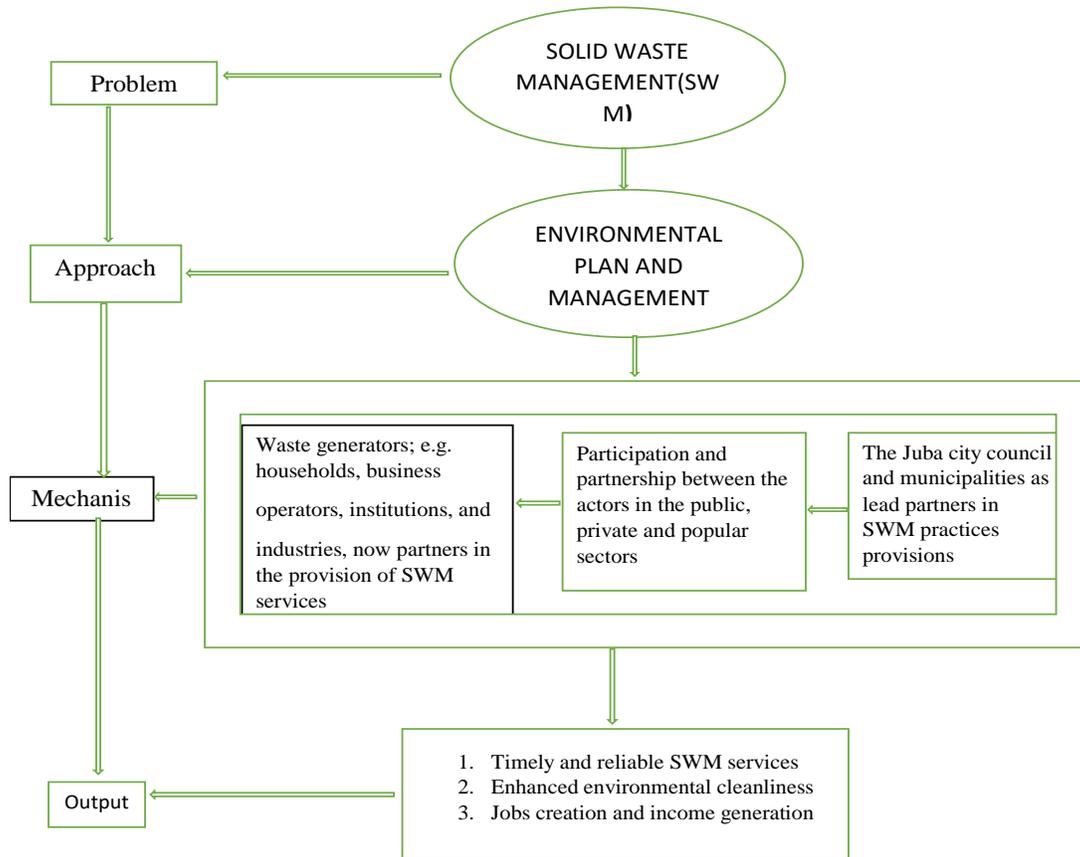


Figure 5. Proposed practices for solid waste management improvements

4. Discussions

Juba City suffers from the aggravating problem of solid waste at the density populated, based on the data collection and analysis, it was revealed that the authority of solid waste in the city of Juba City lacks experience and effective practice in the collection, transportation and disposal of waste, that it is still uses traditional methods of collection and transport of conventional waste disposal randomly in old dumps where health standards are not available, and it operates its work without prior study to the city’s population increase and urbanization in the outskirts of the city, and its lack of control over waste collection process in all three blocks (districts) regularly. neighborhoods and the marginal areas of the city where we find piles of garbage on the roads, water canals and space on the outskirts of neighborhoods as is the case of the neighborhoods of Kator and the old market (Konyokonyo Market) and the main streams that this phenomenon has become a concern of the city’s population, but still a limited service was provided by the administration of Juba city council to some parts of the city, especially in the main streets, the city’s residents, in some neighborhoods.

The main aim of the study was attempted to examine the current situation and practice of municipal solid waste management in the City of Juba. However, Laws and regulations to preserve the environment are not applied due to the lack of a suitable mechanism by the administration of solid wastes in Juba without exception, while we found that some developing countries applied regulations and texts that support and keep the environment clean. This study has proved that the traditional practice for solid waste collection and disposal is useless, for example, that the citizen burnt the waste nearby houses and some citizen carries their wastes to the main streams (Khor) and when it is raining the rain water wash all the garbage to the Nile. Lack of awareness of the health risks of solid waste among families, in general, and decision makers in particular were one of the major obstacles. The illiteracy of some families and workers of solid waste administration or around of the seriousness of such wastes in terms of the types of pests, diseases, and germs may transmit to the healthy and the resulting loss of lives, financial losses, and time which we desperately need. Improving solid waste collecting and disposal requires the ability and the proper approach, and it is linked to improving and maintaining the local infrastructure and as soon as possible due to the urgent need to upgrade local roads in some neighborhoods of the city so that the vehicles' have the ability to gather during the raining season and in all conditions. The study revealed a lack of awareness of citizens of how to get rid of household's waste routes properly, that respondents believe that the solid wastes are thrown in open places in the city, rubbish and wastes end to burn a suitable way for getting rid of them. It is essential to educate the citizens particularly future generations of the importance of benefiting from the disposed garbage. Generating solid waste in Juba City rises up to about 942 tons/day during 2017, and collecting such waste in the city faces the problem that the compressing trucks not have the ability to engage in some city neighborhoods not because they do not have good roads, some roads are also narrow, so vehicles cannot have easy access to these areas. Additionally, municipal of solid wastes should be separated and be stored in separated containers.

The more applicable and used ones are categorized into three different color of containers known as (green, blue, and brown colors), and they should be provided with a lid. For instance, the first container should be used for storing paper and cardboard, the second should be used for other recyclable materials, and the third one should be used for organic materials. It is preferred that the containers that will be used in institutions such as offices, shopping centers, and schools should be designed according to the quality and quantity of waste generated by the institutions. Another important strategy for improving municipal solid waste management in the city is that the roadside waste collection. It is a method where residents sort recyclable items into the specific collection containers offered by the local authorities. Although many residents collect the relatively high valuable things from the domestic wastes before they place them into the collection sites, most reusable and recyclable items are used to be sent to dump site and burn them there without recycling. Solid waste collection is considered one of the most important processes in the management of solid waste the one who the directors monitor and evaluate the performance daily or weekly collection process, the timetable should be design and given to drivers put programs specific time of collection.

According to the results from the data analysis, the following recommendations are presented and proposed to improve the MSWM in Juba city. (1) Municipal solid waste Management problem in South Sudan especially in Juba town required collective responsibility and authority. This responsibility should be shouldered by local authorities at the state and national level including: the private sector, government and non-governmental organizations. (2) The government should provide the best service to the society, the different unit operations involved in collection, storage, transport, recovery and disposal. (3) Reduce the use of drinks poly bottles for storing water; (4) Ban the use of plastic (bags and water bottles). (5) Encouraging use of (bag and water bottles) that environmentally friendly. (6) Managing excreta of pet dogs and cats. (7) Recycling of solid waste should be considered as one of the alternatives to waste disposal. (8) The Public health authority should provide standard waste containers or garbage bags to each household and must be collected after three days. (9) The government should create the program of public health and environmental awareness on local radios and televisions.

5. Conclusions

This pioneering study on solid waste disposal in Juba Town is intended to be a pointer to the problems of solid waste management and their implication to environmental health rather than offering scientific solution to them. The result of this study reflects in poor solid waste management as most of the disposed waste are done locally and, in most cases, burned regularly emitting high smoke in the air nearest to resident. The best way of solving the problem is provision of facilities and sanitary disposal of solid waste must be far from away from the residential area.

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The Impact of Pre-Secondary School Types on Academic Performance of Secondary School Students: An Evaluation of Output of Primary School Education Programme in Ondo State, Nigeria

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Abstract: *The study was carried out to determine the impact of students' background school type on students academic performance This study is a descriptive research of the survey It is also on expo factor research as the students' scores in Mathematics, English Language, Integrated Science, Social Studies and Yoruba Language were collected for us. The population of this study consists of some selected secondary schools in Akure South Local Government Area, Ondo State. The Junior Secondary School of the selected schools formed the population of the study. The sample was drawn using sample random sampling technique, five subjects were selected for use out of sixteen 16) subjects offered in the school. Two instrument were used to collect data for the study. the instrument used were: Junior secondary school I (JSS I) results were collected alongside the Students' bio- data to indicate whether they are from public or private school. The finding for the study showed that private schools had greater impact to helping students achieve better in their academics at the secondary. school level. Nevertheless there is the problem of the common practice in many homes in the south west Nigeria where the study was carried out where English Language L2 is preferred as medium of communication and how at Kindergarten, Nursery and primary school levels, the speaking of Yoruba (L1) is a distasteful which is being viewed as colonial mentality hindering students' creative and innovative thinking and technological development compared to countries where L1 is promoted as language of instructions.*

Keywords: Primary School output, Proprietor & proprietress, Private & public school, Bilingual language, Language extinction.

INTRODUCTION

In view of the fact that education is considered as investment in most developing countries, the issue of poor performance of Nigerian Secondary School students in various public examinations like West African Examination Council, General Certificate in Education, Unified Tertiary Matriculation Examination, is a source of concern to all. It is in this wise that there seems to a lot of controversies and concern all over the Nation as to the view that the standard of education is falling. One of the most amenable tools for measuring such standard has been student's performance in public examinations.

. Most of the research that has investigated the relationship between private and public secondary schools in respect to students academic performance has concentrated on using global indicators of both the environment and intellectual ability. Most of these

previous studies on education have number of factors which are contributors to poor academic performance of students most especially in the public schools, that is, the government owned schools..

Students' Parental Social- Economic Background and Students' school type.

The parental socio-economic background is the position, which parents occupied in the society and this is measured as a personal index in terms of occupation, level of education and level of income. Past works as in Adodo and Ogunbare (2016) on parents social class have shown that differences exist between classes in income, employment, health, housing, family structure, child bearing, education, and opinions and students' school type and performance.. According to Adekanbi (2001), the immediate surroundings of a child whether rich or poor, hostile or friendly, villages or towns, illiterate or literate have great influence on the child. All these combined tend to positively influence the work and achievement of the child. This shows therefore that difference families creates environment that influence children's intellectual growth and educational motivation in difference ways. It is evident that children of high socio-economic status in Nigeria are many in private schools than children of low socio-economic status.

The studies of Mnweti(2003) and Susan (2010) revealed that parents of high socio-economic status usually value education more than those of low socio-economic status as the former are always privileged to send their children to private schools than the latter. On the home factors effect on the academic performance of children in both schools, Mnweti (2003) reiterated that the intellectual environment that the home provides help the students in their performance at school. He further stated that the mere presence of facilities such as motivational books, radio, television and educational games in a house often stimulate intellectual ability of a child. Hence, the immediate surroundings of a child whether rich or poor, hostile or friendly, villages or towns, illiterate or literate have great influence on the child. All these combined factors tend to positively influence the study habits effort and academic achievement of the child. This shows therefore that differences in families can create environment that influence intellectual growth and educational motivation of a child in difference ways. The environment of many private schools in Nigeria, which is also enhanced by their teachers' attitude to work, is a strong factor influencing academic achievement of their students

School Ownership and School Administrative Style

There have been contentions that school ownership is one factor that affects learning activities which in turn affects performance of students. School ownership can be viewed from two main perspectives public and private. A public school is any school owned and controlled by the state or Federal Government. Its affairs are governed by the government in order to give to the public good and essential education that would build up tomorrow's leaders.(Ajayi 2005).A private school, on the other hand, is a school supported and controlled by religious/ social organizations or individual other private groups/of individuals called proprietors and proprietress in support of the teaching school age pupils in Nigeria which the public schools cannot as at now cater for (Taiwo1980). Their sole aim is also to maximize profit but also provide quality education. Hence, it is widely believed that students in private schools performed better than students in public schools. This is confirmed by Adebayo (2009). Who concluded in his research finding that performance of students is higher in private schools than in the public schools. Some public schools principals and teachers trivialize many things and do whatever they like and care less on many things that can promote productivity.

Teachers' Quality , Effective Supervision and Students Attitude

Though teacher in public schools are likely to be more qualified than those in private schools but the point is that teachers and teaching activities are well managed in private schools by their proprietors and their schools head teachers. The teachers in the private schools are forced to prepare very well by regular preparation of lesson note, search for relevant materials that will help them teach well before coming to the class. This spirit of hard work by the private schools teachers is yielding good results in the qualities of their students in public examinations the standard which and negligence of duty by the public schools teachers even with their qualifications cannot match.. The teachers in private schools are ready to do personal reading and to learn day after day towards accomplishing the goals of their schools to maintain high standard. Adodo (2004) said that teachers who get emergency "credentials" will impact wrong thing to their students but teacher who are highly qualified can contribute to students achievement in their subjects areas of specialization/. As students are expected to be taught by competent teachers which have a clear understanding of how students imbibe instruction and such teachers must be given appropriate resources in terms of tools to carry out their duties. Yet supervision has significant add-on effect to quality of teaching personnel in prediction of secondary school students' academic performance.

The degree of success that a learner can attain in his learning activities depends in a great measure upon his own attitudes and persistent interests to work. Our attitudes are associated with everything about us and one may affect us favorably and another unfavorable. According to Adodo and Gbore (2012), attitude is a set or disposition (readiness, inclination, and tendency) to act toward an object. According to its characteristics attitude when is inactive it may be called a disposition and when an attitude consist of strong feelings, it may be called a sentiment or gush. The physical constitution of the individual, learner, his degree of emotional stability, his temperament, his attitude toward learning (either positive or negative) and his interest whatever the course can affect the extent to which learning success and good academic performance may be achieved. Attitudes, the affective by products of an individual experience have their bases in his inner urges, acquired habits and the environment influences by which he is surrounded. In other words, attitude result from personal desired and group stimulations. They actually are part of an individual own personality but are affected by the attitudes and behavior of the group(s) with which he associated. It therefore, follows that through peer group, ones attitude can be modified whether positively or negatively depending on the peer group. This is turn can affect academic performance either favorably or unfavorably.

Academic Environment and Classroom Factors

The academic environment is a place where teaching/ learning takes place academic environment is expected to be the one in which all the necessary could enhance a suitable teaching/learning process. It is also expected academic environment should be free from distraction for adequate to take place.

The effect of any persuasive message in changing the attitude depends in the situation in which we receive them sometimes when people are to a message they are distracted by sound or activities going on around them.. Another factor that determines the academic performance of secondary school students' classroom in congestion which characterize the State primary and public secondary schools. This has been having negative impact on both the teacher productivity and students' learning outcome. Unlike the private schools with moderate class size in terms of the number of students and so the classrooms are not congested. Though the National policy on education prescribed a maximum of 40 students in a class but surprisingly most, public secondary schools in the State are having an average class size of 50 students. The situations which have been negatively affecting the student who supposed to learn in a more comfortable atmosphere According to Susan (2010), large class is not conducive for serious academic work, Afolabi (1991) found no significant relationship between large class size and students learning outcomes. While Nye, Hedges and Konstantapoubus (2004) opined that smaller classes not only increase students' achievement but also benefitted slow learners who might be left unattended to in a student large size classroom as the smaller the class the greater the likelihood that a teacher will spend more time with individual students. This situation must have boosted the academic performance of private schools students while the vice must have accounted for the low and poor academic performance of public school students.

Teachers' Morale and Motivationon students' performance.

There are various concepts of motivation as there are many motivation theories. Some view motivation as drive, force, goal and expectancy. According to Frase, 1992, Bomia, Behuzo, Demeester and Shelotan 1997), motivation refers to the arousal of tendency to act to produce one or more effects. Mohammad (2000) pointed out that motivation refers the force that energize, direct and sustain a person's efforts towards a specific target. He explained further that motivation is a word used to describe the forces acting within or on a person initiate and guide behavior. A motivated person is always aware of the fact that a definite goal either personal or general must be achieved with all required efforts at achieving that goal in the face of difficulties. It is the process involved in arousing, directing and sustaining behavior. In Frase, (1989), Pinirich and Maehr (2004), motivation is the process of arousing, sustaining the activity in progress and regulating the pattern of activity. Motivation is a practical act of applying incentives and arousing interest of learners for the purpose of causing them to perform in a desired way which according to Slavin (1989) and Hohn (1995) is described as an internally felt urge or desire which spurs an organism to action in an attempt to achieve his goal. However, there are two types of motivation: The intrinsic and extrinsic motivation. Intrinsic motivation arise when an individual desires internally to learn or achieve a particular goal to his advantage. In this case, he does not expect any external reward in return while the extrinsic motivation is contrary to intrinsic motivation in that it occurs when an external reward is attached to a partial behavior or goal. Pursuit for reward, prize and scholarship could be example of the external reward. The activity of learning of a child in this type of motivation is grounded in or attached to winning prizes, getting good grades and awards. In the classroom situation, no lesson plans considered

complete unless it includes motivation. The teaching approach that is an integral part of the learning procedure often serves the most effective form of motive. The teacher is ever on the alert to discover stimuli that will produce pleasant feelings or satisfaction in order that the interest of the student shall be maintained long enough for him to master definite ideas or subject matter. Learners must be motivated in such a way that interest in the content of study is built upon the child's existing interest, the attitude, which the child brings to his task at the beginning of any learning unit. This should be strengthened if this attitude interferes with success during the process of mastery.

Interest as viewed in Adodo and Gbore (2012) is essential for attention and attention is necessary for learning. The interest that motivates on a long course is something deeper and based on fundamental emotions and desire. In sustaining the interest of the students and in motivating them, the use of competition and co-operation learning can be employed as this can also promote good academic performance. Timely feed back in terms of marking Students assignments and scripts and making them aware of their progresses can also serve as motivation factor. While praise and reward are better than blame and punishment. Class comfort and the physical conditions under which a class is working can also affect individual learner's moral and the degree of motivations.

Statement of the Problem

It is important to note that the problem of low level of discipline has gone a long way to affect the academic performance of public schools students. Also the attitude of teachers to work in public schools coupled with large class size and classroom management has also marred the productivity and quality output of the public schools and the effective management of the school

Purpose of the Study

The purpose of this study is to compare the students' pre-secondary school background (public or private schools). academic performance while they are now in the same public secondary schools

Hypotheses

:Ho 1 There is no significant difference in the performance of students in Mathematics with private schools background and public schools background.

Ho 2. There is no significant in the performance of students in English Language from the private schools background and public schools background.

Ho 3 There is no significant difference in the performance of student from the private school and public school. In Basic Science,

Ho4. There is no significant difference in the performance of student from the private school and public school. in Yoruba Language (L1).

Significance of the Study

As the results of this study have revealed many things on students' school type (private schools or private school) and their learning output, parents and education stakeholders in Nigeria will know where to braise up in the educational training and upbringing of Nigerian pupils and other moral, ethical and cultural issues that needed to be addressed. The outcome can also be reflected upon by other African countries.

Methodology

This study is an ex-post-facto research in which the student's scores in Mathematics, English Language, Basic Science, and Yoruba Language were collected. . The population of this study consisted all Junior secondary schools students in Akure South Local Government Area of Ondo State. The sample was drawn using sample random sampling technique, 176 students' scores from Junior secondary school class one (JSS I) in four key or core subjects were collected through Inventory pro-formal sheet which include students background bio-data for use.

Results

:Ho 1 There is no significant difference in the performance of students in Mathematics with private schools background and public schools background.

Table 1: t-test analysis of the mean scores of students in Mathematics from private schools and public schools

	school background	N	Mean	S.D	D.F	t-Cal	t-tab
performance of students in Mathematics.	Private	67	48.30	20.171	174	1.284	0.201
	Public	109	44.16	21.158			

Fromtable one above the mean score of students from private school performances in mathematics is 48.30 while standard deviation is 20.171. The mean scores of students from public schools performances in mathematics is 44.16 while standard deviation is 21.158. The t-calculated is 1.284 and t-table is 0.201 at the degree of freedom of 174. The t-calculated of (1.284) is greater than t-table (0.201). This shows that there is a significant differences between private and public school performances in Mathematics. Hence the hypothesis is thereby not accepted.

Ho 2. There is no significant in the performance of students in English Language from the private schools background and public schools background.

Table 2: t-test analysis of the mean scores of students in English Language from private schools and public schools

	School background	N	Mean	S.D	D.F	t-Cal	t-tab
performance of students in English Language	Private	67	54.51	15.434	174	4.394	1.960
	Public	109	42.61	18.551			

From table two above, the mean score of student from private schools performance in English language is 54.51 while the standard deviation is 15.434. The mean score of students from public school performance is 42.61 while standard deviation is 18.551. t-calculated is 4.394 and t-table 1.960 at the degree of freedom of 174. The t-calculated of (4.394) is greater than t-table (1.960). This shows that there is a significant different between private and public schools performances in English language. Hence the hypothesis is thereby not accepted. .

Ho 3 There is no significant difference in the performance of student from the private school and public school.in Basic Science.

Table 3: t-test analysis of the mean scores of students in Basic Science from private schools and public schools

	School background	N	Mean	S.D	D.F	t-Cal	t-tab

performance of students in Basic Science and Technology.	Private	67	52.55	20.724	174	1.933	055
	Public	109	46.51	19.742			

From table there above, the mean score of student from private school performance in Integrated Science is 52.55 while standard deviation is 20.724. The mean score of student from public school performance is 46.51 while standard deviation is 19.742. the t-calculated is 1.933 and t-table is 055 at the degree of freedom of 174. The t-calculated of (1.933) is greater than t-table 055. This shows that there is a significant difference between private schools and public schools performance in Integrated Science, Hence the hypothesis is thereby not accepted.

Ho4. There is no significant difference in the performance of student from the private school and public school.in Yoruba Language. (L1)

Table 4: t-test analysis of the mean scores of students in Yoruba Language from private schools and public schools

	School background	N	Mean	S.D	D.F	t-Cal	t-tab
performance of students in Yoruba Language	Private	67	32.16	24.313	174	3.058	003
	Public	109	43.63	23.913			

From table five above, the mean score of students from private school performances in Yoruba is 32.16 while standard deviation is 24.313 The mean score as students from public school performance in Yoruba language is 43.63 while the standard deviation is 23.913.. The t-calculated is 3.058 and t-table is 003 at the degree of from of 174. The t-calculated (0.058 is greater than t-table (003) This shows that there is a significant difference between private school and public school performances in Yoruba Language. Hence the hypothesis is thereby not accepted.

Discussion

The results from the tables show that there were significant difference between the private school and public school performance in Mathematics, English Language, Integrated Science, and Yoruba Language. The difference is in favour of the private schools, which means that the academic performance of students in private school is far better than students academic performance in public schools. This outcome was supported by Mnweti (2003) who indicated that students performance in standardized test was higher in pirate schools than in public schools. It also goes with the findings of (Slavin 1989 , Hohn 1995, Adodo and Gbore 2012). They all concluded in their studies on some various factors such as students and teachers attitude to work teachers morale and students motivation as the possible reasons why performance of students was higher in the private schools than those in the public schools. Other connected influences can be highlighted as effective monitoring and supervision by the proprietor and proprietress as well as to the supervision by the school head teachers. Private schools believe there is time to work, play and so hardly can one find their students outside the classroom except when they are on recess or break period, unlike the public schools where every lesson period are characterized with noise making as some of the teacher may not be in the classes to teach the students and nobody can query them because many could be wives of the high up hence the problem of nonchalant attitude of some teachers to work in the public schoolsresulting to the negative effect on the academic performance of students in the public schools. Another possible factor might be the students teachers ratio: The nation policy on education prescribed a minimum of (25-35) students per class, but surprisingly, public schools in reference to this particular local government of study have an average class size of 50-60 students per class.This

situation might have resulted to the students' performance negatively. This was supported by some studies with the conclusion that large class is not conducive for serious academic work. Nye, Hedges and Konstantapoulos 2004 reiterated in their findings that smaller classes not only increase achievement for all students but also benefited the weak learners for proper help. The smaller the class, the greater the likely hood that a teacher will have more time to handle the individual differences among learners during classroom interactions.

This study on the other hand also revealed that students performance from private schools in Yoruba Language (L₁) was not encouraging as public schools students performed better. The trends which has triggered a lot of public and media reactions as observed presently that many children from western Yoruba speaking states in Nigeria are no more lucid at speaking and writing Yoruba their L₁. This is calling attention as research outcome have alerted that in 50 years to come, out of the three major languages in Nigeria, (Hausa, Igbo and Yoruba), that Yoruba language may go to extinction. This prediction might not be unconnected with the common practice in many homes in the south west Nigeria where English Language L₂ is preferred as medium of communication and how at Kindergarten, Nursery and primary school levels, the speaking of Yoruba (L₁) is a taboo while the only language of instruction is English language L₂. It is high time Nigeria and other African countries with bilingual[problems reconsider the benefits of mother tongue-based bilingual education as highlighted in (Alexander 1989, Pattanayak 2003, Fafunwa, Macauley & Soyinka 1989, Dalby 1985) and the 9-point goals of EFA for developing countries and outlined in Carole (2004). Also Adeyemi and Igbineweka, (2004) reiterated that cultural freedom and African emancipation cannot be cultivated, expanded and developed where language in which people are most creative and innovative are not language of instruction. It worth to note that countries like Germany, Japan, India and China are making remarkable impact globally in automobile, medicine and electronics based on what Adeyemi and Igbineweka, (2004) are saying and today Nigeria is one of the largest importer of products from these countries.

Conclusion

The finding for this research showed that private schools had greater impact to helping students achieve better in their academics at the secondary school level. In view of the fact that there are difference in the performance and on what impact private schools have on the academic performance of students, it can be concluded that effective supervision and discipline being the watch word of private schools hence the reason why they are always able to excel above the public schools. These factors though needed to be researched on further to justify the role, they play, yet they still stand as factors determining the student's better academic performance in private schools.

Recommendations

On the basis of these findings and from the results of the analysis, it is therefore recommended that the government should make provision for a conducive learning environment in public schools; the class size reduction program (i.e breaking down of large classes) should be implemented encouraged government and school administrators irrespective of the cost in order to improve the academic performance/ achievement of students, irrespective of the qualification of the teachers on the part of the school proprietors, they should ensure to employ qualified and experience teachers to teach in schools.

For students better leaning outcome, the school management and government should organize teachers development programmes and workshop. to update the teachers with new methods of teaching. There is also the need for more effective supervision in our public schools. While the students level of discipline should be improved upon. Also other neglected factors such as intra and inter schools debate, quiz competitions and other means of improving students' reading culture should be revived in our public schools.

The government should provide free education from primary up the secondary schools and also support the private schools proprietors by extending then grace of textbooks and other education incentive provision to their students Therefore, it is believed that if these recommendations are taken seriously, there will be a greater improvement in public schools leading to meeting up with the academic challenges before them as panacea to the problem of poor academic performances of students in public schools.

In view of the fact that transfer of linguistic and cognitive skills is facilitated in bilingual programs, and that once students have basic literacy skills in the L₁ and can begin to read and write in the L₂ by effectively transferring the literacy skills they have acquired in the familiar language where their affective domain involving confidence, self-esteem and identity, is strengthened by use of L₁, the six-year Yoruba Medium Primary Project of Fafunwa et al (1975) with a little modification that it should be limited to the first three years of primary education is recommended in both the Public and private schools. As said that, cultural freedom and African emancipation

cannot be cultivated, expanded and developed where language in which people are most creative and innovative are not first language of instruction.

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Impact of Land Use Changes on Wildlife Population in The Kimbi-Fungom National Park, North West Region, Cameroon.

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Abstract. Land use and land cover change is one of the major threats facing wildlife in the tropics today. This is mainly as a result of human search for earth materials for sustenance, due to increasing human population. This study set out to evaluate the effect of land use/land cover change on the population of wildlife in the Kimbi Fungom National Park with the main objective to assess the trend of wildlife population change in the face of growing anthropogenic activities in this newly created national park of Cameroon. This study employed both the use of satellite images, Biological and socioeconomic techniques. The land use/cover situations were examined for three time periods for the past 30 years (1987 -2017) and the periods chosen were 1987, 2007 and 2017. We acquired images from USGS using <https://glovis.usgs.gov> website. We downloaded 30m resolution landsat and 30m digital elevation model (DEM). They included multispectral optical and radar-derived (SRTM DEMs) satellite data. Digital image-processing software ENVI 5.5 and GIS software Arc GIS 10.2 were used for processing, analysis and integration of spatial data to reach the objectives of this study. The pixel categorization

process was supervised by specifying to the computer algorithm; numerical descriptors of the various land cover types present in the scene so as to be able to ascertain the type and spatial extent of various land use/land-cover types. In order to test the accuracy of the classification, 42 ground truth points for each Land-use/Land cover class were randomly collected from the field using a GPS and were entered into ArcGIS. Wildlife data were got through transect walk, concentrated searches, opportunistic encounter, the use of questionnaires and interview. Results revealed a decrease in the forest from 49641.97ha (52.05%) in 1987 to 36198 (38%) in 2017. This accounted for -13444 (-14.1%), giving an annual deforestation rate of 0.47%. Savanna increased from 28985.37ha (30.39%) in 1987 to 31045 (32.5%) in 2017. This gave a magnitude rate of 2060 (2.2%) giving an annual growth rate of 0.07%. Farmland and fallow land increased from 9467.87ha (9.75%) in 1987 to 15096ha (15.8%) in 2017. This gave a magnitude change of 5628.1ha (5.9%), with an annual rate of 0.2%. This change in land uses/land cover has affected the movement of wildlife, numbers and the prevalence of human wildlife conflicts. It was discovered that some wildlife species have been locally extinct, such as the preuss monkey and the moustache monkey. However, it was recommended amongst other things that involving local people in the conservation process, maintaining the present habitats through controlled farming, grazing and illegal exploitation could help improve wildlife in the park, thereby making the park a tourist destination.

Keywords: land use, change, deforestation, wild life population trend, human wildlife conflict.

1.0 Introduction

Land use and land cover changes represent a serious threat to ecosystem sustainability as naturally vegetated forms give way to manmade vegetation (Robert et al. 1996, Fahrig L. 2003, Lambin, 2003, Lambin and Geist, 2007). Such conversion is known reduce the availability of energy, water and nutrients supplies to ecosystems. On the other hand, it also facilitates the invasion of natural system by exotic species (Kamusoko, Sutter et al, 2005, Kamusoko, 2007). The removal of native vegetation in most cases has resulted not only in the loss of native species, but also in significant areas of original habitat, as well as its fragmentation. Fragmentation from a general prospective is the selective removal of patches of native vegetation, leaving behind fragments of native habitat that are not suitable to serve specific function such as nature reserves, protection for river banks or hunting areas (Saunders et al. 1991, Laurance *et al.*,2002). Although habitats may be naturally patchy due to discontinuities in environmental factors (soil types, elevation), anthropogenic fragmentation is a major concern for conservation due to its rate and extent (Laurance, 2002). Tropical forest loss and fragmentation through increasing anthropogenic land uses have been advocated as the main causes of wild population declines and extinction in almost all parts of the tropics (Turner 1996, Laurance et al. 2002). This is very common especially large carnivores, large herbivores and birds (Turner and Corlett 1996, Corlett and Turner 1997). Land use conversion in any form is known to have negatively affected species distribution and diversity globally (Ottichilo et al., 2001, Lambi and Takang, 2010). This negative effects are among others increased mortality of individual moving between different patches, lower recolonisation rates of empty patches and reduced local population sizes resulting in increased susceptibility to extinction (Fahrig, 1999, fahrig, 2003).

According to the Environment New Service report released in August 1999, “the current extinction rate is now approaching 1000 times the background rate and may climb to 10, 000 times the background rate during next century, if present trends continue a loss that would easily equal those of past extinction”. The Millennium Ecosystem Assessment report released in March 2005 proposed that human activities may cause an irreversible loss to biodiversity of Earth. Yoshioka *et al.*,(2014) proposed numerous reports that recognized accelerated climate change impacts as threats to biodiversity like Millennium Ecosystem Assessment, 2005; Secretariat of the Convention on Biological Diversity, 2006; United Nation Environmental Programme, 2007 and IUCN report 2011. Globally, anthropogenic habitat loss and habitat fragmentation have been identified as among the main factors of global biodiversity problems (Wilcox and Murphy 1985, Balmford et al. 2003).

Land use and associated changes play a key role in the distribution of wildlife population around the globe. Hassan et al. (2008) showed that buffalo require a certain balance between the quality and quantity of forage available. In the Campo Ma’an National Park, Bekhuis, De Jong & Prins (2008) indicated that monocotyledons associated with open areas (mainly savannah patches and logging roads) contributed disproportionately to the diet of forest buffalo. Kingdon, (1982) noted that there is a relation between the density of buffalo and their food and the absence of food resulting from land uses could results in the high migration of buffalos. Tchouto, (2004) and Nkemtaji et al., (2017) in their collective studies showed that buffalos thrive well where there is forest and grassland. White (1992) estimated a maximum density of buffalo at a single site in the Lope´ Reserve, where the vegetation was characterized by a savanna forest mosaic and forest with a high density of monocotyledons. Primates have also been known to affected by land uses changes where population richness is said to decrease with fragment size but in some isolated relatively small forest patches of less than 50 km², primate densities have been found to increase, possibly owing to the absence of main predators such as large cats and birds of prey (González-Solís et al.,2001, Harcourt and Doherty, 2005). The persistence of primates in small fragmented forests depends on their ability to cope with changes (Onderdonk and Chapman, 2000; Chaves et al., 2012).

Increasing land use resulting to habitat fragmentation and habitat loss is a major concern for wildlife conservation due to its rate and extent (Laurance 2002). The most vital steps in designing effective conservation management strategies are the assessment of population parameters such as size, density, and distribution of a species across the landscape. These are important baseline data which can be utilized to assess conservation status and to measure success of conservation efforts over time (Krüger, 2006). Population size and density are important for long-term monitoring, and the distribution of individuals and their use of space are informative in targeting key areas of protection (Deborah *et al.*, 2013). Therefore, the management of wildlife in the Kimbi-Fungom National park in the face of growing anthropogenic activities is important to understand the extent and consequences of increasing land uses. It is for this reason that this study was undertaken in the Kimbi-Fungom National Park found in the Western Highland of Cameroon with diverse vegetation types which have been identified as suitable habitats for many wildlife populations. These suitable habitats are thought to be modified by the growing human activities in the park. These activities have shaped the wildlife population as they are now limited to isolated habitats. This study therefore sets out to investigate how land use changes have affected the population trend of wildlife throughout the park. This is in a bit to promote wildlife conservation as well as sustainable ecotourism in the park.

From the above, the research generated the following questions; how has land uses changed in the Kimbi Fungom National Park? What is the magnitude of land use/cover change in the park?, what are the causes of land use change in the park? what are the impacts of land use change on wildlife population in the park. Based on these research questions, the following working objectives were derived;

Objective of the study

The overall objective of this study was to evaluate the impacts of land use change on the population of wildlife in the Kimbi Fungom National Park.

Specifically, this research set out;

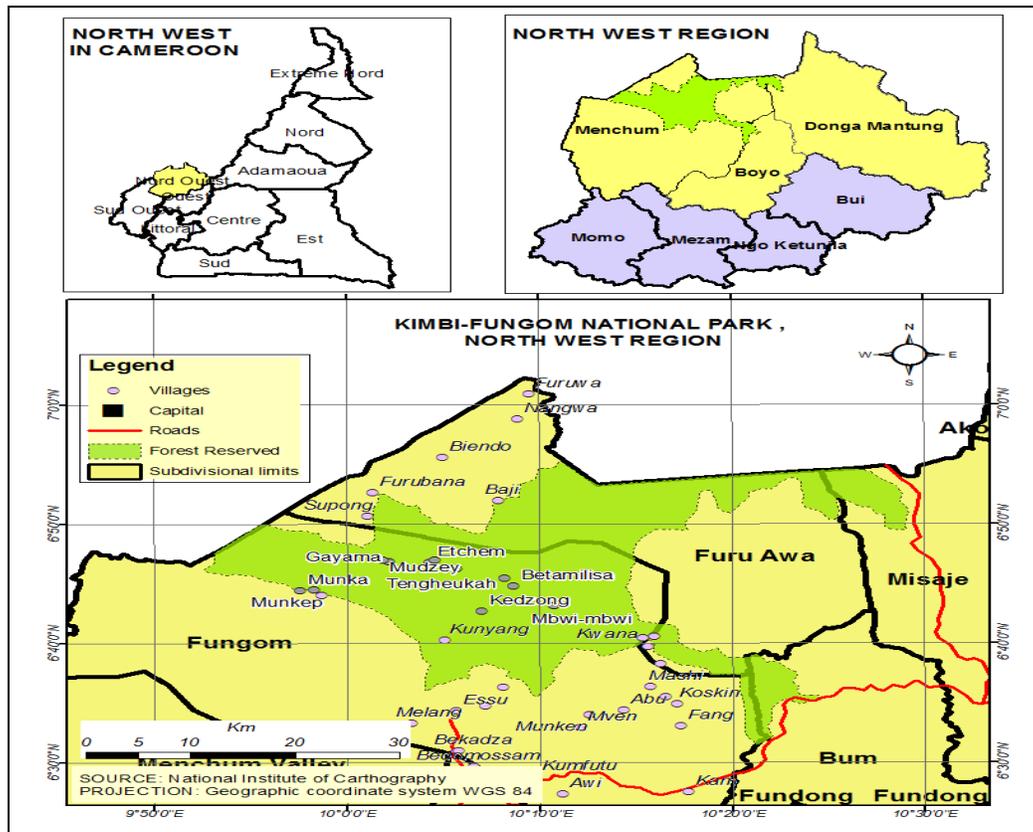
- To examine land use change from 1987 to 2017 in the KFNP
- To evaluate the magnitude of land use change in the park
- To determine the population trend of wildlife in the park
- To identify the impact of land use changes on the population of wildlife
- To suggest some conservation effort towards the improvement of the park.

2.0 Materials and Methods

2.1 Location of the study area

The Kimbi-Fungom national park is located between latitude 6.5-6.9° N and longitude 9.8-10.5° E in the North West Region of Cameroon covering a total land surface of 95,380 hectares. This National Park is located in three divisions of the North West Region of Cameroon cutting across four Sub divisions. These divisions are Menchum, Boyo and Dongo Mantung and found in the respective sub divisions of Fungom and Fru Awa, Misaje and Bum. The Kimbi-Fungom National Park (K-FNP) is a newly created National Park and the only national park in the region..

This region experiences two seasons; a long rainy season from mid march to mid November and a short dry season from mid November to mid march. The wettest months are July, August and September and the driest months being January and February. Hawkins and Brunt, (1995) described the climate as a “sub-montane cool and misty climate” with an annual mean maximum temperature of 20⁰ C to 22⁰ C and mean minimum of 13⁰ C to 14⁰ C. Annual rainfall varies between 1780 mm and 2290 mm. Most of the rainfall occurs between July and September. A dry season occurs from mid - October to mid- March (Tata, 2015).



Map1;Kimbi Fungom national park

Geographically, the kimbi-Fungom National Park has a heterogeneous landscape. The Fungom area lies east of Weh-Esu and South of Esu to Kung and Fang reaching a height of 1524 m. This area is made-up of woody savanna with hills or mountains running from Weh to Kuk. It enjoys topography of less than 250m above sea level from the Western boundary at the Munkep-Gayama axis to a height of 1000m at the summit of the Newman Hill in the Esu-Kpép axis at the Fungom area. It is characterized by a rugged terrain from steep rolling hills into extensive flat valley at lower altitude. The Munkep-Gayama axis is an extensive valley about 6 kilometers wide in the Munkep area to over 10 km in Gayama zone. It is in the midst of chains of two steep rocky hills which are almost impassable. The lowlands take another orientation from Munkep at a place called ‘Last Town’ towards the eastern forest. The valley starts behind the eastern forests where it extends for more than 20km wide to over 30km long passing through a lot of farmsteads. This extensive eastward valley is fertilized by alluvial silts from the Southern near- Escarpment chain of long hills that stretched from the West towards the East in the Fungom Reserve. This relief has greatly influenced the vegetation types and distribution within the park (Fominyam, 2015). The Munkep Gayama axis lies on an extensive valley between chains of two hills. These valleys gradually

protrude into near long rolling steep hills which are characterized by the woody vegetation. These hills are sandwiched by gallery forests which form the basis for the numerous tributaries in the park.

It is drained by a wide range of rivers and streams, notably the Kimbi, the Katsina Ala, and the Kendassamen rivers, along with significant streams that include: the Batum, Akum, Bissaula, Kenda, yemene, Imia. These streams feed into the bigger ones that eventually, through the Katsina Ala River, enter the river Benue, (Tata, 2015).

The soil types in this area include; Acrisols, Andosols (Black soils of volcanic landscapes), Ferrasols (red and yellow tropical soils with a high content of sesquioxide), Leptosol (shallow soil) and Nitisols (deep, well-drained, red, tropical with a clayey subsurface), (Birdlife, 2010).

The vegetation is principally lowland tropical rainforest at the Fungom low altitude area of the park and gradually progresses into tropical deciduous forest to savanna and the grassland savanna. It has many tree species of economic values.

This park harbors many types of primates, ungulates, carnivores, a host of rodents, reptiles and amphibians. Endangered species such as the Nigeria-Cameroon Chimpanzee (*Pan troglodytes ellioti*) and the pangolin (*Smutsia gigantea*) found in the park. Other primates found include the Mona monkey (*Cercopithecus mona*), Putty-nosed monkey (*Cercopithecus nictitans*) and baboons (*Papio Anubis* and *P. cynocephalus*).

2.2 Methodology

2.2.1 Data Processing

Remotely sensed data are not free from internal and external errors such as radiometric and geometric distortions; many of these errors are systematic and are most times corrected before it gets to the users (Lambin (1999)). However, the major pre-processing that was done on the images was enhancement. This was done to increase the apparent distinction between the features in the scene in order to enable image classification process. Colour composites and band rationing were the major enhancement techniques used in this work. Digital image-processing software ENVI 5.5 and GIS software Arc GIS 10.2 were used for processing, analysis and integration of spatial data to reach the objectives of this study. Using ENVI 5.5 software, the images were rectified to a common Universal Transverse Mercator (UTM) projection/coordinate system after which they were re-sampled to a common spatial resolution of 22m using nearest neighbour technique. After re-sampling was done, the images were used to generate land-use/land-cover maps of the study area. In doing this, ENVI 5.5 software was used to generate a false colour composite of each image. This was done by combining near infrared, red and green bands (i.e. band 4, 3, 2) for those images. This was done to enhance vegetation recognition, hence chlorophyll in plants reflects very well in the near infrared than the visible band (Curran, 1992). The false colour composite images were then imported into Arc GIS 10.2 for further processing and classification.

2.2.2 Image Classification

2.2.2.1 Preliminary Image Classification

Prior to fieldwork, a preliminary image classification was carried out using unsupervised classification where the Computer automatically categorize all the pixels in the images into land-cover classes or themes based on their reflectance values. This means that the computer was allowed to assign the image's pixel to a defined number of classes based on their value in different channels (i.e. no training areas used).

2.2.2.2 Supervised Classification

In classifying the images into various themes, the supervised approach to classification was adopted using Arc GIS 10.2 software. The researcher supervised the pixel categorization process by specifying to the computer algorithm; numerical descriptors of the various land cover types present in the scene so as to be able to ascertain the type and spatial extent of various land use/land-cover types. To do this, representative sample sites of known land-cover types, called training areas or training sites, were used to compile a numerical interpretation key that was used to describe the spectral attributes for each feature type of interest. Each pixel in the data was then compared numerically to each category in the interpretation key and 45 labeled with the name of the category it looks most like. This classification is a modification of Anderson, Hardy, Roach and Witmer (1976) as shown in the table 3.1

2.2.2.3 Accuracy Assessment

In order to test the accuracy of the classification, 42 ground truth points for each Land-use/Land cover class were randomly collected from the field using a GPS; these ground truth points were further inputted into ArcGIS environment where the Kappa tool was used to test the accuracy of the 46classifications. The kappa coefficient according to Congalton, (1991) expresses the proportional reduction in error generated by a classification process compared with the error of a completely random classification. A Kappa coefficient value of 0.64 was obtained and this signifies that the classification accuracy was moderate (Anthony, Viera and Joanne, 2005).

2.2.3 Wildlife survey

The "Line transects technique as described by Burnham et al (1980), Buckland et al. (1993), Sunderland and Tchouto (1999), Buckland *et al.*, (2001) was employed. The line transect survey method has been widely used by several researchers on their study of mammals, especially primates in Africa due to the nature of mammalian species and rugged terrain of most study areas in the continent (Burnham, 1980, Arnold and Zuberbühler, 2008). A total of twenty 3 kilometers line transects were established in the park with the aid of GPS. The transects were placed in the North-South direction and so followed the topography to avoid regular obstruction from the step impassable rocky hills. Line transects have been the main method used to survey diurnal primates. This is because they can be used to cover long distances relatively quickly and good methods have been developed to analyze the data (Buckland *et al.*, 2013). The trails were cut by an experienced hunter with minimal impact on the vegetation and swept clear of debris to minimize noise during walks. We walked transects three times each, covering 3 kilometer transect in two hours. Along each transect, within the range of 25m on both sides of the central line, a 100% search and recording of wildlife and was done. In large fragments and dense woody savanna, we focused on concentrated searches once we were told about the presence of any particular

species. Once a species was encountered, a total count (Srivastava *et al.*, 2001) was obtained. Intense searches were made in areas where wildlife had been seen before or were noted to have been endemic. During the search and transect walk, all mammal sightings, vocalizations, signs (dung, resting places, foot prints, carcasses, tracks and food remains) were recorded. Data recorded on transects when species were encountered included: location (transect and meter marker), species, distance (m) from observer to primates, perpendicular distance (m) from species to transect, height of species in the trees, activity, habitat type, number of individuals in group, weather condition and time of day. This gave us a total of 274 km distance covered for the survey.

The study employed some socio economic techniques and Participatory Rural Appraisal tools such as focused group discussions, key informant and historical time line. These socio-economic techniques make use of the random and the purposive sampling methodology for the selection of villages and the respondents for interview. This was aimed to understand the inhabitant perception about the threat posed by habitat fragment on primates in the National park and how they can be conserved in the face of growing human occupation of the park.

A total of 20 villages are selected for the exercise, 8 of which are located in the park (Munkep, Munka, Gayama 1, Gayama 2, Etchem, Kpep, Tenghukah and Nkang) while 12 were located some 1 to 6km from the park (Esu, Kimbi, Su-Bum, Gida-Jikum, Sabon-Gida, Cha, Fungom, Mashi, Mundabili, Nkang, Nser, Badji and Turuwa). The 20 villages were purposefully selected on the bases of (a) a long history of agriculture and hunting (b) proximity of villages to the National Park and (c) the security situation of the villages. In each of the 20 villages 35 questionnaires were distributed giving a total of 700 questionnaires. From this number, 556 were retained giving a retention percent of 79.4%.

2.2.3 Selection of respondents

A set of questionnaire divided into three sections A, B, and C was used for the conduct of the study. Respondents to the questionnaire were Staff of the Divisional delegations of Forestry and Wildlife, farmers, graziers, Village Chiefs, Village Traditional Council members, hunters, None-Timber Forest Products (NTFPs) species harvesters/collectors, teachers, trappers, women, youths and other forest users. These groups of respondents were targeted because they make life directly or indirectly from the park or protectors of the park. Sections A and B of the questionnaire which was made up of open ended questions in conjunction with appropriate PRA tools, gathered information on questions related to habitat use, number of farms, farm sizes, hunting activities, the trends of wildlife, time of occupation of the park, willingness to surrender property to government, crop raiding activities, threats to wildlife and conservation strategies. On the other hand, section C which was made up of a mixture of open ended and close questions in conjunction with appropriate PRA tools, collected information on the potential effects of habitat fragmentation on the distribution of primates and the most affected species, least and preferable conservable species in the park, isolation time.

Semi structured interviews and a series of focused group discussions were also conducted. Before field work proper, we identified potential hunters and interviewed them with pictures of primates in the field. They identified the primates found or ever seen in the park. An interview guide was produced and the types of primates were used for our interview throughout the period. Interviewees are asked about types of primate presence, abundance, threats, crop raiding activities, and the occurrence of other primates in the area. We also asked about the most preferable conservable primates and the least preferable conservable primates if they were made conservators. Interviews conducted were done during the evening periods between 4 to 6 pm every day where respondents were at home and in the morning and afternoon on market days and Sundays respectively. We used a systematic interview procedure to get

information from hunters and farmers. The Divisional delegate for forestry and wildlife in Menchum and the conservator, were also interviewed on the status, conservation and future of prospect of primates in the park. A series of meeting were held with hunters and farmers in farmsteads inside the park on the threats they are posting to wildlife and the best method to conserve wildlife, the last being that held in Munkep and Gayama on June 8th 2018 chaired by the chief of Forestry for Fungom Sub Division accompanied by four Eco guards from Kimbi.

The survey is guided by a hunter-farmer. These are people who are vest with the park. The entire field survey exercise was constituted by a team of two knowledgeable farmers and two brave hunters, one eco guards, two field assistants, two Botanist, three research students (master students from the University of Dschang) and 21 local people in the park. The team was trained on how to identify and distinguish between different primate's footprint, dung, feeding signs and nests. The Botanists duty was to identify plant species during which was meant to aid in the description of the flora of the park. The first field assistant carried a pair of binoculars and recording all observations in a data sheet, the second field assistant helped the team leader in searching for signs while the second hunters helped as field guide based on their familiarity with the terrain. They were responsible for initially marking the survey track (with machete cuts) and also acted as porter and the also as a guide. The eco-guard was responsible to legally guide the research team and also because he was vest with the park and to scare (not kill) any animal found aggressive during the research period. The 21 local people were either selected by the chiefs or elders to guide the team in particular farmsteads during concentrated searches of animals and threats. Each village in the park provided 2 local guides who were used within their sphere of influence partly as demand by their customs and partly because of fear of intrusion of different farmers into their farmlands. This was guided by a cover letter from the paramount fon of Esu which was presented in all the farmsteads or villages in the park for security reason.

2.3 Data Analysis

To determine the Land-use/Land-cover of the area in 1987, 2007 and 2017 as well as to determine the extent of vegetation cover in the area in 1987, 2007, and 2017 and each image set were broadly classified into five different categories/polygons as on table 3.1. After the classification was done, the area coverage (extent) of each land-use/land-cover type of the four time periods was ascertained by constructing the histogram of each classified image. To determine the land-use/land-cover change of the study area between 1987– 2017, the area coverage (km²) of each classified land-use/land-cover type for these time period was extracted from the images histograms prepared earlier, and the results was subsequently compared to calculated the area (km²) and percentage change of each land-use/land-cover type. The changes in square kilometer/hectare of a particular land-use/land-cover type were derived by subtracting the former area coverage (km²) from the latter area coverage of that particular land-use/land-cover type. Change in square kilometers = the latter area coverage of land-use/land-cover type of interest minus the former area coverage of the same land-use/land-cover type (for example, the area coverage of vegetated land in 2007 minus the area coverage of vegetated land in 1987). To get the percentage change of each land-use/land-cover type between 1987– 2017, the observed change was divided by the base year (area coverage of the base year) multiplied by 100.

Percentage change of class =	observed change (km ²) X 100
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	Base year
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To analyse the rate of vegetation change in the study area between 1987– 2017, the area, percentage and rate of vegetation change in the study area were determined. The area coverage of vegetation in kilometres as derived from the classified image statistics was used. The area change of vegetation was ascertained by subtracting the former area coverage of vegetation from the latter area coverage of vegetation. The change in square kilometres (Observed change) = the area coverage of vegetation of the latter image minus the area coverage of vegetation of the former image (i.e 1987-2017). Percentage change, was however determined by dividing observed change by sum of changes multiplied by 100 Percentage change (trend) = Observed change X 100 Base year

In obtaining annual rate of change in vegetation, the percentage change of vegetation was divided by the number of study year, 1987 – 2017(30yrs). Annual Rate of change = % change No of study year. To determine the extent to which human activities have affected vegetation cover in the area, the landuse/land-cover maps prepared from the images were used to assess changes in vegetated land and bare soil. This was done by overlaying (clipping) the portion of the study area occupied by bare soil for each study year on the vegetated land of the base image of 1987 (Original vegetation) so as to find out the amount of the original vegetation that was displaced by the bare soil in each study year. The resultant map histogram was used to determine the aerial and percentage extent to which vegetated land has been displaced as a result of bare soil.

Socio-economic data were compiled using the Microsoft Excel 2010 spread sheets and analyzed using SPSS version 20. Encounter rate of identified of wildlife were calculated using Microsoft Excel 2010. The Encounter rate (ER) or index of Kilometric Abundance (IKA) = Total number of objects or signs observed divided by the length (L) of transect (in kilometer).

$$ER= N / L$$

Where: N = Number of objects observed

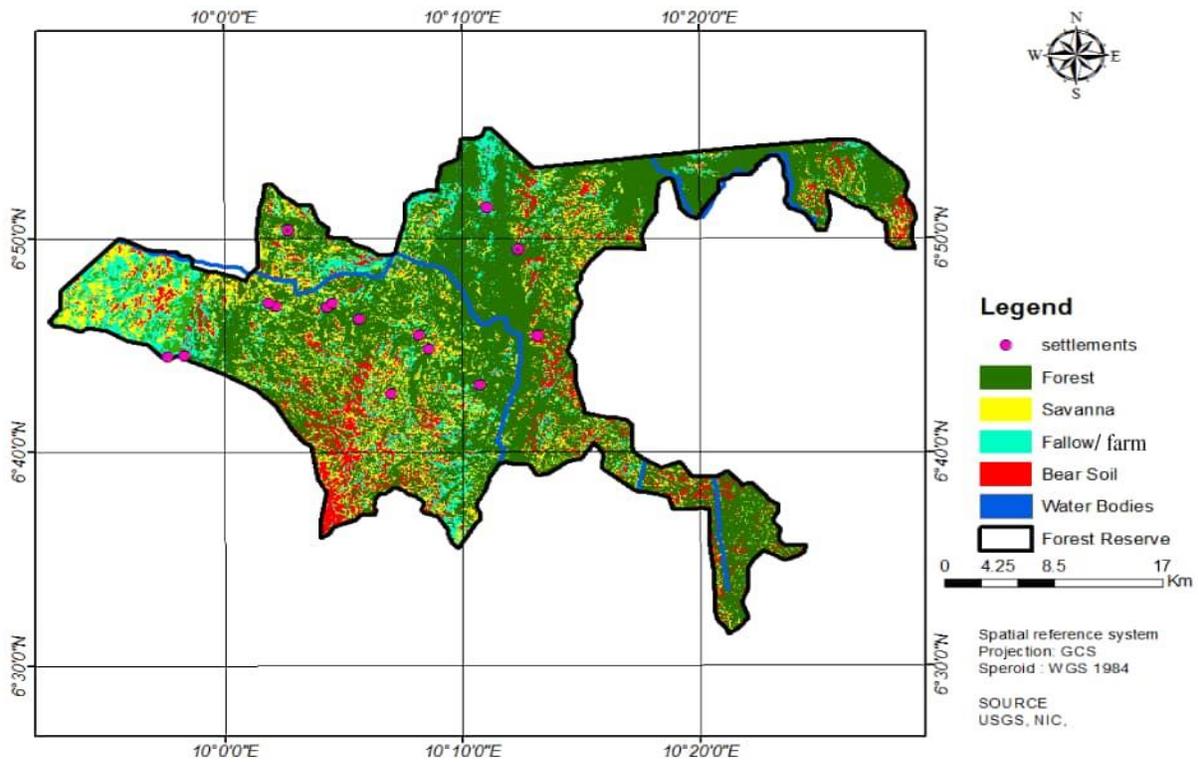
L = Length of transect (Km)

results were presented in tables, charts and graphs

3 Results

3.1 Land use change 1987

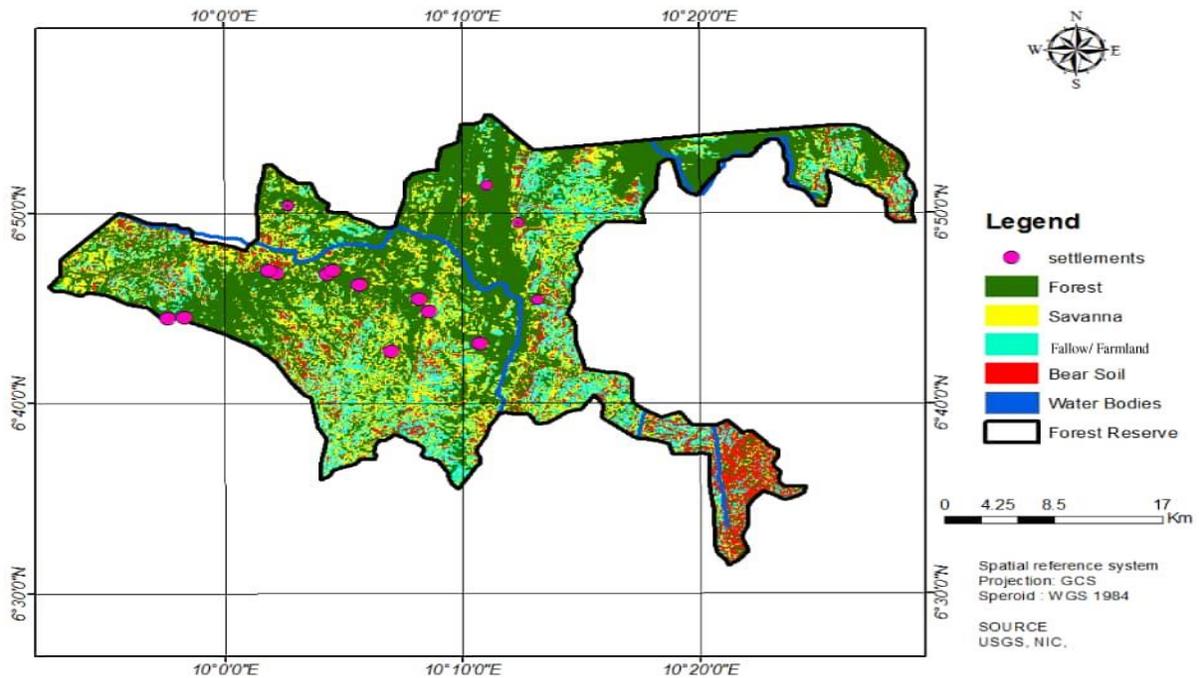
The assessment of land use status in 1987 showed that forest covered 49641.97 ha (52.05%) of the total land surface of the park. The savanna was covered by 28985.37ha (30.39%) of the total land area. This was followed by farmland and fallow land which covered 9467.87 (9.75%) Bear soil covered 5134.58ha (5.38%) which was either degraded grazing lands or natural waste land. Settlement covered 1830ha (1.92) while Water bodies covered 320.48ha (0.34%) of the total land surface. (Map 1 and table1)



Map 1. Cover of the KFNP, 1987

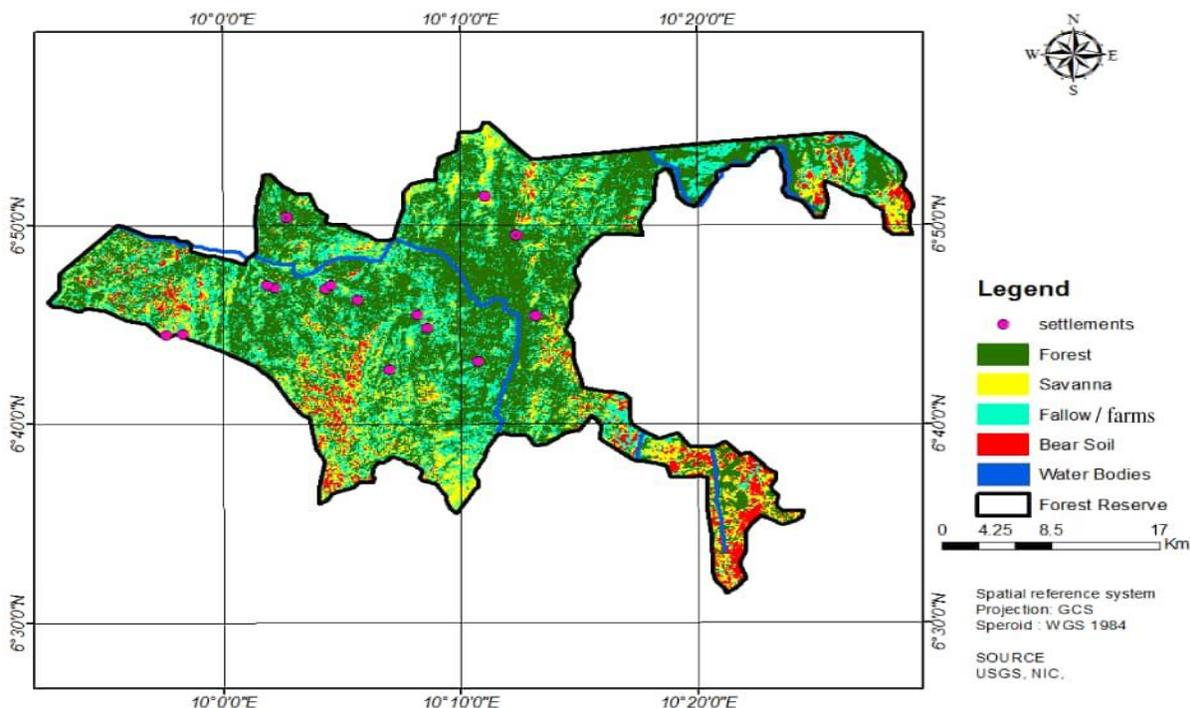
In 2007, the forest has reduced to 42356.7 (44.4%) meaning a reduction by 7.62%. savanna also witnessed a reduction in surface area coverage to 24824.6 (26%) meaning a reduction by 4.39%. Bare soil saw an increase and covered 11227.5, representing 11.8% of land coverage. Settlement increased to 1921ha (2.01%) and water bodies increased to 1983.6ha (2.08 %). This is shown in map 2 and table

1



Map 1: Cover of the KFNP, 2007

In 2017, forest covered 36198ha (38%) of the total land surface, savanna cover 31045 (32.57%), fallow covered 15096.1 (15.8%), bear soil (little or no vegetation) covered 10189.4 (10.7%), water body covered 698.75ha (0.73%) and settlements cover 2153.6ha (2.26%) of land (table 1)



Map 3; Cover of the KFNP, 1987

Table 1 LULC Land use change for KFNP, 1987, 2007 and 2017.

land use (Ha)	1987		2007		2017	
	Area (Ha)	Area in %	Area (Ha)	Area in %	Area (Ha)	Area in %
forest	49642	52.05	42356.7	44.4	36198	38
savanna	28985	30.39	24824.6	26	31045	32.5
bear soil	5134.6	5.38	11227.5	11.8	10189	10.7
Fallow	9467.9	9.75	13065.8	13.7	15096	15.8
settlement	1830	1.92	1921	2	2153.6	2.2
Water	320.48	0.34	1983.6	2.1	698.75	0.73
SUM	95380	100.02	95380.2	100	95380	100

3.2 Magnitude of LULC Change of the KFNP from 1987 to 2017

The magnitude of land cover and land use change has been manifested in the rates at which the changes occurred. From 1987 to 2007, the forest reduced from 49641.97ha (52.05%) to 42356.7ha (44.4%) in 2007. This accounted for a magnitude change of -7285.3ha (7.6%) reduction of the forest with an annual deforestation rate of 0.38%. Within this time, savanna, reduced from 28985ha (30.39%) in 1987 to 24824.6 (26.0%) in 2007. This gave a magnitude change of -4160.4ha. (4.4%) accounting for an annual reduction rate of 0.22%. Farmland and fallow land Cultivable farm) increased from 9467.87ha (9.75%) in 1987 to 13065.8 (13.7%) in 2007. This

indicated a magnitude change of 3597.9ha (3.8%) giving an annual growth rate of 0.2%. in the same line, bear soils increase from 5134.58ha (5.38%) from 1987 to 11227.5 (11.8%) in 2007. This accounted for a magnitude change of 6092.9ha (6.4%), giving an annual growth rate of 0.32%. During this time, water bodies increased from 320.4775ha (0.34%) in 1987 to 1983.6 (2.04%). This resulted to a magnitude change of 1663.3ha (1.71%) accounted for an annual rate of 0.09% while settlements from 1830ha (1.92) in 1987 to 1921 in 2007. This gave a magnitude change of 91ha (0.09%).

Between 2007 and 2017, the magnitude of change was also very significant. Forest reduced from 42356.7 (44.4%) in 2007 to 36198 (38%) in 2017. This gave a magnitude change of -6158.7 (6.4%), giving an annual reduction rate of 0.64%. Savanna changed from 24824.6ha (26%) in 2007 to 31045ha (32.5%) in 2017. This gave a magnitude change of 6220.4ha (6.5%) with an annual rate of 0.65%. Farmland changed from 13065.8ha (13.7%) in 2007 to 15096 (15.8%). This gave a magnitude change of 2030.2ha (2.1%) giving an annual rate of 0.21%. Bear soil change from 11227.5ha (11.8%) in 2007 to 10189 (10.7%) in 2017. This accounted for a magnitude change of 1038.5 (1.1%), accounting for 0.11% annual change. water bodies changed from 1983.6ha (2.08%) in 2007 to 698.75ha (0.73) in 2017. This gave a magnitude change of -1284.85ha (1.35%) accounting for annual rate of 0.14% while settlement increased from 1921ha (2.01%) in 2007 to 2153.6ha (2.26%) in 2017. This gave a magnitude change of 323.6ha (0.24%) with annual rate of 0.02%.

The magnitude of change for our study period (1987-2017) showed an increasing in the magnitude of land use and land cover. Forest reduced from 49641.97ha (52.05%) in 1987 to 36297.72ha (38%) in 2017. This accounted for -13444 (-14.1%), giving an annual deforestation rate of 0.47%. Savanna increased from 28985.37ha (30.39%) in 1987 to 31045ha (32.5%) in 2017. This gave a magnitude rate of 2060ha (2.2%) giving an annual growth rate of 0.07%. Farmlands increased from 9467.87ha (9.75%) in 1987 to 15096ha (15.8%) in 2017. This gave a magnitude change of 5628.1ha (5.9%) with an annual rate of 0.19%. Bear soils increased from 5134.58 (5.38%) in 1987 to 10189ha (10.7%) in 2017. This is accounted for 5054.4 (5.3%) magnitude change, giving an annual reduction rate of 0.18%. Water bodies changed from 320.4775ha (0.34%) in 1987 to 698.75ha (0.73%). This is responsible for 378.25ha (0.39%) giving an annual change of 0.01% and settlement increase from 183050ha (1.92%) to 2153.6ha (2.26%). this gave a magnitude change of 323.6ha (0.34%) accounting for annual change of 0.01%.

Table 3 Magnitude of LULC change 1987-2017

Land cover/	1987-2007		2007-2017		1987-2017	
	Magnitude of change (Ha)	% of change	Magnitude of change (Ha)	% of change	Magnitude of change (Ha)	% of change
land use						
forest	-7285.3	7.6	-6158.7	6.4	-13444	14.1
savanna	4160.4	4.4	6220.4	6.5	2060	2.2
bear soil	6092.9	6.4	1038.5	1.1	5054.4	5.3
Farmland/Fallow	3597.9	3.8	2030.2	2.1	5628.1	5.9
settlement	91	0.09	232.6	0.24	323.6	0.34
Water	1663.12	1.74	-1284.85	1.35	278.27	0.29

3.3 Major causes of land use change in the Kimbi Fungom National Park;

This land cover change is caused by a number of factors which are grouped into expansion of farmlands, population increase, livestock grazing, environmental change, bush fire and illegal exploitation of the forest (figure 2). From our questionnaire administration, a high proportion of the respondent (20.9%, n=116) were of the fact that increasing farming activities in the park have remained the main cause of land use change. This was followed by 19.1% (n=106) for those who advocated population increase to be the main cause of land use change. The least (13.1%, n=73) were those who saw bush fire as leading cause of land cover change.

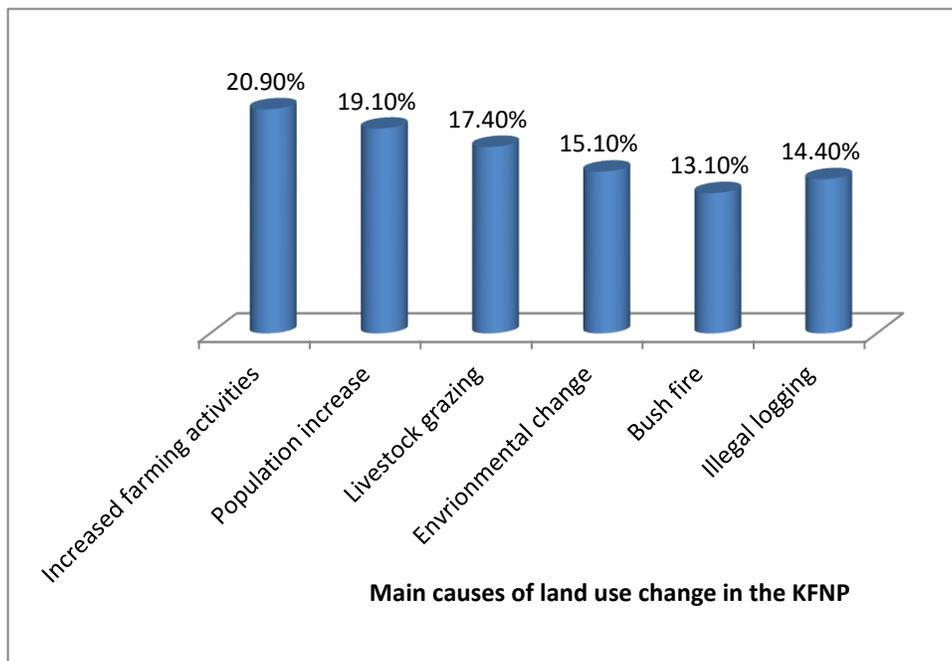


Fig 1: Major causes of land cover/land use change in the KFNP.

3.4. Trends on wildlife population in the park

We sampled respondent opinions on the changing trends of wildlife in the park from 1987 to present using a 10 years interval. A high proportion, (n=518) observed a declining trend in the animal population for the past 30 years while very few people (n=38) observed an increasing trend in the population of species. The results for the fluctuation in wildlife population trends were presented in table 4. Those who observed an increase were those who lived in areas like Munkep Gayama where hunting pressure is being managed and hunters have resorted to farming, a thing that has led to rapid habitat fragmentation and habitat loss.

Table 4: Trend of some large mammals in the park for the past three decades

Family	Common Name	Scientific Name	1787-1997	1998-2007	2007-2017	Trends
Bovidae	Buffalo	<i>Syncerus caffer</i>	****	***	**	Reducing
	Bushbuck	<i>Tragelaphus scriptus</i>	****	***	**	Reducing
	Bay duiker	<i>Cephalophus dorsalis</i>	****	****	**	Reducing
	Red duiker	<i>Cephalophus natalensis</i>	****	****	***	Reducing

Suidae	Bush Pig	<i>Potamochoerus larvatus</i>	***	***	***	Increasing
Pongidae	Chimpanzee	<i>Pan troglodytes ellioti</i>	***	***	**	Reducing
Cercopithecidae	Olive baboon	<i>Papio anubis</i>	****	****	****	Reducing
	Patas monkey	<i>Cercopithecus sp.</i>	***	***	***	Reducing
	Velvet monkey	<i>Chlorocebus pygerythrus</i>	****	****	***	Reducing
	Mona monkey	<i>Cercopithecus mona</i>	***	***	***	Increasing
	White nosed monkey	<i>Cercopithecus nictitans</i>	****	***	***	Increasing
	Preuss monkey	<i>Cercopithecus preussi</i>	**	*	*	Extinct
	Moustache monkey	<i>Cercopithecus cephus</i>	**	*	*	Extinct
	Canidae	Bush dog	<i>Lycaon pictus</i>	**	**	**
Viverredae	African civet	<i>Viverra civetta</i>	**	**	**	Reducing
Herpestidae	Slender Mongoose	<i>Herpestes sanguinea</i>	***	***	**	Reducing
Hystricidae	Porcupine	<i>Hystrix cristata</i>	****	***	**	Reducing
Thryonomyidae	Cane rat	<i>Thryonomys swinderianus</i>	****	****	****	Stable
Procaviidae	Rock Hyrax	<i>Procavia capensis</i>	****	***	**	Reducing
	Hyena	<i>Hyaenidae</i>	**	**	**	Reducing
Manidae	Pangolin	<i>Smutsia gigantea</i>	***	**	**	Reduced

****=very abundant ***= abundant, ** less abundant, * not present

3.5 Current population trend of species based on classes

We classified the most commonly found species in order of abundant as of present in the park based on field observation, interviews; transect walk, concentrated searches and opportunistic views. We classified the animals into four groups; rodents, ungulates, primates and carnivores. A high proportion of respondents (30.8%, n=171) were of the fact that rodents dominate the national park. This was followed by those who saw primates as most numerous (26.6%, n=148). The least was those for carnivores (19.4%, n=108)

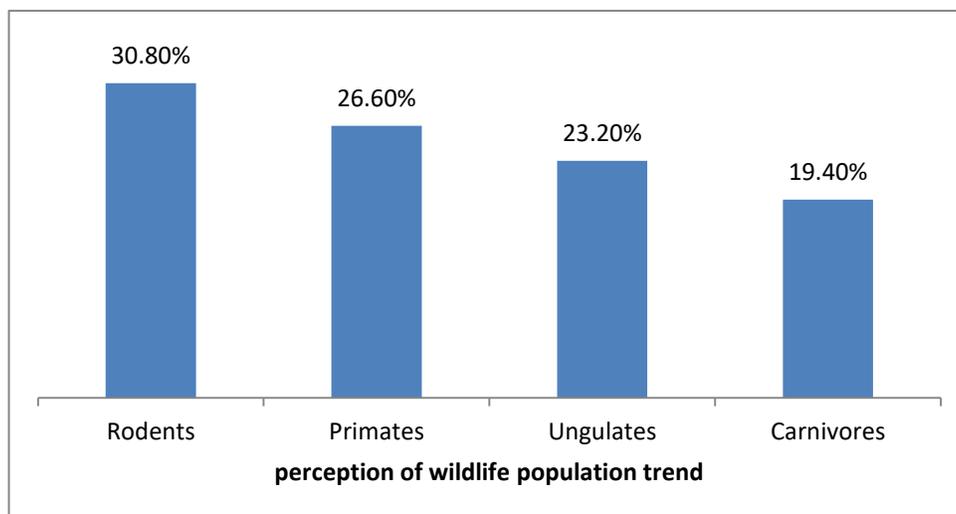


Fig 3. Species distribution according to family

3.6 Encounter rates of wildlife

A total of 274km distance was walked both in the line transect and concentrated searches. The encounter rates (n/L) of wildlife calculated to give the current trends of wildlife in the park. This was through signs in different locations such as dung, clearings (feeding signs), footprints and vocalizations. The highest encounter rate and density was gotten from cane rat (ER=0.76). This was followed by baboons(ER=0.72). It was followed by Mona monkey and white nosed monkey(ER=0.56, 0.56 respectively. The least encounter rates came from pangolin and chimpanzee (0.03 and 0.06 respectively).

Table; Encounter rate and densities of some large mammals in the park, 2018

Family	Common Name	Scientific Name	Number	ER
Bovidae	Buffalo	<i>Syncerus caffer</i>	25	0.09
Bovidae	Bushbuck	<i>Tragelaphus scriptus</i>	17	0.06
Bovidae	Bay duiker	<i>Cephalophus dorsalis</i>	19	0.07
Bovidae	Red duiker	<i>Cephalophus natalensis</i>	28	0.1
Suidae	Bush Pig	<i>Potamochoerus larvatus</i>	24	0.09
Pongidae	Chimpanzee	<i>Pan troglodytes ellioti</i>	16	0.06
Cercopithecidae	Olive Baboon	<i>Papio anubis</i>	170	0.62
Cercopithecidae	Patas monkey	<i>Cercopithecus sp.</i>	82	0.3
Cercopithecidae	Velvet monkey	<i>Chlorocebus pygerythrus</i>	122	0.45
Cercopithecidae	Mona monkey	<i>Cercopithecus mona</i>	131	0.48
Cercopithecidae	White nosed monkey	<i>Cercopithecus nictitans</i>	142	0.52
Canidae	Bush dog	<i>Lycaon pictus</i>	17	0.06
Viverredae	African civet	<i>Viverra civetta</i>	20	0.07
Herpestidae	Slender Mongoose	<i>Herpestes sanguinea</i>	100	0.36
Hystriidae	Porcupine	<i>Hystrix cristata</i>	27	0.1
Thryonomyidae	Cane rat	<i>Thryonomys swinderianus</i>	178	0.65
Procaviidae	Rock Hyrax	<i>Procavia capensis</i>	125	0.46
Manidae	Pangolin	<i>Smutsia gigantea</i>	8	0.03

3.7 Impact of land use change on the population trends of primates

Five factors were discovered to have been the major impact of land use changes on the population of wildlife in the park. A high proportion of respondent (34.2%, n=190) identified migration of species as a major consequence of land use changes. This was followed by those who opined that decline in wildlife population is the major resultant effects of land use (30.4%, n=169). The least were those who thought that land use change is leading to increase in wildlife population in the park.

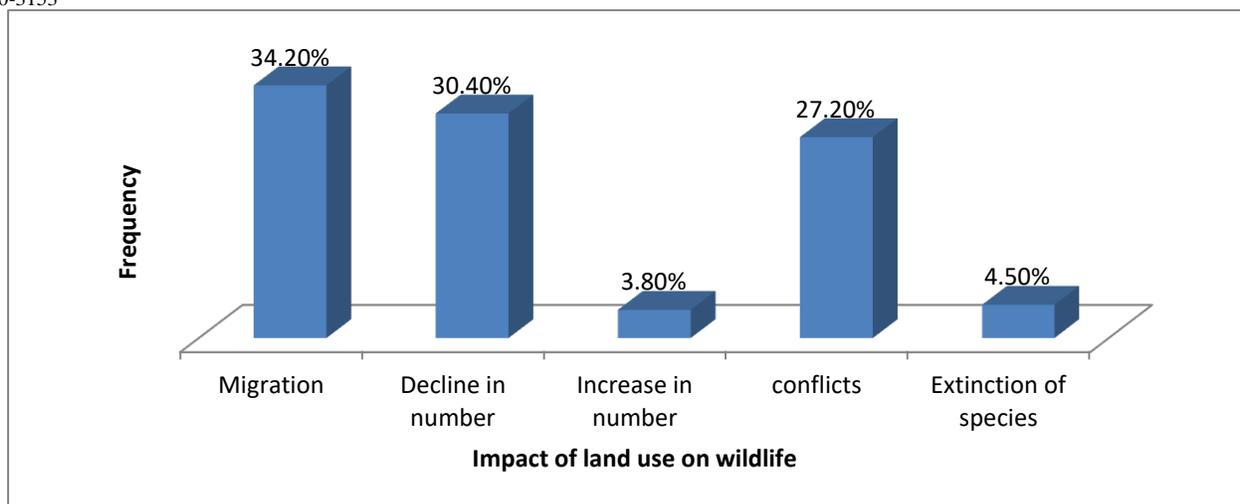


Fig 3: Major Impacts of Land use change

4.0 DISCUSSION

4.1 Magnitude of land use change

The magnitude of land use change in the KFNP is really visible; through a reduction of forests stand by 14.1% (for example, expansion of farm land, illegal logging) for the past three decades and the increase in bare soils of 5.3% (increasing grazing) for same period. Previous study put deforestation rate in the park at 12.67% (Roger, 2011), while at moment deforestation stands at 14.1% (133.44km²). Thus, meaning an increase of 0.67km² in the past 6 years. If land uses continue in the same paste, holding everything constant, we are expected to loss an additional 22.11km² by 2050. This is enough to displace a great number of wildlife. The increasing anthropogenic activities in the park have led to the increase incidents of small patches of land (Fahrig, 1999, Fahrig ,2003). This increase in the number of patches in natural habitats leads to high degree of fragmentation (Wilcox and Murphy, 1985) and this affects the minimum requirements of wildlife species in their respective ranges (Turner and Ruscher, 1988, Aramde et al, 2014). Extensive land uses occurs in all habitat types but remained the dominant threats to forest and grassland species (Aramde et al, 2014) as seen from deforestation rate and the rate of bare soils in the park. This had significantly affected wildlife in the Kimbi Fungom national park through population change. The major factors responsible for land use and land cover change were the expansion of farmlands (commercial and subsistence), population growth, increasing livestock grazing activities, environmental degradation, bush fire illegal logging and settlements. We encountered 14 settlements in the park, 7 of which are grown up villages with social amenities and 7 farmsteads which are gradually growing into independent villages. These villages and farmsteads have a population of over 3500 who are involved in farming, livestock grazing, illegal logging, hunting, collection of NTFPs (Tata, 2015) which reflected a true picture of habitat fragmentation and habitat loss leading to land cover change.

Farming was recognized as the major land use activity in the park and responsible for massive habitat fragmentation. A high proportion (47.7%, n=265) of the people involved in farming both subsistence and cash crop production have between 3 and 5 farms while 32.7% (n=182) have less than 3 farms and 19.6% (n=109) have above 5 farms. Individual farm sizes differ. A great number of the people (44.4%) of the people have farm sizes ranging from 0.5ha to 3ha. This is followed by 39.3% with farm sizes between 3.5ha to 5ha while 16.4% have farm sizes that range above 5ha. Out of these farmers who make life in the park, 52.5% live inside the park with 47.5% live in the surrounding margins of the park. Farming was discovered to be the major activity in lowland areas such as

Munkep, Gayama, Mudzey, Etchem, Tengheukah, Mbwi Mbwi, Kedzuh and in the highland of Kedzong and was accounted for 13.99% of forest cover change in the study area with calculated from the satellite maps with an annual rate of 0.47 %. We encountered over 800 farms in the park and interviews with park occupants and authorities confirmed that there are over 2000 cocoa and palms farms in the park. This remained the greatest threats to wildlife in the park (Sainge, 2015). Global environmental change (soil depletion, rainfall variability and droughts) in recent years have led to massive crop failures in other farmlands, thus pushing a majority of the farmers in the lowlands of the park.

Grazing too is very active in the park. We encountered 20 grazers with over 40 herds giving an estimated population figure of 4000 cows in the park. Besides, cows, sheep, goats and pigs are reared in the park. Cows were noted to be responsible for the degraded hilltops in the park in Nkang, Kedzong and Kimbi (Photo 1). The increased in cattle number fragment the habitats of bush buck, red duiker and many rodents in the higher elevation and brings about competition (Galliziole, 1979, Forminyam, 2015, Nkemtaji, 2017).



Photo 1; Overgrazing in the Kimbi Fungom National Park

When often, savanna species inhabit areas closed to Gallery forest when the habitat is degraded thereby exposing wildlife to hunters. In 2011, the Gayama zone was carved out as a transhumance zone in Esu village and many Nigerian graziers brought in their livestock during the dry season (Balgah and Fang, 2016) which have been in total competition with mammals in the perennial lowland. Overgrazing and trampling can severely affect soil erosion by compacting the topsoil, which leads to a decrease in rates of infiltration, increased surface runoff and subsequently to erosion (Broersma et al. 2000) which changes the structure of natural vegetation which reduces the plant diversity leading to a migration of savanna species (Garnett and Crowley 2000).

As human population increases, there is the tendency of agricultural expansion (Fahrig, 2003). According to information from the UNITED COUNCILS AND CITIES OF CAMEROON, the Zhoa municipality has a total population of 58,000 inhabitants distributed over its 35 villages with women making up to 52% and men 48% of the population. The Furu Awa council area on the other hand, has a population of about 19,000 inhabitants spread over a surface area of 1,500km². Official statistics put the population of the Fonfuka council area at 27,750 persons. Finally the Misaje council area counts 40,706 inhabitants, with a population density of 0.83persons/km² (UCCC, 2014). Out of these figures, field evidence showed that closed to 5000 people made lives directly (permanently) from the park with additional numbers of about 500 who come for seasonal benefits such as the collection of NTFPs (Njangsa Bush mango, honey) and hunting (mainly trapping between June and October). This increase in population in the park has

been caused by global environmental change resulting from crop failures in other farmlands. The fertile lowlands of the park thus remained the haven for agricultural potentials. Thus, in early 2018, the park received more than 100 new people forcefully displaced by the social unrest in the North West and South West. These people have in turned embraced farming unintentional, thus swelling the population of the park. This is manifested in the number of settlements in the park and the number of new houses and hurts in the park with high room density (between 4 to 10 people per house). This affects wildlife population directly and indirectly or indirectly (Olson, 2000)

Logging has been recognized as a fundamental threat to forest habitat fragmentation as it results from the selective removal of areas of vegetation (Saunders et al. 1991, Laurance et al. 2002). We observed that besides the logging in the lowland forest, the woody savanna since early 2017 have become under serious logging. The discovering of *Pterocarpus erinaceus* species commonly called “Kosso” in Nigeria or “Madrik” has become the news making event in the park as those who are supposed to protect the species area involved in the business. These trees are logged and exported to Nigeria through the recently flooded River Katsina Ala.



Photo 2; illegal logging of *Pterocarpus erinaceus* and creation of tracts

Being a protected area where any form of logging is illegal, selective logging of this nature is known to leads to the creation of tracks that are usually unsuitable for a protected area (Laurence, 2001). Such tracts are known to eventually serve as access routes for other anthropogenic activities (Kühl *et al.*, 2008) such as hunting, snaring as well as clearing more areas for farms, which have led to the massive displacement of wildlife in the park today.

4.2 Effects on the movement of wildlife:

Land use and land cover change are the leading threats to wildlife population changes in most of the protected areas today (Blake, 2001). This affects the movement of wildlife, numbers and accelerates conflicts especially when natural food supply is limited due to habitat loss. Before the establishment of farms in the today kimbi Fungom National park, there were high movement of buffaloes in the park and were seen at close range. When farming started increasing, the population changes as well. Today, due to habitat degradation, buffaloes move to the lowlands of Marshi in the dry season have in the fungom area they have drifted towards the north east. This observation is in line with Grimshaw and Forley (1990) in a study conducted in Nairobi on elephants. As they move, the presence of farms and people scared them and some of them are lost to hunters (Nkemtaji, 2017) or find their path blocked by farms or settlements (Grimshaw and Forley, 1990). Illegal logging which dominated the park in 2017 and 2018, have also resulted to the

blockage of many transhumance or migratory routes of animals leading to a North East drift of Buffaloes. Chimpanzee in the park used to move freely in virgin forests as they vocalized regularly and were frequently seen especially at Munkep, Gayama, Etchem and Mbwi-Mbwi (confirmed by 100% of hunters). The high abundant of chimpanzee in the 1980s in the park especially in the Fungom forests have today occupied the almost impassable steep rocky gallery forests due to the destruction of the extensive lowland forest, accompanied by illegal hunting in the park. The fragmentation of habitats eased the view or access of hunters to chimpanzee in the patches where they occupied before the 2007. Other primates like velvet monkey, mona monkeys, baboons and patas monkey were also frequently seen some years back in all the vegetation types as abundant food from the virgin forest kept them. Today, they are seen in different time periods and movement has been limited to areas where food supply is possible. During harvesting periods (rainy season), primates moved more regularly close to the farms (Chistine, 2003). During non harvest periods they move more frequently in natural vegetations where food is available especially in steep gallery forest with high presence of food.

4.3 Impacts on the number of species

Field results saw a declining trend in wildlife population for the period under study. Though some people are of the fact that some species have started increasing owing to the 2015 recognition of the Fungom area by the Cameroon government and the creation of the KFNP, over 90% of the species have remained on the steady decline due to intensification of human activities. There has been a gradual takeoff in the primate's population as from 2015 in some parts of the park like Munkep and Gayama as gunshot is partly under controlled and also due to the fact that primates have adapted to the steep gallery forests and the thick woody savanna (Onderdonk and Chapman, 2000; Chaves et al., 2012). But this has not solved the problem to feel that primates are increasing because at least every week a primate is killed in the park especially in areas where accessibility is really impossible. Thus, population of the primates is still on a decline and the chimpanzee population has been the most affected. We recorded the presence of chimpanzee through nests and callings (vocalization). A great number of callings were recorded out of the park. Our concentrated searches found 16 nests in the park and 100% of hunters confirmed those chimpanzees are on a serious decline. Such observations were also made by Mvo, *et al.*, (2016) in their study of "Chimpanzee in Ethno-Primatological Practices in the KFNP and Kom-Wum forest reserves". Most of the chimpanzee nests were found in gallery forests with elevation above 1000m due to the massive presence of human activities in the lowlands. This is similar to the a study conducted on gorillas a close relative to chimpanzee at Kagwene where gorillas occupied higher elevation due to the presence of human activities at lower elevation of 401 to 550 m (Nkwatoh *et al.*, 2017). The population of patas monkey in the park is on a gradual increase. This is partly due to the fact that Patas monkey have the ability to survive in drier habitats which provide them with a buffer against extinction (Lynne et al, 2007) and partly because of cultural believes that people (especially herders) transformed into patas around the park. Thus many hunters do not kill patas and many local people do not eat them.

The population of ungulates (especially buffaloes, bushbuck and duikers) is on a drastic decline due to the depletion of habitats through grazing and expansion of farmlands. In addition to habitat problems, ungulates have also remained the most hunted animals in the park leading to low encounter rates. These results were also got by Nkemtaji (2017) where he found a low encounter rate of buffaloes and bushbuck in the park. Thus conservation effort should help spare the lives of these species. The population of pangolin is on the decline and this was confirmed by 100% of hunters based on their bush meat trade. Pangolins were one of the species sold in the market on weekly basis. But today, it is extremely difficult to see a pangolin. The population has drastically declined but hunters are of the fact that the population is still high in some parts of the park. This information needs thorough verification because our survey came across mainly signs and a carcass caught in the dry season of 2017. The inglorious hunting trips have been caught short

due to low return and also because of the continuous education on hunting. Their talk from long distance hunting, accompanied by a less returned is forcing many hunters to abandon the job and turn towards farming. However, abandoning hunting or the reduction in gun sounds have only camouflaged success in the conservation efforts of the officials of the Kimbi-Fungom national park who have not quickly realized that agricultural expansion remained the greatest threat to wildlife ((Suleiman, 2014). Chimpanzee and pangolin remained the highest endangered species in the park with the lowest encounter rates and population densities and need urgent conservation effort to spare the remaining numbers.

Most importantly previous report indicated the presence of the Preuss, black and white colobus while hunters confirmed the presence of the moustache monkey some years back. In the face of growing land uses. Our one year in the park did not come across such species and hunters confirmed their existence three decades back. This is in contrast with widespread misconception about the presence of these species by some researchers (Tata, 2015, Nkemtaji, 2017). Also, Ndenencho (2005), mentioned the presence of the Black and white colobus, but our observation noticed that there might be some conception between the rumped putty nosed monkey and black and white colobus. This species has not been sighted in the park and hunters confirmed that they have not come across them or even their signs. They are either locally extinct or extirpated.

4.4 Impacts on Human Wild Conflict Situation

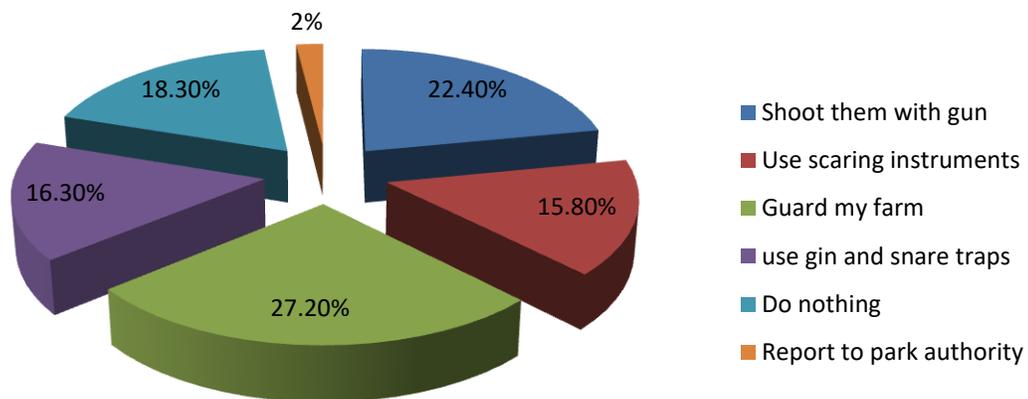
Land use changes have exposed the inhabitants of the Kimbi-Fungom national park to the risk of conflicts. These conflicts are either through physical confrontation, crop raiding or property destruction. According to the conservator of the park, wildlife human conflicts have resulted mainly from habitat destruction which has degraded food supply to wildlife especially large mammals. In the Kimbi compartment, there has been buffalo-herder conflicts and buffalo-farmer crisis while in the Fungom zone, there has been a series of buffalo-human confrontation and massive crop raiding from wildlife especially primates and rodents. Nearly all the farmers (99% of respondents) have been victims of crop raid by wildlife. During planting and shooting, rodents raid the crops as well as bushbuck, duikers and some birds. At maturity, primates take unguarded farms hostage causing more harm whenever they come in contact with maize or groundnuts. These primates especially baboons invade farmlands especially maize and groundnuts which are the indigenous staple food causing more damage in a single raid (Suleiman, 2014). Baboons have been reported to be the most notorious crop raiders (Naughton-Treves, 1998). Maize and groundnut remain the highest crops which have suffered enormous in areas like Kedzuh (with over 800 subsistence farmers) and Kedzong and it is indigenous staple food. These crop raids have been more intense when primates have no opportunities to obtain food from the natural forest (Lamarque *et al.*, 2009, Suleiman, 2014). Their movements in search of food from one natural fragment to the other give them an intervening opportunity when they meet croplands on their roads. That is why 100% of the respondents took baboon as the least preferable conservable species in the park and elsewhere and prefer chimpanzee since they have never caused any destruction on their crops.

Physical confrontation has been recorded between hunters and buffaloes, hunter and chimpanzee and grazers and buffaloes. Cows have been killed in the Kimbi compartments due to the intrusion of buffaloes from the park into livestock herds especially in the dry season in the Kimbi village in 2015. Hunters have been wounded by buffaloes in the Fungom area with the last case recorded in 2014 in Munkep where a wounded buffalo attacked a hunter in a forest beneath the park. Injuries were sustained in Kimbi by government officials who went to evaluate the damage caused by a stray buffalo on a farm in 2016. The buffalo left the herd, invaded a farm where it stayed there for weeks. The officials who came to evaluate the farm and to officially sell the buffalo to a hunter did not

achieve their mission as they were all scared by the buffalo in the thick grassy landscape. Human wildlife conflicts have thus remained high in the park. This observation is very much similar to Thirgood, (2005) in Kenya where human wildlife remained paramount.

Respondents' reaction to crop raiding activities

Crop raiding activities is one of the greatest deadlocks to the conservation of wildlife in the park. Crop raiders give farmers serious problem and always give farmers a change of mind when crop fields are taken hostage by wildlife. Different people have different reaction to wildlife when crops are being raided. A high proportion of the people (27.2%, n= 148) opined that they guard their farms starting from planting to harvesting especially with crops like maize and groundnut. This was followed by those who advocated that they kill wildlife whenever they are found in their fields (22.4%, n=122) while the least said they report to the park authority (2%, n=11).



Guarding of crops especially maize and groundnut was recognized to be the major crop raiding protection activity in the park. This activity is time consuming as it delays production or divert activities of the farmers. This activity is mostly done by children when they are on holidays. Hurts are constructed in farmlands at strategic positions where the entire farm holding can be viewed. Children on holidays who are supposed to be weeding crops or assisting their parents in other activities in the park spend about two to three months in guarding farms. Guarding of farms was also observed by Valerie and Catherine (2009) in North Sumatra, Indonesia as a way to protect crops from wildlife. This makes farmers to invite hunters to shoot wildlife especially primates if destruction of crop persists. According to all the interviewees, shooting of wildlife was the most effective way to control them against crop damages. All hunters were of the opinion that any primate found on cropland is a thief and must be killed to pay the price of crop raid. Their perceptions about primate's attack on cropland were very offensive especially as their livelihood totally depended upon farming. This gives no reasonable doubt about the drastic decline in primate's population.

5. Some proposed management measures

There should be knowledge on the abundance and distribution of both animals and plants species in the park and regular patrols in the K-FNP in order to ensure a better protection of these species and sustainable management of their natural habitats. Also, designing <http://dx.doi.org/10.29322/IJSRP.9.01.2019.p8562>

awareness and educational programs, implementing effective communication channels between the local inhabitants, council, wildlife managers and the government

Communities in and around the park should be educated on the important of wildlife management. This should be done through a series of regular sensitization campaigns in the park. They should be placed on an annual rate based at enhancement development in their communities. This should be facilitated by performing a cost-benefit analysis on wildlife management. For instance, the cost of killing a pangolin to an individual and the benefit of protecting a pangolin to the community in terms of research and tourism was very interesting.

Land use planning strategies should be developed and implemented. For instance, the issue of expanding farmlands in the park should be handled through “limited use zone policy” where farmers are limited to their present farm holdings through farm intensification. This will help in the prevention of further habitat loss thereby enhancing the population growth of wildlife. Also, the encroachment of grazing activities in the park should be controlled and if grazing must take place in the park, grazing activities should be limited to area with relative low animal population.

The park should be divided into compartments, based on wildlife hotspots and cold spots. Places with little or no wildlife should be taken off the park while corridors with wildlife abundant should be incorporated into the park. For instance, the Western section of the park (Fungom zone) with a high number of chimpanzees should be incorporated into the park while the North Eastern degraded part of the park should be curved out of the park. This will facilitate management of the park.

Ecotourism activities should be promoted by implementing income generating micro- projects in order to divert local people attention from hunting and the encroachment of farmlands in the park.

6. CONCLUSION

Land use and land cover change has been known to be the major threat to wildlife population change in many tropical landscapes. This affects the population of wildlife negatively as the destruction of habitats could either lead to the migration of wildlife out of the park leading to their concentration in very difficult landscape, thus making it very difficult for people to have access to them. This can therefore lead to a decline in tourist potentials in the park, thereby defeating the purpose for park functionality. In recent times, there has been heavy farming, grazing and illegal exploitation of trees. In the Fungom zone with it rugged terrain characterized by steep rolling hills and heavily occupied extensive lowland, tourism may become very difficult since wildlife view is really difficult. Primates are only heard vocalizing in steep gallery forests, chimpanzee sneeze in far off zones, west of the park, buffaloes are concentrated at Mbwi-Mbwi and hyena footprints are viewed in sandy and muddy soils in the grassland. This makes conservation of wildlife in the park very difficult. However, restoring habitats through controlled grazing, intensifying agriculture in the park and involving the occupants of the park in the conservation process and most importantly identifying wildlife hotspots could yield fruits if the Kimbi-Fungom National Park must be seen as a tourist destination.

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Storybird: Engaging Learners in Building Simple Sentences

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Abstract- Major changes in technology have had an influence on education. In schools located on the outskirts of town in remote areas, technological advances are often ignored and the traditional way of teaching writing is considered the best option. Thus, pupils are hindered from maximizing their learning potential and creativity during writing activities. By incorporating Storybird, an engaging digital story writing website, it allows pupils to focus on the content of their writing aided by fun illustrations. This research aims to enhance pupils' writing skill and engagement in building simple sentences by using Storybird. The research design is action research which employed semi-structured interviews, anecdotal records as well as pretest and posttest in the form of worksheets. This research design is based on an action research model by Kemmis and McTaggart [5]. The data was collected from 15 pupils in three different primary schools in Sarawak, Malaysia located in Sebauh, Bekenu and Lubok Antu district respectively. The research results indicated that there was a positive improvement in pupils' writing skill in building simple sentences. They were also motivated to build simple sentences as they enjoyed the process of using Storybird. The pupils have also reflected positive engagement through collaborative learning in completing tasks using Storybird. Hence, Storybird is proven to help young learners with low English language proficiency to be more engaged in building simple sentences through collaborative learning.

Index Terms- Storybird, digital story writing website, simple sentences, writing skill, low English language proficiency

I. INTRODUCTION

The use of Information and Communication Technology (ICT) has been proven to improve the process of teaching and learning in general. Nevertheless, the use of ICT in teaching writing skills in English as a Second Language (ESL) classrooms is still not very encouraging [13]. Therefore, the Ministry of Education (MOE) in the third thrust Education Transformation Plan Rural School Sabah and Sarawak have redoubled efforts to improve the development of physical facilities, internet access and virtual learning (e-learning) to enable teachers and students to make use of ICT in teaching and learning process [6]. Pertaining to the concern on writing skills, according to former education

director-general Khair Mohamad Yusof, results of Malaysia Primary School Achievement Test in 2016 showed the students' weakness in writing accurate and grammatically-correct answer and revealed that Primary 6 pupils have yet to achieve a level desired for writing in the English Language [8]. Thus, the use of the digital storytelling website, Storybird can fulfil the lack of ICT exposure among primary school pupils in the outskirt and rural areas while providing an engaging and meaningful atmosphere in learning writing. Moreover, technology should be used as a beneficial tool in promoting students' creativity [11]. It also provides a platform for teachers to improve their practices in teaching writing by incorporating ICT.

Therefore, the aims of this research paper is to enhance pupils' writing skill in building simple sentences by using Storybird. It also strives to examine pupils' perception of the use of Storybird to help them build simple sentences and enhance teaching practice by using Storybird to improve pupils' writing skill.

II. LITERATURE REVIEW

In Malaysia, English is taught as a second language (L2) in primary and secondary schools. Much attention is paid by the Malaysian government towards the low language skills among Malaysian pupils [12]. Along with the establishment of the national policy which acknowledges English as the second language taught in schools, writing has been part of the teaching and learning of English in various levels of education.

Information and Communications Technology (ICT) in teaching and learning

A study was carried out by Yunus and Salehi to identify both advantages and disadvantages of using ICT in teaching ESL reading and writing [13]. The findings of the study revealed that attracting pupils' attention, facilitating students' learning process, helping to improve pupils' vocabulary knowledge and promoting meaningful learning were regarded as the most important advantages of using ICT in teaching ESL reading and writing.

Advantages of Storybird

A research on Storybird was conducted by Zakaria et. al. to identify students' experiences in using digital storytelling tool

called Storybird in writing English as a Second Language (ESL) narrative text [16]. The findings showed that majority of the respondents reflected their positive experiences in using Storybird in writing ESL narrative text. The use of Storybird helps pupils to develop their interest and a sense of authority in writing, knowing that they can write and express themselves via online tool. The application of Storybird has encouraged the users to create over 10 million picture books for the past few years as there are avid readers and talented writers who are inspired with the use of arts in storytelling [3].

In another study conducted by Yunus and Wan on the use of Storybird, concluded that Storybird was effective in improving students writing skill especially in developing creative ideas and critical thinking [12]. As Storybird offers the possibility to write collaboratively using various illustrations provided, learners gained new since they not only learn to write but also they have the authority of creating their own storybook.

III. FINDINGS AND DISCUSSIONS

The research design of this research is action research, based on the Kemmis and McTaggart model. In this model, there are four main stages which are planning, acting, observing and reflecting. During the planning stage, pupils' writing problem was identified. The acting stage involves the implementation of Storybird to address the problem. The data of the outcomes were collected and analysed. Subsequently, reflections were done based on the observations. These steps were repeated by taking into account improvements that have to be implemented in the next cycle.

Pretest and posttest consisting of identical questions were employed to examine the changes in pupils' ability to build simple sentences as a result of using Storybird. The researchers documented anecdotal records of the post-implementation of Storybird on pupils' reaction and behavior towards the use of Storybird, pupils' interaction in their pair or group and when the posttest was conducted. Semi-structured interviews were conducted to investigate the pupils' perceptions on using Storybird to enhance their writing skill. 7 participants including 5 females and 2 males were interviewed regarding their experience of using Storybird in writing simple sentences. Consequently, the findings will be able to provide significant insights from different perspectives of proficiency levels.

Table 1: Participants and the location of their respective schools

School location	Participants
Sebauh, Bintulu, Sarawak	P01
	P02
	P03
	P04
	P05
Subis, Miri, Sarawak	P06
	P07
	P08
	P09
	P10
Lubok Antu, Sri Aman, Sarawak	P11
	P12
	P13
	P14
	P15

Research Participants

The participants of the study included fifteen 9-year-old pupils from three different schools of the state of Sarawak, Malaysia. The schools are located in Sebauh, Bekenu and Lubok Antu district respectively. Purposive sampling method was employed with the intention of exploring pupils' experiences in using Storybird in building simple sentences. The participants were measured in their writing ability based on their past examinations from this year. All the participants fall into the category of low English language proficiency level.

Procedures

One hour English lesson was used to teach the simple sentence structure and conduct pretest. Teaching aids such as colored words cards were used during the lesson. The participants were then given pretest in the form of worksheets. They were required to build eight simple sentences correctly based on the subject given for each sentence. To solely measure their writing ability in building simple sentences, no visual aid were given during the lessons as well as in the worksheets. Participants were grouped in pairs or group of three. Since none of the participants had experience in using the tool, the researcher conducted step-by-step tutorials on how to use the tool were shown. After the participants have familiarized themselves with the tool, they were instructed to sign up for Storybird. Subsequently, they were assigned a writing task based on the theme, 'Friendship'. The participants were asked to complete the task individually in the first 30 minutes. Next, 45 minutes were allocated for them to work collaboratively among themselves to maximize language learning experience. At the end of each session, the participants were requested to publish their story online.

Data analysis techniques

Central tendency of descriptive statistics is selected to analyse the data of pre- and post-score of simple sentence construction test using Statistical Package of Social Sciences

(SPSS). The semi-structured interviews and post- implementation anecdotal records were transcribed and analyzed thematically.

Findings and Discussions

Participant	Pre-test score	Post-test score
P01	7	11
P02	6	10
P03	4	9
P04	9	12
P05	9	13
P06	9	13
P07	8	10
P08	6	9
P09	9	13
P10	9	11
P11	3	7
P12	7	10
P13	9	13
P14	4	7
P15	8	11
Mean (M)	7.13	10.6
Standard Deviation (SD)	2.10	2.03

Using Statistical Package of Social Sciences (SPSS), the following are the results of this analysis; pretest, N=15, M= 7.13, SD=2.10 and post-test, N=15, M= 10.6, SD= 2.03. The results show that the participants’ scores are more consistent and higher during post-test.

From the semi-structured interviews and anecdotal records based on the 3 schools, similarities were identified from the responses and observations and themes were formed. The use of illustrations in Storybird plays a role by providing visual stimulants for pupils to relate vocabulary with the illustrations. They will then be able to build simple sentences. The notion is supported by the following responses from participants as stated below:

P02: *“I look at the picture and see what is happening. Then, I write the sentences.”*

P07: *“I look at what the characters are doing in the picture.”*

P15: *“The pictures help me to know the actions and objects to write.”*

These responses have also been reflected in the anecdotal records in three schools whereby it is written that pupils were able to relate and figure out the appropriate words for the verbs and objects based on the situation shown in the picture that they have selected. Pupils appeared to be confident in constructing simple sentences as they were able to recall the words used in the activity.

Pupils’ motivation for writing simple sentences using illustrations increased as they were given the autonomy to choose the attractive illustrations which they find suitable. From the interviews with the pupils, it can be concluded that they have developed an interest in learning English using Storybird as it became easier and more purposeful for them to build simple sentences correctly. This is evident in the responses from participants as follow:

P06: *“It was fun because it has beautiful pictures.”*

P08: *“I feel happy because now I have picture to help me build sentences.”*

P12: *“I enjoyed making the sentences because I can choose the pictures for the sentences.”*

The anecdotal records have stated that pupils were enthusiastic about selecting illustrations which they can base the simple sentences on. Majority of the pupils find that it was exciting for them to select illustrations that they want to use.

Pupils have gained confidence and established positive engagement through collaborative learning in completing tasks using Storybird. Pupils were able to help their partners or group members to select the appropriate illustrations, coming out with the correct vocabulary and building grammatically correct simple sentence. These conclusions were reflected in pupils’ responses as shown below:

P09: *“..we can choose the pictures together and make sure we make the correct sentences.”*

P11: *“..my friend can help me to make sentences when I have problems.”*

P15: *“..we can write the correct sentences because we helped each other.”*

Based on the anecdotal records, pupils were seen to be helping their respective partners or members to translate the vocabulary from their native language to English. Pupils took turn to build simple sentences and they helped to check for errors made by the partner or group members.

The major themes that can be concluded from the analysis of the semi-structured interviews and anecdotal records are as follow:

- i. illustrations in storybird provide visual stimulants for pupils to relate with relevant vocabulary
- ii. autonomy in activity leads to increase in motivating in building simple sentences
- iii. confidence and positive gained through collaborative learning

IV. CONCLUSION

The innovation of Storybird in this research as a teaching and learning strategy has helped to improve pupils’ writing skill in building simple sentences. This was achieved by engaging pupils to learn writing in a fun and creative manner. The skills gained can then be expanded by encouraging pupils to write more complex sentences which will eventually be used to produce coherent stories. Storybird is a great tool for teaching creative or narrative writing especially for young learners [1].

By giving pupils access to a wide range of web-based tools, Storybird allows pupils to publish work and engage with real life context as a form of empowerment from the teacher [11]. This research hopes to deliver insights to Malaysian schools with less exposure of ICT on the benefits of implementing such ICT tool to improve pupils’ writing skills and also provide a new interesting approach to teaching and learning.

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The Effect of Custom and Excise Duties On Economic Growth in Kenya

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Abstract: *The responsibility shouldered by the government of any nation, particularly the developing nation is enormous; the need to fulfill these responsibilities largely depends on the amount of revenue generated by government through various means. Kenya relies heavily on tax revenue to fund government expenditure. The role of tax revenue in promoting economic growth may not be felt if the correct choice between different taxes is not made, this calls for proper examination of the relationship between the revenue generated from different types of taxes and economic growth. The fiscal crisis occasioned by the international oil shock in early 1970s, motivated the Kenyan government to shift the tax policy towards greater reliance on indirect taxes. Consequently, the level of revenue from custom and excise taxes has risen steadily in the period 1973-2010; however, this was coupled with a persistent decline in economic growth. Such significant increases in custom and excise tax revenue raise pertinent questions about the effect they have had upon economic growth. The purpose of the study was therefore to analyze the effect of custom and excise duties on economic growth in Kenya for the period 1973 to 2010, This study is motivated by two developments. First, by the inconsistency in existing empirics and secondly by the wide knowledge gap occasioned by the paucity of empirical literature on Kenya. Therefore, this study attempts to reconcile the different positions and also close the knowledge gap. The study adopted a correlation research design based on its ability determine the strength and direction of relationships between variables while the theoretical framework was anchored on endogenous growth model. The empirical results indicate that custom and excise duties are positively correlated with economic growth in Kenya.*

1.0 INTRODUCTION

The responsibility shouldered by the government of any nation, particularly the developing nation is enormous, Furthermore, the new constitutional dispensation in Kenya establishes a devolved system of government with its enormous resource requirements, the need to fulfill these responsibilities largely depends on the amount of revenue generated by government through various means therefore there is need to put measures that are geared towards enhancing the revenue base (Kago, 2014). A system of tax avails itself as a veritable tool that mobilizes a nation's internal resources and it lends itself to creating an environment that is conducive for the promotion of economic growth (Ayuba, 2014). Muriithi and Moyi (2003) observe that a good tax system should be able to generate the needed revenue for government; redistribute income; and investment infrastructure that will provide the guarantee for business to thrive and economic growth.

Despite far reaching reforms implemented in taxation in Kenya, tax revenue collection has not yet reached a level where it can meet all the expenditure requirements of the government (Kago, 2014). The machinery and procedures for implementing a good tax system in developing countries are inadequate; hence tax evasion and avoidance of the self-employed individuals and organizations whose data base is not captured in the relevant tax authority's data system (Fasoranti, 2013). A study by Parliament's Budget Office (2012) says that Kenya's large and rapidly expanding underground economy has expanded rapidly to become a mammoth Sh825 billion

industry that is denying the government at least Sh275 billion in uncollected revenues. The need for the government to generate adequate revenue from internal sources has therefore become a matter of extreme urgency and importance (Afuberoh&Okoye, 2014).

The desire of any government to maximize revenue from taxes collected from tax payers cannot be over-emphasized. This is because the importance of a tax lies in its ability to generate revenue for the government, influence the consumption trends and regulate economy through its influence on vital aggregate economic variables (Fasoranti, 2013). Kenya relies heavily on tax revenue to fund government expenditure, both current and capital, the role of tax revenue in promoting economic growth may not be felt if the correct choice between different taxes is not made. This calls for proper examination of the relationship between the revenue generated from different types of taxes and economic growth. Tax revenue mobilization as a source of financing developmental activities in less developed economies has been a difficult issue primarily because of various forms of resistance, such as evasion, avoidance and other corrupt practices can easily be perpetuated within the direct taxes bracket (Akhor, 2016). The solution appears to be in broad-based indirect taxes like Custom and Excise Duty that has the potential of diversifying the revenue portfolio for the country to promote fiscal sustainability and economic growth (Azaiki&Shagari, 2007).

The performance of Kenya’s economy during the first decade of independence in 1963 was impressive because the growth of real GDP averaged 6.6% per year over the period 1963 –1972. Kenya experienced its first major fiscal crisis occasioned by the international oil shock in early 1970s and this motivated the government to shift the tax policy towards greater reliance on indirect taxes as opposed to direct taxes. The aim was to create a sustainable tax system that could generate adequate revenue for economic growth. Consequently, the level of revenue from custom and excise taxes has risen steadily in the period 1973-2010; however, this was coupled with a persistent decline in economic growth (table 1.1). Such significant increases in indirect tax revenue raise pertinent questions about the effect they have had upon economic growth.

Table 1.1.Tax structure in Kenya as a percentage of GDP and GDP growth rate from 1963-2010

Type of tax	1963/4-1972/3	1973/4-1982/3	1982/3-1992/3	1992/3-2002/3	2002/3-2010/1
Excise duty	2.1	2.0	2.1	4.0	3.2
Custom duty	4.2	4.4	3.6	4.0	1.7
GDP growth rate (%)	6.6	5.2	4.2	2.3	4.3

Source: Karingai and Wanjala (2005), Amanja and Morrissey(2005),Economic surveys.

This research looks at the effects of custom and excise duties on economic growth for Kenya, a developing country. An enormous amount of studies have been carried out in Kenya on the effects of taxes. However, the researches often look at sector specific taxes (Okello 2001, Kiringai et al 2001, Kiringai et al 2002, Bouet and Roy 2012). The empirical studies on the effect of custom and excise duties on economic growth in Kenya are relatively few. Some empirical studies have been conducted to examine the effect of custom and excise duties on economic growth in both developed and developing countries, but one common feature of these empirical studies is lack of consensus among the scholars, Most studies have therefore reached substantially different conclusions on the relative impact of custom and excise duties on economic growth. This study is motivated by two developments. First, by the inconsistency in existing empirics and secondly by the wide knowledge gap occasioned by the paucity of empirical literature on Kenya. Therefore, this study attempts to reconcile the different positions and also close the knowledge gap.

2.0 REVIEW OF THEORITICAL AND EMPIRICAL STUDIES

In examining the effects of tax policy on economic growth, there are two lines of thinking: according to the exogenous growth models (Solow, 1956), tax policy has no impact on economic growth in the long run, assuming that key factors of production such as labour and technological progress are determined outside the model; on the contrary, endogenous growth theorists (starting with Barro, 1990; King and Rebelo, 1990; and Lucas, 1990), who believe that economic expansion is determined within the system, argue that tax policy does have an impact on economic growth and welfare over time.

The theoretical foundation of the study revolves around endogenous growth model’s proposition that government spending and tax policies can have a long- term or permanent growth effects. The endogenous growth theory advocates the stimulation of level and growth rate of per capita output through the economic policies such as tax policies. Economic growth is generated by three production

factors: labour, capital and technological progress, which are related to each other through a production function. Taxes could alter the economic decisions regarding these factors, and thus affect economic growth (Zipfel and Heinrichs, 2012). Barro (1990) constitutes one of the first attempts at endogenizing the relationship between growth and fiscal policies. He distinguishes four categories of public finances: productive vs. non-productive expenditures and distortionary vs. non-distortionary taxation. Taxation is non-distortionary if it does not affect the investment decision, and hence economic growth. This is, above all, the case for customs duties, excise duties and value added tax. Otherwise taxes, such as direct income and profit taxation are considered distortionary.

2.1 Kenya's tax structure

The tax system in Kenya refers to the range of taxes over which the government has exclusive or shared jurisdiction. The tax system also covers the machinery put in place by government for the administration and collection of such taxes. Different types, forms and classes of taxes exist, but the most common classification in Kenya is direct and indirect taxes. In Kenya, the government can emphasize on any one of the tax forms depending on the objective it wants to pursue. The direct tax is a levy on personal income, corporate profits or property. When the imposition is on the price of goods and services, then it is called an indirect tax, the different prominent components of indirect taxation in Kenya include; value added tax, custom duty and excise duty.

Customs and excise duties are the oldest forms of modern taxation; they were first introduced in Kenya around 1923. The term 'excise' relates to a form of taxation which is applied to a narrow base of goods (and services), which primarily are seen to have a level of harm associated with their consumption (Preece, 2013). Excise duty is a levy that is applied selectively on particular commodities such as tobacco, cigarettes and alcohol in order to compel the users of the excisable commodities to internalize the externalities associated with the commodities, and it is also charged for revenue purposes. (Okello, 2001). The tax is directly paid by the manufacturers, but the tax burden is passed to the consumers through an increase in prices. The most compelling reason for the use of excise taxes is that they can potentially raise a great deal of revenue with little distorting effect (McCarten and Stotsky, 1995). Customs duty is the tax charged most times on the value of goods or upon the weight, dimensions, or some other criteria that will be determined by the government on imports by the customs service of Kenya to raise revenue for the country and also to save domestic and infant industries from cut-throat competition.

The Custom duty and Excise duty are regulated by the Custom and Excise Act (Cap 472) Laws of Kenya. The administration of custom and excise taxes, therefore, is the responsibility of the Customs and Excise Department of the Kenya Revenue Authority. Customs duty is applicable when importing or exporting certain goods and services. In Kenya, excise duty is imposed on both goods and services including beer & spirits, soft drinks, cigars & cigarettes, polythene bags (of a particular specification) wine, cars and mobile telephony services among others. It was administered under the Customs & Excise Act 2010, however, effectively, 1 December 2015; the tax is administered under the Excise Duty Act 2015.

Studies of the period 1870-1914 have emphasized that protectionist tariff policy was associated with higher rates of economic growth. Starting from Bairoch's (1989) observation that the tariff hikes of the 1870s had positive growth effects for the countries that applied this policy, O'Rourke (2000) and Jacks (2006) tend to confirm propositions regarding the positive correlation between custom duties and growth in the late nineteenth century. Azam (2011) examined the link between institutions, tariffs, and economic growth. Their model was an extension of the "tariffs and Schumpeterian growth" model of Dinopoulos and Syropoulos (1997). Their results revealed that the relationship between tariffs and economic growth is not as obvious. They found that if a country has a technologically dynamic export sector (characterized by large innovations), higher tariffs reduce economic growth by channeling labour away from Research and Development in the export sector. On the other hand, in a country with a technologically dynamic domestic production sector, higher tariffs may lead to higher growth.

Other studies that follow a similar time-series strategy point out that the relationship between average tariffs and economic growth depends crucially on the countries included in the sample. Irwin (2002b) shows that rich land-abundant countries may be outliers in the relation between tariffs and economic growth, because they often relied on customs duty to generate a large proportion of their government revenue therefore they tended to impose high tariffs, but without following an import substituting strategy. Schularick and Solomou (2009) assembled data for a panel of 19 countries (Argentina, Australia, Brazil, Canada, Chile, Denmark, France, Germany, Japan, Italy, India, Mexico, Netherlands, Norway, Russia, Spain, Sweden, United Kingdom, USA) to reassess the empirical

evidence on the relationship between custom duties and economic growth during the period 1870-1914. Using the OLS fixed effects panel estimation within a Generalized Method of Moment (GMM) approach. Their results suggested that the relationship between custom duties and economic growth during the period 1870-1914 was insignificant – although there is evidence of a negative relationship in some of the models estimated.

By heavily focusing on how taxes affect economic growth in OECD, Goyer and Burns (1997) conducted a study about the relationship between tax structure and economic indicators for the Organization of Economic Cooperation and Development (OECD) countries. From their finding, customs and excise duties are highly significant, in which there is a positive relationship with economic growth (GDP). However, according to them total tax revenue has a negative relationship with two economic indicators that is saving and investment. Åsa, Heady, Arnold and Vartia (2008) investigated the design of tax structures to promote economic growth. Their empirical evidence suggested that excise duties, value added taxes, custom duties and property taxes appears to have significantly less adverse effects on GDP than income tax. A reform towards greater use of taxes on consumption could raise GDP but it would also increase inequality, particularly at the lower end of the wage distribution as consumption taxes are less progressive than personal income taxes. . Shinohara (2012) analyzed the effect of tax structures on economic growth. They separated and analyzed 30 countries of OECD and 21 countries of OECD. In the former group, it was found that fund procurement by annual revenue items, other than personal income has a positive effect on economic growth, Value added tax, customs and excise duties have a positive effect on economic growth.

Dejong and Ripoll (2005) examined the relationship between custom duties revenue and growth rates in a panel that consisted of 60 countries over the period 1975-2000; paying particular attention to its potential contingency on the level of economic development. Using the OLS fixed effects panel estimation within a Generalized Method of Moment (GMM) approach, the study found that the relationship between customs revenue and economic growth is negative and significant among the world's rich countries, while it is positive and significant among the world's poor countries. Their results run contrary to the view that higher tariffs are universally detrimental to growth. Dritsaki and Katerina (2005) examined the relationship between tax revenues and three economic indicators namely change in gross domestic product, savings and investment in Greece during the period 1965-2002. They applied the seemingly unrelated regression (SURE) approach in order to determine the relationship between tax categories and economic indicators. Their results showed that a long run relationship exist between tax categories and economic indicators and are significant. Particularly, they found a robust negative relationship between custom and excise duties and gross domestic product.

Atukorola and Chand (2005) employed the conventional growth accounting framework in investigating the tariff growth nexus in the Australian economy over the period 1871 to 2002. The model was estimated for the overall period, and four sub-periods: namely, 1870-1900; 1901-1949; 1950-2002; and, 1901-2002. The sub-periods are chosen carefully with a view to examining possible structural breaks in the tariff-growth nexus. Their results provide strong support for a negative association between custom duties and economic growth. The results, however, were consistent with the consensus view in Australian policy circles that unilateral liberalization is the best policy for the nation (Garnaut, 2003). Gustavo, Vazquez and Vulovic (2013) examined the effects of taxation policy on economic growth in a sample of 19 Latin American countries over 1990-2009. They used two empirical approaches; VAR analysis for Argentina, Brazil, Chile, and Mexico, and panel data analysis for the Latin American region alone. The regression results using the worldwide sample indicate that at higher levels of taxation, personal income tax could have significant negative effects on economic growth and greater reliance on custom and excise duties has significant positive effects on growth in Latin America in general.

Sameti and Rafie (2010) analyzed the relationship between income distribution effects of tax and economic growth in Iran and some selected East Asian countries. They used panel data regression in the period 1990-2006. Their results denoted that the impact of customs and excise duties on economic growth is negative and significant, but the ratios of tax on income, profits and capital gains have positive and significant effects on economic growth. Punt et al (2006), in a bid to examine impact of excise duties on GDP, trade and prices, as well as the welfare of households of the Northern and Western Cape in South Africa for the years 1998-2005. The study used a static computable general equilibrium model to analyze the impact of an increase in excise duties on GDP. The results indicate that there is a negative relationship between excise duties and GDP and investment. Ebiringa and Emeh (2012) used simple linear regression technique to investigate the impact of various taxes on the economic growth in Nigeria, using a time period of 1985-2011. Results show that customs and excise duties was negatively related to gross domestic product which implies that an inverse

relationship existed between customs excise duties and economic growth in Nigeria. Company income tax and value added tax had a direct and significant relationship with GDP.

Examining the effect of customs and excise tax reforms on the economic growth of Nigeria, Anyanwu (1997) used the simple linear regression technique to examine the effects of taxes on Economic Growth in Nigeria during the period 1981-1996. The results revealed that customs and excise duties positively and significantly affect GDP just like companies' income tax. However, petroleum profit tax negatively and significantly affects Nigeria's GDP. Adegbe (2011) studied the Customs and Excise Duties Contribution towards economic growth of Nigeria and stated that there is a strong positive relationship between customs and excise duties and economic growth of Nigeria; meaning that this is a source of income that Nigeria should rely on and grow. Okafor (2012) explored the impact of tax revenue on the economic growth in Nigeria over the period 1981-2007. The OLS multiple regression analysis was adopted to determine the relationship between Nigeria's economic growth and the major components of tax revenue, namely petroleum tax revenue, company tax revenue, value added tax revenue, customs and excise duties revenue. The regression result indicated a very positive and significant relationship between customs and excise duties and GDP.

Oladipupo and Ibadin (2015) examines the impact of indirect taxes on economic growth of Nigeria, utilizing time series data spanning a thirty-four year period, from 1981 to 2014, the study utilized the Error Correction Model to evaluate the impact of VAT, PPT and CED on the RGDP. The findings revealed that VAT and PPT exert a positive and significant relationship on the RGDP. It was also revealed that CED of two period lags has a positive relationship with RGDP. Chibu and Njoku (2015), investigated the impact of taxation on the Nigerian economy for the period 1994 -2012. The results of their statistical analysis revealed that positive relationship also existed between the explanatory variables (Custom and Excise Duties, Company Income Tax, and Petroleum Profit Tax) and the dependent Variables (Gross Domestic Product, and Unemployment).

In relation to Kenya, Karingi et al (2001) conducted an assessment on beer taxation in Kenya and concluded that low taxes on beer may create incentives to produce more; this would then lead to higher levels of income through revenue from the increased taxation. On the other hand, looking at the tobacco industry, Kiringai et al (2002) find that the price elasticity of demand for tobacco is low, reported that an increase in price from increases in taxes on tobacco products is unlikely to reduce demand by so much, while instead increasing government revenue. Bouet and Roy (2012) examined trade protection and tax evasion for Kenya, Mauritius and Nigeria, and indicated that higher tax tariffs tend to provide disincentives to pay taxes resulting in lower revenues for the state rather than the intended purpose of increased revenue. Awiti (2012) used a theoretical approach to analyze the effect of taxes and economic growth in Kenya and revealed that an increase in consumption tax has a reducing effect on real income, consumption and Savings decline hence economic growth declines.

Gacanja (2013) explored the relationship between economic growth and tax revenues in Kenya for the period 1991-2011 .Using cointegration and Granger Causality test, the results of the study revealed a positive relationship between economic growth and tax revenues; with all tax variables, income tax, import duties, excise duties and value added tax showing a positive effect on GDP, while the Granger Causality test indicated a bi-directional relationship between economic growth and excise duties. Onduru (2003) analyzed the impact of indirect taxes on economic growth in Kenya for a period of thirty-one years (1972-2002). By interacting indirect taxes with certain key macroeconomic variables namely; population size, investment, volume of trade and external debt, the study found that custom duties cause distortions in the market decisions and consequently impact negatively on economic growth.

Applying the concept of buoyancy and elasticity of excise duties in Kenya, Okello (2001) analyzed the structure of excise duty in Kenya from the period 1970-96. The results of the study showed that the excise tax system has been efficient over the period. This means that although the growth in excise tax can mainly be attributed to the growth of GDP, the effects of discretionary changes were also successful in generating additional revenue. In the long-run, however, the results predict that excise tax revenue will continue to grow faster than the growth in GDP, but that discretionary measures will not generate the expected additional revenue.

RESEARCH METHODOLOGY

3.1 Model specification

The model which is in line with the work of Akhor (2016), in their analysis of the impact of tax structure on economic growth of Nigeria was found relevant to lead this study. The model was modified to fit custom and excise duty separately to enable assessment of their impact separately. If we substitute these variables into Akhor’s model

$$GDP=F(CD,ED,IT,VAT).....(3.4)$$

The model in its econometric format becomes:

$$GDP = a_0 + a_1 CD_t + a_2 ED_t + a_3 IT_t + a_4 VAT_t + \mu_t..... (3.5)$$

Where:

- GDP = gross domestic product
- VAT = value added tax.
- ED=excise duty
- IT = income tax
- CD=customs duty

where; μ_i is the Error term or other variables that could have lent further explanation to the explained variables but are not included in the model and is assumed to be normally distributed in zero and constant variance.

In consonance with economic theory, it is expected that the level of value added tax, customs duty, income tax and excise duty to a large extent, determine the level of economic growth of a country. All things being equal, *a priori* intercept and the slope of the coefficients are expected to have positive signs. Thus, the *a priori* expectation may be denoted mathematically as: $a_0 a_1 a_2 a_3 a_4 > 0$. The numerical values of the parameters were estimated by the use of ordinary least square techniques based on econometric computation. To determine the relevant hypothesis, estimates were evaluated for statistical significance based on the relevant statistics of regression output. The explanatory power of the model as a measure of goodness of fit is then decided.

3.2 Data Description and sources

Annual quantitative time series secondary data from 1973-2010 was used for the analysis. The data on five economic variables was used namely the gross domestic product, income tax revenue, value added tax revenue, customs duty revenue and excise duty revenue. The data was obtained from relevant government departments, Kenya Revenue Authority (KRA), Kenya National Bureau of Statistics (KNBS), Ministry of National Treasury, official published documents of the government of Kenya; such as statistical abstract and Economics surveys. Other sources include the World Bank and International Monetary Fund publications and reports. Data was also obtained from internet and library sources.

3.3 Data Analysis and presentation

A combination of cointegration and error correction modeling through regression was adopted in this research. The choice of these econometric techniques is based on their ability to ascertain stationary and test for causality among the variables. The analysis of data was conducted using EViews statistical package Version 7.0. The descriptive and inferential statistics was used in addition in order to build strong conclusions about the impact of indirect tax revenue on economic growth. The study used tables and figures for data presentation.

3.4 Diagnostic Tests

Time series diagnostic tests were carried out to ensure that the model satisfies the classical linear regression model assumptions. The data was subjected to diagnostic tests notably normality of the disturbance term and functional form misspecification, Stationary, serial correlation, multicollinearity and heteroscedasticity. These tests are meant to verify whether the data are normally distributed, stationary and have no mutual correlation among the independent variables and thereafter used it in regressions without fear of getting spurious results.

RESULTS AND DISCUSSION

4.1 Stationarity test

When time series data is non-stationary and used for analysis, it may give spurious results which cannot be used for any meaningful inferences, since estimates obtained from such data will possess non constant mean and variance (Muthui *et al* 2013). Moreover, if the data is not stationary, the value of R-squared is high and this makes it difficult to determine the relationship between the variables. Because this study used time series data, it was important to establish the stationary of the data. The variables are therefore tested for unit root and in its presence differencing is done to alleviate the problem. However, this leads to loss of some fundamental long run information hence biased solutions and this is corrected through Augmented Dickey Fuller Test.

Table 4.1(**Appendix II**) shows the unit root test for stationary using Augmented Dickey-Fuller. The result shows that all the variables (GDP, customs duty, excise duty, income tax and value added tax revenue) are stationary at first difference. Since the t-statistics are greater than the critical values at 1% and 5% level of significance in absolute term. We therefore conclude that all variables are not characterized by unit root problem and accept the hypothesis that says customs duty(CD), excise duty(ED),income tax(IT), value added tax(VAT), and gross domestic product(GDP) have no unit root problem.

4.2 Diagnostic test

Time series data is associated with several problems which require investigation to avoid spurious results upon application of the OLS method of estimation. Primarily, the OLS method assumes serial uncorrelation, correct model specification, homoscedastic error term and absence of correlation between the error terms and the regressors. If these assumptions are violated, the estimated parameters would not meet the statistical threshold. Tests carried out on the data included the normality test, unit root test, multicollinearity test, serial correlation test and heteroscedasticity test.

4.2.1. Testing for Multicollinearity

Multicollinearity among the independent variables implies that they are perfectly correlated. If the explanatory variables in the model are perfectly linearly correlated, the parameters of the model become indeterminate and the method of OLS breaks down (Mukras, 1993). This violation is not a problem of the model or the disturbance term and therefore does not affect the BLUE properties of the OLS estimates (Musaga, 2007).In any practical context, the correlation between explanatory variables will be non-zero, although this will generally be relatively benign in the sense that a small degree of association between explanatory variables will almost always occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other (Dakito, 2011).

Table 4.3 (**Appendix III**) shows multicollinearity test between independent variables. The VIF is less than 10, meaning that the variables are poorly correlated with each other. Therefore, there is no Multicollinearity among the independent variables. So it appropriate to use the independent variables simultaneously in order to run the regression model since there is no multicollinearity problem.

4.2.2 Test for Serial Correlation

4.2.2 (a) Durbin Watson Test for Autocorrelation

The Durbin Watson Test was used to test for autocorrelation. The statistic ranges between 1 and 4. A value of 2 indicates that there is no autocorrelation. With Durbin-Watson statistics of 1.954836, it shows that there is no autocorrelation and therefore the model gives a good description of the variables.

4.2.2.(b) Breusch-Godfrey Test for Autocorrelation

Serial correlation is usually as a result of model misspecification or genuine autocorrelation of the model error term. In the presence of serial correlation, ordinary least squares estimators are no longer Best Linear Unbiased Estimators (BLUE). Moreover, the R^2 may be overestimated, standard errors underestimated and t-statistics overestimated (Musaga, 2007) There was therefore further need to

test for serial correlation. Table 4.4 (**Appendix III**) shows the Breusch-Godfrey LM Test for autocorrelation is used to test for serial correlation among the error terms in the model, a violation of which would make emanating results have invalid statistical significance inferences. The null hypothesis states no serial correlation against the alternative hypothesis of serial correlation ($p < 0.05$). The results indicate the p-value is 0.6651 which is greater than the critical p-value (0.05) hence accept the null hypothesis of no serial correlation. This shows the nonexistence of serial correlation.

4.2.3. Heteroscedasticity test

Table 4.5 (**Appendix III**) shows the Harvey test of heteroskedasticity. The Probability Chi-Square value for observed R-squared is 0.3997(39.97%) which is more than 5 percent meaning that the null hypothesis that there is no heteroscedasticity in the model is accepted. This shows that there is no evidence for the presence of heteroskedasticity since the p-values are considerably in excess of 0.05.

4.3 REGRESSION MODEL RESULTS DISCUSSION

From the regression results in Table 4.6 (**Appendix IV**), the R^2 (0.6270) of the regression showed that the independent variables explain about 62.7% of the variations in the dependent variable. It implies that: customs duty, excise duty, income tax and value added tax explained about 62.7% percent systematic variations in output growth over the observed years in the Kenyan economy while the remaining 37.3% percent variation is explained by other determining variables outside the model.

The empirical results of the estimated model show that the probability value of F- statistics (0.000002) is less than the 5 per cent critical level. We therefore accept the alternative hypothesis that the explanatory variables which includes, Customs Duty (CD) Excise Duty (ED), income tax (IT), and Value Added Tax (VAT) are effective determinant factors of the economic growth (GDP). As a result the model was perfectly specified and there is statistical evidence to show that customs duty, excise duty, income tax and value added tax can jointly influence economic growth. The Durbin Watson statistic (1.955) illustrates the absence of auto correlation.

The regression model is of the form:

$$GDP = 0.0679 + 0.1228CD + 0.3709ED - 0.0252IT + 0.0356VAT + \mu \dots \dots \dots (4.1)$$

(3.044) (5.968) (-0.3653) (0.5171).

4.4 The Statistical Significance of the Parameter Estimate

The statistical significance of the parameter estimate can be verified by standard error test; the adjusted R -squared, t-statistics, the F-statistic and the Durbin-Watson statistics.

4.4.1 Hypothesis One,

The null hypothesis (H_{01}) that custom duty has no significant effect on economic growth in Kenya. We can test the statistical significance of the parameter estimate (a_1) by t-statistics.

The null hypothesis dictates if probability of t-statistics is greater than 0.05 the parameter estimate is not statistically significant. From Table 4.6 (**Appendix IV**), the results of the t-test had probability values 0.0046 less than 0.05; hence the non-statistical assumption of the parameter estimate is rejected. The decision rule is that the variable is statistically significant at 5% level of significance.

In summary, since the econometric tests applied in this study show a statistically significant relationship between the GDP and customs duty. The estimates of the model parameters show consistency with the theoretical expectations for variable a_1 . The estimated value of the partial regression coefficient CD that is a_1 is positive. This implies that Customs Duty correlates positively with economic growth (GDP). At 0.05 level of significance, the coefficient of CD is statistically significant. This suggests that Customs Duty is an

important determinant of growth. We therefore accept the alternative hypothesis which states that: Customs duty has significant effect on economic growth in Kenya.

This logical finding can be explained by the fact that customs duty increases the revenue base of government and make funds available for development purposes that will accelerate economic growth. Secondly, we also discovered that customs duty have more impact on economic growth than Income Tax and Value Added Tax. The reason for this revelation could be attributed to the high rate of imports in the country. As imports increase, the duties on imports will continue to experience growth, and ultimately increase output. This outcome is in tandem with the result of studies carried out by Gober and Burns (1997), Dejong and Ripoll (2005), Adegbe (2011), Okafor (2012), Gacanja (2013), Chibu and Njoku (2015), among others, all of whom reported positive and significant relationship between customs duty and economic growth. However, this finding is inconsistent with the findings of Onduru (2003), Dritsaki and Katerina (2005), Sameti and Rafie (2010), Ebiringa and Emeh (2012) who opined that customs duty has a significant negative effect on economic growth.

The positive and significant relation between customs duty and GDP indicates that policy measures to expand customs revenue through more effective custom administration will impact positively in growing the economy. These results run contrary to the view that higher custom tariffs are universally detrimental for growth. This is important from a policy perspective, since it indicates that the maintenance of high tariff barriers does not appear to be a leading culprit for the economic stagnation suffered by Kenya and other developing countries in the world.

4.4.2 Hypothesis Two

The null hypotheses (H_{02}) that excise duty has no significant effect on economic growth in Kenya. We can test the statistical significance of the parameter estimate (a_2) by standard error test; and t-statistics.

The null hypothesis dictates if probability of t-statistics is greater than 0.05 the parameter estimate is not statistically significant. From Table 4.6 (**Appendix IV**), the results of the t-test had probability values 0.0000 less than 0.05; hence the non-statistical assumption of the parameter estimate is rejected. The decision rule is that the variable is statistically significant at 5% level of significance

In summary, since the econometric tests applied in this study show a statistically significant relationship between the GDP and excise duty. The estimates of the model parameter show consistency with the theoretical expectations for variable a_2 . The estimated value of the partial regression coefficient ED that is a_2 is positive. This implies that Excise Duty correlates positively with economic growth (GDP). At 0.05 level of significance, the coefficient of ED is statistically significant. This further suggests that Excise Duty is an important determinant of growth, thus, we accept the alternative hypothesis which states that: Excise duty has a significant effect on economic growth in Kenya.

This logical finding can be explained by the fact that excise duty can potentially raise a great deal of revenue with little distorting effect. This provides a predictable and stable flow of revenue to finance development objectives that will accelerate economic growth. Excise duty also reduces aggregate consumption and raises savings, stimulating capital accumulation and economic growth. This outcome is in tandem with the result of studies by Gustavo, Vazquez and Vulovic (2013) Okafor (2012), Gacanja (2013) Anyanwu (1997), among others, all of whom reported a positive and significant relationship between excise duty and economic growth. However, this finding is inconsistent with the findings of Ebiringa (2012) and Onduru (2003) who opined that excise tax revenue has a significant negative effect on GDP.

The positive and significant relation between excise duty and GDP indicates that policy measures to expand excise revenue through more effective excise administration will impact positively on growing the economy.

4.5 Cointegration Tests

In this study, we employ Johansen Cointegration test. Therefore, by employing Johansen Cointegration test we make use of Trace statistics and Max-Eigen from the model respectively by comparing their values with the critical values at 5% level. If the values of the Trace/Max-Eigen are greater than the critical values, then, we conclude that there will be long-run equilibrium relationship. Otherwise, the regression residual is not co-integrated.

Table 4.7 (**APPENDIX V**), reports the Johansen's cointegration results. Both Trace test and Maximum Eigen value tests indicate three cointegrating equations at the 0.05 level because the hypotheses at None, At most 1, At most 2, are rejected because they have significant probability values of less than 0.05. The result of the Johansen's cointegration test shows the existence of a cointegrating equation. This means that the estimated parameters of the regression equation are the long-run coefficients that link economic growth and tax revenues. This shows that there exists a long run equilibrium relationship between GDP and the fundamentals used in the model.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study investigated the effect of custom and excise duties on economic growth in Kenya. The motivation for this study was primarily premised on the paucity of empirical literature on the indirect tax – growth dynamics in developing economies and the inconsistency of empirics on the issue in the developed economies of Europe and America. In trying to achieve this objective, a combination of Johansen co integration and error correction modeling through regression was adopted for the data analysis. Empirical results of the study indicate that the custom and excise taxes are positively correlated with economic growth in a time series data of Kenya's Economy during 1973 – 2010. The results of Johansen's cointegration test indicate a long-run stable relationship between customs duty, excise duty and value added tax and economic growth. The research closes the knowledge gap induced by inconclusive evidence on the growth effects of custom and excise duties which most often have resulted in situations where results of researches done in developed economies are generalized to developing countries.

5.2 Conclusion

The main objective of the study was to find out the effect of custom and excise duties on economic growth in Kenya from 1973 to 2010. Based on the research findings presented and discussed in the preceding chapter (4), we arrived at a number of conclusions:-

The first objective of this study was to determine the effect of customs duty on economic growth in Kenya for the period 1973-2010. Analysis of research results has shown that customs duty has a positive and significant effect on economic growth in Kenya. Regression analysis results in Table 4.6 (**Appendix IV**), demonstrate this kind of relationship. It shows that if there is a 1% increase in customs duty revenue would increase economic growth by 0.1228%. Customs duty would increase the revenue base of government and make funds available for development purposes that will accelerate economic growth. From the findings, it can be concluded that customs duty has a significant positive effect on economic growth.

The second objective of this study was to determine the effect of excise duty on economic growth in Kenya for the period 1973-2010. Analysis of research results has shown that excise duty has a positive and significant effect on economic growth in Kenya. Regression analysis results in Table 4.6 (**Appendix IV**), demonstrate this kind of relationship. It shows that if there is a 1% increase in excise duty revenue would increase economic growth by 0.3709%. Excise duty can potentially raise a great deal of revenue with little distorting effect. This provides a predictable and stable flow of revenue to finance development objectives that will accelerate economic growth. From the findings, it can be concluded that excise duty has a significant positive effect on economic growth.

5.3 Recommendations

The results indicate that customs and excise taxes provide a predictable and stable flow of revenue to finance development objectives that will accelerate economic growth. The government should rely more on custom and excise duties than income tax due to its growth prospect and its less distortionary nature, and also utilize the positive relationship between indirect tax and economic growth

to realize efficient government investment expenditure that spurs economic growth. The government should re-visit and review some custom and excise tax laws and regulations that are repugnant to the performance of the custom and excise tax system, so as to block and discourage the loopholes that are being exploited by taxpayers to either evade or avoid tax payments. Constant review of existing custom tax laws will keep the act in pace with the economic reality.

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APPENDICES

APPENDIX I

TABLE 4.1 DESCRIPTIVE STATISTICS OF GROSS DOMESTIC PRODUCT, CUSTOM DUTY, EXCISE DUTY, INCOME TAX AND VALUE ADDED TAX.

Var	Max	Min	Median	Mean	Std.dev	Jarque-Bera	Prob	Skewness	Kurtosis
GDP	2551160	17566	244351	622783.6	719336.6	9.710	0.0078	1.216	3.471
CD	46072	796	80999.5	15164.32	13356.24	3.369	0.1855	0.540	2.020
ED	80567	463	7655	21004.61	24770.66	6.907	0.0316	1.040	2.812
IT	272264	1176	18499.5	50551.24	66173.38	30.99	0	1.783	5.619
VAT	145707	694	23594	39178.82	40980.4	5.908	0.0521	0.9635	2.867

Source: Authors computation.

APPENDIX II

TABLE 4.2 UNIT ROOT TEST AT FIRST DIFFERENCE

<http://dx.doi.org/10.29322/IJSRP.9.01.2019.p8564>

Variable	ADF	1%	5%	Decision
CD	-5.544682	-3.626784	-2.945842	Reject H_0
ED	-5.624120	-3.626784	-2.945842	Reject H_0
GDP	-4.349471	-3.626784	-2.945842	Reject H_0
VAT	-5.627301	-3.626784	-2.945842	Reject H_0
IT	-4.96784	-4.23497	-3.54033	Reject H_0

Source: Computation using E-views econometric software, version 7.

APPENDIX III: DIAGNOSTIC TESTS

TABLE 4.3 VARIANCE INFLATION FACTORS.

Variance Inflation Factors
 Date: 09/25/16 Time: 22:41
 Sample: 1974 2010
 Included observations: 36

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.92E-05	1.001297	NA
D(CD)	0.000729	1.259000	1.258958
D(ED)	0.001710	1.059275	1.058904
D(IT)	0.002341	1.188650	1.188482
D(VAT)	0.002250	1.407744	1.407646
U(-1)	0.027970	1.020291	1.019554

Source: Computation using Eviews econometric software, version 7.

Where CD=Customs Duty, ED=Excise Duty, IT=Income Tax and VAT=Value Added Tax.

TABLE 4.4 SERIAL CORRELATION RESULTS

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.338161	Prob. F(2,30)	0.7158
Obs*R-squared	0.815741	Prob. Chi-Square(2)	0.6651

Source: Computation using Eviews econometric software, version 7

TABLE 4.5 HETEROSCEDASTICITY TEST

Heteroskedasticity Test: Harvey

F-statistic	0.982374	Prob. F(4,32)	0.4310
Obs*R-squared	4.046574	Prob. Chi-Square(4)	0.3997
Scaled explained SS	5.379728	Prob. Chi-Square(4)	0.2505

Source: Computation using Eviews econometric software, version 7.

APPENDIX IV
TABLE 4.6 REGRESSION MODEL RESULTS

Dependent Variable: GDP
 Method: Least Squares
 Date: 05/29/14 Time: 11:06
 Sample: 1974 2010
 Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.067919	0.014007	4.848889	0.0000
CD	0.122787	0.040333	3.044323	0.0046
ED	0.370923	0.062153	5.967917	0.0000
IT	-0.025155	0.068856	-0.365327	0.7173
VAT	0.035601	0.068842	0.517138	0.6086
R-squared	0.627002	Mean dependent var		0.134550
Adjusted R-squared	0.580377	S.D. dependent var		0.062702
S.E. of regression	0.040617	Akaike info criterion		-3.444173
Sum squared resid	0.052792	Schwarz criterion		-3.226482
Log likelihood	68.71721	Hannan-Quinn criter.		-3.367427
F-statistic	13.44783	Durbin-Watson stat		1.954836
Prob(F-statistic)	0.000002			

Source: Computation using Eviews econometric software, version 7

APPENDIX V

TABLE 4.7 COINTEGRATION TEST RESULTS

Date: 06/30/15 Time: 08:48
 Sample (adjusted): 1977 2010
 Included observations: 34 after adjustments
 Trend assumption: Linear deterministic trend
 Series: GDP CD ED IT VAT
 Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.803382	123.3298	69.81889	0.0000
At most 1 *	0.590193	68.02905	47.85613	0.0002
At most 2 *	0.525285	37.69870	29.79707	0.0050
At most 3	0.200771	12.36730	15.49471	0.1402
At most 4 *	0.130325	4.747624	3.841466	0.0293

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.803382	55.30072	33.87687	0.0000
At most 1 *	0.590193	30.33035	27.58434	0.0216
At most 2 *	0.525285	25.33140	21.13162	0.0121
At most 3	0.200771	7.619677	14.26460	0.4187
At most 4 *	0.130325	4.747624	3.841466	0.0293

Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

Source: Computation using Eviews econometric software, version 7

APPENDIX VI

TABLE 4.8 ERROR CORRECTION MODEL

Dependent Variable: D(GDP)

Method: Least Squares

Date: 08/08/15 Time: 08:55

Sample (adjusted): 1975 2010

Included observations: 36 after adjustments

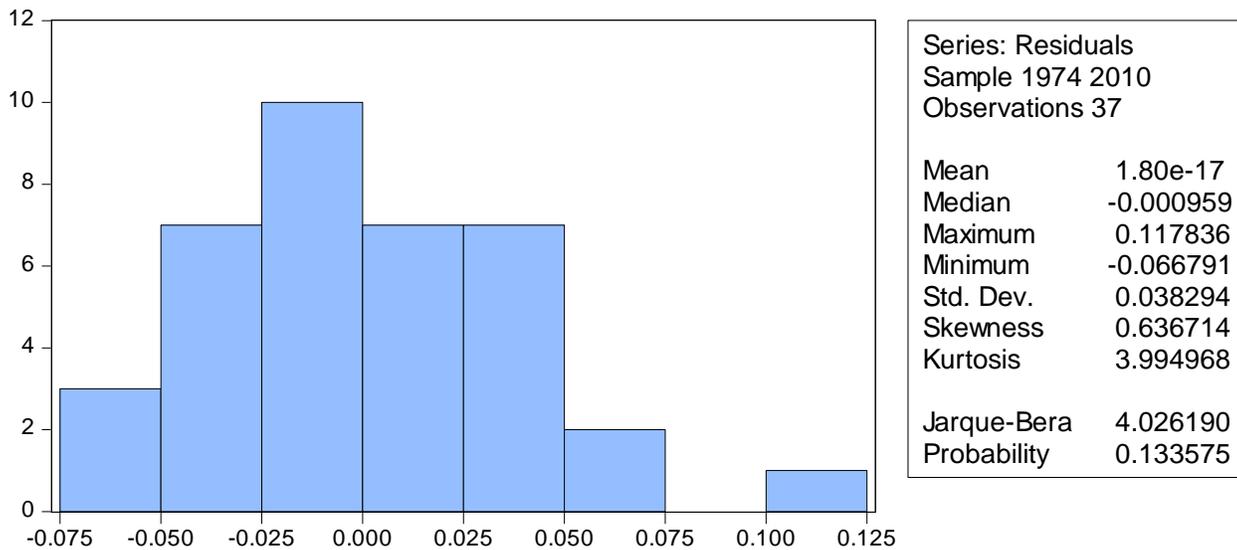
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001232	0.006264	-0.196625	0.8454
D(CD)	0.068626	0.027000	2.541725	0.0164
D(ED)	0.346363	0.041358	8.374727	0.0000
D(IT)	-0.087403	0.048386	-1.806354	0.0809
D(VAT)	0.080937	0.047437	1.706205	0.0983
U(-1)	-1.028119	0.167241	-6.147519	0.0000

R-squared	0.786713	Mean dependent var	-0.003142
Adjusted R-squared	0.751166	S.D. dependent var	0.075290
S.E. of regression	0.037557	Akaike info criterion	-3.574902
Sum squared resid	0.042316	Schwarz criterion	-3.310982
Log likelihood	70.34823	Hannan-Quinn criter.	-3.482786
F-statistic	22.13115	Durbin-Watson stat	1.931441
Prob(F-statistic)	0.000000		

Source: Computation using Eviews econometric software, version 7.

APPENDIX V

FIGURE 4.1 HISTOGRAM-NORMALITY TEST RESULTS



Kashmiri Women Folk from Subservient to Striving Subjects during Dogra Regime in Jammu and Kashmir.

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Abstract: Women are essence and prerequisite part of any society in the world, but from times immemorial they have been discriminated in all spheres of life-political social, educational etc. It is well-known fact that the Jammu and Kashmir was under the capricious and inhuman reign of the Dogra's during the colonial period. Majority population of the state was subjected to oppression under the different Dogra rulers. The research paper will focus on social evils like women trafficking or harlotry and the role played by Kashmiri men in abolition of such practices. Further researcher will bring to light the educational status of Kashmiri women on the one hand and the role played by them in the freedom struggle on the other hand against oppressive rule, which started in the thirty's of the twentieth-century in Jammu and Kashmir, in order to uproot the despotic, dynastic, feudal centered, and religious centered rule of medieval ages.

Keywords: *Women, essence, prerequisite, capricious, inhuman, harlotry, education, oppressive, freedom struggle, despotic, dynastic, feudal, and religious-centered.*

Introduction:

In 1846, by virtue of treaty of Amritsar, J&K was handed over to Maharaja Gulab Singh and his male heirs with an independent authority to rule over internal affairs of the state and to maintain the dynastic, feudal centered and religious centered rule of medieval ages. After becoming the ruler of state, Maharaja Gulab Singh claimed to be the absolute sovereign. Moreover, he considered the state especially the valley of Kashmir as his purchased property. His successors also carried on both these claims. Thus Dogra rulers indulged in gross misgovernment. It is worthwhile to mention that Muslim women were subjected as beast of burden. These Dogra's legalized flesh trade or prostitution in Kashmir especially of Muslim women. It is strange to acknowledge that one considerable item of revenue to the Maharaja was received from a traffic, which most government endeavor to conceal, due to shame attached with it.

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There used to be two ill fame prostitution centers in Srinagar one at Maisuma other at Tashwan. The license granting permission to purchase a girl for the purpose, costs about 103 chilkee rupees. It is very much tragic, that so many socio-religious and political reform movements gained foot in Srinagar but the pathetic plight or hue & cry of women did not draw their attention. Tribute, however, goes to prolific young person of Maisuma namely Muhammad Subhan Naid (Barber). The regardless services of Subhan Naid bore the fruits of his efforts when in 1934 state assembly during Hari Singh's rule passed an act. It declared flesh trade, trafficking, sale of girls as illegal and those who indulge in it were liable to be penalized. Muslim women in general were illiterate and the role played by Missionary schools with regard to their education could not be underestimated after facing severe criticism.

Despite of their social disabilities and illiteracy, Muslim women played an indispensable role in the freedom movement against the centuries of servitude under Dogra's. It is remarkable that illiterate women of Srinagar were guiding the men in freedom movement against in human and capricious Dogra regime.

Purpose of the study:

1. To examine the social evils among Kashmiri Muslim women during Dogra regime.
2. To explore the efforts of Kashmiri men in the abolition of social evils like prostitution.
3. To analyze the attitude of Dogra rulers towards Muslim women.
4. To highlight the contribution of Christian missionaries towards women education.
5. To evaluate the contribution of Muslim women towards freedom struggle against Dogra's.

Methodology:

The research is purely based on available data like travel accounts, contemporary writings, autobiography and secondary sources like books. It is a text based literary research based on sources pertaining to this aspect of history. Accordingly an attempt will be made to interpret the available data in order to unveil the truth in such a way as to present a new perspective which may be helpful for future researchers and readers in this field of knowledge.

Prostitution a curse:

By virtue of treaty of Amritsar, Jammu and Kashmir was handed over to Maharaja Gulab Singh and his male descendants with an independent authority over the internal affairs of the state, maintained dynastic, feudal centered and religion centered rule of Medieval ages.¹ We came to know from the various writers like Walter Lawrence and Robert Thorpe that "every thing except air and water was taxed". Robert Thorpe rightly observed the pathetic condition of people of Kashmir in this way, "The British had sold the Kashmir into slavery and they were suffering untold miseries at the hands of the Dogra officials. It was strange enough; the British did not pay heed to these atrocities. It is not enough fact that politicians sold the Kashmiris into the slavery of the Dogra family of Jammu for a

few pieces of silver.”² It is quite astonishing and tragic that, “one considerable amount of revenue of Maharaja was derived from traffic. The sale of young girls in Kashmir to the established houses of ill fame was both protected and encouraged by the government. The license granting permission to purchase a girl for this purpose, cost about 103 chilkee rupees.”³ The women did not suffered only at the hands of Govt, but also from the supporting structure created by the Dogra rulers i.e. officials. “It was a common practice that a young Muslim peasant lady would serve as a milk maid for the babies of the pundit Naib, so that sucking of milk from breasts of the Naib’s wife would not affect her beauty. The baby of milk maid would cry for Mother’s milk in the stable.”⁴ It is worth while to mention here that most sales took places of “lower caste especially among wattal community”.⁵ It is also said that there were 18,715 state prostitutes in Kashmir in 1880.⁶ The report appeared in the London times on 20th April, 1880, wrote that “his highness the Maharaja received from 15 to 25 percent of the whole revenue of his state from the gains of his licensed prostitutes. There were in the Kashmir territory, 18715 state prostitutes, and they paid over to the government Inspectors a fixed proportion of their disreputable gains. The report which came in times London, forced British government to ask, the officer on special duty in Kashmir, namely Mr. Henry to find out the truth about it. He submitted report: the prostitutes, who are registered and taxed as such, are principally of the wattal or lower caste. They are sold at tender age by their parents to brothel keepers for Rs 200 or Rs 100 per child. This is not only recognized but also recorded on stamped paper by the government. The estimated number of prostitutes acquired in this way is 250 Or 300 for Srinagar. They are divided into three classes according to their ‘gratifications’ and were taxed accordingly”.⁷

1st class rupees 40 per annum

2nd class rupees 20 per annum

3rd class rupees 10 per annum

There is hardly any writer of this period who does not mention the tax on prostitutes. Although state derived lot of revenue from these marginalized prostitutes, but no amount of Money was spend on their health. Mr. Henry, officer on special duty in Kashmir in 1880, writes that “no care was taken of the sick prostitutes. As a result of that a terrible disease was spreading. This is evident from the report of Srinagar mission hospital that reveals that during 1877 – 1879 the total no. of patients who came for treatment was 12977. Out of these 2516 were those who were having venereal diseases”.⁸ Yet another misery attached to these prostitutes was that they could not left the brothels, since they cannot repay money to their purchaser either the price paid for them or the license tax to the government of the Maharaja.⁹ There were two ill fame centers in Srinagar viz Maisuma and Tashwan.¹⁰ It is also fact that ‘the girls from the lower classes were not only sold as maid servants but also used as concubines. The Maharaja himself kept concubines and his example was followed by his successors’.¹¹It was a tragedy on the part of these poor creatures of Kashmir, “no socio-religious and political movements of that period in Srinagar engage their attention. Never they raise voice against for them”.¹² Self respecting

women were obliged to wear dirty garments, for if they wore clean clothes they might be taken for women of loose life, such was the threat among the women which has been best observed by Tyndale Biscoe.¹³ An “significant looking little Mohammedan, a barber by profession, whose trade is considered a low caste one, lived in a street in Srinagar in which were situated many houses of ill fame. His name was Muhammad Subhan Naid (Barber). Unlike of socio- religious and political movements, he was continuously disturbed at night by wrangling men. But what really upset him were the cries of anguish from the unfortunates recently forced into this cruel life, many of them quite young, who had been sold by their relations under the disguise that marriages had been arranged for them. The cries of these poor creatures went to his heart and prompted him to take action. For that matter, he tried to get help from the descent men in order to curb this evil. He used to write pamphlets, to show up this cruel traffic, and distributed hundreds of them in the city in order to mobilize the people of this immoral flesh trade, which was imposed on these poor creatures of nature. He would stand up in the streets and preach, and at night, with some of his friends. For that matter, but unfortunately the keepers of these houses soon became active and with the help of police started to harass him.”¹⁴ One night for instance, “a police officer who was the son of an official of Kashmir, a Sikh. He begged this officer not to enter, but without avail soon he told the official of his son’s whereabouts. He narrated whole episode and said to him, ‘I did not ask for money, but if you wish me to keep the matter quiet regarding your son, you must have all this traffic stopped’. For time being it was achievements and sigh of relief for him when official agreed to close all such places in the municipal areas of Srinagar”.¹⁵ No doubt, “it did not curb the evil, rather his efforts bore the fruit, when in 1934, the state assembly passed an act suppressing immoral trafficking of women. It provided penalties for persons who kept, managed or allowed the use of any place as brothel or procure women or girls for prostitution or live upon the earnings of prostitutes or traffic in women and children. Those who solicited in public places encouraged or abetted seduction or prostitution of minor girls were also penalized”.¹⁶The “abolition of prostitution act has disastrous effect on the large no of women who were forcibly engaged in this kind of trade. It was very difficult for them to eke out their existence. While some on the advice of gallant barber took up the job of spinning charkha while some fled to other parts of India. It is worth while to quote here that some of the prostitutes earned a descent living by working in the silk factory”.¹⁷

Role of Christian mission ladies towards women education:

The inhabitants of Kashmir were thankful to Christian missionaries who took up the pinnacle task of imparting education to the women of Kashmir. Among the noble personalities, who faced the severe weather of winter and make girls education acceptable in Srinagar, were Miss Churchill Taylor, Miss Stubbs, and Miss Goodall.¹⁸ It was some time between 1893 and 1895, a girls school was opened at fateh kadal in Srinagar by mission ladies.¹⁹The “establishment of girls school surprised the entire population of Srinagar. In the streets of Srinagar it became the gossip of the day. The people of Kashmir were of the opinion that imparting education to girls would mean to impure their morals”.²⁰ We came to know from the writing of Biscoe that, “the girls who were brave enough to attend

were very timid and their parents were somewhat hesitant, as public opinion was very much against them".²¹ It is once again interesting to quote the episode of prize day, "on this day, the lady superintendent had invited some European ladies to attend the function. All the girls were assembled in the school. Once these guests appeared in the school, somebody in the street spread rumor that the Europeans had come to kidnap the girls. This episode leads to closure of school for some time and even after few weeks, the school reopened and surprisingly school registered an increase in the number of girl students. At Islamabad (Anantnag), Miss Coverdale, a Christian missionary lady had a girl's school in which there were one hundred girl students enrolled."²² In 1912, Miss Fitzee started "a girl's school in which majority roll was of Muslims girls. As per yearly school report maintained by Miss Fitzee remarked, she lost many Hindu girls on account of its being considered improper for them to go outside after the age of 12, until they married. I have lost quite a number of promising ones in this way. Consequently the Hindu's on the roll call number were only 35, while Mohammadan run upto 40."²³ initially "she faced lot of opposition from various quarters but by 1914, opposition seems to have calmed down when the number of girls school rose to 3 in number".²⁴ By 1916 the girls were seen "coming more than even before and mothers actually cherished dreams about their education".²⁵ By 1920, apparently, "girls education had registered some progress. Besides the three mission schools, a new denominational high school run by the state education department, a Muslim school and five Hindu schools there of middle standard were functioning in different parts of Srinagar".²⁶

Contribution of Muslim women towards freedom struggle:

In spite of social and educational problems, Muslim women played an exemplary role in the freedom movement of Kashmir against the alien rule of Dogra's.²⁷ It should, however, be remembered that social, economic and political changes which occurred after 1931 contributed greatly to the emancipation of women.²⁸ The appearance of "women participation in freedom movement could be traced soon after 13 July, 1931 episode. But their contribution to freedom struggle against the Dogra's remained behind curtain due to their backwardness in education and disability due to purdah system which restrained them from achieving the fame which they deserve".²⁹ It is utmost important to mention that "women of Muslim gentry and upper middle class who were generally secluded did not take any active part whatsoever in the struggle. The number of educated ones was very small. It was actually the women of working class who fought with determination and refused to remain confined to four walls".³⁰ In the city of Srinagar and other big towns of Kashmir like Anantnag, Sopore, Baramullah and shopian, hundreds of women raised slogans against Dogra regime.³¹ Soon after the disturbances broke out in 13 July, 1931, they stood in processions entirely composed of women folk, some with suckling babies holding in their arms, raising slogans, denouncing the suppressive policy of Dogra govt.³² After 1931, event one of the women orator addressing to public gathering of women went to extreme of saying that on 02 august,1931 that ,,"our men should sit in their homes and wear burqas! We are proud of our Punjabi Muslim brethren but so far they confined themselves to merely issuing statements. We request the members of British parliament to take our grievances into the League of Nations. We appeal to the army not to oppress women as

it was no chivalry. But if they have any such instructions, they will find us ready to meet the challenge".³³ In autumn 1931, "the govt lost nerve and after the city had been handed over to military command, a horrible crowd of women was shamelessly poured upon and lathi charged on 6th September, 1931 by the champions of law and order. The prime minister of that period namely Raja Hari Krishan Koul, thereupon issued orders not to deal harshly with women demonstrators in future".³⁴ This order however remained confined to paper when once again "women gathered in large procession, a few days later were assaulted with gushing water poured upon them. Despite of wet clothes and bodies shivering due to cold, the women patriots hold the ground firmly and held a meeting ventilating their grievances before final dispersal".³⁵ It is interesting to note, whenever the public meetings held by the Muslim political workers were everywhere attended by women" especially when speaker used to be Sheikh Muhammad Abdullah".³⁶ The period between "1931-1933 women would appear on the streets of Kashmir in large numbers. There were so many Muslim women who belong to working class sacrificed their life for the sacred cause of freedom against Dogra regime. Worthwhile were, in shopian Sajida Banoo, aged 25 years received bullet in military firing. She was pregnant and died along with child in her womb on the spot. The second women to die was Jan Begum, aged 35 years was a resident of Nowshera Srinagar. The third victim who died due to police firing was Mist Freechi, a resident of Baramullah. She hurled kangri on the face of police officer. The fourth casualty was of Fazii, who was killed on 24th September, 1931".³⁷

Jan ded "one of the greatest personalities recorded in the annals of Kashmir history. Upcoming from the lower strata of the society, she was having liberal outlook on life. Had she been educated and allowed to bloom fully she would have proved her worth in the attaining of freedom. Unfortunately gets disheartened by Muslim leaders and had to quit politics after 1934".³⁸ The period from 1936-46 Kashmiri women took little or no part in politics. It was when in may, 1946, the national conference launched "Quit Kashmir" under the leadership of Sheikh Muhammad Abdullah.³⁹ Once again almost after a decade politically conscious women especially who belong to working class of the society came in large numbers to participate in the movement. During quit Kashmir movement in 1946, the women of Srinagar, "hide the under ground leaders, even when they knew that the revelation would mean the arrest of their men folk and harassment for month. They lent their clothes to disguise runaway leaders. They brewed tea and cooked food for those in hiding. They shouted slogans after curfew hours; they congregated at Dargah sharief every week In spite of military trucks and police guards".⁴⁰ An elusive figure was "Noor Gujri- a milkman's daughter had a great ability of generating energy among women folk due to his attractive speech. She was repeatedly arrested by the authorities".⁴¹ Another heroine of the Quit Kashmir movement was Fatima, a peasant women from Anantnag who was shot dead.⁴² Among many unnamed poor women who suffered for the cause of Kashmir may be mentioned Zoni and Mukhta.⁴³ At last not least women namely Begum Abdullah and Zainab begum both of whom belong to richer section and were educated played unforgettable role in Quit Kashmir movement after the arrest of Sheikh Muhammad Abdullah in may 1946.⁴⁴

Conclusion:

In the nutshell, the research shows that in all fields like political, social and educational, the Dogra's treated Kashmiris especially women folk as dumb driven cattle. Many personalities of Kashmir should be credited, particularly the role played by Subhan Naid (Barber) in raising voice against prostitution centers which ultimately due to his constant efforts led to the abolition of flesh trade in Kashmir in 1934. Further regardless work done by the Christian mission ladies can't be neglected in making girls education possible in Kashmir which was till then completely neglected not only at local level but also at government level. At last, women belonging to lower strata of the Muslim community came into forefront in the freedom movement even sacrificed their lives for the noble cause. We witnessed change in the women regarding their outlook on life in the last phase. Thus women played a pivotal role in shunning the foreign yoke along with their men.

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Customer Satisfaction in Tourism Industry

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Abstract- The tourism market, on the other hand, is extremely dynamic and shows a high degree of competitiveness (World Economic Forum, 2013). It is necessary to continuously monitor and evaluate the existing tourist offers, as well as constant efforts in reaching the standards of tourist offer and setting new ones development goals, such as the expansion of the tourist season, the creation of tourism products that enable them involvement of wider market segments, further development of infrastructure, etc. Such development is necessary to be harmonized at all levels, from local, regional to state level. In that view participants who make tourist offer of tourist destinations must have marketing activities to satisfy tourists and their expectations, and accordingly, it is necessary to constantly adjust the existing one tourist offer of a tourist destination in relation to the selected market segment.

I. INTRODUCTION

Implementation of detailed research can gather enough information for the development of tourist destinations in terms of improving the quality of the attribute of the tourist offer of the tourist destination and creating a recognizable one brands of tourist destination. The outcome of such positive movements in the end result is inflow visitors and creating a satisfied tourist. Because of their varied technical demands, educational requirements, location, and conditions, the type of person attracted to employment in the tourism industry also can be very different, making it hard to categorise tourism industry workers. That said, broad classifications are provided by the ILO and ISCO (1988) and the Standard Occupational Classification (SOC) (HMSO), such as (ILO, 1988):

1. Hotel and accommodation managers;
2. Restaurant and catering managers;
3. Travel and agency managers;
4. Receptionists/telephonists;
5. Chefs;
6. Waiters, waitresses;
7. Bar staff;
8. Travel and flight attendants.

II. QUALITY IN TOURISM AND TOURIST SATISFACTION

According to the definition of the World Tourism Organization (UNWTO, 2014), the quality of tourism is considered is the result of a process that implies satisfaction with

all legitimate needs for products and services in tourist destinations, the satisfaction that comes with meeting the requirements and user / tourist expectations, as well as satisfaction with price and value. The organization also defines quality determinants in tourism such as safety, since it is final the tourist product must not pose a danger to people's lives or property risk, it is meant to respect the standards of security and protection prescribed by law. Furthermore, hygiene and compliance with the prescribed sanitary regulations are one of the basic determinants of quality in tourism. The cleanliness standards of accommodation, catering and other facilities should be respected in order to achieve the required level of quality. Removing physical, communication and all others the obstacle, or the establishment of accessibility of the destination, is extremely important in achieving the required quality levels. Comprehensibility, transparency and indigenoussness of the tourist offer important quality determinants in which account is taken of the truth and accuracy of the information about the offer which is offered, as well as the originality of the offered content, while respecting the characteristics of culture and tradition destinations. All the stated quality in tourism complement the need for coherence tourist activities with an environment in which the local population lives and with the natural environment. Quality in tourism and sustainability are inherently interconnected (UNWTO, 2014) and in that sense can set up a broader concept of quality in tourism that implies a conventional application quality management in tourism as a base for achieving quality with the addition of natural and cultural environment. The above items represent the overall quality of the tourist experience, or experiences of tourists. In other words, while quality is directly observed through activities tourists, sustainability is a framework of action and management processes that take place in the background and enable the achievement of a high quality tourist offer and keeping or encouraging the guest on a return visit.

The level of satisfaction and, in particular, the experience of tourists when visiting a tourist destination, constitute the final product of a tourist destination (Middleton, 1994; Smith, 1994). Satisfaction is primarily the reason why tourists visit tourist destinations and is a pleasure the determinant of the quality of the tourist visit, as well as the quality of the tourist offer itself tourist destinations, that is, the capacity and performance of tourism entities and employees in frameworks for providing satisfactory services to users, i.e. tourists.

Customer satisfaction measure is used to determine the conclusion as to how the final product responds on the demands and needs of a certain group of users (Hill, Alexander, 2003). Accordingly, User satisfaction can be defined in other ways: satisfaction is the result of the comparison expectations of users /

consumers and actual perception of the attributes of the final product. To the above, the pleasure of acting when expectations are exceeded or when they are satisfied (Crompton, Love, 1995). In literature related to tourism and catering, satisfaction is being required to be viewed as a posture that arises after experiencing a certain experience (Pearce, 2005) and how the emotional state that arises as a result of the experience of a tourist product (Crompton, Love, 1995). Tourists, like other service users, have initial expectations about the quality of their services is offered in a specific tourist destination. Expectations are formed mainly through information available through commercial messages, brochures, mass media and informal ones information obtained from friends, relatives and close people. The extent to which it is formed expectations of completion in the final will determine the level of satisfaction of tourists. If it's all experience during or after a visit to a specific tourist destination fulfills or exceeds the initial one tourist expectations, the level of tourist satisfaction will be felt. But if perceived experience fails to meet or exceed the initial expectations of tourists, then it will be considered that the satisfaction of tourists has not been achieved. It can be said that a satisfied tourist will recommend it beforehand tourist destination to others, and such a form is the cheapest and most effective form of marketing and promotions.

Furthermore, the satisfaction of tourists contributes to the increase in the retention rate of tourists through their loyalty and patronage, which in turn helps in the realization of economic goals such as an increase in the number of tourists and total revenues (Hapenciuc, Condratov, 2007). Consequently there is a positive association between the satisfaction of tourists and long-term economic success tourist destinations (Hapenciuc, Condratov, 2007). But the overall satisfaction of the tourists is based not only on the quality of the tourist offer, but also on the price and perceived value tourist product and / or service. Since the tourist's satisfaction is a tourist destination can greatly affect the choice of destination of potential tourists, the satisfaction of tourists is seen as an important indicator of the performance of the tourist destination and its financial position results. The satisfaction of tourists is considered one of the primary variables maintaining competitiveness in the tourism sector, since it affects the choice of destination and the consumption of products and services and the decision to return to a tourist destination (Kozak, Rimmington, 2000). From all of the above, one can emphasize the exceptional importance of customization tourist offers in tourist destinations to the needs and expectations of potential tourists. If there is obvious incompetence or inability to adapt to market segments, it comes to the gap between the expected value and the subsequent experience experienced by the tourist in tourism destination, which results in discontent of tourists and reduces the chances of his returning return / re-purchase.

III. SATISFACTION OF TOURISTS RELATED TO THE QUALITY OF THE TOURIST DESTINATION

The satisfaction of tourists can be related to the very quality of the tourist destination, that is, quality of the entire tourist offer in a particular destination. Tourist destination owns quality, that is, a tourist destination is considered a quality if the whole tourist service, or offer, meets the needs of tourists and ultimately fulfills their expectations. Today's expectations of tourists and potential

visitors to tourist destinations are higher than in previous periods. The diversity, contrast, and wealth prevail in the needs of contemporary tourists content and forms, innovations and innovative products with emphasis on quality. Achieving above elements also presuppose achieving a new quality in all aspects of the tourist offer. The existence of a relationship between the quality of service, that is, the quality of a tourist product and satisfaction users, tourists, can be seen in relation to how the increase in the quality of the tourist offer affects increasing the tourist's satisfaction with the tourist destination, i.e. her tourist offer and ultimately by its success, in particular, an increased number of visitors / nights and financial results. Such quality development contributes to individual components destinations, especially the image of the tourist destination and the very profitability that is being realized loyalty of tourists and oral transmission. This contributes to the increased inflow of new tourists who are attracted by a stable and high reputation of quality experience (Suneeta, Koranne, 2014).

Most tourists are attracted by the archaeological and other historical heritage and were able to overlook the lack of infrastructure at these sites. Egypt gains more than 28% of all foreign receipts from tourism (Tohamy and Swinscoe, 2000), and that 34% of all those visiting Egypt's museums and antiquities as the main attraction. This confirms the need to satisfy tourist expectations at cultural sites, and that tourists are likely to be more attracted to such sites in their initial visits to the country. It also suggests that tourists are likely to be motivated to visit countries particularly by its archaeological sites, and hence, special attention to making these accessible and comfortable, is needed.

IV. CONCLUSION

Tourism today becomes an important activity both on the national and global level, the tourist destination operates in the environment of continuous technological and information development, and the needs of people (tourists) are changing very rapidly. Tourists appear as users of services, consumers, who satisfy their needs both with material and intangible assets. Many companies believe that their consumers are generally satisfied because the percentage of complaints is very low. However, complaints are a very unreliable indicator of customer satisfaction. Research shows that only 4% of dissatisfied consumers complain, only 4% of complaints come to decision-makers, while average dissatisfied customer informs about nine negative people about their negative experience, and an average satisfied consumer informs about his positive experience only five to eight people. Satisfied customers is the key to any success. The success and profit of each hotel is closely linked to the satisfaction of guests, which is one of the main conditions of their loyalty. In the time ahead of us the satisfaction of hotel guests will be a leading indicator of the hotel's business performance. For a hotel company, the development of direct relationships with customers is very important and affects their choice in the buying process. But it is equally important for the hotel company to learn from consumers in this way in order to promote sales and strengthen their loyalty. In this context, hotel service users are seen as an important strategic source for a hotel company.

Quality is the key to achieving customer satisfaction. Overall satisfaction "products" of loyal consumers. A higher level

of satisfaction is most often achieved through the continuous improvement of the quality of service. The elimination of shortcomings in the tourist offer and the increase in the quality of the tourist product becomes a strategic variable in the struggle for the market segment in the increasingly demanding, tourist market. The importance of tourist satisfaction makes it necessary to measure tourist's satisfaction and the factors affecting it. Sustainable growth of tourism industry depends on a good plan for related services and facilities. Measurement of satisfaction helps the tourism industry managers to understand the motivations and behaviors of visitors and use it to increase industry performance. Hotels, shopping malls, temples are some examples of destinations where safety can be improved by government. Furthermore, acting immediately, such as police reports and search for lost items when something happened could reduce dissatisfaction. The Government must also take serious action against misuse of gullible tourists. Improving accessibility of tourist facilities is another important factor. Shopping malls, museums, restaurants; cafes and eating-places and other facilities must be available during the holiday season to make sure that tourist have access to them. Access to information centers, help-lines and internet/email must be provided 24 hours a day. Similarity, accessibility to different variety of food is important, as food is one of the dissatisfactory attributes. Providing better information about the conditions of infrastructure, transportation, and accommodation, such as, huts, hotels, motels, water quality and features of tracks could help visitors be better prepare for what they may encounter. Other contexts that could increase tourist satisfaction and would help visitors, include increase information centers providing information categorized as national or local/regional, reports on weather conditions, local events and 'survival' information. Another area of increasing satisfaction is better provision of interpretative and educational information. Interpretative information about sites, their features, geographical and historical information about the area, the culture and environment, accessible nightlife and entertainment, and attractions other than mainstream or adventure activities are crucial. The quality of the presentation of the information is also identified as an area for attention, with better organization of areas, text/labelling, audio-visual presentations (seating, frequency, quality). Suggestions also include use of models and displays, up-to-date photos, pamphlets

and maps with more information on them. The staff-tourist interface is important in managing the general atmosphere of the experience, training and development and getting the right people is critical. Providing high standards of service, with staffs, which are friendly, helpful, approachable and locally knowledgeable, remain important. The service must be quick, fair and useful to respond to the tourists' needs.

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Firm Capacity in Inter-Stakeholders Collaboration in Corporate Social Responsibility Program Implementation

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Abstract: One of the keys to success in implementing CSR that is able to empower the community is the involvement of all stakeholders in the implementation of CSR programs. Such involvement is not only from the community as an object as well as the subject of the program, but also from the government, other companies, as well as regional organizations and at the grassroots level. This study will describe the capability of the company as the main stakeholder in collaboration between stakeholders on the implementation of corporate social responsibility (CSR) programs.

This research was carried out in the CSR program of PT. Pertamina EP 3 Asset Subang using a qualitative approach and descriptive method. The capability of the company will be described based on aspects of the company's core capacity which are an important component of the capability of the organization.

The results showed that PT. Pertamina EP 3 Asset Subang has adequate internal capacity to build collaboration between stakeholders in the implementation of CSR programs. What needs to be done by PT Pertamina EP to maintain the sustainability of collaboration is to give greater attention to aspects of fostering and maintaining relationships with stakeholders on the basis of mutual trust.

Keywords: organizational capability, collaboration, stakeholders, corporate social responsibility

Introduction

Poverty is a common problem that occurs almost at all areas of oil and gas operations in Indonesia. In this case the *Corporate Social Responsibility* (CSR) program by oil and gas companies should be able to contribute to improve empowerment of surrounding communities and reducing poverty. Associated with Oil and Gas Law no. 2 of 2002 concerning implementation obligations community development and empowerment, existence should be oil and gas companies in a region can also contribute to welfare local communities. However, so far it is precisely the communities around the area operations, especially in the Ring 1 region, are in a state of poverty.

Every year oil and gas companies carry out CSR programs with large amounts of funds. However, the communities around the operating area are still in a state of poverty. Various challenges and obstacles in the implementation of CSR by oil and gas companies in Indonesia are supported by the thoughts of oil and gas companies that they are not companies that sell goods directly consumed by the community, so the implementation of CSR programs is only carried out to obtain local permits for which oil and gas operations related to production targets and state revenues achieved. This thinking that led to the implementation of CSR is sometimes only done as a form of charity assistance. This then becomes a temporary answer why the implementation of CSR has not been able to increase the empowerment of communities around the operating area and contribute to improving the welfare of the community around the operational area.

The community still does not feel the significant impact of the results of the implementation of CSR. Likewise with the local government, the company contributes very little to the implementation of regional development. The important thing that needs to be observed in the implementation of CSR is that companies often carry out CSR activities partially and do not coordinate with government development plans. This often results in an overlapping program (BPMIGAS, 2008). Likewise, the relationship between the company and the existing local institutions, there is a negative stereotype from the local institutions towards the company, which sees the company as very stingy and exclusive. The opposite happened that the company viewed local institutions as the political elite of the people who blackmailed the company. This problem certainly becomes serious when between stakeholders have different understandings, goals and interests, because these conditions do not encourage the achievement of CSR goals that empower the community.

One of the keys to success in implementing CSR that is able to empower the community is the involvement of all stakeholders in the implementation of CSR programs. The main stakeholders are companies as the main implementers of CSR activities, as well as those who fund CSR programs . Furthermore, the community as beneficiaries must participate in this CSR activity.

Participation will encourage people to be able to solve the problems they face without dependence on the company. Community participation will lead to independence which is a manifestation of a empowered society. The role of the government is also considered very important, because as the holder of control in every activity that exists in the community carried out by the company or by the community independently.

The involvement of stakeholders in the implementation of CSR has not been fully implemented optimally. In general, the involvement of the government in the implementation of CSR is only carried out as far as coordination when the program will be rolled out, while full involvement between stakeholders in accordance with their roles has not been carried out optimally (Resnawaty, 2015). The initial assessment carried out also shows the same conditions. So far, stakeholders have carried out their respective roles as an institution that has legitimacy and interests. But one another has not yet collaborated to achieve mutual interests.

From the company side, the capability of the company itself determines the collaboration process that they build with other stakeholders. Considering that the company is the main stakeholder in the collaboration process among stakeholders, the position of the company is very strategic in determining the dynamics and achievements of collaboration among stakeholders. As a party that has financial resources as the main resource in implementing CSR, companies can move the direction and process of collaboration in accordance with their interests. But on the other hand, the interests of other stakeholders must also be taken into account by the company so that various interests will remain well-contained .

The capability of the company is understood by some researchers as the ability of the company to carry out tasks or activities in a coordinated manner in order to achieve the objectives of the company (Mulyono, 2013). Organizational capabilities is the main source for achieve good company performance and the application of good or not capabilities depends on available resources (Grant, in Mulyono, 2013). The point is that when the resources owned by the company are not good , the company will have difficulty managing resources power and therefore the capability will not be optimal. Therefore, the core capacity that is part of the capability of the company in the context of implementing CSR will determine the dynamics of the company in the process of collaboration in the implementation of CSR .

Materials and Methods

This research was carried out in the CSR program of PT. Pertamina EP 3 Asset Subang held in Dangdeur Village, Subang District, West Java, Indonesia. To get an overview of the company's core capacity that reflects its capacity as the main stakeholder in collaborating on the implementation of CSR programs, this study will use a qualitative approach with descriptive methods. The role of the company will be described based on data regarding the tasks performed by the company as the main stakeholder of collaboration. As for the aspects of core capacity, which is an essential component of organizational capability (Hu et al., 2015) are described based on the core capacity of an organization that can describe its capabilities, namely: (1) *leadership programs*; (2) *scope management*; (3) *governance programs*; (4) *matrix organizational structure*; (5) *Compete nce staff*; (6) *partnering with key stakeholders*; (7) *risk management* (8) *cost management* (9) *schedule management*; (10) *knowledge management*.

The research data was collected using in-depth interview techniques and observations as well as secondary data review. Deep interviews committed against companies, local governments, local institutions, and the community. Observation is done by observing the activities carried out by stakeholders on implementation of CSR programs. The secondary data analysis is carried out on secondary data in the form documents related to CSR policies for oil and gas companies and the implementation of CSR programs. This review of secondary data provides complete information to obtain an overview of the company's capacity, while also reflecting its capacity to collaborate with other stakeholders.

Results and Discussion

Before describing the company's core capacity , it will first be described about PT. Pertamina EP Asset 3 Subang Field (hereinafter referred to as Pertamina EP) as the subject of this research. Pertamina EP is a moving company in the field of oil and gas management and exploration in Subang Regency West Java province. As a mining company, Pertamina EP has responsibility social responsibility in developing the economy of the community around the location exploration. Pertamina EP is not only limited to orientation looking for and producing oil and gas sources . In the environmental field Pertamina EP has made several efforts including through energy efficiency activities, emission reduction, 3R waste management, water recycling, and concern for environmental conservation.

In the socio-economic field, the company views and is committed that the community development program is a very important activity, both for the benefit of the company and the community itself. Pertamina EP is committed to carrying out activities operations that are in line with community development activities , as part of which is inseparable from the company's business processes and sustainable CSR and provides added value to company and society . The CSR policy orientation developed in Pertamina EP is a commitment to community empowerment to create prosperity and independence, guided by *Sustainable Development Goals* (SDGs), implement program management to create synergy with the community, and involve stakeholders at each program stage .

The policy regarding corporate social responsibility becomes the foundation of the company in empowering for equity welfare around the location. Following this direction, Pertamina EP implemented a community empowerment program to in the Home Inspiration program. This program is intended for improvement quality of life and welfare of the community R 1 from the wells of the Pertamina mine. Subang Field's Pertamina EP Asset 3 CSR program brings the concept *Ecogreen* with the theme of protecting the environment. *Ecogreen* is a concept which departs from an ecological, social and economic philosophy which

means that rural or urban communities try to integrate the sustainability of the social environment the way of life has low impact on the environment.

Institutionally the management of the Pertamina EP CSR program is CSR Staff and Community Development Officer (CDO) who have duties and functions as implementers in the field. In carrying out its duties CDO is responsible to CSR staff. The task of CSR staff is gathering, compile, process and implementing a CSR program in Subang Region to ensure Corporate and Social Responsibility compliance with The surrounding environment and the laws and regulations applies that supports the creation of good relations with stakeholders and positive image of the company. While the duties as CDO that is tasked to assist and facilitate the community in implementing community development programs at the field .

Company Capability

As stated by Mulyono (2015) that in the company's capacity is one factor internal importance in managing the resources that the company already has . When existing capabilities in a good company, the management of resources will be good - especially when the resources that the company has are good - and later they will be able to achieve *competitive advantage* . More firmly, the capability of the company in addition to helping managers make decisions right, it also facilitates the formation, integration, interweaving and reconfiguration organizational resources, both internal and external (Majid & Yasir, 2012)

Picture capability of the company to collaborate with other stakeholders can be reflected in the *core capacity* company. Core capacity demonstrates the company's ability to utilize internal company resources when interacting with various parties in the framework of managing programs and activities. The company's core capacity includes: (1) *leadership programs* ; (2) *scope management* ; (3) *governance programs* ; (4) *matrix organizational structure* ; (5) *Compete nce staff*; (6) *partnership with key stakeholders* ; (7) *risk management* (8) *cost management* (9) *schedule management* ; (10) *knowledge management* (Hu et al , 2015) . Each component of this capacity will be the capital for the company in building collaboration and striving to achieve the company's program objectives.

Leadership Program

The leadership program is defined as 'the good leadership and clear direction of setting all levels within a program organization' (Reiss et al., 2006, in Hu et al , 2015). Hu et al (2015) also added that Mrs. Scholars affirmed the significant role of leadership in constructing high-performing program organizations. In the context of the program developed by PT. Pertamina EP, The leadership program is an aspect that explains the role of leaders in CSR programs carried out by Pertamina EP. The ability to utilize organizational resources will determine the achievement of company goals. Leadership in the program can encourage companies to be able to allocate funds from profits obtained for the benefit of CSR programs as needed and planning results of *social mapping* and corporate strategic planning .

Base on the structure in Pertamina EP 3 Asset Subang, then sequentially leadership structure in the work unit in the program are: 1) Asset GM; 2) VP Legal & Relations ; 3) Operation and financial functions ; 4) Head Office CSR ; 5) Asset CSR Analyst ; and 6) CSR Staff Field . Pertamina EP builds a working mechanism and work relations between these units that enable the distribution of authority and tasks to be carried out proportionally. This also includes setting up the implementation of tasks in conjunction with collaboration. For example, institutionally coordinating with SKK Migas is the CSR of the head office.

Scope Management

Scope management is given the limits of the program to identify, m engukur and expectations of the program is done to masyarakat. Scope management refers to the identification, measurement and achievement of the expected benefits that a program organization is intended to deliver (PMI, 2006 , in Hu et al, 2015) . The following are the boundaries that are meant in the CSR program Pertamina EP, namely:

1. *Community Development* programs are given to help community based on priorities, real needs of society, help the community in a critical, disaster, disaster nature etc.
2. Assistance provided by the company can provide benefits strategic both for companies and society
3. The community development program is implemented not take the local government program but support it local government program.
4. The community development program is implemented already is an agreement and has been approved by the government area, company and society.
5. Community Development assistance is given in kind money, and not politically oriented.
6. The recipient regions of the program are prioritized by the community in Ring I, which is the community/village that lives directly adjacent to the location of the company's operations. while Ring II and so on, is a community that is located outside Ring I but still in the area of the local government.
7. Development of community development activities in governance this organization is limited to the management of PT Pertamina EP / SKK Migas.
8. Legal & Realtion functions are either requested or not provide consulting assistance or support oeprasi kep a da public relations operating unit / business unit to complete issues that have the potential affect the image of company

Governance Program

Quoting the opinions of some experts, Hu et al. (2015) said that governance is referring to a decision board that can sustain external resource input and ensure progress in accordance with the requirements of prescribed objectives. There is one similarity in the direction of development policy in the two regions which is the basis of the Pertamina EP Community Development

program (Karawang and Subang) which is aimed at alleviating poverty and creating employment through populist economic development. The policy was primarily emphasized through the leading economic development sector in the Subang and Karawang regions, namely the agricultural sector.

The agribusiness program was developed by Pertamina EP holistically from upstream to downstream creating sustainability and sustainability and not just achieving the target of economic improvement and community capacity, but also is expected to support the government in developing infrastructure of region, management of other fields of environment through innovation and technology dissemination .

Strategic plan for Subang Field Pertamina EP Asset 3 Comdev too trying to adopt the values of local wisdom which become the breath of development including mutual cooperation, independence and justice. Value mutual cooperation is realized by developing programs participatory involving Pertamina's partnership with the community, the government regions, colleges and other institutions. The value of independence is directed through the target of achieving each program is the development of independence community and building superior regional centers. Justice values developed through the principles of managing comdev on target, right location, on time and handled with the right mechanism.

The alignment of the program orientation developed by Pertamina EP made collaboration with the regional government easy to do. But there are challenges that have always been a classic reason in the company's CSR program, which is about funding that the government often relies more on the company to make it happen.

Matrix Organizational Structure

Matrix of organizational structure is organizational form in which staff should report to departmental head and project leaders respectively. This factor is one of the characteristics of program organizations (OGC, 2003 , in Hu, 2015). Furthermore, Lycett et al. (2004) pointed out that proper attention should be given to program roles and responsibilities in designing organization programs for megaprojects construction.

The organizational structure matrix describes the position among the parties in the organization involved in the implementation of CSR programs. The CD / CSR institutional model greatly influences effectiveness the performance. Management commitment, financial capability, production characteristics and coverage area are some variables that determine the form CSR institutional model. On the CD / CSR organizational structure of PT Pertamina EP Asset 3 Subang Field is under the authority of the Legal and Relations Section . The implementation of CSR in Pertamina EP is carried out by employees based on tasks and functions arranged in an organizational structure whose bureaucracy provides flexibility to the level of implementers to develop their creativity.

Competent Staff

Competence staff is the competence of the CSR program implementers Pertamina EP 3 Asset Subang that looking from behind education and experience. Shehu and Akintoye (2010 , in Hu et al., 2015) stated that the lack of qualified staff is a major obstacle in constructing the high-performing program organizations. This was strengthened by Geraldi et al. (2010) who agreed with his opinion, adding that competent staff is indispensable for the competitiveness of program organizations .

When paying attention to the qualifications of the staff at Pertamina EP who are responsible for implementing CSR programs, they have an adequate educational background. With at least a level of education in the field of social science, the staff can develop their creativity with the right ingredients and flexibility from their superiors. What is then needed to strengthen these competencies is the appropriate stimulants and standardization that can be used as a guide so that the sustainability of the activities developed is not wasted.

Partnership with key stakeholders

Quoted by Chan et al. (2008), Hu et al. (2015) stated that the partnership with key stakeholders to the establishment of a strong relationship with key stakeholders involved in a program. In addition, Hu et al (2015) also found numerous studies have revealed that internal stakeholder management is crucial in sustaining program success. Related to this, the CSR program of PT Pertamina Asset 3 Subang Field collaborated with many the stakeholder starts from the level of ketokohan desa, RW, Karang Taruna, puskesmas like rahayu, village government to district government Subang. Cooperation carried out in the form of active participation cooperation from some stakeholders such as community leaders and cadets, and passive participation from village and district governments.

During the collaboration with several stakeholders in the operation the running of the house inspires subang, the activities carried out by Rumah Inspirasi Subang has received appreciation from PT Pertamina and the Government especially from the Environmental Service. Both parties support inspirational home program with the delivery of goods and gifts training for employees and local residents for capacity building. The Environmental Service felt helped by the House of Inspiration because on one side of Rumah Inspirasi Subang is a waste management program and according to the environmental service if Rumah Inspirasi compared to other garbage banks in Subang, home inspiration has all the more complete and adequate facilities. Nevertheless, support from the local government through the Environmental Service has not been fully felt.

Risk Management

Risk management is a mechanism developed by the company to reduce risks that may occur as a result of actions taken. Considering that CSR is an important program to support the company in carrying out its *core business*, the success of the program is important to ensure its success. But on the other hand, the success of a CSR program is not only determined by the performance of the company in organizing it, but is also determined by the performance of other parties with an interest in the

objectives of the CSR program. Strategy ompany exact p required in dealing with issues related to CSR programs. Risk management and insurance refers to tasks of keeping a program's risk exposure at an acceptable (Pellegrinelli, 2002). But what must be considered in its management, Lycett et al. (2004) stated that risk management at the program level is more important than that at the project level, which could address the strategic requirements of the level through proper insurance arrangements . To reduce the risk of errors or failures in the implementation of CSR programs, Pertamina EP establishes a monitoring and review mechanism at the program level . This will also facilitate the management of collaboration with other stakeholders when each party develops its own program and activities.

Cost Management

According to Hu et al (2015) c ost management, the first of the 'iron triangle'objectives, Refers to tasks that control program expenditure in the approved budget. Subang's CSR program at Pertamina is not only in Subang, there are some programs spread in Subang and in Karawang are indicators Proper funding of more than 1% of the company's profits is used for CSR program. Funding from those already budgeted is not only for one the Home Inspiration program but also to fund programs others are based on needs, the CSR budgeted then proposed to financial division. The process of submitting a budget is not all that is submitted is approved fully but if it has been approved, funding will be sent to implement to carry out activities in the program after that made use of reporting of funds.

Schedule Management

Quoting PMI (2006), Hu et al (2015) stated that management, the second of the 'iron triangle' objectives, referring to activities of ensuring that the program will produce its required deliverables and solutions on time (PMI, 2006). Kem a mpuan company to manage program implementation schedule shows the institutional capacity of the company is good for organizing activities. Setting the activity schedule made by the company must consider the possibility for the involvement of other stakeholders in the activity. In building collaboration, the existence of other stakeholders is taken into account seriously so that it can be built openly

Related to schedule management and cost management, the components that determine the capability of the company in organizing collaboration is functionality and quality management. These the third of the 'iron triangle' objectives, referring to activities that determine and ensure function and quality requirements to meet the prescribe objectives during execution (Reiss et al., 2006 , in Hu et al, 2015). Pertamina EP builds its CSR program activities through prior social mapping which enables them to determine activities with targets that can be implemented by involving other stakeholders in a collaboration mechanism.

Knowledge Management

Knowledge management is the company's ability to know the conditions and situations that develop along with the implementation of company programs. Various factors that are thought to be able to disrupt the implementation of a program may not be detected beforehand or it can be estimated with the correct interference caused. The way to find out the progress of program implementation is to carry out monitoring and evaluation. Through monitoring will it is known whether the implementation and achievement of the program are in accordance with planning or not.

More systematically monitoring is an activity periodic information gathering to determine whether an activity has been carried out in accordance with the plan. Monitoring is continuous processes are carried out throughout the program cycle starting from training and outreach, planning, implementation and preservation. Results of monitoring activities are used to improve the quality of implementation and adjustments to planning. (Pamsimas, 2013: 30)

Monitoring becomes important because this helps the perpetrators the program knows the progress and development that has been achieved by program. The findings of the monitoring activities as well help program actors to check whether an activity is successful completed according to plan or not. Information obtained from monitoring results is used to evaluate program implementation. E impact valuation is carried out to identify problems and various potential factors explain the problem (Elfindri, 2011). Thus, monitoring and evaluation is finally carried out to improve the quality of the program . The things evaluated need to cover aspects of input, process, output and outcome.

Pertamina EP conducts independent monitoring and evaluation by PT Pertamina EP Subang Field CSR Unit or by l embaga i ndependent appointed to conduct monitoring and evaluation. In addition, program monitoring and evaluation activities are carried out regularly, both monthly or annual with -indikator indicator refers to mentoring. Monitoring and evaluation refers to the results of reporting regular from the companion, namely report two m ingguan. This biweekly report contains an evaluation the implementation of the program is based on a two-week work plan that has been prepared in which obstacles are reported or obstacles encountered and solutions.

Next is the CSR Unit periodically PT Pertamina EP or independent institution appointed together with CSR implementing partners conducting monitoring and evaluation every six months. Results monitoring and evaluation are outlined in the semester report. The Semester report contains the level progress of implementing the mentoring plan in empowerment and development activities village model compared to the plan formulated a month before, and the development of village model activities according to the indicators predetermined successes, problems and constraints faced, solutions that have been made, and suggestions for follow-up.

With the monitoring and evaluation mechanism carried out by Pertamina EP, the company can maintain the availability of information about the program and the condition of the area it manages so that it can take the necessary steps quickly and accurately. This of course will be very easy for decision makers in determining the actions that need to be taken.

Conclusions

Judging from the company's capability to develop collaboration in implementation CSR program, PT. Pertamina EP 3 Asset Subang has adequate internal capacity. Institutionally they are working mechanisms with a bureaucratic flow that is quite strict but quite flexible, allowing everyone to be creative. This is supported by the competency of qualified field implementers in the field of community development. In addition, the relationship fostered by interested parties made PT Pertamina EP easy to develop into a collaborative relationship. The availability of a controlled budget, with a well-managed schedule, and the ability to control the development of the program allow the collaboration of PT Pertamina EP with other stakeholders to be sustainable and mutually beneficial. To maintain the sustainability of collaboration, PT Pertamina EP needs to pay more attention to aspects of fostering and maintaining good relationships with all stakeholders based on mutual trust.

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Adsorptive Capacity of *Prosopis Africana* Husks on Pesticides

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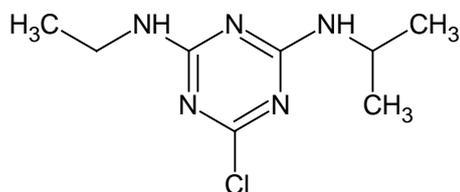
Abstract: The adsorptive capacity of ammonia-treated activated *Prosopis Africana* pod husks (APAPH) and carbonized activated *Prosopis Africana* pod husks (CPAPH) on atrazine was studied. All the adsorbents derived shows favorable physicochemical attributes (pH, bulk density, attrition, iodine adsorption number/surface area, titratable surface charge, SEM and FT-IR analysis). Batch adsorption studies were also carried out under the effect of operational parameters such as initial atrazine concentration (10-60 mgL⁻¹), initial solution pH (2-12), adsorbent dosage (0.5-2.5 g), contact time (30-240 Min), and temperature (300-350 K). Depending on the adsorbents, optimal removal of atrazine was: CPAPH (66.0 %) and APAPH (56.5 %). Equilibrium adsorption data obeyed isotherm models in the order (Langmuir> Dubinin-Radushkevich>Temkin>Freundlich).

Keywords: *Prosopis Africana*, Atrazine, activated carbon, adsorption, capacity

1. Introduction

Pesticides have been detected in soil, surface and groundwater throughout the world (Ijpelaar *et al.*, 2006) which is as a result of indiscriminate use of large quantity of pesticides to control, combat pests in order to ensure higher productivity of crops. Among the herbicides systematically monitored in our environments, atrazine (2-chloro-4-ethylamino-6-isopropylamino-1, 3, 5-triazine) emerges as the most common and Prolific (Antonio *et al.*, 2010). Atrazine is a pre and post emergent herbicide used in the control of weeds mainly in crops of maize, sugar cane and sorghum (Chirside *et al.*, 2009). A significant amount of the pesticide may remain in the soil which in turn drains into surface waters. Pollution by pesticides has been revealed to affect aquatic life (Ijpelaar *et al.*, 2006). To address this, the World Health Organisation (WHO) has produced guidelines for exposure limits for individual pesticides in drinking water (Yokley and Cheung, 2000).

Although herbicides are the largest group of pesticides in terms of the number of compounds and total weight used, insecticides have historically posed the major environmental and health hazards (Yokley and Cheung, 2000). Atrazine is a selective systemic herbicide use for control of weed. The mode of action for atrazine is through inhibition of photosynthesis in the target plants. Atrazine is a soluble substances which can be transported in dissolved form from one place to other (Pathak and Dikshit, 2012).



Chemical Structure of Atrazine

Recent studies have shown that the aromatic structure of atrazine could be metabolized to gaseous end products in mixed cultures under methanogenic conditions (Raj and Anil, 2012). *Prosopis africana* is a leguminous plant of the Fabaceae family. It is a flowering plant that is locally called “kiriya” in Hausa, “okpehe” in Idoma and “gbaaye” in Tiv languages of Nigeria (Chidi *et*

al., 2012). It was originally found in the Sahel and Savannah forests of Senegal to Ethiopia. The trees of *P. africana* are common in the middle belt and northern parts of Nigeria (Aremu *et al.*, 2006). It grows to a height of 4-20 m, with slightly rounded buttress roots and dark stem bark, which is scaly, slash and has white streaks. It flowers once a year. The fruits are smooth, hard pod-like capsules having banana fruit shape and are brown-black in colour. The seeds are many, tiny and very hard, brownish-black in colour with high resistance to water and insect attack. It is traditionally used for formulation of animal feeds and preparation of local condiments through boiling and fermentation processes (Aremu *et al.*, 2006).

In Nigeria and many parts of West Africa, the seed hulls from this process lie as wastes and constitute environmental concern, therefore, good handling of the waste materials generated from this process could result in waste minimization and tremendous cost saving (Afidah and Zaharaddeen, 2015).

Prosopis africana tree is of great value to man and animal economically; it fixes nitrogen to enrich the top soil, generates timbers and produces protein rich leaves and sugary pods used as feed for animals (Annongu *et al.*, 2004). However, the disadvantage of *Prosopis* is of high content of anti-nutritive such as tannins, *prosopine* and toxic amino acids which are capable of causing adverse effect on simple stomachs when consumed without proper processing (Yusuf *et al.*, 2008). Consequently, the specific objectives of the present study were to prepare, characterize, and evaluate the effectiveness of adsorbents from *Prosopis Africana* pod husks (PAPH) (biomass) to remove Atrazin, a common herbicides from aqueous phase, with emphasis on adsorption equilibria.

2.0 Experimental

2.1 Preparation and characterization of *P. Africana* pod husk adsorbents

P. africana pod husks (PAPH) were collected locally from different places in Otukpo and Adoka both in Benue State, Nigeria and were identified with LA 70874-4490 USA batch number. They were washed with water and raised with distilled water to remove dirt, air dried for 24 h, pulverized using a locally made grinder and sieved into particle size of 2 mm to generate the adsorbent precursor (Zaharaddeen and Afidah, 2014). The sieved material was chemically treated by steeping it in a saturated ammonium chloride solution for 24 h (Wuana *et al.*, 2016).

The slurry was filtered and the residue rinsed repeatedly with distilled water and air-dried to serve as the chemically (ammonium chloride) treated adsorbent (APAPH). A portion of APAPH was pyrolyzed in a muffle furnace at 350 K for 2 h. The resulting carbon was washed repeatedly with distilled water to remove ash, air-dried, and stored as the carbonized adsorbent (CPAPH).

The adsorbents were further characterized physico-chemically. Adsorbent pH was determined by dispersing 1.0 g triplicate samples of the adsorbent in distilled water for 4 h and measuring the pH of the resulting filtrate (Wuana *et al.*, 2015). Bulk density was determined by the tamping procedure of Ekpete and Horsfall, 2011. Attrition was determined by a procedure described by Toles *et al.*, 2000. Adsorbent surface area was determined by the iodine adsorption number method during which, a 0.5 g portion of the adsorbent was treated with an excess of standard iodine solution followed by back-titration of the unreacted iodine with

standard sodium thiosulphate solution (Wuana et al., 2015). A blank titration was also performed on an aliquot of iodine solution not treated with the adsorbent. The iodine number, n_{I_2} (i.e. amount in moles of iodine adsorbed per g adsorbent) was calculated using Eq. (1); while the adsorbent surface area, A (m^2/g) was calculated with the aid of Eq. (2), a modified form of that of Wuana et al., 2015

$$n_{I_2} \left(\frac{mol}{g} \right) = \frac{C_{S_2O_3^{2-}}(V_b - V_s)}{2 \times 10^3 M_a} \quad 1$$

$$A(m^2/g) = N_o \left(\frac{C_{S_2O_3^{2-}}(V_b - V_s)}{2 \times 10^3 M_a} \right) \sigma_{I_2} \quad 2 \quad \text{where } C_T \text{ is}$$

the concentration of the thiosulphate ($molL^{-1}$), V_B and V_S are, respectively, the titer values of the blank and adsorbent-treated iodine solutions (L); m_{AD} is mass of the adsorbent used (0.5 g); N_o is the Avogadro's number; and σ_{I_2} is the cross-sectional area of an iodine molecule (m^2), given as $3.2 \times 10^{-19} m^2$. Titratable surface charge was determined by the Boehm titrimetric method described by Van Winkle (2000). pH point of zero charge determination by Ekpete and Horsfall, (2011). Fourier transform infrared analysis utilized the FT-IR (Agilent-CARY-630), and was performed according to the manufacturer's specifications.

2.2 adsorption experiments

Batch adsorption experiments were designed to evaluate the effect of different operational parameters (initial solution pH, adsorbent dose, contact time, temperature) on aqueous phase abatement of atrazine by APAPH and CPAPH.

In order to study the effect of initial solution pH on adsorption of atrazine, separate 50 mL aliquots of atrazine solution (50 mg/L) were adjusted to pH 2, 5, 7, 9, and 11 by drop-wise addition of 0.1 M NaOH or 0.1 M HCl, as the case may be, with the aid of a pre-calibrated pH meter (HI96107, Hanna Instruments). The solutions were further contacted with 0.5 g of AMPH or CMPH adsorbents for 4 h with the aid of a mechanical shaker (HY-2, Jiangsu, China). The slurries were filtered and the residual atrazine concentrations in the filtrate determined using the GC-MS (Wuana *et al.*, 2015).

The effect of adsorbent dose on adsorption of atrazine was investigated by dispersing accurately weighed portions (0.5, 1.0, 1.5, 2.0, and 2.5 g) of APAPH or CPAPH in 50 mL aliquots of atrazine (50 mg/L) solution with the aid of a mechanical shaker for 4 h. all samples were removed after and filtered, then stored in a glass bottle for further analysis (Taha *et al.*, 2014).

The effect of initial concentration was carried out with different initial atrazine concentration of 10-60 mgL^{-1} . 0.1 g of adsorbents (APAPH and CPAPH) were contacted with different concentrations was placed on a mechanical shaker and agitated at 150 rpm, at room temperature for 4 hrs to ensure equilibration. The suspension was then filtered using Whatman filter paper (Wuana *et al.*, 2015).

The effect of contact time on adsorption of atrazine was investigated by dispersing 0.5 g of adsorbents (APAPH and CPAPH) was placed in five well labeled 250 mL Erlenmeyer flasks, each containing 50 mL of atrazine solution. The flasks were placed on mechanical shaker for 30, 60, 90 120, 180 and 240 Minute. Resulting mixture was filtered using Whatman filter paper and stored in a well labeled glass bottles at normal room temperature for further analysis (Venkatraman *et al.*, 2011).

Lastly, the effect of temperature on adsorption of atrazine was assessed by contacting 0.5 g of adsorbents (APAPH and CPAPH) was contacted with 50 mL of atrazine solutions using the Gallenkamp temperature controlled water bath. The instrument was set at 30°C for 4 hrs, after which the sample was taken off and filtered using the Whatman filter paper, stored in a well labeled glass bottle at room temperature for further analysis. The same procedure was repeated for samples at temperatures of 40°C, 50°C, 60°C and 70°C for 4 hrs each (Verma and Mishra, 2010).

In all batch adsorption experiments, the quantity of Atrazine adsorbed, Q (mg/g) was calculated by the mass balance equation:

$$Q(\text{mg/g}) = \frac{(C_i - C_f)V}{m_{AD}} \quad 3$$

where C_i and C_f are the initial and final (residual) Atrazine concentrations (mgL^{-1}), respectively; V is the aliquot of Atrazine solution used; and m_{AD} is the mass of adsorbent (g) that will be used for this particular batch treatment.

The percentage removal of Atrazine by PAPH was calculated as:

$$\% \text{ Removal} = \frac{(C_i - C_f)}{C_i} \times 100 \quad 4$$

2.3 Aqueous Phase Analysis of Atrazine using Gas chromatography

A gas chromatography-mass spectrometer (GC/MS) is used for separation and quantization of Atrazine using selected ion monitoring (SM) in the electron ionization (EI) mode, the GC/MS gives superior specify and similar sensitivity compared to NIST library.

Quality control was achieved by good laboratory practices. All glassware and plastics were appropriately washed with acid (1 + 1 HNO_3) and finally with distilled water and oven-dried. Procedural blank samples were subjected to similar treatments using the same quantity of reagents. In all cases, measurements were done in triplicate.

3.0 Results and discussion

3.1 Physicochemical attributes of *P. Africana* pod husk adsorbents

The physicochemical attributes of *P. africana* pod husks adsorbents (i.e. CPAPH and APAPH) are recorded in Table 1. CPAPH and APAPH had pH of 7.10 ± 5.0 and 7.30 ± 5.2 mean and standard deviation values respectively. Adsorbents with pH 6–8 are acceptable for applicability for water and wastewater treatment (Wuana *et al.*, 2016). Bulk densities of 0.66 and 0.49 kgm^{-3} were showed in table 1 for CPAPH and APAPH; respectively if the density of activated carbon is high then it

will provide greater volume activity and hence better quality of activated carbon (Kibami *et al.*, 2014). Among the samples, the densities of CPAPH are higher than APAPH. The results shows that all the adsorbents used for the study have higher apparent densities. Attrition has values of 13% and 17% for CPAPH and APAPH respectively which are shown in table 1, somewhat higher than adsorbents from moringa oleifera pod husk (Wuana *et al.*, 2016). Both adsorbents showed acceptable attrition loss after preparation.

The iodine number indicates the extent of micropore volume distribution within the adsorbents matrices, hence the surface area and Iodine numbers ($\times 10^{-4} \text{ molg}^{-1}$) were 640 and 395 for CPAPH and APAPH; respectively. CPAPH particularly had high ash content indicative of low carbon content. Titratable surface acidic groups ($\text{mmol H}^+_{\text{eq}}\text{g}^{-1}$) were determined by the selective neutralization with a series of bases of varying strength: NaHCO_3 , Na_2CO_3 and NaOH . NaHCO_3 neutralizes carboxylic groups wherein, those neutralized by Na_2CO_3 but not by NaHCO_3 are lactones. The weak acid groups neutralized by NaOH but not by Na_2CO_3 were postulated as phenols (Wuana *et al.*, 2013).

The pH at zero point charge is above 7.0 for both CPAPH and APAPH. The results in Table 1 show that $\text{pH} > \text{pH}_{\text{zpc}}$ for CPAPH and APAPH, This indicates the surface is negatively charged for both CPAPH and APAPH which arises from both basic/acidic sites that combine with protons from the medium.

Table 1: Selected Physiochemical Parameters of Adsorbents.

Parameter	CPAPH	APAPH	RPAPH
Bulk Density (gcm^{-3})	0.66±0.47	0.49±0.35	0.44±0.31
Iodine number (mgg^{-1})	640	395	245
Iodine number ($\times 10^{-3} \text{ molg}^{-1}$)	2.52	1.56	0.97
Surface area (m^2g^{-1})	485.92	299.90	186.02
Ash Content (%)	10%	-	-
pH_{pzc}	7.6	7.2	6.4
Attrition (%)	13%	17%	30%
pH	7.10±5.0	7.30±5.2	6.83±4.8
Titratable surface charge ($\text{mmol H}^+_{\text{eq}}\text{g}^{-1}$)			
NaOH	0.89	0.88	0.64
NaHCO_3	0.97	0.68	0.93
Na_2CO_3	0.54	0.26	0.15

CPAPH= carbonized *P. africana* pod husks, APAPH= ammonium chloride-treated *P. africana* pod husks and RPAPH= raw *P. africana* pod husks

FTIR spectrum for Ammonium-modified *P. africana* pod husk (APAPH) showed four absorbance peaks with high intensity at 3257.7 mL⁻¹, 2922.2 mL⁻¹, 1613.9 mL⁻¹ and 1028.7 mL⁻¹ as well as four other peaks with lower intensity at 2050.0 mL⁻¹, 1214.2 mL⁻¹, 1319.5 mL⁻¹ and 723.1 mL⁻¹. The strong peaks at 3257.7 mL⁻¹ was typical of vibration originating from O-H stretching frequency of hydroxyl functional groups with hydrogen bonding. The peaks at 2922.2 mL⁻¹ could be assigned to C-H stretching of aldehyde or alkane. Also, the peak at the range of 1613.9 mL⁻¹-1438.8 mL⁻¹ could be ascribed to N-H bend of amine. The peaks at the range of 1319.5 mL⁻¹-723.1 mL⁻¹ were attributed to C-O stretching of alcohol or ether. While the peak at 1028.7 indicate the presence of C-H of alkanes. The peak at 2050.0 is assigned to -C≡C- stretching of alkyne or C≡N stretching of nitrile.

The highest intensity peak for Carbonized- *P. africana* pod husk (CPAPH) was obtained at the range of 3652.8 - 3548.4 mL⁻¹, indicated the presence of weak O-H alcohols or phenol groups. The peak at 2322.1 -2108.7 mL⁻¹ was ascribed to C≡N symmetric, while the peak 2108.7-2072.4 mL⁻¹ was attributed to C≡N nitrile and -C≡C- of alkynes. The lower intensity peak of 1561.8 mL⁻¹ was attributed to C=C stretching vibration of alkenes (Wuana *et al.*, 2016).

The micrographs from SEM analysis of the *P. africana* showed a heterogeneous and irregular texture with an eroded surface for all the adsorbents derived from *P. africana* pod husk (RPAPH, CPAPH and APAPH).

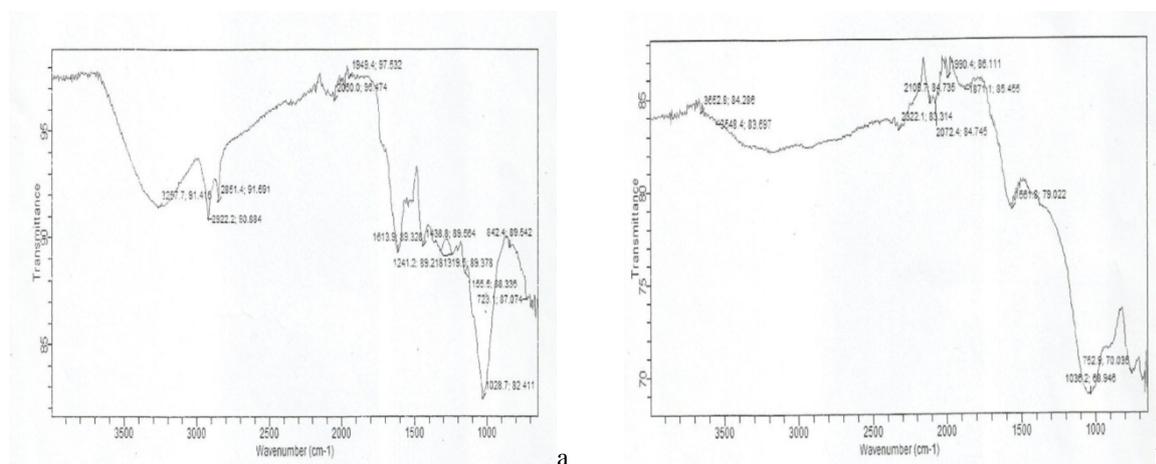


Figure 1: FTIR Spectrum of (a) carbonized (b) Ammonium-Chloride Modified *P. Africana* pod husks.

Table 2: Comparative FTIR spectra characteristics of CPAPH, APAPH and RPAPH

Vib. Freq(cm ⁻¹) Ranges	Observed		Functional groups	Assignment
	CPAPH	MPAPH		
1000-690	1036.2-752.9	1028.7-842.4	-	Alkanes

1320-1000	-	1319.5-723.1	1230.0-845.8	C-O	Alcohol, Carboxylic acid and ester.
1640-1550	1561.8-1475	1613.9-1438.8	1613.9-1435	N-H Bend, -C=C-	Amines, Alkenes.
2260-2100	2108.7-2072.4	2050.0	2214.0-2105.9	-C≡C- stretch C≡N stretch	Alkynes Nitrile
2410-2280	2322.1-2108.7	-	2325.9-2214.0	C≡N	Nitrile
3000-2850	-	2922.2-2851.4	2922.2	C-H, stretch C-H stretch	Alkanes Aldelyde
3000-2500	3652.8-3548.4	3257.7-3000	3280.1-3000	O-H stretch, O-H stretch O-H broad	Carboxylic acids Alcohol.

CPAPH= carbonized *P. africana* pod husks, APAPH= ammonium chloride-treated *P. africana* pod husks and RPAPH= raw *P. africana* pod husks

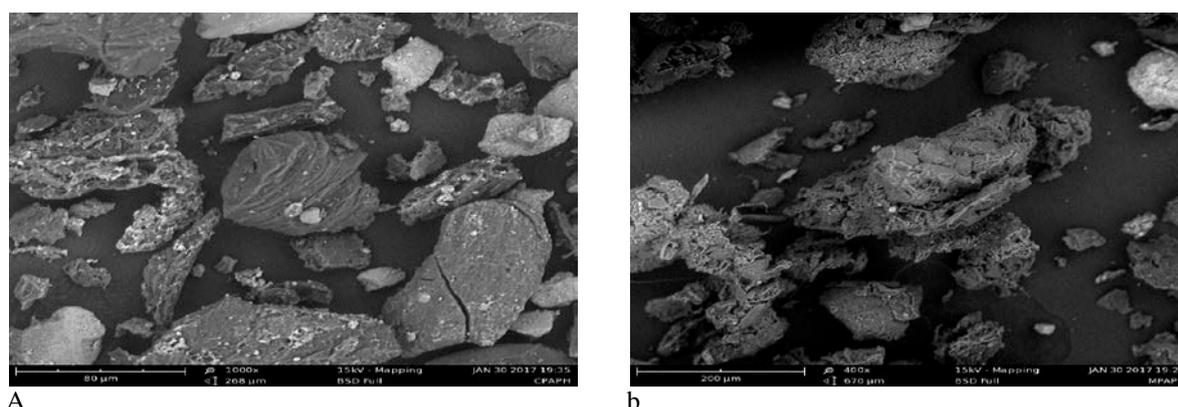


Figure 2; SEM micrograph of (a) Carbonized and (b) Ammonium-Chloride treated *P. Africana* pod husks.

3.2 Effect of initial solution pH on aqueous phase abatement of atrazine

Figure 3 shows the effect of initial solution pH on the aqueous phase sorptive abatement of atrazine by CPAPH and APAPH. The effect of initial solution pH (Figure 3) was investigated over the pH ranges of 2, 4, 7, 9, and 12 at a fixed initial concentration of atrazine (50 mg L^{-1}). The amount of atrazine adsorbed decreased with increase in pH for APAPH adsorbents, while CPAPH slightly increased with increase in pH. The highest atrazine uptakes: APAPH (65%) and CPAPH (72%) were recorded at pH 2; while the least: PAC (69%), APAPH (30%) and CPAPH (70%) were achieved at pH 12.

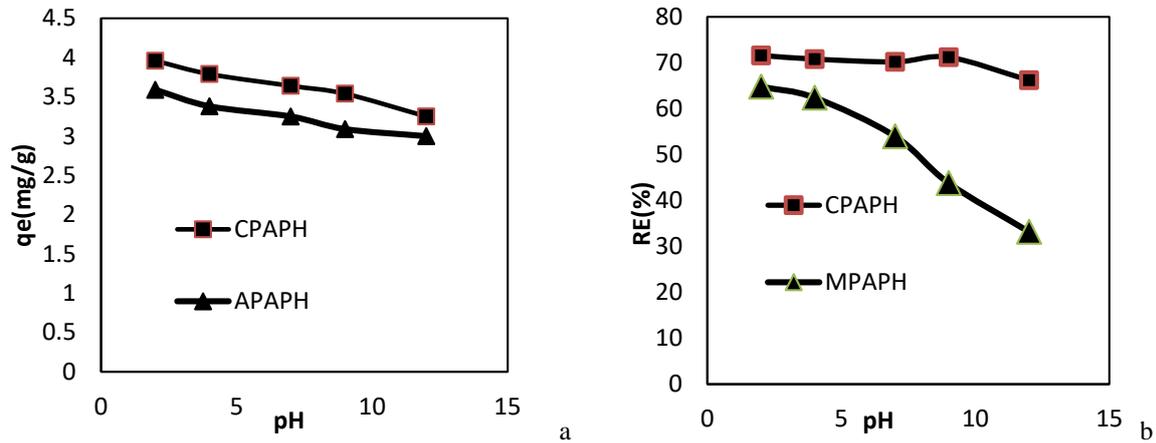


Figure 3: Effect of Initial Solution pH on Equilibrium Adsorption of Atrazine onto Carbonized *Prosopis Africana* pod husks (CPAPH) and Ammonium-chloride treated *Prosopis Africana* pod husks (APAPH). a=Equilibrium phase adsorption and b= Percentage Removal efficiency

3.3 Effect of adsorbent dose on aqueous phase abatement of atrazine

The effect of adsorbent dosage was studied at 30°C by varying the sorbent amounts from 0.5 to 2.5 g; Figure 4 shows that the adsorption of atrazine onto CPAPH and APAPH decrease as dose increases. From the results, it is revealed that CPAPH was better on adsorption uptake of atrazine than APAPH. The percentage of atrazine adsorption on *P. africana* is determined by the sorption capacity of the *P. africana* and the maximum removal of atrazine was obtained at the adsorbent dose of 0.5 g for both CPAPH and APAPH.

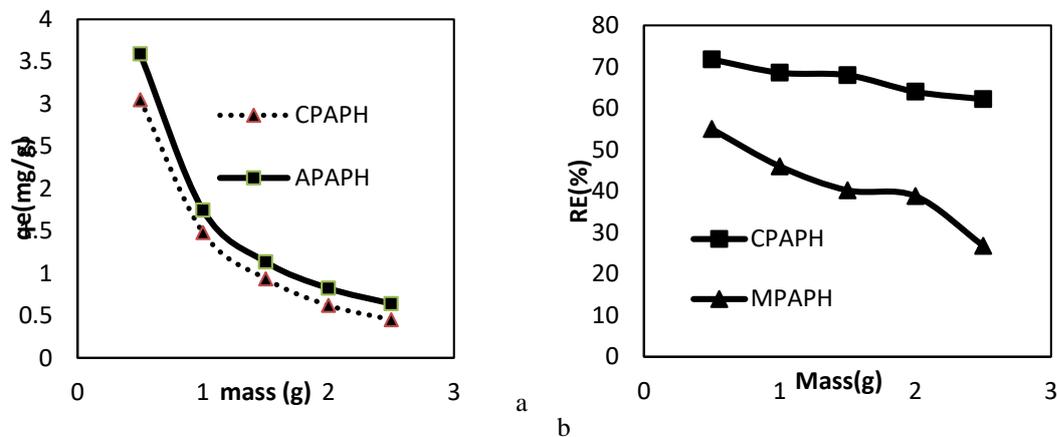


Figure 4: Effect of adsorbent dosage on Equilibrium Adsorption of Atrazine onto Carbonized *Prosopis Africana* pod husks (CPAPH) and Ammonium-chloride treated *Prosopis Africana* pod husks (APAPH). a=Equilibrium phase adsorption and b= Percentage Removal efficiency

3.4 Effect of initial solution concentration on atrazine

The adsorption removal capacity was determined at different Atrazine concentrations ranging from 10-60 mgL⁻¹. Figure 5 shows the adsorption uptake at different Adsorbents (CPAPH and APAPH). It is shown that the adsorption was fast during the early period of sorption but began to slow down gradually at the end for all the Adsorbents. The initial faster rates of adsorption may be attributed to the presence of a larger number of binding sites available for adsorption, and the

gradually reduced adsorption rates at the end were caused by the saturation of the binding sites and attainment of equilibrium.

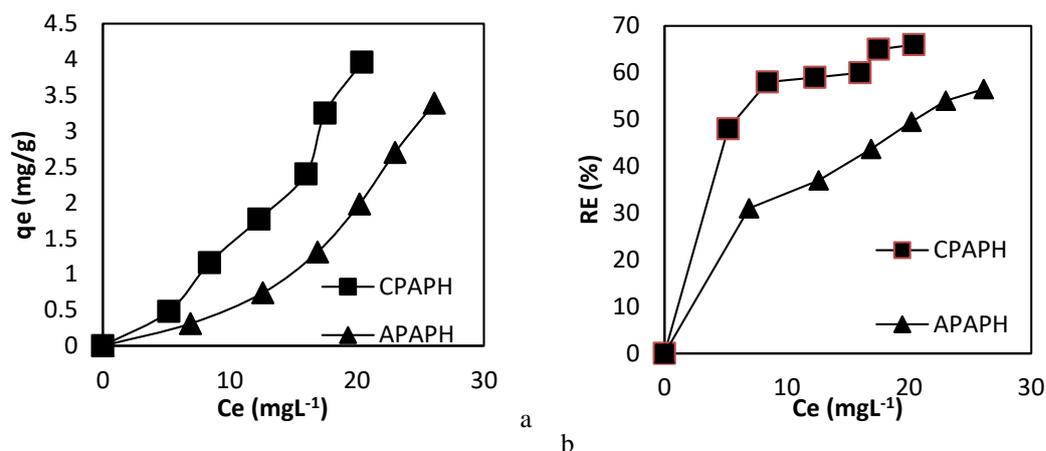


Figure 5: Effect of equilibrium concentration on Equilibrium Adsorption of Atrazine onto Pure Activated carbon (PAC), Carbonized *Prosopis Africana* pod husks (CPAPH) and Ammonium-chloride treated *Prosopis Africana* pod husks (APAPH). A=Equilibrium phase adsorption and B= Percentage Removal efficiency

3.4.1 Isotherm Studies of atrazine adsorption

Adsorption isotherm is invaluable curves, which explain the phenomenon of mobility or release of a substance from the aqueous phase or aquatic environments to a solid-phase at a constant temperature and pH (Allen *et al.*, 2004). It is important to determine the most appropriate correlation for equilibrium adsorption isotherm, to optimize the design of a sorption system (Wuana *et al.*, 2015). The Freundlich, Langmuir, Temkin, and Dubinin-Radushkevich isotherm models were used to analyze the adsorption equilibrium.

Langmuir isotherm: The model predicted a maximum values that could not be reached in the experiments. A K_L (Lmg^{-1}) value indicates are; 0.45 and 0.85 for CPAPH and APAPH. The monolayer saturation capacity, q_m , is shown to be 20.57 and 33.33 mgg^{-1} at a temperature of 30 °C for the adsorbents (CPAPH and APAPH) respectively. As shown in Table 1, the values of R_L for atrazine adsorption on the adsorbents (0.49, 0.49 and 0.48) were less than 1 and greater than zero for (PAC, CPAPH and APAPH) indicating favorable adsorption.

Table 2: Isotherm Experimental Constants for Adsorption of Atrazine onto PAC, CPAPH and APAPH.

Isotherm model	Constants	Values		
		PAC-ATR	CPAPH-ATR	APAPH-ATR
Langmuir	R^2	0.842	0.974	0.998
	K_L (Lmg^{-1})	0.80	0.45	0.85
	R_L ($Lmol^{-1}$)	0.49	0.49	0.48
	q_m (mgg^{-1})	10.87	28.57	33.33
Freundlich	R^2	0.874	0.988	0.842

	N	0.59	0.67	0.81
	K_f (mgg ⁻¹)	11.16	23.01	4.07
Temkin	R^2	0.955	0.900	0.836
	β_T (KJmol ⁻¹)	-100.12	-100.12	-36.79
	$1/\beta_T$	-9.98x10 ⁻⁰³	-9.9x10 ⁰³	2.7x10 ⁰²
Dubinin-Radushkevich	R^2	0.968	0.914	0.951
	β (KJmol ⁻¹)	-8x10 ⁻⁰⁶	1 x 10 ⁻⁰⁵	-6x10 ⁻⁰⁵
	E	250	223.6	91.23

PAC= pure activated carbon, CPAPH = carbonized *P. africana* pod husks and APAPH= ammonium- chloride *P. africana* pod husks.

Freundlich adsorption isotherm The model parameters and R^2 values are presented in Table 2. The Freundlich constants K_F and $1/n_F$ were calculated from the slope and intercept of the $\ln q_e$ versus $\ln C_e$ plot, as shown in Figure 11 and the model parameters are shown in Table 2. The magnitude of K_f (23.01 and 4.07) showed that CPAPH had a high capacity for atrazine adsorption from the aqueous solutions studied. As shown in table 2, $1/n_F$ value is less than 1 for all the adsorbents (CPAPH and APAPH) indicated that atrazine is favorably adsorbed by all the adsorbents used. As shown in Figure 11. The n values for all adsorption systems studied were less than unity, which reflects the favorable adsorption of the reactive atrazine over the entire concentration range used in this study (Wuana *et al.*, 2016).

Temkin adsorption isotherm The model parameters are listed in Table 2. The correlation coefficients of (CPAPH and APAPH) 0.900 and 0.951, Temkin isotherm appears to provide a good fit to the atrazine adsorption data.

The adsorption energy in the Temkin model, β_T , is negative for atrazine adsorption from the aqueous solution, which indicates that the adsorption is exothermic. Consequently, the adsorption isotherm of atrazine on CPAPH and APAPH can be described reasonably well by the Temkin isotherm.

Dubinin-Radushkevich (DRK) Isotherm DKR isotherm is used to determine the apparent energy of atrazine adsorption onto PAC, CPAPH and APAPH. The DKR parameters are calculated from the slope of the plot of $\ln q_e$ versus ε^2 , yielded straight lines and indicates a good fit of the isotherm to the experimental data. Values for β (mol⁻²J⁻²) are shown in Figure 13. The linear regressions are shown on Table 9, the values of q_m and β calculated from the intercepts and slopes of the plots respectively are shown on Table 9. Also shown on the same table 9 is the apparent energy (E) of adsorption from the Dubinin-Radushkevich isotherm.

From the linear plot of DRK model, q_m was determined to be very high for all the adsorbents (CPAPH and APAPH), the mean free energy, $E = 250$ KJmol⁻¹, 223.6 KJmol⁻¹ and 91.23 KJmol⁻¹ indicating a physisorption process and the $R^2 = 0.968$, 0.914 and 0.951 higher than that of Tempkin.

4. Conclusion

The adsorbents prepared in this study showed favourable physicochemical attributes (pH, bulk density, attrition, iodine adsorption number/surface area, titratable surface charge, and FT-IR analysis). Batch sorption experiments conducted to investigate the effects of operating conditions such as initial Atrazine solution, pH (2–11), adsorbent dosage (0.5–2.5 g), initial solution concentration (10–60 mgL⁻¹), contact time (30–240 min), and temperature (300–350 K) on Atrazine removal showed that at equilibrium, optimal Atrazine uptake (mg g⁻¹) occurred at pH 2 and sorbent dose of 0.5 g for all adsorbents. Langmuir isotherm described the equilibrium adsorption data better than the Freundlich model, the fact that the Langmuir isotherm fits the experimental data well may be due to homogeneous distribution of active sites on the pulp waste surface, and since the Langmuir equation assumes that the adsorbent surface is energetically homogeneous.

The Dubinin–R and Langmuir isotherms model provided a better fit of the equilibrium the R²= 0.968, 0.914 and 0.951 higher than that of Tempkin. The Temkin isotherm appears to provide a good fit to the atrazine adsorption data as well.

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Evaluation on English Language Proficiency of Maritime Students' At Naval State University

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ABSTRACT

This paper aimed to investigate the English language proficiency of maritime students' at Naval State University – main campus. Specifically, it sought to answer the following: level of English language proficiency in oral reading, speaking proficiency and significant difference between oral reading and speaking proficiency of maritime students at NSU. Descriptive research design is utilized to assess how proficient in oral reading and speaking to maritime students at NSU. The study is conducted in the college of maritime education of Naval State University, school year 2018 – 2019. There were one hundred (100) randomly selected respondents. The data retrieved, collected, and analyzed using the exact statistical treatment. Results, revealed that majority of the students in the college of maritime education were highly proficient in the English Language Proficiency.

Keywords: English, evaluation, language, maritime students, proficiency

I. INTRODUCTION

In the Shipping Industry, English language is the main tool so that everyone should understand each other. English has developed over the course of more than 1,400 years ago. The world influence of the British Empire, modern English spread around the world from 17th to mid-20th centuries. Through all means of printed and electronic media, and spurred by the emergence of the United States as a global superpower. It is called superpower due to the fact that this language is used for or in any forms of communications, specifically when seafarers onboard international merchant fleet. Communicating and sending information onboard ship were just some examples that English is important to the seafarers. Cohen & Wickens (2018) mentioned that academically English is the primary venue of instruction and considered the primary pathway to educational success especially when working with different nationalities.

However, the success of maritime students' prevalence to the teaching strategy of the faculty on how they performed the contents of the course in the classroom setting. Perhaps, faculty should evaluate and let the students practice reading and talking in English language inside the classroom for them to become proficient. Reading and speaking using English language has vital role in the maritime sector, since the students are the future seafarers to navigate the ship. Onboard ship, only English language can be used to communicate because crews are coming from different nationalities. The crews that are not native English embark onboard merchant fleet for the first time to work; definitely they would encounter hardship speaking to their crewmates. Eventually, the seafarers could not perform their job well, such as reporting ship in the vicinity, informing company(s) about crews' performance, implementing the laws and regulations, loading & unloading of cargo, and by monitoring the quality management system and other related works pertaining to the ship's operation onboard. These things somehow would lead to maritime accident if the seafarers have poor foundations in English language. The maritime accidents happen according to Varsami, et al. (2010) is due to human error and would occur because of miscommunication between two people talking each other.

The study conducted by the International Maritime Organization (2005), eighty (80%) percent of accidents at sea are caused by human error. One of the main causes is due to poor foundations in maritime English. It was reported that many seafarers have

problems in expressing themselves using English. Ventosa (2005) emphasized that English is a powerful vehicle for conveying feelings and emotions, for expressing hopes, illusions, fears, and wisdom.

Therefore, the researcher believed that there is a need to assess the performance of English language proficiency of the maritime students at Naval State University – Main Campus, school year 2018 - 2019. Findings would be the tool to develop and enhance the teaching and learning process specifically in English language by crafting some interventions to address the needs in the maritime world.

Theoretical Background

This study anchored on Krashen's (1988) theory of second language acquisition. These are acquisition-learning and affective hypothesis. This theoretical hypotheses models have been used because the study investigates the language proficiency of maritime students specifically on their reading and speaking skills.

The acquisition-learning is the most fundamental of all the hypothesis in Krashen's theory and the most widely known among linguists and language practitioners. The acquisition system is the product of a subconscious process very similar to the process on children undergo when they acquire the first language. It requires meaningful interaction in the target language – natural communication – in which speakers are concentrated not in the form of their utterances, but in the communicative act. This previous theory addressing towards the maritime students to become more proficient in English language, they must engage or practice communicating to others so that the message coming from the senders will be internalized. Perhaps, students can get exact and proper delivery of the messages when in two-way communications. In fact, language acquisition (Krashen, 1988) does not require extensive use of conscious grammatical rules, and does not require tedious drill. But this would require meaningful interaction in the target language - natural communication - in which speakers are concerned not with the form of their utterances but with the messages they are conveying and understanding.

Finally, input hypothesis model explains how the learner acquires a second language – how second language acquisition takes place. The Input hypothesis is only concerned with 'acquisition', not 'learning'. According to this hypothesis, the learner improves and progresses along the 'natural order' when students receives second language 'input' that is one step beyond their current stage of linguistic competence. For example, not all of the learners can be at the same level of linguistic competence at the same time, therefore, Krashen suggests that this model is suited for designing syllabus so that the maritime students would easily receive some inputs appropriate on their current stage of language acquisitions. This is also one way to develop their skills in communication because of the instructional materials.

II. METHODOLOGY

Objectives of the study

1. Determine the English Language communication proficiency of the maritime students.
2. Is there a significant difference between oral reading and speaking proficiency of the maritime students at NSU?

Research Design

The researcher was used the descriptive research design and quota sampling method because it aimed to determine English proficiency of maritime students at Naval State University.

Research Respondents

There were one hundred (100) respondents involved in this study. The respondents were all maritime students currently enrolled in the college of maritime education, academic year 2018 – 2019.

Research Instrument

This study utilized secondary data for the academic performance in English course of maritime students, while the English language proficiency of the students was used standardized questionnaire with supplemental interview.

Validity and Reliability

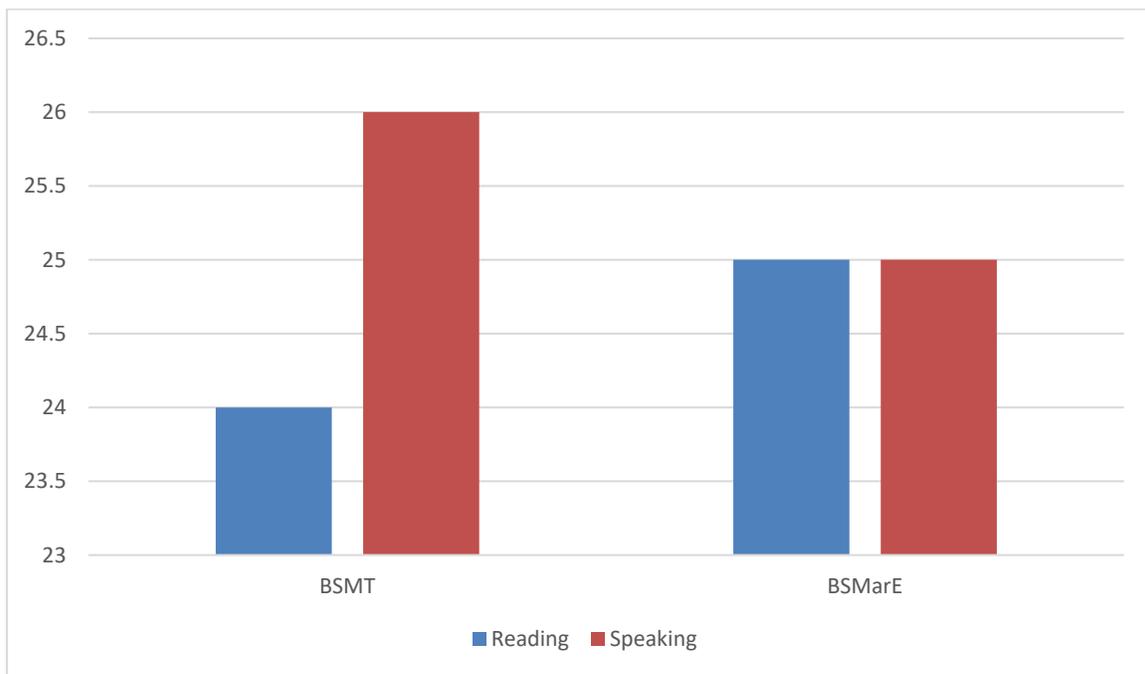
The gathered data were valid and reliable because the researcher himself went to the registrar’s office to get the student’s academic performance. However, English language proficiency, the standardized questionnaire has been used. But before the distribution, the university research office validated on the said questionnaire if it is authentic or reliable.

Statistical Analysis

This study used the exact statistical treatment for data analysis which includes percentage, frequency, mean, and analysis of variance (ANOVA) using SPSS software.

III. RESULTS AND DISCUSSIONS

Table 1. English language communication proficiency of the maritime students’ at NSU



As shown in Table 1, students from BSMT proficiently speak the English language correctly compared to BSMarE students. But, BSMT students were lesser when it comes to oral reading proficiency compared to BSMarE. The BSMT students were higher in speaking skills may be because they were on the deck in which in-charge to communicate other vessels in the vicinity. This would imply that the students were trained in linear or transactional process of communication.

Table 2. Significant difference between oral reading and speaking proficiency of the maritime students at NSU

Program	Mean	C-value	T-value
Oral Reading Proficiency	2.523	4.513	4.352

Finally, in Table 2 summarized the significant difference between oral reading and speaking proficiency of the maritime students at NSU. As shown on table 2, computed value is greater than the t-value. It means that H_0 in which there is no significant difference between oral reading and speaking proficiency of the maritime student is rejected at 0.05 level of significance. Therefore, null hypothesis is accepted that there is a slightly significant difference (0.2) when it comes to oral and speaking proficiency of the maritime students. This would imply that more students can communicate in English proficiently. This would support (Ventosa, 2005) that English becomes a noble tongue when one uses it with affection and respect.

IV. FINDINGS

- Students' enrolled in BSMT are proficient in English communication compared to BSMarE, however, BSMT is lesser in oral reading proficiency (24%) compared to BSMarE (25%).
- The academic performance in English course and English language proficiency of the maritime students are significantly related.

V. CONCLUSION

The students in the College of Maritime Education of Naval State University – Main Campus are highly proficient in communication compared to oral reading in English Language both BSMT and BSMarE.

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Critical Analysis of Ethics in Human Resource Management and Employee Performance

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Abstract- Current corporate dynamics have led to the growing interest in business ethics, both in academia and in the professional practice. However, moral lapses continue to happen in human resource management activities, leading HR academics and professionals to rethink what to do to reinvent new strategies to successfully manage ethics in HRM functions. The broad objective of this critical literature review therefore is to establish the role ethics can play in human resource management to improve organizational performance. The methodology used was critical review of relevant literature with the scope of the study encompassing qualitative research of theories and comparative nature of ethics in HRM. The study attempted to answer the question: does the application of ethics in HRM functions improve employee performance? The critical concern is that ethics in the management of human resource still lags behind compared to business ethics today. The role of ethics in human resource management appeared to be relegated to compliance with business principles perspective. The finding from the critical literature review was that ethics in HRM is significant in improving employee performance. All HR practices need to be fair in their approach and application and the call for strong appreciation of ethics in HRM should be headed. Studies strongly suggested a need for the application of ethical principles in HRM which will be seen to be fair, acceptable across the board and can be considered as a basis for a minimum standard to evaluate ethics in HR practices.

Index Terms- Ethics ,Human Resource Management, Ethical climate, Employee Performance

I. INTRODUCTION

1.1 Background of the Study

Literature on ethics shows that organizations in the 21st century are experiencing the throes of ethical challenges that are essentially threatening their existence (Miller, 2009). Emerging scientific and technological advancements, increased employee awareness of their rights, competitive challenges, globalization and leadership behaviours have made it difficult for human resource managers to ignore the important role ethics can play in the business activities, employees' daily activities, and in the HR functions. As noted by Berrone (2007), critics of ethics in HRM infer that ethical issues still remain a controversial and sensitive area and continue to challenge human resource managers' persuasion of ethics against the organizational bottom line. Despite

such criticism many HR practitioners have begun to develop an appreciation for traditional philosophies of morality and appreciating diverse ethical viewpoints of others in organizations (Valentine, 2006). Rogers (2011) had a view that companies that develop policies and procedures that address ethical behavior build a positive environment for high employee performance.

Critics of ethics in HRM however note that ethical commands are not always clearly evident and easily understood by a number of HR and line managers thus leading to disagreements about what should be considered right or wrong and that inference creates an ethical dilemma among managers (Hofstede (2001). Such ambiguities critics say sometimes lead some business managers to believe that ethics is based merely on personal opinion and choice. Current reports show that unethical labour behaviours are rampant in organizations in Kenya (Office of Ombudsman, 2014). The report showed unethical business practices in Kenya as a big orchestrated syndrome which manifests itself in recruitment and promotions of employees in the form of kickbacks otherwise called bribes and nepotism. The major concern as noted by James (2002) is that unethical practices have contributed to high unemployment of skilled people, poor services, business closures, legal cases, employees' retrenchment and so on that are a huge cost to organizations. With this background, it is therefore vital to review the role of ethics in HRM and significantly in spurring performance in organizations. The main research gap is that there has been tremendous increase research in business ethics but little has been about the relationship between ethics in HRM practices and employees' performance (O'Fallon and Butterfield, 2005). Broad objective of this critical literature review is to establish the role ethics in human resource management can play to improve organizational performance. The study is expected to determine any further gaps available from previous studies that may enhance continuous research in the study of ethics in human resource management. The findings of this literature review are expected to add to the body of knowledge in the study of HRM as an academic discipline. Further, the findings will go along way in improving the HRM practice in organizations and particularly in Kenya where organizations may develop policies as a result, with the aim of improving performance. Lastly the study is suppose to answer the question, does the application of ethics in HRM functions improve employee performance?

1.2 Human Resource Management Functions

Ulrich (1997) defined Human Resource Management (HRM) as the strategic approach to effectively and deliberately manage employees in organizations by maximizing employee's performance in meeting set objectives. Foot (2001) described HRM as activities primarily concerned with managing employees focusing on policies and laws that govern employee employer relationships and the general labour systems. Schumann (2001) noted that this process of managing the relationship between employees, employers and managers raise ethical questions about their individual responsibilities and rights as well as what is expected as the right attitude. Van (2003) observed that HRM has an ethical foundation and deals majorly with the consequences of employee behaviour in organizations and such justifies the reason why ethical guidelines for HRM should be subsumed in HRM practice in order to address the ethical HRM dilemma that can hinder the successful attainment of organizational performance.

A review of HRM literature revealed there are five key HR functions in the organization thus, selection and the recruitment process, employee development, employee relations, reward process and performance (Wiley, 1993). Previous studies have indicated that Human Resources Management main purpose is to ensure that the organization is able to achieve success through people by bringing in new talent and skills and motivating them to give their very best (Winstanley, 1996). Other than that, HR professionals manage the human capital of an organization and target implementing policies and processes that enhance performance. The concept of HRM functions therefore is all those activities done by the HR department focused on managing employees to achieve organizational goals.

1.3 Employee Performance

Performance has been defined by Prasetya and Kato (2011) as the ability to achieve an outcome by the use of the employees' skills. Pattanayak (2011) also added that employee performance is determined by an observable and measurable outcome of his or her action in a given measurable task. Employee performance includes individuals' contribution in the achievement of organizational goals. Individual performance is very key within work structures (Campbell, 1990). However, measure must be considered in identifying specific individual performance by setting key performance indicators (KPI). Going by the current unpredictable business challenges, the concept of performance and performance measurement models are changing as well and that draw ethical concerns (Ilgen and Pulakos, 1999).

Studies show that when analyzing performance concept one has to differentiate between the behavioural aspect and the performance outcomes (Campbell, 1990). The behavioural aspects refer to how an individual employee does his work to complete a task while performance outcome is the target organizations set for employees to do. Therefore performance is not only defined by the action itself but by measurement of behaviour and appraisal evaluative processes that require ethical considerations (Motowidlo, Borman, and Schmit, 1997). The concern then is that the methods of performance management and evaluation process present ethical worries that this paper seeks to address.

1.4 Ethics in HRM

Ethics has been defined differently by various scholars. Kidder, Rushworth (2003) contends that ethics involves systematizing, defending, and recommending ideas of right and wrong conduct. Greenwood (2007) notes that ethics investigates issues such as how best do people live, and what behaviours are acceptable or not acceptable in any cultural environment. Legge (2005) notes that the practice of ethics is aimed at identifying and resolving challenges of morality by determining what is good or evil, right or wrong, virtuous or vice, justice and criminal. From these definitions it can be deduced that ethics determine acceptable conduct in HRM functions. Many studies advocates for the HR officers to take responsibility in promoting ethical behaviours that support organizational goals and societal ethical expectations of the business (Feldams 1996).

Maxwell (2004) indicated that there are three main fields of ethical studies that are so far recognised today and viewed to be of great relevance to HRM practice thus; the Moral ethics - that deals with right or wrong behaviours through levels of growth and reasoning from childhood to adulthood classified in stages of a persons development as pre-conventional, conventional and post-conventional stages of growth; the Normative ethics – that is an area that study ethical actions or beliefs in their prescriptive form for example causing a child to die due to failure of seeking medical attention because of a religious belief; and Meta-ethics – that investigates how people understand morals, know morality and what is meant with what is right or wrong (Kidder, Rushworth, 2003). Studies by the Institute of Business Ethics (2003) notes that ethics emanates from ethical reflection in work. Professional ethics of, for example, doctors, nurses and therapists, has its counterpart in medical and health care ethics. The ethics of businessmen has its counterpart in business ethics, so on (Crane 2007). Ethics is therefore premised on the practice of a profession and that is where we invoke the indulgence of HR as a profession in adopting ethics in its functions as a tool for improving organizational performance.

Scholars have variously attempted to give meaning and justification as to why the role of HRM practices should be embedded in ethics in day to day HR activities. Valentine (2006) posited that moulding employees to behave ethically requires development of a moral culture and climate. Ethical climate was defined as the shared perceptions of what ethically good behavior is, and also the method moral issues are handled (Victor and Cullen, 1987). According Foot (2008), moral climate represents the organization's policies, procedures and practices on ethical issues that influences workers' attitudes and behavior and forms a reference for worker behaviour. Osion (1998) outlined moral climate as a persons feeling of how moral problems in their work atmosphere are managed.

Many researchers have stressed over time the importance of HRM in developing and sustaining ethical culture in organisations (John, 2000; Driscoll and Hoffman, 1998; Wiley, 1998; Wright and Snell, 2005; Thite, 2013; Parboteeah, et al, 2014). However, clarity is needed in the way moral dimensions in HRM can play a role in the process. Guest (2007) claimed that implanting ethics into HRM dimensions through acceptable firm interventions and developing further benevolent ways in which organizations operate is perceived by workers as new approach to HR sensitive and responsible organizations. Employees will accept that HRM can effectively contribute in developing and sustaining ethical

principles, moral culture and ethical climate that support performance (Baker, 2006). Entrenching ethical orientation in every purposeful dimension of HRM is indispensable for organizations now than ever before.

II. THEORIES OF ETHICS

2.1 Introduction

Baron (1997), mentioned three main approaches to moral theories thus; consequentialism, deontology, and virtue ethics although modern researchers mention two additional theories thus; Utilitarianism and Hedonism. In consequentialist ethics, the ethical character of associate action is measured by the particular and projected consequences of the action. Deontological moral theories regard the action itself as the object of ethical analysis whereas virtue theory thinks about the intention behind the action (Wiley, 2000) as shown in fig one below.

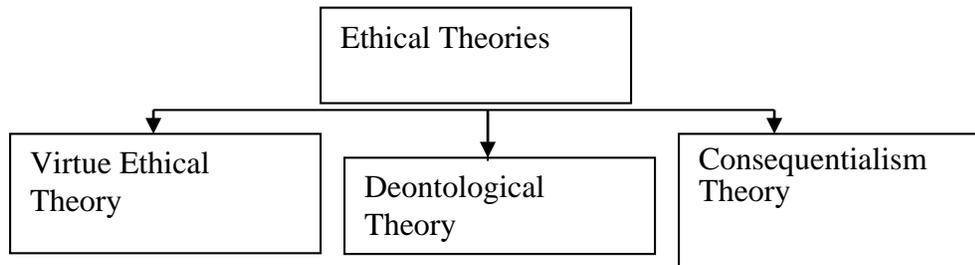


Figure 1: Typology of ethical theories (source: Author, 2018)

2.2. Virtue Ethics Theory

Virtue ethics was founded on a platform of four cardinal virtues known as Justice, Wisdom, Fortitude and Temperance (Paul, Richard; Elder, Linda, 2006). On the other hand Adams (1998) mentioned that there are nine more virtues that makes a moral person and further differentiated virtues dealing with emotions and desire from those dealing with the mind. Those dealing with emotions are called moral virtues for example love, courage, honesty ambitions or humility and so on while the ones dealing with the mind were called intellectual virtues for example wisdom, prudence, justice fortitude, magnificence, magnanimity and temperance. Virtue ethics is that category of ethics that concerns honesty and morality of an individual (Meyer, 1997). Virtue ethics specifies the unwritten guidelines for people's daily behaviour towards each other in the spirit of complex ethical interactions. Studies show that the strengths of virtue ethics to be better than any ethical theory in that virtue ethics examines the moral agent unlike all other theories, it regards human relationships highly, puts more importance to human emotions and most importantly it places virtue at the centre of morality (James, 2002).

Criticisms to virtue ethics fault it for not identifying what types of actions are morally or emotionally acceptable and which ones are not acceptable, and its failure to define what qualities a person should portray to be seen as a good person (Foote, 2008). In addition acts like murder may look immoral or impermissible by society and whoever does it lacks in virtue such as fairness or compassion but the same act of murder is acceptable in law for self defence or as the highest legal penalty (Sandler, 2007). Critics claim virtues are group specific and not generalized characters of people's behaviours that are guided by unwritten acceptable rules and principles and are informed by perceptions, expressions and past experiences. Further criticism say virtues are influenced by the environment one was brought up in hence virtues are relativists in nature, environmental specific and can not be generalized in that context (Goodpaster, 2007). Given the very nature of cardinal

virtues that is wisdom, justice, temperance and fortitude, there is very little of moral advice and decision making skills one can reasonably learn from virtue moral dilemma if virtue oriented approach is to be applied singularly (Sieber, 1992).

2.3 Consequentialism Theory

Perle (2004) described consequentialism as a moral theory applied to examine the ethical relevancy of an action given its contribution to general good of the society. Consequentialism is typically represented as a teleological theory, because it conceives of an ethical theory as setting a goal that we must always attempt to attain (Trevino 2001). The goal that consequentialism sets is to create an environment based on the best balance of good over bad (Butterfield, 1996). Consequentialist theory depends on whether or not the expected result is good or bad. The theory is sub-divided into three sub-types namely: moral egoism - as long as the action is good to the one that carries the action out, it's right; ethical altruism - as long as the action is good to everybody else, it's right; and utilitarianism - as long as the action is good to everyone as well as the one that carries the action out, it's right. Consequentialist theories concentrate on actions. The strength of consequentialism is that each one action and decision has a measurable consequence and it is straightforward to use (Ross, 2002).

Rule consequentialism theory is generally seen as a tool to reconcile deontology and consequentialism and in some cases; usually seen as a criticism of the rule consequentialism (Ross, 2002). Like deontology, rule consequentialism claims that moral behavior involves following rules. However, rule consequentialism chooses rules depending on consequences that the selection of those rules has. Rule consequentialism exists in the form of rule utilitarianism and rule egoism. Consequentialism theory is used to examine whether an action is right or wrong by the consequences of that action (Scheffler, 1982). For example it is widely agreed that lying is wrong but consequentialists agree that saying a lie to save someone's life is right thing to do when faced

with such option. In a hypothetical example, a driver who is faced with moral dilemma of either killing a person outside the road or himself and his passengers on an imminent head on collision with an on coming trailer chose to continue off-road and kill the person instead of braking and killing all five persons and himself is based on the consequence of the outcome of his action (James, 2002). Killing himself and the other five persons has greater bad consequence than killing one person (Ethical Egoism). Also, killing himself and five other persons leaves more families emotionally and economically distressed than killing one person (Ethical Altruism) and lastly, killing himself and five other persons causes more physical and mental pain on everyone involved including his friends and families than one person, thus Utilitarianism (Vickers 2005).

Critics of consequentialism say the theory is complicated and hard to predict the future actions (Berrone, 2007). Only a supernatural being may know the future with some precision to justify time and scope as envisaged in consequentialism approach. Critics of consequentialism say that it is impractical as it can't list all actions that are deemed good acts even when the actions are objectionable. When deciding which act to perform, consequentialism stresses we should perform whichever act that leads to the most good. According Kagan (2000) consequentialism, if it were determined that, say, beating children to get them to behave, led to maximal happiness, then those would be the correct moral choice. But the fact that we morally shy away at such actions shows that consequentialism is not morally sound (Lafollette, 2000). Further criticism argue that rule consequentialism is guilty of rule worship; it is utopian in bad taste and more often collapses into act consequentialism and manifestly implausible. Ideally critics of consequentialism argue the theory permits actions against important moral rules just on the basis that doing those actions would produce better societal consequences in the agent's actual circumstances (Foot, 2001).

2.4 Deontological Theory

The deontological ethical theory conforms to rules to decide what is right or wrong. The theory as developed by Kant (1785) infers that ethical actions follow universal moral laws for example, don't lie, don't steal or don't cheat. This theory is the most simple to use as it requires people to follow guiding rules when going about their duties (Weaver, 1999). Deontology approach basically fits well with the natural intuitions about what is or is not moral. Compared to consequentialism that judges actions by their societal results deontology does not rely on analysis of cost and benefits weighting and that helps deontologist avoid subjectivity as they only follow the rules (Van Gerwen, 1996). The strength of deontology is good will in that as long our intentions are good then it means we follow moral laws.

Critics of deontological theory perceive deontology to have put more dependence on laws. The argument is that rules or laws can be obsolete hence inapplicable wrong and many times some rules have outlived their usefulness (Betham, 1996). Another criticism is that deontology emphasizes moral absoluteness which can never be practiced by any normal person (Adler, 1997). In the face of deontological principles killing is wrong but such absoluteness could be misleading for instance in the case where it may be necessary to kill one person who is a threat to majority. This cast doubts on the moral absoluteness of making

deontological decisions. Other critics claim that deontology is often based on religion (Kagan, 2000), for example although god/gods may presumably exist, and will presumably need individuals to follow ethical absolutes, it's not probably that this god would. There is a chance that this god doesn't exist, really an oversized likelihood since there are many alternative religions that have gods that can't co-exist. If this god doesn't exist, deontological religious-based ethics fails; as these were codes written by humans who were virtuously inferior to us since the zeitgeist is moving increasingly forward (Mackie, 1990). Another criticism of deontology is that it reduces morality to the easy dodging of dangerous actions, rather than creating an endeavor to develop moral character like virtue ethics. The most important weakness of deontology is considering human relationships virtuously dangerous

2.5 Utilitarianism Theory

Utilitarianism is a moral theory that states that the most effective action is the one that maximizes utility. Utility is defined as the sum of all pleasure that results from an action, minus the suffering of anyone involved in the action (Moore 2008). Doris (2008) noted that the principle of utility will be applied in two classes either to explicit actions or general rules. The previous is termed act-utilitarianism and the latter is termed rule-utilitarianism. Act-utilitarianism is applied on various act alternatives. The correct act is then outlined as the one that brings the most effective results or less amount of bad results. Rule-utilitarianism is employed to determine the validity of rules of conduct (moral principles). Danley et al (1996) argued that a rule like promise-keeping is established by analysing the consequences of a society in which people break promises at will against the society where promises were binding. Right and wrong are then outlined as following or breaking those rules. The strength of the utilitarianism philosophy is that morality increases pleasure and amount of good things and at the same time try hard to reduce pain, amount of bad things lead to high levels of unhappiness (Betham, 1996). That people should always strive to achieve higher pleasures for instance intellectual capabilities than the low pleasures in that ordinal manner.

Critics of utilitarianism theory opine that utilitarian philosophy is mainly based on the context of thinking about the legal system (Bentham, 1996). Some critics have claimed utilitarianism encourage and justify slavery that is the boss's overall happiness was better than the subordinates unhappiness. Critics again claim that the theory does not value justice; an example is if framing an innocent person for an offence to stop further strike than taking the pain of looking for the real culprits then that would be an optimal choice. As an innocent person suffers there will be less pain for the majority (O'Higgins, 2005). Further critics claim the theory has problems in analyzing actions in real time and scope (Guest, 2007). The calculation of utility is said to be self-defeating because by the time the best utilitarian course of action has been calculated and decided, the chance to take this action may well have elapsed. It is also possible to justify immoral acts using Act utilitarianism for instance suppose you could end a regional war by torturing children whose fathers are enemy soldiers, thus revealing the hide outs of the fathers that is right action. The major weakness of utilitarian theory is the weighing of consequences that seems more often a matter of vague

intuition than of scientific calculation (Rhodes, 2012). Critics of utilitarianism reject rules which they claim are traditions or orders that doesn't enhance open mindedness in the pursuit of pleasure (Hofstede, 2001).

2.6 Hedonism Theory

Hedonism puts more emphasis on pleasure, or the absence of pain is seen as the most important principle when deciding the morality of a potential course of action (Mill, 1998). Pleasures include typically things like sex, drugs, crime, dance, and so on. Pleasure also includes any valuable experience like reading a book (Trevino, 2004). Studies suggest that the strengths of hedonism theory lie in its nature to motivate people by psychologically soothing the mind for example when one gets a new employment, academic achievement and so on and pleasure reduces stress (Axelrod and Antinozzi, 2002). Strength of hedonism is that it is also used for guidance; for example intellectual guidance nurture young people to develop good life impressions in their beacon life and that would help them avoid pain in future life. Hedonism also helps develop creativity as it dissuades monotony and boredom and always wanting to make every new moment different from the routine and that increases pleasure (Moore, 1993). Most importantly pain in hedonism is meant to indicate that something needs to be done to change the prevailing situation.

Critics of hedonism idea understand it to be un-psychological (Baron, 1997). Moral hedonism is seen to be plausible; as a result what we usually mean by happiness is more often welfare, for example we have a tendency to all aim at the happiness of our youngsters. this implies that we have a tendency to all aim at the welfare of our youngsters, which incorporates health, education, character, career and so on, thus moral hedonism is insufficient to mean pleasure alone. Doris (2008) criticizes hedonism in that it considers the consequences of an action that produces either pleasure or pain. Pleasure and pain are not tangible objects so they cannot be valued either qualitatively or quantitatively. Again the craving pursuit for pleasure more often lead pain for example the pleasure of taking excessive alcohol may lead to blindness or fatality (Thite, 2013). The major weakness of hedonism concept is the imagination that people should always have pleasure and that is over presumptuous. Justifying any act in a thin line of pleasure is a huge flaw (Richardson, 2007).

III. SCOPE OF ETHICS IN HRM

3.1 Introduction

The ethics of managing employees still drops behind compared to business ethics (Winstanley and Woodall, 2000). The role of ethics in human resources management is about compliance and of a fairness perspective (Vickers, 2005). A number of organizations currently attempt to formalize the way they manage ethical behaviours by developing business policies and compliance to law but ethics in the role of HRM still remains unclear in the application of ethics in business (Wiley, 2000). Studies on organizational fairness and ethical practices showed that the involvement of HR in corporate ethical programmes was perceived to be propounding fairness in organizations (Vendemiati, 2004). Other studies also show that many organizations are now creating formal ethics departments with ethics officers doing ethics policing (Center for Business Ethics,

1992). In Kenya ethics and anti - corruption commission (2011) has since been established (EACC).

Ethics management involves careful handling fairness issues on a larger spectrum of the organizational functions (Valentine, 2006). Most organizations communicate expected ethical behaviours through codes of conduct, company policies, in-house training programmes and sometimes vide top down instructions (Meyer and Rowan, 1977). Studies show that HR leaders are the most suited staff to propagate and manage ethics programs in organizations (Wright, 2005). The core ethical challenges for HR managers' bridge the gap between employers and staff and managing the interest of either side require adequate skills in both HR knowledge and moral skills (Ulrich, 1997). Resolving push and pull conflicts between employees and employers require that each party to acknowledge that HR professionals can represent worker desires and implement management agendas, be the voice of worker and also the voice of management, act as a partner to both staff and managers within the management of ethics (Thite, 2013).

3.2 Ethical Standards in HRM

It is admitted that more organizational line managers involve in HRM activities like coaching, recruitment and selection, and appraisal and so on as their delegated job roles, however, the very fact remains that they're usually never needed nor expected to possess a similar level of competency as skilled HR Manager nor do they command a similar standard of HR practice (Wooten, 2001). it's so necessary to notice that the ethics of HRM whereas sharing several options with general business ethics is comparatively distinctive in many respects. In recent times, HRM has come under intense criticism as being very artful, consumptive and in truth immoral (Vickers, 2005).

Critical writers like Guest, (2007), Kidder (2003), Donaldson (2001) and Berenbeim (2010) have steered in their varied works that HRM practices objectifies individuals; suppresses resistance and confrontation and creates a brand new reality through its rhetoric and controlling tendencies. Ethical approaches to HRM are numerous and have completely different theoretical frameworks and moral arguments for the management of human resources in organizations. It is pertinent to denote that several ethical paradigms can be applied in ethics in HRM. A multifaceted approach (Winstanley and Woodall, 2000) should be adopted that entails ethical principles and ethical code of conducts from a critical perspective to engrain the extent to which ethics in HRM can be anchored.

3.2.1 Principles of ethics in HRM

Study by Beauchamp and Childress (2009) on business ethics showed four principles of ethics that ordinarily control set of pillars for ethics in HRM thus; Respect for Persons/Autonomy by acknowledging a person's right to have life choices or alternatives, to hold views, and take actions that support personal values and beliefs. Two, Justice, treat others equitably, distribute benefits/burdens fairly. Three, Nonmaleficence (do no harm), obligation to not impose harm/damage deliberately and lastly Beneficence (do good), offer benefits to persons and contribute to their welfare for the good of all.

This has since been expanded to six principles by Childress thus, five, Integrity – that means to be clear-cut and six, to be honest in professional and business interactions (Miller, 2009).

Critiques of ethics in HRM have questioned the objectivity of the principles of ethics in that they are claimed respectively to be imperialist, inapplicable, inconsistent and inadequate in their interpretation and application in people management (Solomon, 1984). If applied as they were then they permit prejudice, and such may be the basis of conflict of interest that can overrule professional or behaviour judgements in HR functions (Beauchamp and Childress, 2009). That to keep up professional knowledge and skills ethical principles may not be suitable for current HR practice because there are in place company policies and legislations that guide interactions with employees hence ethics is inapplicable (O'Higgins, 2005). That the respect of employee confidentiality of information acquired by HR as a result of professional practice envisaged by ethics unless where a legal or professional right or duty to disclose such information is sought is inconsistent with the technological advancement especially where the information is nowadays open and readily available on world wide web and that makes ethical standards for HRM unnecessary in this age (Schaffer, 2012).

3.2.2 Ethical Code of Conduct in HRM

The terms code of ethics and code of conduct are often mistaken and used interchangeably though they are completely different documents (Donaldson, 2001). Baqqini (2007) noted that code of ethics refer to a value statement that is similar to the constitution of an organization. It specifies the general principles that guide behaviours and outlines a set of principles that inform decision-making process (Baqqini et al 2007). The code of conduct on the other hand outlines specific individual behavioural characteristics and prohibitions required as a condition for continuity of employment. For example a code of conduct may forbid sexual harassment, racial bullying or use of abusive language in the organization. Therefore flouting the code of ethics can result in termination or discharge from the organization (Solomon 1984). There are basically two main types of code of conduct thus code of conduct that is compliance based and two, code of conduct that is value based (Trevino 1999). Compliance-based codes of ethics are laws that regulate issues such as hiring and safety standards of employees.

Compliance-based codes of ethics typically not solely set pointers for conduct, however additionally lay out penalties for violations (Victor, 1988). On the opposite hand Value-based codes of ethics deals with the company's core value system. They address standards of responsible conduct relating to the larger public good and the environment (Lafollette 2000). Value-based moral codes require a bigger degree of self-regulation than compliance-based codes. Critics however, have opined that code of conduct as a catalog of laws is sometimes perceived to be counterproductive in pursuit of performance (Thibaut 1975). Similarly critics of codes of ethics in HRM claim that they are time and again only nice, predictable and meaningless expressions that have no serious obligation (Arnaud, 2010). Both codes are perceived as merely a marketing and public relations mechanisms and that a lived code of conduct or ethics is only referred to when an employee is to be punished rather than in trouble free times.

Employees who are perceived offenders will painfully experience the consequences of a disregarded written ethics code (Roe, 1999).

Sometimes it is felt that a code is encouraging unrealistic expectations, it is a self-righteous document in an unrealistic employment field. Such criticism view code of ethics as a romantic set of rules and regulations that does not take the real employment relationship into consideration (Beauchamp, 2004). Other critics argue that high dependence on codes of ethics generally may lead employees to blind reliance on the written codes and such may hinder them to develop moral sensitivity of their own (Driscoll, 1998). Inconsiderate compliance with codes can lead to wrong decision making just out of fear to make mistakes. Although a strong compliance might have negative influence on ethics acceptance, studies suggests that ethical compliance can help reduce unethical behavior in organizations (Trevino et al., 1999). Enactment of clear ethical policies and modes of discipline for violations raise employees' expectation of fairness when handling cases about ethics in the organization (Ferrel, 2008), without objectivity in ethical policies sustaining compliance activities may be seen as a pretense.

3.2.3 Values and Ethics in HRM

Values are the elementary beliefs that guide or inspire attitudes or actions. Values give pointers for conduct and facilitate us to work out what set of values are important to us (Bruno, 2000). Values describe the individual qualities we propose to guide our actions, the type of person we wish to be, the way in which we wish to treat ourselves and our interaction with the society. Values are essential to ethics and are concerned with human actions and therefore the choice of these actions. Ethics evaluates those actions, and therefore the values that underlie them by determining which values ought to be pursued, and which of them should not. Values can be described as those things that are vital to or esteemed by a person, collectively or an organization. In discussing values and morals there are various, frequently used terms with similar implications as values thus, morals, standards, basics and ethics. Taylor and Halstead (1996) characterize values as principles, crucial feelings, beliefs, benchmarks or life positions which act as a common conduct, as a reference point in decision-making, or the assessment of convictions, or actions. Values are the beliefs of what a corporation stands for, and need to be the premise for the behavior of its people. A corporation might distribute one set of values, perhaps in an attempt to thrust forward a positive image, whereas the values that really direct company behavior are totally different (Lara, 2005). Once there's such disengagement between expressed and working values, it's going to be hard to determine what's worthy.

The reason standards of measure are vital within the discussion of morals and values is that standards might allow or empower desired behavior to keep with society's or an organization's explicit values. There's another facet to be thought-about, which is that the influence of social groups or organization norms. Norms are the unwritten rules, sometimes informally reached by the members of a group, which govern the behavior of the group's members (Savater, 1999). Norms usually have a bigger impact on what's and is not done by the members of a group than formal rules and regulations. Normally, it's believed that values ought to be promoted by moral leaders and remodeled through examples and rules within the management of ethics by means of

behaviour codes, codes of ethics, implementing policies and so on. Different studies have established that management's philosophy of ethics and values relates largely with the standard of worker's performance. Hall (1998) mentioned that successful organizations support values, like respect, listening and sharing with others. These organizations are capable of embedding traditional values, like efficiency, quality and high productivity into ethical HRM.

3.3 Rationale of Ethical Practice in HRM

Conventionally, ethical analysis of labour management was pegged on the rights and duties of employers and employees and involved assessment of the strengths and application of justice and fairness in organizations (Greenwood, et al 2007). The practice of ethics in HRM has been lauded greatly by previous scholars (Hatch, 2006). For ethics practice in HRM to be successful ethical values should be binding thus; loyalty for ethics by HR practioners is one key component in the practice of ethics in HRM. HR practioners are expected to be loyal in safeguarding diversity, ability of employees to make independent decisions and avoiding undue influences and conflict of interests. Another expectation of HR practioners is Fairness. HR practices are expected to be fair enough in the eyes of employees and other stakeholders (Sims, 2003). Fairness is manifested by commitment to justice, equal treatment, tolerance for divergent opinions, willing to admit wrong doing and so on. Concern for others is another element in the practice of ethics in HRM. Ethical HR practioners are expected to be compassionate, benevolent and kind to employees, use the golden rule when helping staff in need, they should be courteous and that all employees with equal respect and dignity (Perle, 2004).

Practice of ethics in HRM requires HR Managers to be law abiding people. HR Managers in organizations are expected to obey laws, policies rules and regulations at all times in making decisions that affect employees (Hofstede, 2001). Another expectation of ethics practice in HRM is that the HR practioner should be a person committed to excellence. Ethical HR practioners should pursue excellence at all times when performing their functions by increasing proficiency and responsibility in the decisions made (James, 2002). Leadership is another virtue that ethics practice in HRM seeks in order for ethics in people management to be successful. The leader conduct is a positive element in ethical role model as a HR leader (Parboteeah, 2014). Other than that ethics practice in HRM requires that the reputation and morale of the employees be raised and protected and that improves the image of the organization to attract more skilled candidates (Wright, 2005). Lastly ethics practice requires HR practioners to be accountable, which is being accountable for the ethical quality of their decisions and omissions in the course of their service.

IV. ETHICAL CONCERNS IN HRM FUNCTIONS

4.1 Introduction

A study conducted by Wiley (2000) on ethical standards for human resource management functions showed five main HR activities that reveal unethical actions. These are recruitment, training and promotion, disciplinary, performance appraisal and sexuality (sexual harassment). The performance management process involves creating a work environment that empowers

worker to give the very best of their abilities. The process employers use to empower employees vary from one business to another depending on varying company values (Thite, 2013). Despite these differences, the performance management process involves planning (setting goals or objectives), performance assessment (evaluating performance achievements), recognition for performance achievements and career development based on the outcome results of the assessment (Pattanayak, 2011).

Crane (2007) listed nine worker rights in a very positive moral HRM climate thus; right to equal and discrimination-free treatment; right to personal respect and dignity; right to honest conduct (in promotion, dismissal, disciplinary procedures), right to negotiation and representation; right to participation; right to work in a very safety and health hazard-free environment; right to adequate compensation; right to free speech and conscience; right to work. In modern work structure, however, the granting of the mentioned employee rights is much from excellent and pose great ethical concerns. (Crane, 2007). Out of all organizational issues or policies, ethical considerations in HRM practices are the most ignored issues and difficult to deal with (Hatch, 2006). The dimension of unethical HRM practices arise in recruitment, remuneration and benefits and industrial relations as analyzed as follows;

4.2 Ethical Considerations in HRM Functions

Ethical considerations are becoming increasingly important in HRM functions today than ever before albeit slow in its application. Studies show that human resource functions may be the best means to disseminate ethical culture in organizations that encompass recruitment and selection, performance appraisal, compensation, and employee relations decisions (Vickers 2005). Thus, human resource functions and ethical cultures should be subsumed in the process of creating competitive advantage for organizations.

Bentham (1996) notes that a focus on ethics in HRM have been perhaps a response to employee dissatisfaction, lack of commitment, frustration, or growing distrust in the workforce among other things, the increasingly wider gap between managers pay and lower cadre employees' pay, inequalities that arise once individuals work along, like discrimination, favoritism, harassment, work-life balance, inconsistencies in discipline, or just how staff get at the side of managers (dyad). Willey (2000) avers that ethics in HRM can yield a strategic advantage for better performance through adopting codes of ethics, providing ethics training, and creating a positive ethical climate.

4.2.1 Ethical Concerns in Employee Recruitment Function

Recruitment refers to the processes organizations use to attract new staff to job vacancies in the organization (Winstanley, 2000). Legge (2000) noted that the process of recruitment in organizations is more often mired with nepotism, cronyism and sycophancy. The utilitarian argument against racial/tribal and discrimination of any nature at recruitment is based on the fact that employees productivity will be maximized when they feel that jobs are awarded on the basis of competency. Different jobs require different skills and personality trait to perform effectively (Shwaartz, 2009). Discrimination among job applicants based on race, religion, tribe, or other characteristics unrelated to job performance is unethical in the utilitarian principle.

Ulrich (1997) noted that the recruitment process ought to very objective if it is yield talented staff to support performance and organizational growth. Organizations that rely on referral from internal employees to recruit new staff tend to recruit from same families and tribes/race and hence objectivity can never be found, it locks out competent job seekers and that compromises performance (Greenwood, 2011). Recruitment and selection is a function that skilled decision making hence it requires thorough attention coupled with best practices to ensure unethical practices such as corruption and discrimination are eliminated.

4.2.2 Ethical Concerns in Employee Reward Management

Driscoll (1998) noted that the compensation of workers consists of payments and rewards progressing to him by virtue of employment and this reward system is usually not clear, pegged on loyalty than worker capabilities and performance. Francis (2006) notes that rewards consists of two parts, direct monetary payments that's wages, salaries, incentives, commissions and bonuses and indirect payments for example paid insurance and vacations that are continuously differentiated to even workers with capability similarities. In practice many organizations face the problem of pay inequities that more often disrupt performance (Foot, 1999). Wages and salary discrimination exists more often to the extent that wages and salaries are deliberately or for prejudicial reason not given to employees doing the same work with equal skills.

John (2000) argued that there are also potential negative consequences that critiques note have ethical concern in the reward management system. For example, suppose a worker's motivation strategy involves a performance threshold like a set target on top of which the worker earns considerably more cash in bonuses. Striving to meet that threshold may be a continuing source of stress for workers particularly if the basic pay is low (Francis, 2006). The unintended result will be lower employee morale. Another moral downside arises if worker incentive strategy does not distribute benefits fairly. As an example, the nature of some employees' responsibilities would possibly make it easier for them to earn rewards. Other workers never get the prospect to realize similar advantages, therefore dissatisfaction builds and morale plummets. Unethical workers would possibly notice ways in which to game the system, and if the program rewards production numbers instead of quality, some workers would possibly execute to spice up their rewards (Lind, 1990). Careful style of a program will forestall obvious sorts of abuse, however sooner or later, loopholes can emerge, requiring the business to reassess and maybe overhaul its program.

4.2.3 Ethical Concerns in Employee Relations Function

Employee relations involve the management of creating harmony between employees and employers (Legge, 2005). Labour relations issues posses' ethical dimensions and require ethical alertness for ethics in employee relations is fruitful. Employee relations deal with both procedural and substantive issues about employment relationship and that is source of ethical concerns. Working conditions for workers is a significant area of conflict in several workplaces, and is sometimes a central issue in labor negotiations and cause of strikes (Lind et al, 1990). Unethical employers fail to supply safe operating conditions either through negligence or by design and such will cause higher rates

of health problem and injury to employees. Whereas it is comprehensible that employees wish higher pay and employers wish to pay less, some employers exploit employees to the point that it becomes unethical. If rates of pay go below wage laws, this practice becomes not solely unethical but illegal as well (Maclagan, 1990). However critics of ethics in employee relations argue that employee theft costs companies a lot of billions a year and that remains unethical and illegal behaviour by employees (Kidder, 2003).

V. RELATIONSHIP BETWEEN ETHICS IN HRM AND EMPLOYEE PERFORMANCE

5.1 Introduction

The importance of ethics in HRM can not be exaggerated. Staffs trust HR Managers to exercise discretion, logic and fairness through out staffs stay within the organization (Ulrich, 1997). Ethics in HRM guarantees that the organization meets that expectation. Unethical HR practices can lead to serious legal, societal and employee behavioural problems that may lead to high turn over rates, litigation costs and bad reputation of the organization which is why HR must act responsibly in the spirit of ethics. O'Higgins and Kelleher (2005) suggested that harmony between ethical activities and expectations of employees raise the level of employee satisfaction. Woodall (2000) noted that there's a significant relationship between employee's positive perception of moral HRM practices and motivation to perform.

Performing HR functions enshrined in the framework of business moral principles is a vital necessity these days. HR leaders are expected to respond to the necessities of efficiency and high performance in a business environment of distrust and skepticism amongst employees (Van Marrewijk, 2003). HR practioners who do understand ethical decision making as well as ethical implications of their actions within the organization can create a great value for both employers and employees. However, performing HRM functions supported by ethical ideology has additional distinctive importance, as a result of HRM purposeful plan to inspire workers (Woodall, 2000). To attain this goal, all functions of HRM ought to be enforced based on moral principles like justice, equality of opportunities, and accuracy to boost the required performance. With such background this chapter aims to reveal ethical concerns in specific HR functions and the relationship between employee performance and ethics in HRM functions.

5.2 Relationship between Ethics in HRM and Employee Performance

Previous empirical studies confirm positive relationship between ethics and firm performance (Mikula 1990). Studies by Okwiri (2012) on relativism and idealism in business ethics revealed that relativism highly influenced ethical behaviour than business practices. Study by Mulelu (2016) on understanding the factors that influence level of awareness of teachers' service commission code of conduct found that high school teachers in Machakos town constituency had low level of awareness of teachers service commission code of conduct and ethics thence low performance. Study by Simiyu (1997) to determine the level of understanding of business ethics among corporate decision-makers revealed that few companies apply ethical principles in

decision-making processes and few have formal ethical policies within their organizations. Study by O'Higgins and Kelleher (2005) supports the validity of this assumption that organizations that are honest and truthful towards their staff and systematically develop HRM practices received higher scores within the Fortune company reputation index that lists businesses operating in accordance with the principles of good governance. In conclusion the results of the relationships of ethics in HRM and performance from empirical studies reviewed reveal that ethics in HRM significantly predicted employee performance. This supported a study by Baker (2006) that focuses on university campuses as a major site of the recruitment process that outlined the 'ethos' of the ideal future worker.

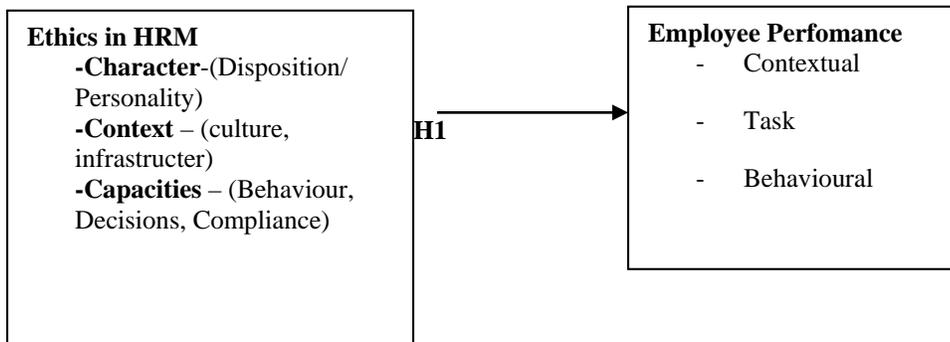
Study by Trevino (2004) on ethical leadership; a review of future directions, found out that moral leadership emphasizes fair treatment, shared values and integrity in workers and business transactions, and that moral leaders should inspire favorable behaviors among workers, encourage high levels of pride and commitment to the organization and develop the means for workers to understand the job ethical content. Mathenge (2012) conducted a study on moral issues in human resource management in Kenya; Theory and practice and examined the use of various moral theories and also the challenges grappling human resource managers in Kenya and different countries. The findings were that human resource management policies were weak and may thence use moral thought to re-engineer and redefine them. Osemeke (2014) conducted a study on the impact of moral HRM practices within the private sector in Federal Republic of Nigeria. His

results discovered a positive relationship between ethical HRM and effective recruitment and selection practices, effective performance appraisal practices and performance. Liao & Teng (2010) conducted a study on the relationship between ethics training, employee satisfaction and gender balance and found that ethics training positively influenced social corporate responsibility practices, employee satisfaction and performance. In conclusion, Foot (2008) supports that HRM significantly serves to enhance the relationship between ethical leadership and employee performance by using HRM practices that influence the employee behaviour. The relationship between ethical leadership and employee performance is expected to be stronger when employees perceive high levels of ethical HRM and vice versa and that performance diminishes when there are unethical HRM practices in the relationship between ethical HRM and employee performance.

5.3 Conceptual Framework

Based on the discussion of the various literature reviewed, studies have established that there is a relationship between ethics in HR individual functions and organizational performance, (James, 2002, Hofstede, 2001 and Foot, 2008) to the extent that they enhance employee commitment and good employee relations (Adams 1998). The conceptual model in table 4.1 below shows the perceived relationship between ethics in HRM practices and organizational performance that the study seeks to confirm in reference to the null (H0) hypothesis.

Table 5.1. Conceptual Framework



Independent Variable
 (Source: Author)

Dependent Variable

5.3.1 Hypothesis

H1: Ethics in Human Resource Management does not affect organizational performance.

affects successful implementation of ethics in HRM (Wright, 2005) Victor (1988) proposed that HR practioners should identify and practice ethical principles that are aimed at creating sustainable moral behaviours subsumed in organizational culture.

6.2 Conclusions

The study found that ethics in HRM does affect employee performance in organizations and that the HR leader and HR department plays a key role in placing ethical HRM practice on its right place in organizations (Greenwood, 2007). This study conjointly found that analysis of ethics in HRM observed three inter-related levels: the macro system, mezo (company and HRM department) and small (individual) levels (Martin and Cullen, 2001). On a macro (social, economic system) level the elementary

VI. CONCLUSION AND GAPS IN KNOWLEDGE

6.1 Introduction

Ethics are the principles and values used by an individual or group to govern his or her actions and decisions (Buckley, 2001). An ethical organizational environment consists of leaders and employees adhering to code of ethics (Tyler, 1990). Empirical findings show that organizational leaders disloyalty to ethics

issue is how we see theoretical assumptions and practices of firms as ethical, and if these do not appear to be, then a judgement may be formed on HRM ethics (Legge, 1998). The HRM department (Mezo) might have a significant, formal and informal role in developing overall policies and codes of ethics in HRM and after all the micro – individual moderates the worker moral behaviour expectations within the organization (Guest, 2007). This paper has brought to perspective clear knowledge about ethics in HRM practice and how this impacts on performance. A number of gaps in empirical literature about ethics in HRM have also been identified in the endeavour of building case for ethical culture adoption in HRM practice. Quite a number of studies put more emphasis on the need to re-invent the wheel in people management by adopting ethics in HR practices. The HR department and HR professionals have been identified as the people well positioned to develop, instill and police the implementation of ethical culture in organizations thereby changing employees' ethical behaviour and line manager's approach to handling workers.

6.3 Identified Gaps in knowledge

Findings of this critical literature review revealed quite a number of gaps in relation to the study of ethics in HRM. Quite observable from previous studies was the thematic nature of ethics that was majorly used in Philosophical studies and medical discipline. Besides the thematics, the contextual gaps were evident in that a lot of studies in ethics were done in the European countries with almost no known study done in African countries and specifically in Kenya. Studies done on ethics in relation to HRM were just limited to the aspects of human resource development (HRD), leaving a big gap in the study of ethics in many other HRM functions or practices. This paper has brought out gaps in the perspective of ethics in HRM functions in relation to performance improvement as shown in table 2 below.

Table 2: Research Gaps

Author(s)	Study Topic	Methodology	Findings	Study Gaps	Proposed Remedy for Study Gaps
Mulelu Joel M Bevi (2016),	Factors that influence teachers level of awareness of TSC code of conduct among secondary school teachers in Machakos town constituency.	Descriptive Survey	The study established that the level of awareness of TSC code of conduct and ethics among secondary school's teachers in Machakos Town Constituency was very low	The choice of the variables limited discussions on the fundamental ethical issues in ethics codes and HRM practice.	Need for a comparative study on teachers evaluations of ethical codes and HRM practice
Grace Tanui (2016),	The perceived relationship between ethical leadership and employee performance at Kenya ports authority	Cross sectional survey	The correlation results found that ethical leadership influenced the performance of the employees in the work place. Fairness, justice and equal opportunities motivated employees	Leadership was found to be relative term hence did not relate to functions of HRM	A new study to relate ethical leadership to HRM functions
Margarida Pimenta (2015)	Ethics in human resource management	Exploratory Survey	The study found that absence of ethical infrastructures in organizations contributes to questionable practices of favoritism and practices of discrimination.	Ethical infrastructure is too wide. Has both formal and informal systems that may not to HRM practices parse	Required a combined study of ethical infrastructure in HRM
Bi Bi Eshrat Zamani; Mohammad Poudrjam; and Mitra Masoumi-Fard (2014)	Defining the dimensions of professional ethics in managing human science research of organizations: concepts, approaches and patterns	Field survey	The study suggested that developing essential ethical norms is positive to improving performance in organizations	The choice of variable could not bring out real ethical dilemma in HRM practice	There is need for another study to focus on ethical norms in HRM practice
Muhammad Burdbar Khan (2014)	Ethical Human Resource management; a critical analysis	Survey	The study inferred that HR practioners authentic education in ethics has significant orientation to rebuilding employee relationships	Contextual differences	Similar study to address the Kenyan situation

Michelle Greenwood (2013)	The bigger picture: developing the ethics and hrm debate	Field survey	The study found that the unitarist tendency of HRM, negatively influenced lack of divergent ethical interests of employees	the variables chosen could not link any quantitative relationship perhaps because of its qualitative nature	A new study on the pluralist approach of HRM and ethical interest of employees quantitatively
Pinnington, Macklin and Campbell (2007)	Human Resource Management: Ethics and Employment	Field survey	Study found that bringing ethical awareness into the core of HRM is directly related to employee commitment	Contextual differences	Similar study to address local ethical dilemma in employment related to ethnicity/nepotism
Gary R. Weavera and Linda Klebe Trevino (2001)	The role of human resources in ethics/compliance management a fairness perspective	Descriptive Survey	The study suggested that extensive involvement of HR in ethics programs significantly influence fairness, and employee commitment	The study focused more on compliance to business ethics rather than ethics in HRM practices	Need for a more pragmatic study on ethics in HRM practices specific devoid of business ethics

Source: (author)

6.4 Summary of Literature Review

A number of suggestions have been made in the literature review to support the practice of ethics in HRM (Greenwood, 2012). Vickers (2005) stated that the role of ethics in human resources management is about compliance and of a fairness perspective. Vendemiati (2004) observed that the involvement of HR in corporate ethical programmes was perceived to be propounding fairness in organizations. Meyer and Rowan (1977) contend that organizations communicate expected ethical behaviours through codes of conduct, company policies, in-house training programmes and sometimes vice top down instructions. Kidder, Rushworth (2003) contends that ethics involves systematizing, defending, and recommending ideas of right and wrong conduct. Baqqini (2007) noted that code of ethics refer to a value statement that is similar to the constitution of an organization. Hofstede (2001) noted that practice of ethics in HRM requires HR Managers to be law abiding people who obey laws, policies rules and regulations at all times in making decisions that affect employees.

Solomon (1984) as mentioned earlier, criticized the objectivity of the principles of ethics that they are imperialist, inapplicable in nature, inconsistent and inadequate in their interpretation and application in people management. Thibaut (1975) argued that code of conduct in people management as a catalog of laws is sometimes perceived to be counterproductive in pursuit of performance and that they are time and again only nice, predictable and meaningless expressions that have no serious obligations to actors. Trevino (1999) added that thoughtless compliance with codes can lead to wrong decision making just out of fear of making mistakes and a strong compliance might have negative influence on ethics acceptance. Bentham (1996) Criticized ethics in HRM that it puts more dependence on rules and laws, and that rules or laws become obsolete with time hence many times some rules have been outdated and outlived their usefulness making the application of ethics in HRM redundant.

6.5 Recommendation for Research

Based on the results of this study, it is recommended that a study be done to find out the mediating impact of organizational culture in the relationship between ethics in HRM and worker performance in organizations in Kenya. This will shed light on the contextual differences as most studies in ethics in HRM were done in the western context. Finding the joint effect of ethics in HRM, organizational culture and employee performance would be significant to give strength to the subsummation of ethics in HRM in organizational culture.

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Shape of Our Universe

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Abstract- This work is basically about the shape of our universe . It has always been questioned that what is the shape of our universe . There are different theories related to this question but none is satisfactory . Possibly our universe is ring shaped with non uniform thickness and this configuration explains various important phenomenon's like big bang , expansion , big crunch etc. Using this configuration we can solve mysteries of our universe and we can get answers to some questions .

Index Terms- Big bang , big crunch , expansion , configuration , universe , ring shaped .

I. INTRODUCTION

The word universe is a big mystery for the scientists . Our scientists are still continuously researching on our universe . As the time is passing slowly – slowly we are exploring it . Our research on universe was started from very early civilization . But some have contributed more to it like sir Galileo Galilee , Isaac Newton , Albert Einstein , Stephen Hawking's and many more . Their work is tremendous in field of physics . They have solved some great mysteries of our universe like newton's gravity , Einstein general theory of relativity . There are so many questions today also whose answers we are unable to find . One of the most curious , difficult and interesting question about our universe is that “ what is the shape of our universe “

This is a difficult one and there are so many reasons for it :

- We live in a three dimensional world and we can assume , observe or feel 3 dimensional objects or 3 dimensional quantities only . Possibly our universe is having some higher dimensions in which our universe is holded . And we are sensitive to only 3 dimensions .
- Physically we are not able to travel much distance in our universe . We have travelled only 12 billion km distance from our earth which mean that we are not able only to get out of our solar system . And our universe is possibly

10^{26} times larger than our solar system (observable universe) . It will take thousandth of billion light years to travel this distance and till then we may not alive.

- Till date we have not yet become an intelligent life . There are some energies we are not able to detect which govern our universe .
- Our strongest telescope in space which is Hubble telescope is not able to see and capture farther than 14 billion light years from us . James web telescope will be a good alternative of Hubble telescope and can solve many mysteries of our universe .

But these limitations cannot restrict our brain to think and imagine about our universe

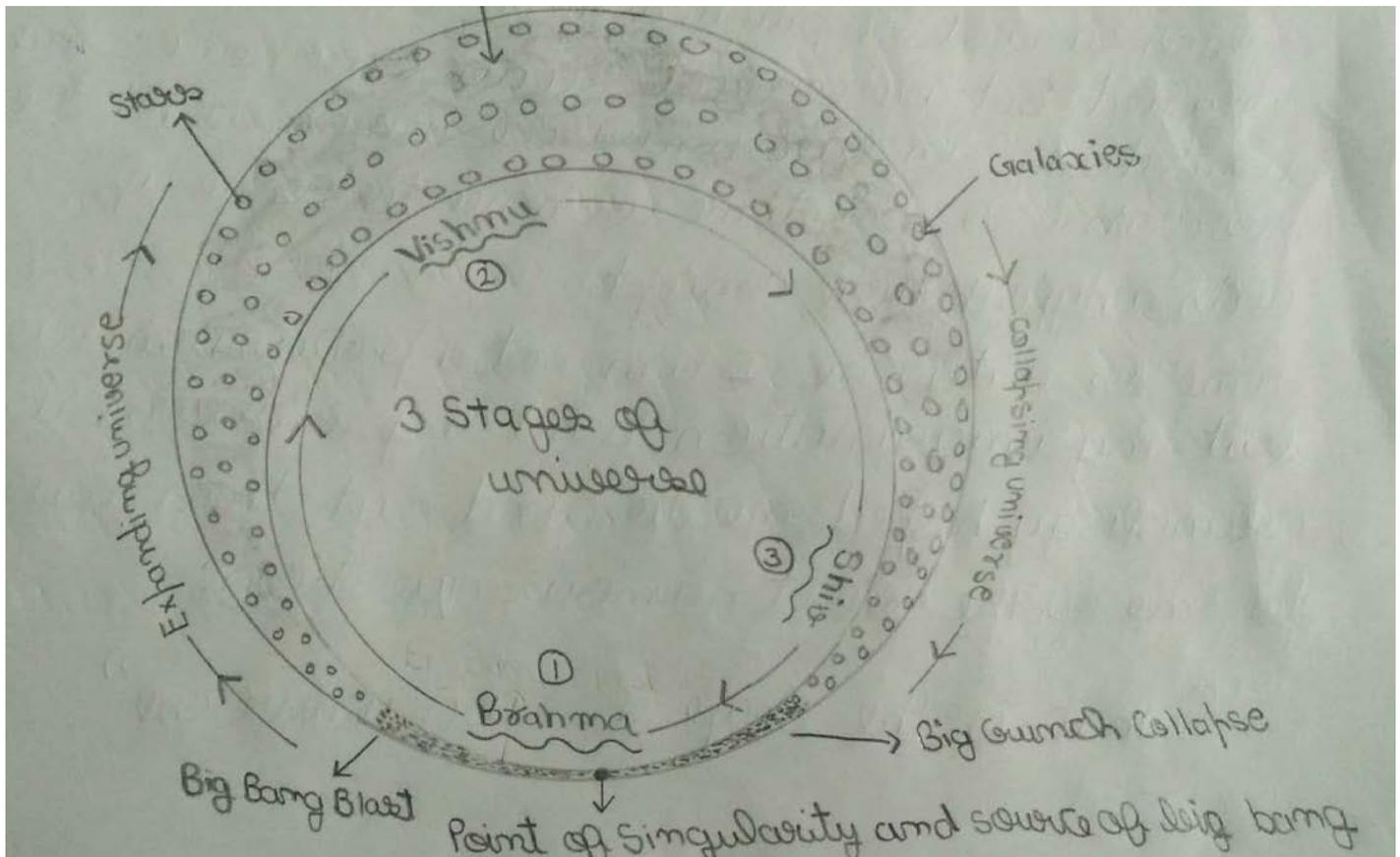
There are many theories which are result of imagination and thought experiments . Like general theory of relativity was a result of imagination and thought experiments of Albert Einstein . We can accept a theory if it explains certain phenomenon and observations . Because there are some mysteries which cannot be practically verified . But are correct because we have some limitations in our universe . So , sometime we have to come up with a theoretical concept .

Same is with this theory . It cannot be practically verified in present date but it explains certain phenomenon's and can give answer to this question that...

“ what is the shape of our universe “?

II. RESEARCH WORK

According to many scientists our universe is a bubble shaped or spherical shaped . Recently , Stephen Hawking's said that there are thousands of universe and they are bubble shaped . But actually spherical shape of our universe does not explain every phenomenon like big bang , big crunch , expanding of our universe , motion of our galaxies and the recreation of universe . So , in my point of view , our universe is not spherical but ring shaped with a non uniform thickness as show below :



This configuration is a result of my imagination and my imagination is based on certain phenomenon's of our modern science as well as Hindu Vedic physics which was written thousands of years ago. I have concluded this configuration by merging both modern physics and Vedic physics . I appreciate both of them for their work .

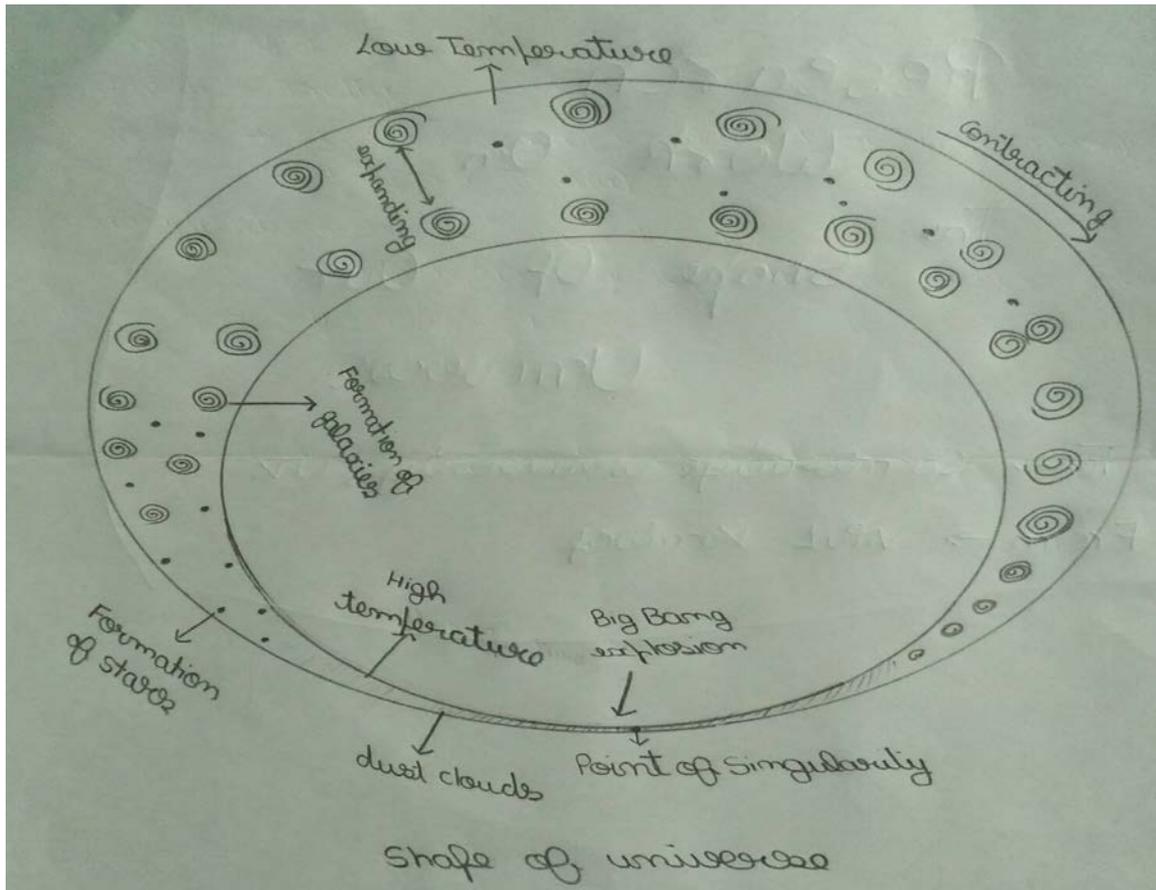
Now , I will prove this configuration by certain phenomenon's :

- ❖ **BIG BANG** : According to our scientists , our universe began with a blast from a point of singularity where all matter was concentrated . Suddenly , a blast happened and our universe was created with a bulk of energy and gases with some dust matter . So , our universe geometry be something like that it must have a point which should have very small cross sectional area nearly about an small ball where all matter was concentrated at a particular point . And this configuration has that point with a very small cross section area.
- ❖ **EXPANDING UNIVERSE** : Our astronomers in 90's observed that our universe is expanding by studying the distances between two galaxies . It was observed that the galaxies are moving far apart from each other . So , our universe must have a geometry like this which enables the matter to move apart from one another . And this configuration has that stage . It's area increase continuously from point of singularity .

- ❖ **TEMPERATURE** : Scientists say that at the time of beginning of our universe or we can say at the time of big bang , there was a lot temperature in trillion and trillion degrees because a lot of energy , matter and gases were concentrated at a small point but as the universe was and is expanding , the temperature began to cool down and it's very cold in outer space today . This is possible only when cross section area increases . And this configuration shows that the area is increasing after blast .
- ❖ **BIG CRUNCH** : Many scientists including many reputed scientists believe that after billions and trillions of years , our universe will again start contracting and collapsing and will again result in a point of singularity . This is possible only when cross section area stars decreasing after a certain period of expansion , and this configuration include that part .
- ❖ **VEDIC THEORY OF RECREATION** : According to our Hindu Vedas , a universe is created and destroyed and then same universe is again created by a energy named as Brahma . That universe consist of same energy and matter as previously destroyed universe consist . Again same incidents take place as taken in previously destroyed universe . From this we can conclude that boundary of our universe remain same which is made of higher dimension , only matter and time explodes , expands and gain contract and again explodes in the form

of big bang . Time is same at every point in the universe and is situated in the form of frames . It is a just a process of recycling of matter and energy again and again . It

means that boundary of our universe is made of higher dimension only matter and energy rotates inside . And the universe destroyed is recreated in the same media .



III. CONCLUSION

At last we can conclude that the possible shape of our universe is not like bubble or spherical but a ring shaped like structure which has a non uniform thickness which is narrower at one end and thicker at the other . It is like a close loop in which certain phenomenon's occur like big bang , big crunch , expansion and contractor again and again . When a universe is crunched up , a new universe is formed from the same matter and energy of the previous crunched up universe . It means that formation and crunching of universe is a continous process .

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Understanding Millennial Students

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Abstract- The millennial generation experienced different issues pertaining to their attitude, characteristic and interest towards school and environment. In order for them to change the perspective of the people they should establish a strong belief for their selves. The study was a quantitative design that makes use of research made questionnaire. This study aimed to know and deeply understand the millennial generation and with their level of interest. The researchers conducted the survey among the Senior High School with the total of one hundred seven eight respondents who are requested to answer the questionnaire to complete the survey and gather the data needed. Quantitative data were processed using chi-square. The study has shown the level of student interests in terms of education, technological responsibility, health and sanitation, socialization, spiritual, passion and interest, involvement and participation in organization. It shows that interest and attitude is very helpful in understanding millennial generation. Results also show that level of interest is correlated to the student's profile which includes gender and grade level. It can be inferred that there is significant association of level of interest between students profile.

Index Terms- Millennial Students, Interest, Attitude

I. INTRODUCTION

The millennial generation has caught the attention of everyone due to their unique characteristics and interest. Millennial at the year of 1982 until they get the age of 21 in 2003, while the x-generation reached the age from 22 up to 43 and the baby boomers are in the age of 44 to 58 (Dwyer & Pospisil, n.d). Compared to the past generation millennial were born and expose into the world of technology in which they embraces it in their daily lives. Their generation become popular as they change the mindset and perspective of every individual with regards to education, technological responsibility, health and sanitation, towards environment, socialization, spiritual, passion and interest, and involvement and participation in organization. Their generational cohort continued to increase and exist in the society today.

On the other hand millennial also face issues concerning to their interest and characteristics in the society. Arthur Taylor said that millennial subsists in a loud world that may cause a big issue and covered what is reliable and essential to their task. They become dependent and tend to procrastinate as they focused their attention in using technology and become addicted that could affect their life and change the perspective of the people in the society with their generations. However, their generation also portray positive impact to other people. According to Groscurth and Grover (n.d.) millennial can easily search, find, and expose to a lot of information rather than the other. Millennial should strive hard and find balance to surpass the issue within their generation. To give them knowledge understanding about whom really millennial generation is and how they are different from the other.

Furthermore, this research focused on understanding millennial students in terms of their level of interest. It intends to assess categories in which millennial students shall be more inclined in the kind of interest.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Millennial life stages are changing, expanding and explorative where their values, belief, choices, and custom are notified and developed (Barton, Koslow, Fromm, Egan, 2012). They adapt values in work and have expectancy in terms of career that emphasizes the difference between the Gen xers and Baby boomers (Johnson,(2015). They involve in the active learning by their own capability that possible to empower them (Donnison, 2007). They employ numerous form of participative learning with the integration of Didactic method and personal experiences (Martin, 2007). Millennial aim from their advisory to have a full understanding of their personal level and long period of time goals in their family (Wealthy Millennial: A Generation Seeking the right Advice, 2017). Students are widely open to a new technologies inside their classroom and precise the needs of each professors to give more focus and virtual application of the millennial students in their learning environment (Philips and Trainor 2014). They want different active learning strategy or style that is different from traditional one Price (n.d.).

Millennial do not thrive same as a boomer do in using technology Matulich, (n.d.). They are knowledgeable and have a broad assimilation in terms of digital technology (Russo, 2013). They belong to a digital age where they can easily access different variety of information (Taylor, 2012). They are more aware of two digital news resources and that is the Google news and Buzz feed (Mitchell, 2015). Youth lead the changes using the technologies in communicating and learning (Noguera, n.d.). Millennial used technology to create a social state that go beyond the limits of time and space yet this is the place where the students gain knowledge work and engage in groups. (Ricketts, 2009) Organizational Developments, emphasizes the recent technology that may set aside the opportunities for millennial student to enhance their collaborative skills and strong leadership towards people (Gibson and Sodeman 2014). Social media is a medium used by millennial in communicating their peers (Millennial: Our Newest Generation in Higher Education, n.d.). Millennial student thrive and excel in a collaborative manner (Kotz, 2016). Millennial students want to belong to a certain group (Meeting the Needs of Millennial Student, n.d.). Millennial are exposed to a various aspects of socialization through connecting in multiple online activities. (Chitosca, 2006) Millennial is felt at home with technology and use technology in for their studies or academic necessities. (Goncalves, 2014) They are exposed of different types of technology in these digital worlds from the younger age until they grow older. (Rikleen, 2014)

Millennial are more ambivalent in regards of promoting choices for consumer packaged goods products in rely on the brands health reputation, trusted products and natural quality that affect the probability of the environmentally friendly consumer packaged goods products that being purchased. (Suntornpithug, 2017) Millennial youth long for many opportunities offer to them that is suitable to their passion and interest. (Lituanas, 2017) It is important that millennial must be aware of the benefits of a product (Stegelin, 2012). Millennial are spiritual but absence of formal affiliation (Haworth, 2002). They are more liable to God and their generation. (Black, 2014) They want to become more open and creative to challenges and opportunities every day. They believe to be more attached to their outside lives (Nichols & Smith, 2015). Millennial gives important to energy issues rather than the environmental issues or Problems. (Sogari, Rucci, Aquilani, & Zanni, 2017)

Thus, knowing the interest of millennial student is very important to deeply understand and have knowledge on dealing with their characteristic and meet their needs and expectation as well towards the future. Similarly, the researcher intends to assess the level of understanding millennial students with regards to their interest when it comes to education, technological responsibility, health and sanitation, socialization, spiritual, passion and interest and involvement and participation in organization.

II. WRITE DOWN YOUR STUDIES AND FINDINGS

This chapter presents the findings, analysis and discussion and interpretation of data gathered wherein the main objective is to know the interest of Millennial Student of Senior High School students of Jagobiao National High School in the course of Practical Research 2.

Table1
Frequency of Respondents According to Grade Level

Grade Level	Frequency	Percent
Grade 11	108	108%
Grade 12	70	70%
Total	178	178%

N=178

The table above shows the frequency of respondents according to grade level. There are 108 Grade 11 respondents of 108% and 70 Grade 12 respondents of 70%. This shows that most of the respondents of this study are grade 11 Senior High School Students.

Table 2.
Frequency of Respondents According to Gender

Gender	Frequency	Percent
Female	126	126%
Male	52	52%
Total	178	178%

N=178

The table above shows the frequency of respondents according to gender. There are 126 female respondents of 126% and 52 male respondents of 52%. With this, it can be inferred that most of respondents of this study is female Students.

Table 3.
LEVEL OF INTEREST TOWARDS EDUCATION

Indicators	Weighted Mean	Interpretation
1. I like to do the performance task given by the teacher.	3.73	Often
2. Education helps me to develop my skills.	4.61	Always
3. My teachers mold me into a better person.	4.28	Often
4. I like experimental and exploratory learning.	3.60	Often
5. I like having quizzes every after discussion.	3.29	Sometimes
Overall Weighted Mean	3.90	Often

Legend: Always(4.21-5.00), Often(3.41-4.20), Sometimes(2.61-3.40), Seldom(1.81-2.60), Never(1.00-1.80)
N=178

The table above shows the weighted mean of the interest of millennial students in terms of education. The statement “Education helps me to develop my skills” has the highest weighted mean of 4.61 interpreted as always. The second highest weighted mean is the statement “My teacher mold me into a better person” of 4.28 interpreted as often. Meanwhile, “I like to do the performance task given by the teacher” has the third highest weighted mean of 3.73 interpreted as often. On one hand, the statement “I like experimental and exploratory learning” has 3.60 interpreted as often. Lastly, the statement “I like having quizzes every after discussion” has gather the lowest weighted mean of 3.29 interpreted as often. This means that the respondents perceive education as a means of developing their skills. This also indicates that millennial students want an experimental and exploratory learning and teacher is one of the factors of influencing the student personality. The overall weighted mean is 3.90 interpreted as often indicates that education has a big impact to develop the skills of millennial students.

Table 4
LEVEL OF INTEREST TOWARDS TECHNOLOGICAL RESPONSIBILITY

Indicators	Weighted Mean	Interpretation
1. I am responsible in spending my time in playing computer games or browsing the net.	3.49	Sometimes
2. I learn to balance my studies and the use of my personal gadgets.	3.69	Often
3. I use technologies for educational purposes.	3.83	Often
4. I observe proper netiquette in using and surfing the net.	3.65	Often
5. I only use gadget when it is needed.	3.37	Sometimes
Overall Weighted Mean	3.61	Often

Legend: Always (4.21-5.00), Often(3.41-4.20), Sometimes(2.61-3.40), Seldom(1.81-2.60), Never(1.00-1.80)
N=178

The table above shows the weighted mean of technological responsibility. The statement “I use technologies for educational purposes” has the highest weighted mean of 3.83 interpreted as often. This suggested that technologies are one the necessity of millennial students for their education. The second highest weighted mean is “I learn to balance my studies and the use of my personal gadgets” of 3.69 interpreted as often. It means that millennial students learn to balance their time in using personal gadget and in maintaining their good performance in school. The statement “I observe proper netiquette in using and surfing the net” has the weighted mean of 3.65 interpreted as often. This implies that students observe proper usage of gadgets. On one hand the statement, “I am responsible in spending my time in playing computer games or browsing the net” has the weighted mean of 3.49 interpreted as often. It means that the students learn to manipulate their time properly in surfing the net. While the statement “I only use gadget when it is needed” has the weighted mean of 3.37 interpreted as often. This implies that gadgets are useful to every student. The overall weighted mean is 3.61 interpreted as often. This signifies that millennial students make use of technology as a means of meeting their learning needs. It also indicates that millennial students are technology oriented.

Table 5
LEVEL OF INTEREST TOWARDS HEALTH AND SANITATION

Indicators	Weighted Mean	Interpretation
1. I like to maintain my body healthy by eating nutritious food.	4.06	Always

2. I enjoy eating healthy foods like vegetable dishes.	3.91	Often
3. I enjoy doing physical activities like zumba or wellness exercise.	3.94	Often
4. I observe personal hygiene by taking a bath every day.	4.56	Always
5. I usually get enough sleep every day.	3.40	Often
Overall Weighted Mean	3.97	Often

Legend: Always (4.21-5.00), Often (3.41-4.20), Sometimes (2.61-3.40), Seldom(1.81-2.60), Never (1.00-1.80)
N=178

The table above shows the weighted mean of health and sanitation. The statement “I observe personal hygiene by taking a bath every day” has the highest weighted mean of 4.56 interpreted as always. This indicates that observing personal hygiene somehow is a means of maintaining one’s self healthy. The statement “I like to maintain my body healthy by eating nutritious food” has the second highest mean of 4.06 interpreted as always. This implies that eating nutritious food can also make one’s self healthy. “I enjoy doing physical activities like Sumba or wellness exercise” has the weighted mean of 3.94 interpreted as often. Meanwhile, the statement “I enjoy eating healthy foods like vegetable dishes” has the weighted mean of 3.91 interpreted as often. The statement “I usually get enough sleep every day” has the weighted mean of 3.40 interpreted as often. This means that respondents perceive health and sanitation is an important matter. The overall weighted mean is 3.97 interpreted as often implies that the respondents health is necessary to their daily lives.

Table 6
LEVEL OF INTEREST TOWARDS ENVIRONMENT

Indicators	Weighted Mean	Interpretation
1. I observe cleanliness in my home by sweeping and arranging the room.	4.01	Always
2. I throw my garbage properly.	4.10	Always
3. I enjoy taking good care of plants or animals at home.	3.78	Often
4. I segregate biodegradable over non- biodegradable waste at home.	3.82	Often
5. I enjoy being involved in activities or program related to the environment.	3.61	Often
Overall Weighted Mean	3.86	Often

Legend: Always (4.21-5.00), Often (3.41-4.20), Sometimes (2.61-3.40), Seldom (1.81-2.60), Never (1.00-1.80)
N=178

The table above shows the level of interest towards environment. The statement “I throw my garbage properly” has the highest weighted mean of 4.10 interpreted as always. The second highest weighted mean is the statement “I observe cleanliness in my home by sweeping and arranging the room” of 4.01 interpreted as always. The third highest weighted mean is the statement “I segregate biodegradable over non- biodegradable waste at home” of 3.82 interpreted as often. On the other hand, the statement “I enjoy taking good care of plants or animals at home” has the weighted mean of 3.78 interpreted as often. Lastly, the statement “I enjoy being involved in activities or program related to the environment” has the weighted mean 3.61 interpreted as often. The overall weighted mean is 3.86 interpreted as always it indicates that the respondents observe cleanliness in their surroundings.

Table 7
LEVEL OF INTEREST TOWARDS SOCIALIZATION

Indicators	Weighted Mean	Interpretation
1. I like being involved in a clan or e-sports game.	3.53	Often
2. I joined youth organization in my community.	3.36	Sometimes
3. I like dealing with social media activity.	3.35	Sometimes
4. I enjoy group class activities.	3.66	Often
5. I like to create blogs, channels and face book page with friends in the net.	3.07	Sometimes
Overall Weighted Mean	3.39	Sometimes

Legend: Always (4.21-5.00), Often (3.41-4.20), Sometimes (2.61-3.40), Seldom (1.81-2.60), Never (1.00-1.80)

N=178

The table above shows the weighted mean of the interest of millennial students in terms of socialization. The statement “I enjoy group class activities” has the highest weighted mean of 3.66 interpreted as always. The second highest weighted mean is the statement “I like being involved in a clan or e-sports game” of 3.35 interpreted as often. Meanwhile, “I joined youth organization in my community” has the third highest weighted mean of 3.36 interpreted as sometimes. On one hand, the statement “I like dealing with social media activity” has the weighted mean of 3.35 interpreted as sometimes. Lastly the statement “I like to create blogs, channels and face book page with friends in the net” has the weighted mean of 3.07 interpreted as sometimes. It indicate that millennial students are team-oriented they enjoy working collaboratively with their fellow classmates and they also want to be involved in organizational group. The overall weighted mean is 3.39 interpreted as sometimes indicates that socialization is part of every millennial students as way of communicating with their colleagues.

Table 8
LEVEL OF INTEREST TOWARDS SPIRITUAL

Indicators	Weighted Mean	Interpretation
1. I join to church or religious activities.	3.71	Often
2. I like to sing or hear religious song.	3.99	Often
3. I like attending to religious gatherings from different Christian Denomination.	3.69	Often
4. I enjoy doing charitable works as a means of helping.	3.79	Often
5. I like to join religious programs or activities in the community.	3.75	Often
Overall Weighted Mean	3.79	Often

Legend: Always (4.21-5.00), Often (3.41-4.20), Sometimes (2.61-3.40), Seldom (1.81-2.60), Never (1.00-1.80)

N=178

The table above shows the weighted mean of the level of interest by spiritual. The statement “I like to sing or hear religious song” has the highest weighted mean of 3.99 interpreted as often. The second highest weighted mean is the statement “I enjoy doing charitable works as a means of helping” of 3.79 interpreted as often. Meanwhile, “I like to join religious programs or activities in the community” has the third highest weighted mean of 3.75 interpreted as often. The statement “I join to church or religious activities” has the weighted mean of 3.71 interpreted as often. On one hand, the statement “I like attending to religious gatherings from different Christian Denomination” has 3.66 interpreted as often. This implies that the respondents are enjoying in joining religious activities that can lift up their spiritual life. The overall weighted mean is 3.79 interpreted as always indicates that joining spiritual activities are one of the interest of millennial students.

Table 9
LEVEL OF INTEREST TOWARDS PASSION AND INTEREST

Indicators	Weighted Mean	Interpretation
1. I spend enough time for my hobbies like writing, listening to music, etc.	4.02	Often
2. I give my best in improving my talents like participating in front of many people.	3.78	Often
3. Participating is a way of developing my skills.	4.01	Often
4. I do things that could enhance my talents like joining and participating in activities or programs.	3.88	Often
5. I take much time in playing sports activities like volleyball, basketball etc.	3.37	Often
Overall Weighted Mean	3.81	Often

Legend: Always (4.21-5.00), Often (3.41-4.20), Sometimes (2.61-3.40), Seldom (1.81-2.60), Never (1.00-1.80)

N=178

The table above shows the weighted mean of passion and interest. The statement “I spend enough time for my hobbies like writing, listening to music, etc” has the highest weighted mean of 4.02 interpreted as often. The statement “Participating is a way of developing my skills” has the second highest weighted mean of 4.01. The third highest weighted is the statement “I do things that could enhance my talents like joining and participating in activities or programs” of 3.88 interpreted as often. While the statement “I give my best in improving my talents like participating in front of many people” has the weighted mean of 3.78 interpreted as often. On the other hand, the statement “I take much time in playing sports activities like volleyball, basketball etc” has the weighted mean 3.37 interpreted as often. This implies the respondent’s passion and interest do not vary to their generational cohort but it varies to

their personalities and they spend time with their hobbies and in developing their skills. The overall weighted mean is 3.81 interpreted as often signifies that millennial students have unique passion and interest for it reflect to their hobbies in life that makes them a unique generation.

Table 10

LEVEL OF INTEREST TOWARDS INVOLVEMENT AND PARTICIPATION IN ORGANIZATION

Indicators	Weighted Mean	Interpretation
1. I spend time in joining any activities in school or community.	3.62	Often
2. Joining organization helps me to develop my self- esteem.	3.81	Often
3. I join organization or programs in school or community.	3.55	Often
4. I like to engage and participate in project and programs in the organization.	3.53	Often
5. I want to be involved and attend in different activities in the organization within my community.	3.59	Often
Overall Weighted Mean	3.62	Often

Legend: Always (4.21-5.00), Often (3.41-4.20), Sometimes (2.61-3.40), Seldom (1.81-2.60), Never (1.00-1.80)
N=178

The table above shows the level of interest of millennial students in terms of involvement and participation in organization. The statement “Joining organization helps me to develop my self- esteem” has the highest weighted mean of 3.81 interpreted as often. The second highest weighted mean is the statement “I spend time in joining any activities in school or community” of 3.62 interpreted as often. On one hand the statement “I want to be involve and attend in different activities in the organization within my community” has the third highest weighted mean of 3.59 interpreted as often. Meanwhile, “I join organization or programs in school or community” has the weighted mean 3.55 interpreted as often. Lastly, the statement “I like to engage and participate in project and programs in the organization” has the weighted mean of 3.53 interpreted as often. This implies that joining organizational groups helps one’s self to boost their confidence. The overall weighted mean 3.62 interpreted as often indicates that involvement and participating in organization is an evidence that millennial students wants themselves to be engage in different activities.

Table 11

LEVEL OF INTEREST IN TERMS OF GENDER

	X ²	Df	X ² (2.05)	Decision	Interpretation
Technological Responsibility	30.39	3	7.82	Reject	Significant
Involvement and Participation in Organization	8.67	3	7.82	Reject	Significant
Education	14.65	2	5.99	Reject	Significant
Health and Sanitation	5.71	2	5.99	Failed to reject	Not significant
Towards Environment	3.86	2	5.99	Failed to reject	Not significant
Socialization	3.29	3	7.82	Failed to reject	Not significant
Spiritual	2.49	3	7.82	Failed to reject	Not significant
Passion and Interest	4.21	3	7.82	Failed to reject	Not significant

N=178

The table above shows the significant value of computed chi-square of technological responsibility X²(30.39), education X²(14.65) and involvement and participation in organization X²(8.67) in terms of gender are more than the computed critical value of 7.815 significant 0.05 which reject the null hypothesis. Thus, it is significant. This indicates that millennial students are far interested in education, technological responsibility, and involvement and participation in organization which helps them to develop their skills in communication, self-esteem, talents and technology also meet their needs in learning and communicating with their peers (Noguera,n.d) said that youth leads the changes using the technologies in communicating and learning. According also to Rickes, (2009), millennial used technology to create a social state that go beyond the limits of time and yet this is the place where students gain knowledge work engage in groups.

Likewise the table above also shows the value of computed chi-square which is not significant in terms of health and sanitation X²(5.71), towards environment X²(3.36), socialization X²(3.29), spiritual X²(2.49), and passion and interest X²(4.21) are lesser than the computed critical value of (5.99) and (7.815) significant of 0.05 which fails to reject the null hypothesis. Hence, it is not significant. This indicates that they are active in some aspects that can possibly develop their skills, which is consistent to the study of (Lituanas, 2017), said that millennial youth long for many opportunities offer to them that is suitable to their passion and interest.

Table 12
LEVEL OF INTEREST IN TERMS OF GRADE LEVEL

	X ²	Df	X ² (2.05)	Decision	Interpretation
Education	12.06	3	7.82	Reject	Significant
Involvement and Participation in Organization	15.59	4	9.45	Reject	Significant
Towards Environment	2.73	3	7.82	Failed to reject	Not Significant
Technological Responsibility	8.49	4	9.45	Failed to reject	Not Significant
Health and Sanitation	5.09	3	7.82	Failed to reject	Not Significant
Socialization	7.94	4	9.45	Failed to reject	Not Significant
Spiritual	6.79	3	7.82	Failed to reject	Not Significant
Passion and Interest	6.23	4	9.45	Failed to reject	Not Significant

N=178

The table above shows the significant value of computed chi-square of education X²(12.02), and involvement and participation in organization X²(15.59) are greater than the computed critical value of (7.82) and (9.45) significant 0.05 which reject the null hypothesis. Thus, it is significant and implies that the level of interest of millennial in terms of grade level helps them to develop and mold their skill, capabilities through education and it also lift up their self-confidence through joining and participating in organizations. It also indicates that millennial wants an explorative learning that helped them to gain more knowledge. Price (n.d), said that millennial want an different active learning strategy or style that is different from traditional one.

Likewise the table above also shows the value of computed chi-square which is not significant towards technological responsibility X²(8.49), health and sanitation X²(5.09), socialization X²(7.09), spiritual X²(6.79), and passion and interest X²(6.23) are lesser than the computed critical value of 7.815 and 9.448 significant 0.05 which fails to reject the null hypothesis. Hence, it is not significant. This simply means that technological responsibility, health and sanitation, socialization, spiritual, and passion and interest in terms of grade level had nothing to do with the interest of millennial students. Thus, the millennial interest varies to their own perspective in life. According to Barton, Koslow, Fromm, and Egan (2012), millennial life stages are changing, expanding and explorative where their values, belief, choices, and custom are notified and developed.

VI. CONCLUSION

Most of the Senior High School students were born in millennial generation. Their generational cohort continues to increase as they caught the attention of everyone due to their unique characteristics and interest. In this study, it assessed the different level of interest of senior high school students popularly known as “The Millennial Generation or Gen Y” with accordance to grade level and gender. Based on results, respondents showed different perspectives of interest. In accordance to gender and grade level both profile had showed significant and not significant result. In this matter there is a different relationship of students profile in connection with their interest. This implies that millennial interest varies to their own perspective. Their interest is not a hinder with their daily task instead it became an essential element of their lives and serve as mean of developing their skills and boosting their self-esteem. On the contrary, millennial students are more interested to education, involvement and participation in organization and technology. Generally, students profile does not associate with the level of interest of the millennial students. It inferred that whatever your gender and grade level, it does not reflect to the students interest in one’s self.

APPENDIX

RESEARCH INSTRUMENT

Understanding Millennial Students in the Interest Level

Personal Information

Name:

Grade Level:

Gender:

Direction: Please answer the following items with all honesty. The information that will be gathered by the researcher shall be treated with utmost respect and confidentiality.

5-ALWAYS 4-OFTEN 3-SOMETIMES 2-SELDOM 1- NEVER

Education	5	4	3	2	1
1. I like to do the performance task given by the teacher					
2. Education helps me to develop my skills.					
3. My teachers mold me into a better person.					
4. I like experimental and exploratory learning.					
5. I like having quizzes every after discussion.					
Technological Responsibility					
1. I am responsible in spending my time in playing computer games or browsing the net.					
2. I learn to balance my studies and the use of my personal gadgets.					
3. I use technologies for educational purposes.					
4. I observe proper netiquette in using and surfing the net.					
5. I only use gadget when it is needed.					
Health and Sanitation					
1. I like to maintain my body healthy by eating nutritious food.					
2. I enjoy eating healthy foods like vegetable dishes.					
3. I enjoy doing physical activities like Sumba or wellness exercise.					
4. I observe personal hygiene by taking a bath every day.					
5. I usually get enough Sleep every day					
Towards Environment					
1. I observe cleanliness in my home by sweeping and arranging the room.					
2. I throw my garbage properly					
3. I enjoy taking good care of plants or animals at home.					
4. I segregate biodegradable over non-biodegradable waste at home.					
5. I enjoy being involved in activities or program related to the environment.					
Spiritual					
1. I join to church or religious activities.					
2. I like to sing or hear religious song.					
3. I like attending to religious gatherings from different Christian Denomination.					
4. I enjoy doing charitable works as a means of helping.					

5. I like to join religious programs or activities in the community.					
Socialization					
1. I like being involved in a clan or e-sports game.					
2. I joined youth organization in my community.					
3. I like dealing with social media activity.					
4. I enjoy group class activities.					
5. I like to create blogs, channels and face book page with friends in the net.					
Passion and interest					
1. I spend enough time for my hobbies like writing, listening to music, etc.					
2. I give my best in improving my talents like participating in front of many people.					
3. Participating is a way of developing my Skill					
4. I do things that could enhance my talents like joining and participating in activities or programs.					
5. I take much time in playing sports activities like volleyball, basketball etc.					
Involvement and Participation in organization					
1. I spend time in joining any activities in school or community.					
2. Joining organization helps me to develop my self- esteem.					
3. I join organization or programs in school or community.					
4. I like to engage and participate in project and programs in the organization.					
5. I want to be involved and attend in different activities in the organization within my community.					

TALLY SHEET, TABLE OF OBSERVED, TABLE OF EXPECTED FREQUENCY AND COMPUTATION OF CHI-SQUARE

EDUCATION IN TERMS OF GRADE LEVEL

	1.0-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	0	1	28	62	25
GRADE 12	0	2	14	39	14

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum (O-E)^2 =$$

$$\frac{\sum (1-1.82)^2 + (2-1.18)^2 + (20-20.63)^2 + (14-13.37)^2 + (62-61.28)^2 + (39-39.72)^2 + (25-24.27)^2 +$$

E 1.82 1.18 20.63 13.37 61.28 39.72

$$\frac{(15-15.73)^2}{24.72} = 12.06$$

24.72

EDUCATION IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	0	10	32	10
FEMALE	0	0	3	72	27

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum (O-E)^2 = \frac{\sum (10-3.80)^2 + (3-9.20)^2 + (32-27.46)^2 + (72-66.54)^2 + (10-10.81)^2 + (27-26.19)^2}{14.65}$$

E 3.80 9.20 27.46 66.54 10.81

=14.65

TECHNOLOGICAL RESPONSIBILITY IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	2	10	38	42	16
GRADE 12	1	4	17	34	14

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum (O-E)^2 = \frac{\sum (2-1.82)^2 + (1-1.18)^2 + (10-8.49)^2 + (4-5.51)^2 + (38-33.37)^2 + (17-21.63)^2 +$$

E 1.82 1.18 8.49 5.51 33.37

$$\frac{(42-46.11)^2 + (16-18.2)^2 + (14-11.8)^2}{8.49} = 8.49$$

21.63 46.11 18.2

TECHNOLOGICAL RESPONSIBILITY IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	4	14	24	10
FEMALE	0	14	44	48	20

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum (O-E)^2 = \frac{\sum (4-5.26)^2 + (14-12.74)^2 + (14-16.94)^2 + (44-41.06)^2 + (24-21.03)^2 + (48-50.97)^2 +$$

E 5.26 12.74 16.94 41.06 21.03

$$\frac{(10-8.76)^2 + (20-21.24)^2}{30.89} = 30.89$$

50.97 8.76

HEALTH AND SANITATION IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	0	1	16	58	33
GRADE 12	0	4	15	32	19

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(1-3.03)^2}{3.03} + \frac{(4-1.96)^2}{1.96} + \frac{(16-18.8)^2}{18.8} + \frac{(58-12.19)^2}{12.19} + \frac{(32-54.06)^2}{54.06} + \frac{(33-31.55)^2}{31.55} + \frac{(19-20.44)^2}{20.44} = 5.09$$

HEALTH AND SANITATION IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	0	5	33	14
FEMALE	0	0	28	63	35

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(5-9.94)^2}{9.94} + \frac{(28-23.36)^2}{23.36} + \frac{(33-28.04)^2}{28.04} + \frac{(63-67.96)^2}{67.96} + \frac{(14-14.31)^2}{14.31} + \frac{(35-34.69)^2}{34.69} = 5.71$$

TOWARDS ENVIRONMENT IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	0	3	29	50	26
GRADE 12	0	3	19	31	17

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(3-3.64)^2}{3.64} + \frac{(3-2.36)^2}{2.36} + \frac{(29-29.12)^2}{29.12} + \frac{(19-18.88)^2}{18.88} + \frac{(50-49.15)^2}{49.15} + \frac{(31-31.85)^2}{31.85} + \frac{(26-26.09)^2}{26.09} + \frac{(17-16.91)^2}{16.91} = 28.89$$

TOWARDS ENVIRONMENT IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	0	11	36	5

FEMALE	0	0	24	69	23
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COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(11-13.15)^2}{13.15} + \frac{(24-31.85)^2}{31.85} + \frac{(36-30.67)^2}{30.67} + \frac{(69-74.33)^2}{74.33} + \frac{(5-8.18)^2}{8.18} + \frac{(23-19.82)^2}{19.82}$$

$$= 3.86$$

SOCIALIZATION IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	4	15	35	40	14
GRADE 12	2	14	17	29	8

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(4-3.64)^2}{3.64} + \frac{(2-2.36)^2}{2.36} + \frac{(15-17.60)^2}{17.60} + \frac{(14-11.40)^2}{11.40} + \frac{(35-31.55)^2}{31.55} + \frac{(17-20.45)^2}{20.45} + \frac{(40-41.87)^2}{41.87} + \frac{(29-27.13)^2}{27.13} + \frac{(14-13.35)^2}{13.35} + \frac{(8-8.65)^2}{8.65} = 7.94$$

SOCIALIZATION IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	5	21	21	5
FEMALE	0	20	45	46	15

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(5-7.30)^2}{7.30} + \frac{(20-17.70)^2}{17.70} + \frac{(21-19.28)^2}{19.28} + \frac{(45-46.72)^2}{46.72} + \frac{(21-19.57)^2}{19.57} + \frac{(46-47.53)^2}{47.53} + \frac{(15-10.62)^2}{10.62} = 3.29$$

SPIRITUAL IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	0	10	23	43	32
GRADE 12	0	6	16	31	17

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(10-9.71)^2}{9.71} + \frac{(6-6.29)^2}{6.29} + \frac{(23-23.66)^2}{23.66} + \frac{(16-15.34)^2}{15.34} + \frac{(43-44.9)^2}{44.9} + \frac{(31-29.1)^2}{29.1}$$

E 9.71 6.29 23.66 15.34 44.9

$$\frac{(32-29.73)^2+(17-19.27)^2}{29.1} = 6.79$$

29.1 29.73

SPIRITUAL IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	4	11	27	10
FEMALE	0	13	29	60	24

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(4-4.97)^2+(13-12.03)^2+(11-11.69)^2+(29-28.31)^2+(27-25.42)^2+(60-61.58)^2+(10-9.93)^2+(24-24.07)^2}{61.58} = 2.49$$

E 4.97 12.03 11.69 28.31 25.42

$$\frac{(10-9.93)^2+(24-24.07)^2}{61.58} = 2.49$$

61.58 9.93

PASSION AND INTEREST IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	1	6	28	41	32
GRADE 12	1	2	22	33	12

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(1-1.21)^2+(1-0.79)^2+(6-4.84)^2+(2-3.15)^2+(28-30.34)^2+(22-19.66)^2+(41-44.9)^2+(33-29.1)^2+(32-26.70)^2+(12-17.3)^2}{19.66} = 6.23$$

E 1.21 0.79 4.84 3.15 30.34

$$\frac{(41-44.9)^2+(33-29.1)^2+(32-26.70)^2+(12-17.3)^2}{19.66} = 6.23$$

19.66 44.9 29.1 26.70

PASSION AND INTEREST IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	2	12	26	12
FEMALE	0	5	40	62	19

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \frac{(2-2.04)^2+(5-4.96)^2+(12-15.19)^2+(40-36.81)^2+(26-25.71)^2+(62-62.29)^2+(12-9.06)^2+(19-21.94)^2}{62.29} = 4.21$$

E 2.04 4.96 15.19 36.81 25.71

$$\frac{(12-9.06)^2+(19-21.94)^2}{62.29} = 4.21$$

62.29 9.06

INVOLVEMENT AND PARTICIPATION IN ORGANIZATION IN TERMS OF GRADE LEVEL

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
GRADE 11	3	10	29	39	27
GRADE 12	3	9	21	23	14

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \sum \frac{(3-3.64)^2}{3.64} + \frac{(10-11.53)^2}{11.53} + \frac{(9-7.47)^2}{7.47} + \frac{(29-30.34)^2}{30.34} + \frac{(21-19.66)^2}{19.66} + \frac{(39-37.62)^2}{37.62} + \frac{(27-24.88)^2}{24.88} + \frac{(14-16.12)^2}{16.12} = 15.29$$

INVOLVEMENT AND PARTICIPATION IN ORGANIZATION IN TERMS OF GENDER

	1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
MALE	0	6	14	20	12
FEMALE	0	18	37	57	14

COMPUTATION OF CHI-SQUARE

$$X_c^2 = \sum(O-E)^2 = \sum \frac{(6-7.01)^2}{7.01} + \frac{(18-16.99)^2}{16.99} + \frac{(14-14.90)^2}{14.90} + \frac{(37-36.10)^2}{36.10} + \frac{(20-22.49)^2}{22.49} + \frac{(57-54.51)^2}{54.51} + \frac{(12-7.60)^2}{7.60} = 8.67$$

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Antimicrobial Susceptibility Pattern of Bacterial Isolates from Urine Specimen of Patient with Complain of Urinary Tract Infection at A Tertiary Care Teaching Hospital in Solapur, Maharashtra.

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Abstract- Background: Urinary tract infections (UTIs) account to one of the major reasons for hospital visits by patients, it remains to be one of the commonest infectious diseases diagnosed in developing countries, emergence of antibiotic resistance in uropathogens due to misuse or overuse of antibiotics and has led to limited therapeutic options for treatment which is serious concern for clinicians. **Material and method:** Clean catch mid-stream urine from each patient was collected instructions were given to the patient about method of urine collection, specimen was labelled and transported to the laboratory and analysed within 2 hours of collection. Sample was subjected to wet mount and gram stain for pus cells & evaluation of any bacteria in sample for provisional report and cultured on blood agar and MacConkey medium. Only patients with clinical symptoms of UTI and positive urine culture were included in the study. Study was conducted for a period of 3 months from September- November 2018. **Results:** A total 656 samples were received in Microbiology department from patients suspected of UTI, out of which growth was seen in 164(25%) so the urine culture positivity rate is 25%, sterile samples were 363 (55.33 %) Candida species were seen in 36 (5.48%) samples, insignificant bacteraemia was seen in 57(8.63%) samples, polymicrobial flora was seen in 36 (5.48%) samples. Females 87(53.04%) were more commonly affected by UTI as compared to males 77 (46.95%), in females most common age group affected was from 15-30 years (50.57%) followed by 31-45 years (17-24) however in case of, males most common age group was from 1-4 years (28.57%) followed by age group > 60 years (23.4%). Most common uropathogens isolated from suspected cases of UTI were gram negative bacteria 141 (85.97%) out of which most common was *E-coli* 45 (27 %) followed by *Klebsiella pneumoniae* 41 (25%), *Citrobacter Koseri* 24 (14.6%), *Enterobacter aerogens* 17 (10.36%), *Pseudomonas aeruginosa* 10 (6.09%), *Acinetobacter baumannii* 4 (2.4%). Among gram positive bacteria *Staphylococcus species* were 15(9.01%) out of which MRSA were 5 (33.33%) *Staphylococcus saprophyticus* 9 (60%) and *Staphylococcus epidermidis* 01(6.66%) isolate was seen. *Streptococcus pyogens* 8 (34.78%). Antibiotic susceptibility in gram negative bacteria showed high resistance among urinary isolates was seen with sensitivity to Imipenem (37.2%) followed

by Amikacin 37 %, Cefotaxime 36%, Norfloxacin 36 %, Nitrofurantoin 31.70%, Among gram positive bacteria 100% sensitivity was seen for Vancomycin and Linezolid.

Index Terms- UTI- urinary tract infection, culture positivity rate.

I. INTRODUCTION

Urinary tract infection (UTI) is commonest bacterial infectious disease encountered in clinical practice which has led to increase in morbidity and financial burden on patient. It has been estimated that 150 million people are infected with UTI per annum worldwide¹.

UTI can be classified into uncomplicated and complicated on the basis of their choice of treatment². UTI is more common in females as compared to males due to anatomical factors like short urethra, proximity of the genital tract & urethra³. Other physiological factors may include pregnancy where the plasma volume increases and decrease in urine concentration occurs which may lead to bacterial growth in urine⁴. Sexual activity in females also increase risk of urethral contamination during coitus^{5,6}.

UTI is most commonly caused by bacteria but may also occur due to fungal and viral infection. Gram negative bacteria causes up to 90% of UTI cases while gram positive bacteria cause only 10 % of cases. Most common uropathogens encountered includes *E .coli* which accounts to 60-90 % of all UTIs^{7,8}.

Emergence of antibiotic resistance especially MRDO has made treatment of UTI difficult, which is a serious public health issue. The present study is conducted with aim to know the bacteriological profile and antibiotic sensitivity pattern to commonly use antibiotic agent among patients with complaints of UTI at a tertiary care teaching hospital in Solapur, Maharashtra.

II. MATERIAL AND METHOD⁹

Clean catch mid-stream urine from each patient was collected in 20 ml sterile screw cap container instructions were

given to the patient about method of urine collection, specimen was labelled and transported to the laboratory and analysed within 2 hours of collection. Sample was subjected to wet mount and gram stain for pus cells & evaluation of any bacteria in sample for provisional report and cultured on blood agar and MacConkey medium. Antibiotic susceptibility testing was done by Kirby Bauer disc diffusion method as per CLSI guidelines¹⁰. Only patients with clinical symptoms of UTI and positive urine culture were included in the study while urine samples with 3 or more types of colonies were reported as poly-microbial flora and advised to send repeat sample. In case of insignificant bacteria was reported only after ruling out various conditions where low count is also considered to be significant. Extended beta lactamases (ESBL) detection was done using combined disc test, Metallo-beta- lactamases (MBL) detection was done on isolates resistant to Imipenem using Modified Hodge test, Amp-C production was detected using Amp-C disc test as per CLSI guidelines¹⁰. Study was conducted for a period of 3 months from September- November 2018 in Microbiology department at tertiary care hospital in Solapur, Maharashtra.

III. RESULTS

A total 656 samples were received in Microbiology department from patients suspected of UTI during September to August 2018. Out of which growth was seen in 164(25%) so the urine culture positively rate is 25%, sterile samples were 363 (55.33 %) Candida species were seen in 36 (5.48%) samples, insignificant bacteria was seen in 57(8.63%) samples (after ruling out various conditions where low count is also considered significant), poly-microbial flora was seen in 36 (5.48%) samples. Females 87(53.04%) were more commonly affected by UTI as compared to males 77 (46.95%), in females most common age group affected was from 15-30 years (50.57%) followed by 31-45 years (17-24) however in case of, males most common age group was from 1-4 years (28.57%) followed by age group > 60 years (23.4%). Most common uropathogens isolated from suspected cases of UTI were gram negative bacteria 141 (85.97%) out of which most common was *E-coli* 45 (27 %) followed by *Klebsiella pneumoniae* 41 (25%), *Citrobacter Koseri* 24 (14.6%), *Enterobacter aerogens* 17 (10.36%), *Pseudomonas aeruginosa* 10 (6.09%), *Acinetobacter baumannii* 4 (2.4%). Among gram positive bacteria *Staphylococcus species* were 15(9.01%) out of which MRSA were 5 (33.33%) *Staphylococcus saprophyticus* 9 (60%) and *Staphylococcus epidermidis* 01(6.66%) isolate was seen. *Streptococcus pyogens* 8(34.78%). Antibiotic susceptibility in gram negative bacteria showed high resistance among urinary isolates with sensitivity to Imipenem (37.2%) followed by Amikacin 37 %, Cefotaxime 36%, Norfloxacin 36 %, Nitrofurantoin 31.70%, in case of *Pseudomonas aeruginosa* high sensitivity was seen for ceftazadime 80 % and Piperacillin-tazobactam was 70 %. Among gram positive bacteria 100% sensitivity was seen for Vancomycin and Linezolid, while sensitivity to other antimicrobials were as follows Clindamycin 73%, Erythromycin 40 %, Gentamicin 13.6 %, Norfloxacin 40.4 %. Nitrofurantoin 53.3 %, Penicillin and Nitrofurantoin showed 50 % sensitivity. In case of *Streptococcus pyogens* sensitivity for tetracycline and Norfloxacin 37.5% was seen respectively.

IV. DISCUSSION

In present study prevalence of UTI was found to be about 25%. Studies done by Devanand Prakash et al¹¹ reported prevalence of UTI 53.82 % among patients. Studies done by Wabalem Desta Seifu et al¹² reported overall prevalence of UTI in the area was 90.1%, in our study the prevalence of UTI is found to be less which may be attributed to the fact that it is institution based study so variation may exist, also socioeconomic status & other demographical factors may vary and may lead to variation in prevalence rate of UTI.

In the present study females (n=87)53.04% were more commonly affected by UTI as compared to males 46.95 %, similar results have been reported by Devanand Prakash et al¹⁰ and wabalem Desta Seifu et al¹¹. this is attributed to anatomical differences of urogenital organs between two sexes and sexual activity may lead to urethral contamination during sexual intercourse which often results into UTI.

In the present study age group in females most commonly affected is 15-30 years (50.57%) followed by 31-45 years (17.24%) this is due to the fact that females in the age group are sexually active and physiological activity like pregnancy may predispose patients to UTI. In the present study age group in males commonly affected is 1-14 years (29 %) followed by age group > 60 years (23.4%). Males have bimodal frequency for UTI, one peak in childhood and other peak in elderly patient. In elderly patients especially in male's risk of UTI increases due to genitourinary atrophy^{13,14}.

In early childhood prevalence of UTI in more often due to congenital malformations and uncircumcised genitalia which is often contaminated and may lead to increase prevalence of UTI in early childhood¹⁵.

In the present study most common uropathogens isolated were gram negative bacteria 141 (35.97%) followed by gram positive bacteria 23 (14.02%) studies done by S.B. Salek et al, A.S.Kolawale et al¹⁶, F Khorvash et al¹⁷ are in concordance with our findings. In our study among negative bacteria *E .coli* contributes to about 27% of UTI while *Staphylococcus spp* contributes to 15 % of UTI, these findings are in concordance to various studies done by Devanand Prakash et al¹⁰ & wabalem Desta seifu et al¹¹, where *E.coli* and *Staphylococcus* species are predominantly isolated among gram negative and gram positive bacteria respectively.

Overall antibiotic susceptibility pattern among gram negative uropathogens were found to be multi drug resistant organism (MDRO) with sensitivity to Imipemen (37.2%) followed by Amikacin (37%), Cefotaxime (36%), Norfloxacin (36%) and Nitrofurantoin 31.70%. Among *Pseudomonas aeruginosa* isolates high sensitivity was seen for ceftazadime (80%) followed by Pippercallin-tazobactam(70%).

Among gram positive bacteria 100 % sensitivity was seen for Vancomycin & linezolid followed by Clindmycin 73 %, Nitrofurantoin 53.3%, Norfloxacin 40.4%, Erythromycin 40 %, Gentamicin 13.6%. Among GAS (Group –A streptococcus) sensitivity was seen for tetracyclin and Norfloxacin 37.5 % respectively. Among gram negative bacteria 141 (85.97 %), 75 (53.2%) isolates were ESBL while 50 (35.5%) isolates were MBL producers. And 10(7.09%) isolates were Amp –C producers.

Klebsiella pneumoniae 35 (85.4%) isolates were ESBL producer, while among *E.coli* 30(66.66%) where MBL producers and

5(3.54%) isolates of *E.coli* were Amp-C producer. Amp-C producers were only seen among 3 (2.12%), *Citrobacter Koseri* and 2 (1.41%) isolates among *Klebsiella pneumonia*.

In the present study we see high level of resistance among gram negative bacteria with 53.2% of uropathogens were ESBL producers 35.5% of uropathogens were MBL producers and 7.09% of uropathogens were Amp-C producers among gram positive bacteria MRSA were 33.33 %.

Variation in antibiotic resistance may be between different countries, among different cities even between different institutions this may be attributed to the local antibiotic prescribing habits, patient group under study, socioeconomic status of the patients, hygiene practices and awareness among patients about drawbacks of using over the counter drugs or self-medication.

V. CONCLUSION

UTI is most common problem worldwide; emergence of resistant strains is an widespread phenomenon. There is need to keep vigilance on misuse/ overuse of antibiotics. There is need to increase awareness among patient on the adverse effects of misuse/overuse of drugs and also discourage them to procure over the counter drugs. Hospital should also revise antibiotic policy annually according to local trends of antibiotic sensitivity patterns there is also need to adhere to strict antibiotic stewardship policies. This study has highlighted the bacteriological profile and antibiotic susceptibility patterns among uropathogens from patients visiting tertiary care hospital in Solapur this study will help in guiding for formulation of antibiotic policy and to know local antibiotic sensitivity patterns among population.

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Prevention of NPAs: A Comparative Study on Indian Banks

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Abstract: This study compares the Loans and Advances, NPAs of both public and private sector banks in India to explore the preventive measures to control the rising NPAs. Suitable preventive measures help banks to decrease the level of NPAs in India. A lower level of NPAs helps the banks in consolidating their position, increasing confidence to depositors and increasing market share of the banks.

Keywords: Banking, NPAs, Basel

Introduction:

The study of Non Performing Advances (NPAs) is necessities because of the alarming rise of NPAs of Banks in India from 2015 to 2018.. Indian Banks profits have come down due to higher provision for NPAs indicating poor credit risk management of Indian Banks. This study compares the NPAs of both public and private sector banks in India to explore the preventive measures to control the rising NPAs.

Review of Literature:

Andrew Campbell (2007) observes that ineffective internal control systems as the important factor in controlling the rising NPAs by banks in many countries. He also observes that bank management has to ensure that suitable risk measures were in place for the prevention of NPAs as per Basel guidelines on banking supervision. He emphasizes the need for effective system of banking supervision and regulation to prevent NPAs. Bank supervisors must be satisfied with the credit risk management process of banks with adequate internal controls for management of credit risks to prevent NPAs.

Meena Sharma (2005) observed that NPAs will decrease the profitability of the banks, decrease the credit growth in the economy. So Efficient Credit approval and review mechanism, sound legal framework and strong political will find better solution to the problem of growing NPAs of Indian Banks.

Objectives of the Study:

1. Compare the advances and NPAs of Public and Private Sector Banks in India
2. Analyze the Risk Management practices of Public and Private Banks in India
3. Suggest Preventive Measures for reducing NPAs of Public and Private Banks.

Methodology of the Study:

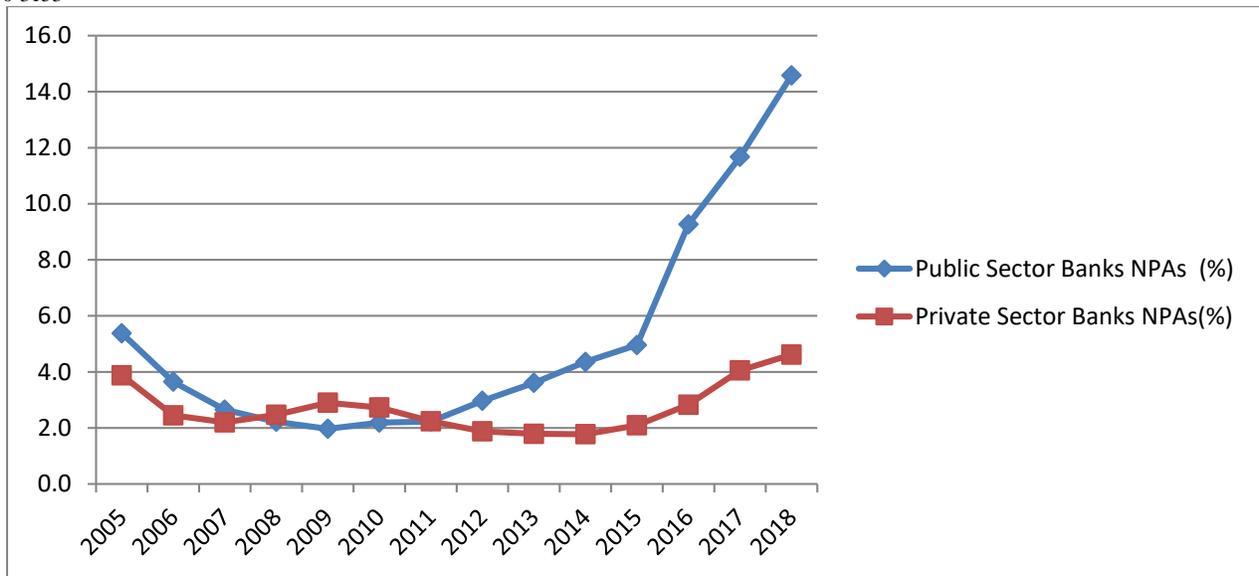
Analyze the data on existing NPAs, Risk management framework of both Public and Private Banks in India for the last three years by collecting secondary data from banks, RBI and internet sources.

Analysis, Interpretations and Suggestions:

Table 1: Gross NPAs of Indian Public and Private Sector Banks from 2005 to 2018

	Public Sector Banks Gross NPAs (%)	Private Sector Banks Gross NPAs (%)
2005	5.4	3.9
2006	3.7	2.5
2007	2.7	2.2
2008	2.2	2.5
2009	2.0	2.9
2010	2.2	2.7
2011	2.2	2.2
2012	3.0	1.9
2013	3.6	1.8
2014	4.4	1.8
2015	5.0	2.1
2016	9.3	2.8
2017	11.7	4.1
2018	14.6	4.6

Source: RBI

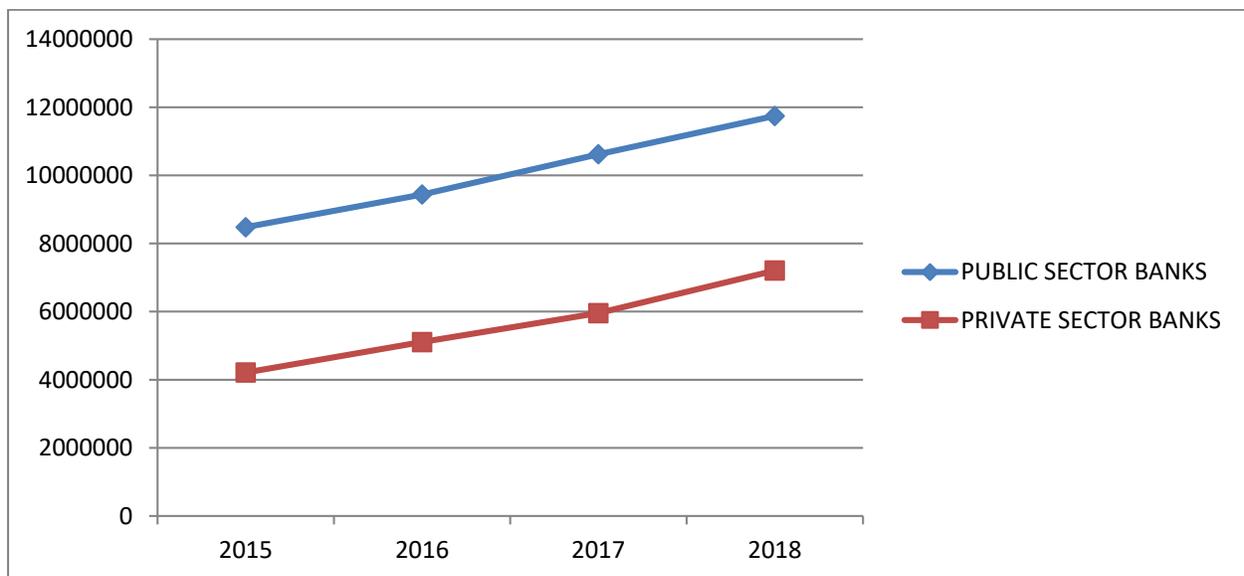


Graph1: Gross NPAs of Public and Private Sectors Banks in India from 2005-2018

Table II: Public and Private Sector Banks advances to sensitive sectors

	2015	2016	2017	2018
PUBLIC SECTOR BANKS	8478012	9438330	10619911	11744076
PRIVATE SECTOR BANKS	4213026	5105458	5955673	7204958

Source :RBI



Graph2: Loans and advances of Public and Private Sectors Banks to Sensitive Sectors from 2015-2018

It can be observed that public sector banks advances to Sensitive Sectors and NPAs are increasing more than Private sector banks in India during the study period.

Risk Management Framework:

All the Banks in India are following standardized approach to credit risk in India prescribed by RBI as per Basel III guidelines. Basel III-Pillar 3 disclosures of Public and Private Sectors banks reveal that the industry wide exposure of private sector banks to sensitive sectors has decreased where as the exposure of public sector banks have increased. Private sector banks have increased retail loans than corporate loans during the study period. It indicates the weakness in analyzing the changing macro and industry factors by the public sectors in limiting their exposures to the respective sectors. It indicates the weakness in credit appraisal system followed at public sector banks. It also indicates that weakness in credit monitoring mechanism and governance at public sector banks in containing credit risk leading to rising NPAs in public sectors banks.

Preventive Measures for reducing Bank NPAs:

Public sector banks need to strengthen the credit approval process using reliable data on changing market and Industry trends to limit their exposures to sensitive sectors.

Public sector banks has to change the loan review mechanism through advanced internal rating mechanism using sophisticated internal rating models as per Basel III advanced internal rating approach as depending on external rating model is not helping the banks for early recognition of the advances becoming NPAs.

Loan rating and loan officer rating using internal risk rating models is must for transparency and follow up of advances. Performance based incentives to loan review officers should be incorporated by the public sector banks.

Conclusion:

The alarming level of NPAs of Public sectors banks will erode the confidence of depositors leading to decreased credit growth, profits and market share for public sector banks. So, Indian Public sector banks have to apply preventive measures to contain NPAs.

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Molecular and in Silico Studies on DHFR of Uropathogenic Staphylococcus Aureus

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Abstract- Urinary tract infections (UTI) are the infection caused by microbes and women are especially prone to it than men due to anatomical reasons. Uropathogenic *S.aureus* have developed resistant to presently prescribed antibiotics viz., Trimethoprim and cotrimoxazole. *S.aureus* clinical isolates were utilized in this study. Antibacterial activity for selected phytochemicals was studied. Plasmid DNA isolation and PCR amplification of *dfr* gene of DHFR *S.aureus* was done. In silico studies were performed to analyze the binding efficiency of various phytochemicals and antibiotics on the DHFR protein of *S.aureus*.

Index Terms- Urinary Tract infection (UTI); Trimethoprim; *S.aureus*; Antibacterial activity; Dihydrofolate reductase (DHFR); Docking

I. INTRODUCTION

Urinary Tract Infection (UTI) is caused by the existence and growth of microorganisms in the urinary tract which occurs in all age groups and in both gender¹. UTI accounts for around 8.1 million visits to a doctor every year². Causative microbes include *Staphylococcus*, *Streptococcus*, *Corynebacterium*, *Lactobacillus*, *Enterococcus* and members of the family of *Enterobacteriaceae*, and the fungus *Candida* (yeast). *Staphylococcus aureus* is a relatively rare cause of urinary tract infection in the general population³.

Antimicrobial resistance among the pathogens that cause UTI is growing and is a most important health problem in the management of UTI. Several antibiotics are used to treat UTI⁴. Oral antibiotics such as Trimethoprim/ Sulfamethoxazole (TMP/SMX) called as cotrimoxazole, nitrofurantoin, or fosfomycin are typically first line. *Staphylococcus aureus* commonly shows resistance to the following drugs; Trimethoprim, Cotrimoxazole, Nitrofurantoin, Amoxicillin, Clindamycin, Oxacillin, Penicillin, Amoxicillin/clavulanic acid, erythromycin, ceftazidime⁵. *S. aureus* resistance to antibiotics is a serious medical problem worldwide⁶.

One of the components of co-trimoxazole, sulfamethoxazole (SMX) induces its therapeutic effect by competing with p-aminobenzoic acid (PABA) in the biosynthesis of dihydrofolate by inhibiting the enzyme Dihydropteroyl synthetase (DHPS). While the other component which is trimethoprim (TMP) serves as a competitive inhibitor of Dihydrofolate reductase (DHFR), thereby inhibiting the de novo synthesis of tetrahydrofolate, the biologically active form of folate.

DHFR Dihydrofolate reductase, [E.C. No. 1.5.1.3] is an enzyme of reductase family that reduces 5, 6 dihydrofolate acid to 5,6,7,8 tetrahydrofolate acid.⁷

Antibiotic resistance is a seriously growing problem in medicine. Hence, there is a need to search for potent therapeutic antibacterial agents. The current study includes isolation and identification of *S.aureus* and investigation of antibacterial activity of different compounds on *S.aureus* and DHFR gene activity assay. DNA isolation and PCR amplification of *dfr* gene.

Molecular docking is a method which predicts the preferred relative orientation of one molecule (key) when bound in an active site of another molecule (lock) to form a stable complex such that free energy of the overall system is minimized. It exploits the concept of molecular shape and physicochemical complementarity. The structures interact like a hand in a glove, where both shape and physicochemical properties contribute to the fit.

This study proposes phytochemicals possessing inhibitory activity on DHFR and thus block the folate pathway. This strategy may bring forth novel biomolecules which could curb antibiotic drug resistant *S.aureus* causative UTI infections.

II. MATERIALS AND METHOD

COLLECTION AND PROCESSING OF URINE SAMPLES

55 urine samples of patients were collected in a sterile container from pathology laboratories from Nagpur, Maharashtra, India. The collected samples were diluted 1:100 using autoclaved distilled water and were stored at 4°C till further use.

BACTERIAL ISOLATION

18 bacterial colonies were isolated by streaking diluted urine sample on differential medium UTI agar plates (Himedia M118) followed by Mannitol salt differential and confirmatory agar.⁷

BACTERIAL INOCULATION

A single bacterial colony was inoculated into 5ml of sterile nutrient broth and incubated at 37°C for 16-18 h to match turbidity with 0.5 McFarland's Nephelometer Standard. This culture was then used for antibiotic susceptibility testing.⁸

IDENTIFICATION OF BACTERIA

Characterization and identification of bacteria was done by Gram staining and different biochemical testing methods.⁹ (Table 1)

Table 1: Biochemical test for Identification and Characterization of *Staphylococcus aureus*

Sr.	Test	Principle
1.	Gram staining	Gains and makes a complex of crystal- violet and iodine in cell wall.
2.	Catalase	Presence of catalase in aerobic bacteria leading to breakdown of hydrogen peroxide to oxygen and water.
3.	Citrate	Bacteria produce citrate permease and are able to utilize citrate as carbon source.
4.	Coagulase	<i>S. aureus</i> produce catalase enzyme which converts fibrinogen to fibrin.

ANTIBIOTIC SENSITIVITY ASSAY

Antibiotic sensitivity test is a procedure of determining the sensitivity of bacterial culture towards specific antibiotics. Trimethoprim was purchased from Himedia, Mumbai. The sensitivity testing was performed by agar disc diffusion method described by Kirby-Bauer. 75ml of Muller-Hilton agar was inoculated with 50µl of bacterial culture and poured onto the sterile petri plate. After solidification of agar, antibiotic discs were kept on it and incubated for 16-18 hours. The diameter of zone of inhibition around the disc was measured (Himedia antibiotic scale: PW096) to determine the sensitivity towards TMP at 5 mcg.

DETERMINATION OF ANTIBACTERIAL ACTIVITY OF PHYTOCHEMICALS

Antibacterial activity of Chlorogenic acid (CGA), Hippuric acid (HA), Gallic acid (GA), Ellagic acid (EA), and Quercetin (Qu) was tested against all the 18 isolates of *S. aureus* at 1, 2, 5, 7, 10, 12, 14, 16 mg/ml. Compounds were used by dissolving them in 100% ethanol. Well diffusion method was employed for this test. Muller Hinton agar (30ml) was poured onto a sterile petri plate of 90 mm diameter. After solidification of agar, bacterial inoculum (40µl) was spread on agar plate by spread plate technique then wells were prepared and solution of phytochemicals at different concentration were added to the wells. The plates were incubated for 16-18 hours at 37°C. The diameter of zone of inhibition around the wells was measured using antibiotic scale.

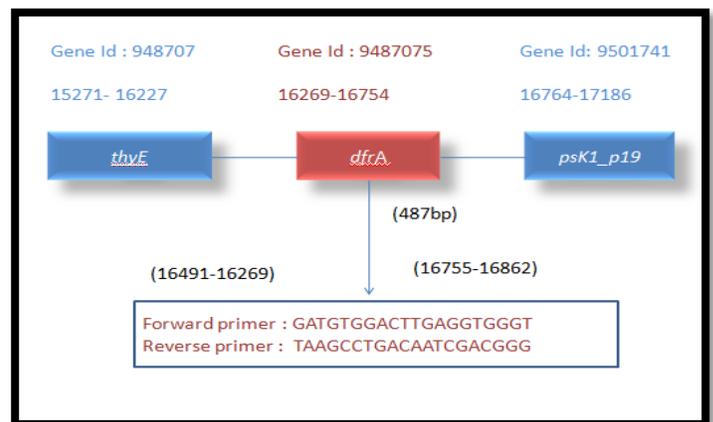
PLASMID DNA ISOLATION

The plasmid DNA was isolated by alkaline lysis method as explained Birnboim and Doly (1979). 1.5 ml bacterial culture was grown overnight for the DNA isolation. The resulting products were run on 1.2% agarose gel and visualized under UV transilluminator.

PRIMER DESIGNING

Primers were designed for DHFR gene (*dfrA*) using online 'NCBI Primer designing tool'. These primers were procured from IDT (Integrate DNA Technology) (Fig 1). The DHFR gene of *S. aureus* is flanked by *thyE* and *psK1_p19* genes. The forward and reverse primers designed would yield an expected amplicon size of 487bp.

Fig 1: Primers for *dfrA* gene of *S. aureus*



PCR AMPLIFICATION

The reaction mixture contained variable amount of plasmid DNA of *S. aureus*, 10µmoles (0.5µl) of each primer, 10mM (0.5µl) dNTPs, 1 U (0.125µl) Taq polymerase, 10X (2.5µl) buffer, solution. Volume was made up to 25µl by DEPC treated water. A thermalcycler (PEQ LAB) was reaction was run under following condition: Hot start at 110° C, 5 min denaturation at 94°C, followed by 30 cycles of 10 min at 94°C, 1 min of annealing at 59.88° C and 1 min elongation at 72°C and final extension at 72° C for 10 min. The resulting PCR products were run on 1.2% agarose gel and visualize under UV transilluminator.

DHFR ACTIVITY ASSAY

1 ml of bacterial culture was inoculated in 100 ml of sterile nutrient broth and incubated at 37°C for overnight. The 100 ml bacterial culture was then centrifuged at 3000 rpm for 10 min at 4°C. The supernatant was then discarded and the pellet was re-suspended in 5 ml of ice cold PBS (0.1M). Cell extracts were prepared by sonication of pellet for 2 min. These cell extracts were further used for the DHFR activity assay.¹⁰

The specific activity of DHFR was determined by spectrophotometry. The reaction mixture (1ml) consisted of cell extract 100µM, TES(pH 6.8) 500mM, betamercaptoethanol

75mM, dihydrofolate 100µM, NADPH 100µM. Incubated at 37°C for 3 min. Read adsorbance at 340 nm using UVvisible spectrometer (Bio Red Eppendorf)

MOLECULAR DOCKING

Docking is a molecular modeling technique that is used to predict how a protein (enzyme) interacts with small molecules (ligands). The ability of a protein (enzyme) to interact with small molecules to form a supramolecular complex plays a major role in the dynamics of the protein, which may enhance or inhibit its biological function. The method aims to identify correct poses of ligands in the binding pocket of a protein and to predict the affinity between the ligand and the protein. Molecular docking process can be separated into two major steps i) searching and ii) scoring.

Search algorithm

The search algorithm implemented in any docking tool should enumerate an optimum number of ways two molecules can be put together. The size of the search space grows exponentially with the increase in the size of the molecules.

Scoring functions

The scoring function measures and ranks the binding of a ligand-receptor complex. The score should directly correspond to the binding affinity of the ligand for the protein so that the top scoring compounds are also the best binders.

This study was performed using AutoDock 1.5 version 6rc2. AutoDock is a molecular docking suite consisting of automated docking tools. AutoDock consists of two main programs: AutoDock and AutoGrid. AutoDock docks the two molecules according to the grid, which is precalculated and set by AutoGrid. AutoDock is considered one of the best programs when it comes to docking and virtual screening¹¹. Docking study is cost effective for speeding up the process of drug discovery and development.¹²

RESULTS AND DISCUSSION

BACTERIAL ISOLATION

The urine samples collected from pathology labs from Nagpur city and thus diluted were streaked on UTI agar. The bacterial mixed population was observed on HiCrome UTI agar (Figure 2). Out of 55 samples, only 18 samples were found to give white to cream coloured, opaque, small, and spherical colonies on UTI agar. Confirmatory test results show yellow coloured colonies surrounded by yellow zones on Mannitol agar plates which indicative of presence of *S.aureus*.

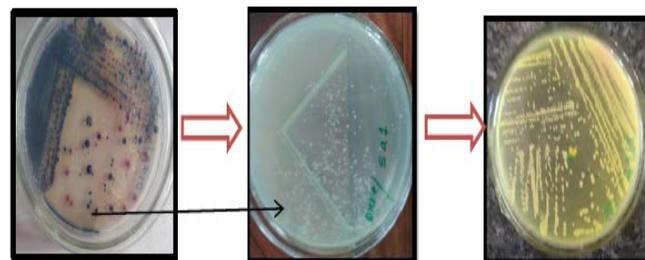


Fig 2a: Diluted urine sample on UTI agar

Fig 2b: *S. aureus*

Fig 2c: Mannitol salt agar confirming *S. aureus*

Fig 2: Isolation of bacteria

IDENTIFICATION OF *S.AUREUS*

The isolated samples of *S. aureus* were further confirmed by Gram staining and several biochemical tests. The combined results of all the biochemical tests confirmed *S. aureus*.

Table 2: Biochemical Tests for Identification and Characterization of *S. aureus*, Gram positive bacteria.

Sr.No.	Test	Result
1.	Gram staining	Violet, Spherical shape
2.	Catalase	Bubbles are generated on slide.
3.	Citrate	Colour changes to blue.
4.	Coagulase	Formation of clumps on the slide.

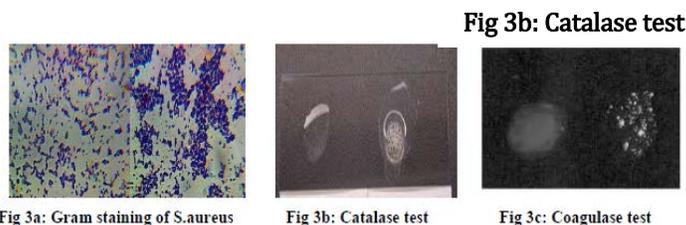


Fig 3a: Gram staining of *S.aureus*

Fig 3b: Catalase test

Fig 3c: Coagulase test

Fig 3: Characterization and identification of bacteria

ANTIBIOTIC SENSITIVITY ASSAY

Trimethoprim, a commonly used antibiotic against UTI, was selected as an inhibitor of DHFR. Out of 18 clinical isolates 12 were resistant and 6 were sensitive to TMP at 5 mcg. Trimethoprim inhibit the bacterial growth by inhibiting the DHFR of the folate synthesis pathway.



Fig4: Sensitivity and resistance towards TMP by agar diffusion method

DHFR ACTIVITY ASSAY

In order to study the response of DHFR in trimethoprim sensitive and resistant strains of *S.aureus*, specific activity of DHFR was determined with and without TMP and selected phytochemicals showing commendable antibacterial activity viz., ellagic acid and gallic acid. while other phytochemicals namely, quercetin, hippuric acid and chlorogenic acid were not used as inhibitors as they showed comparatively less antibacterial effect. Activity assay of DHFR is based on the ability of DHFR to reduce dihydrofolic acid to tetrahydrofolic acid. Activity of DHFR was found to be more in resistant strains as compared to sensitive strains.

ANTIBACTERIAL ACTIVITY OF PHYTOCHEMICALS

The most effective antibacterial activity of gallic acid is at 14 mg/ml, ellagic acid is 5 mg/ml, hippuric acid is 7mg/ml, quercetin is 10 mg/ml, chlorogenic acid is 14mg/ml.

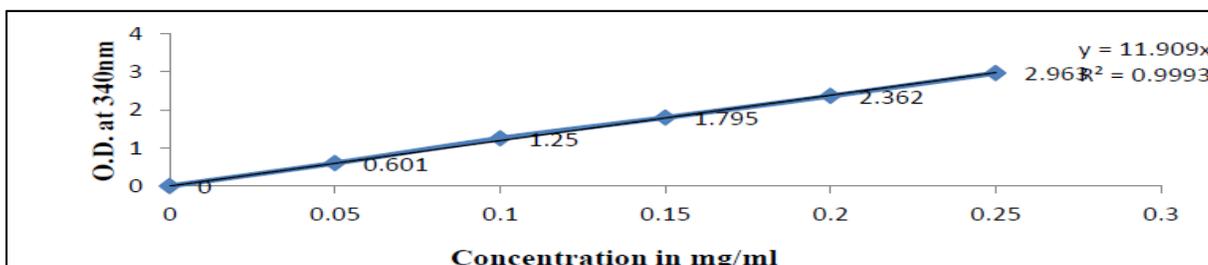


Fig 5: Standard graph of DHFR assay

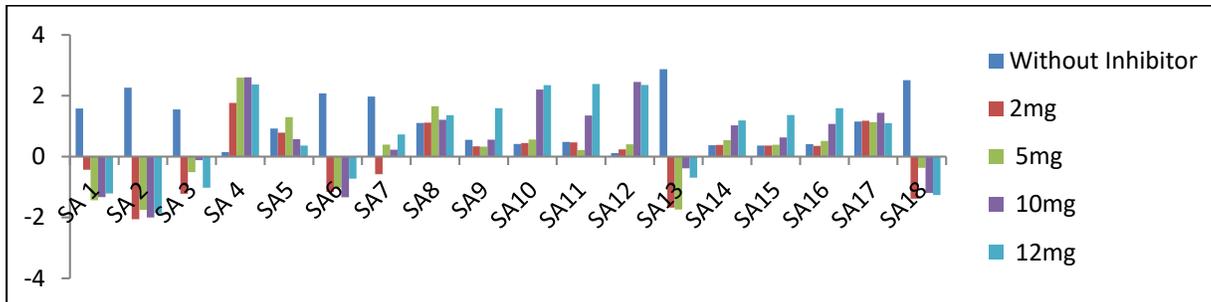


Fig 6: DHFR assay in presence of TMP

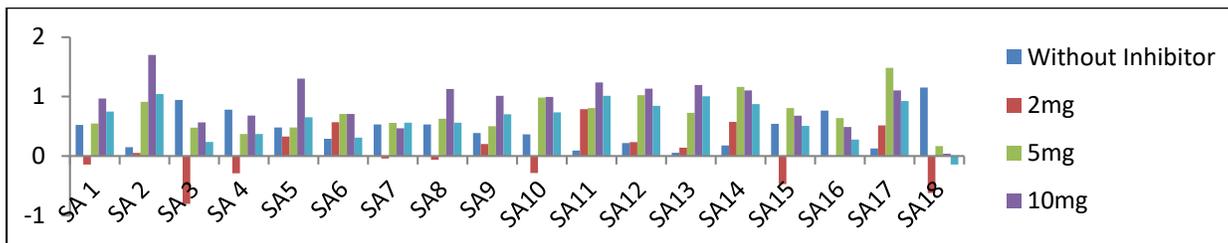


Fig 7: DHFR assay in presence of Ellagic acid

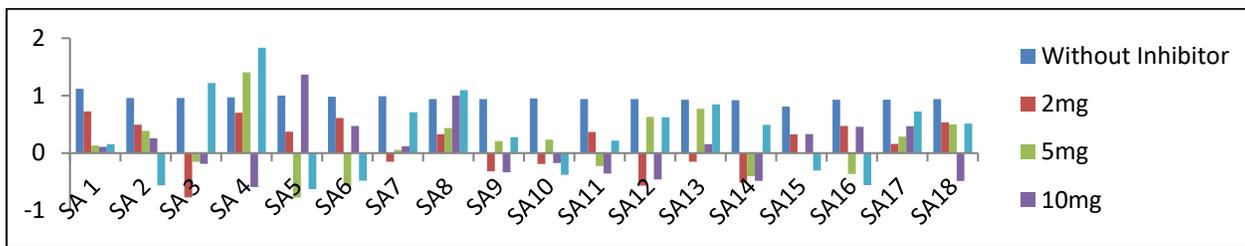


Fig 8: DHFR assay in presence of Gallic acid

Table 3: Specific activity of DHFR *S.aureus* isolates

Samples	Sensitivity towards TMP	Activity of DHFR (Units/mg protein)
Control	Sensitive	0.4146
SA 1	Resistant	0.52
SA 2	Sensitive	0.143
SA 3	Resistant	0.943
SA 4	Resistant	0.780
SA 5	Resistant	0.479
SA 6	Sensitive	0.291
SA 7	Resistant	0.532
SA 8	Resistant	0.538
SA 9	Sensitive	0.387
SA 10	Sensitive	0.366
SA 11	Sensitive	0.093
SA 12	Sensitive	0.217
SA 13	Sensitive	0.054
SA 14	Sensitive	0.177
SA 15	Resistant	0.543
SA 16	Resistant	0.763
SA 17	Sensitive	0.126
SA 18	Resistant	0.55

Since, the antibacterial assays and the DHFR activity assay showed promising results, it is appropriate to study the molecular aspects of DHFR from the TMP resistant clinical isolates of *S. aureus*. Hence, the plasmid DNA isolation was done for 18 *S.aureus* isolates.

PRIMER DESIGNING

The primers were designed for *S. aureus* DHFR with Tm 59.93 and 59.83 for forward and reverse primers respectively. *dfrA* is flanked by *thyE* and *psK1_p19* genes, and with the primers designed the expected amplicon size is 487bp for *S.aureus* DHFR.

PLASMID DNA ISOLATION

After isolation of plasmid DNA, it was run on 1.2% agarose gel and observed under UV transilluminator. The bands of plasmid DNA are shown in the figure below.

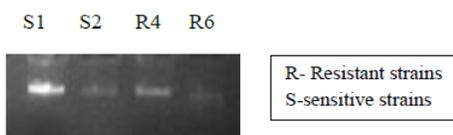


Fig 9: Plasmid DNA of *S.aureus* on 1.2% agarose

PCR AMPLIFICATION

PCR amplification was observed at an annealing temperature of 59.88°C for all *S. aureus* isolates. The PCR products were electrophoresed on 1.5 % agarose gel and the bands of the amplicon size at 487bp corresponds to *dfrA* of *S. aureus* respectively were obtained. Plasmid DNA for 4 samples of *S. aureus* was amplified. Following gel image shows the amplification result.

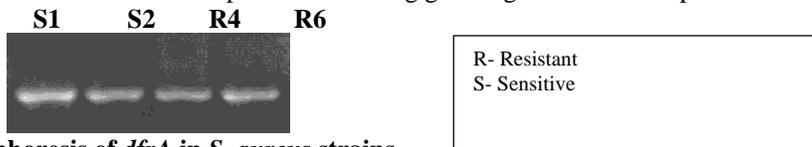
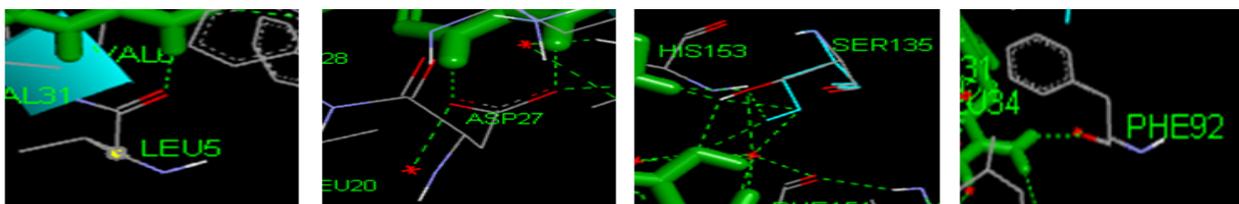


Fig 10: Agarose gel (1.5%) electrophoresis of *dfrA* in *S. aureus* strains.

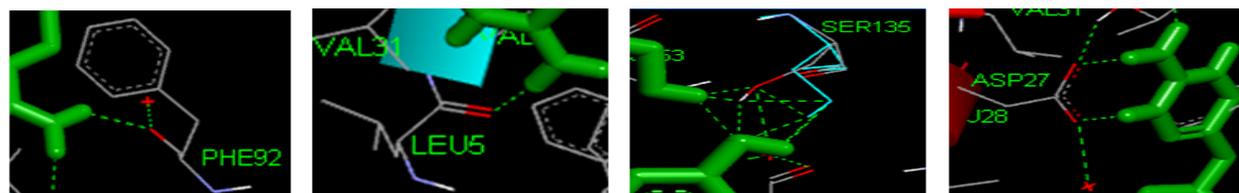
MOLECULAR DOCKING

Docking of various phytochemicals and antibiotics with DHFR of *S. aureus* was performed using various softwares viz., Discovery Studio visualize, AutoDock 1.5.rC2, etc. Phytochemicals which were used for docking were ellagic acid, gallic acid, quercetin, hippuric acid and chlorogenic acid. The antibiotic used for docking was TMP. The structure of *S. aureus* DHFR was obtained from Uniprot and was found to have four amino acids which may interact with its ligands

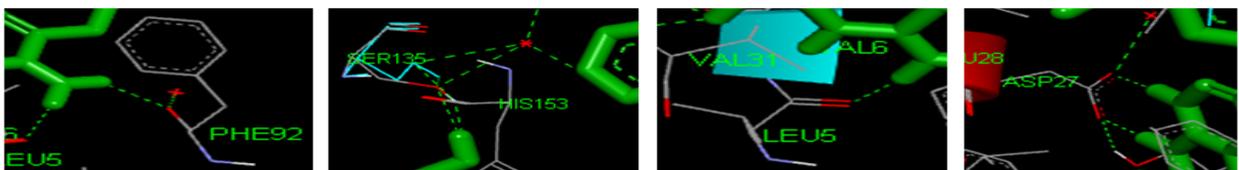
ELLAGIC ACID



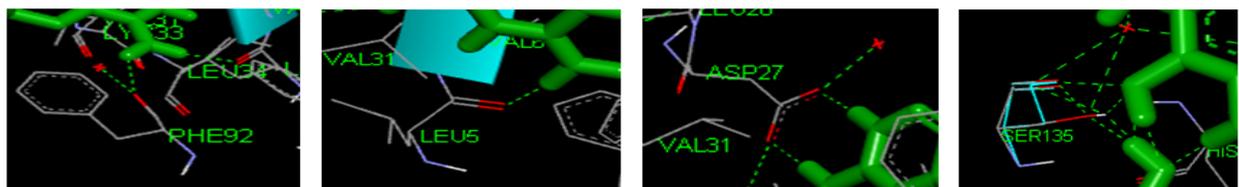
QUERCETIN



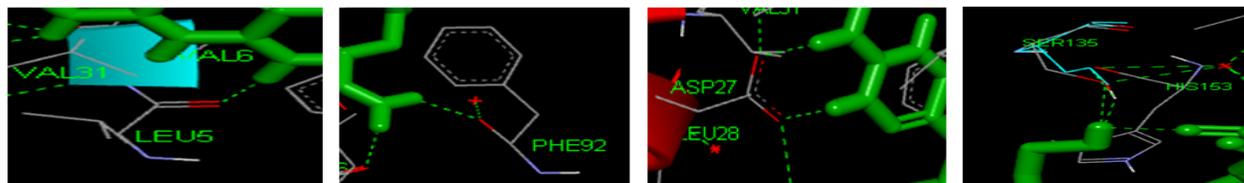
HIPPURIC ACID



GALLIC ACID



CHOROLOGENIC ACID



TRIMETHOPRIM

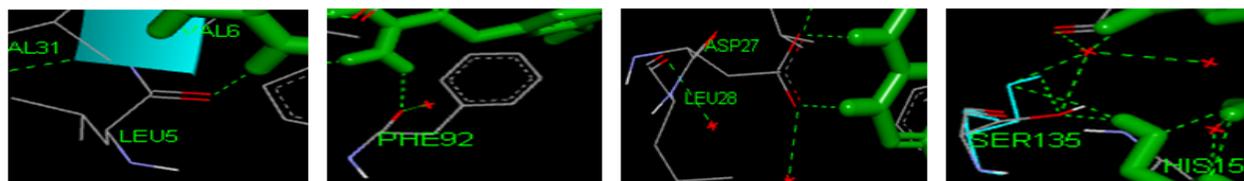


Fig11: Molecular docking images of DHFR with various inhibitors

Table 4: Binding energy of ligands with DHFR of *S.aureus*

Sr. no.	Ligand	Binding energy	Hydrogen Atom	Interacting Sites
1	Chlorogenic acid	-4.80	2	4
2	Hippuric acid	-4.78	1	4
3	Ellagic acid	-6.59	1	4
4	Quercetin	-6.50	2	4
5	Gallic acid	-4.64	2	4
6	Trimethoprim	-5.47	2	4

Most effective binding energy

Table 5: Interpreting values of ligplot of *S. aureus*

Interacting sites of Ligplot	Atoms	X-VALUE	Y-VALUE	Z-VALUE
Ligand-1:TOP				
Phe 92	O	12.163	1.254	14.122
Leu 5	O	9.180	0.498	11.939
Asp27	O	2.888	6.585	11.205
Ligand-2:EDO				
Ser 135	O	3.136	5.267	5.833
Average		6.841	3.401	10.774

The docking of phytochemicals and TMP clearly indicates that quercetin and ellagic acid have more –ve binding energy. The lower the dock score, higher is the affinity towards binding on the protein.

III. CONCLUSION

Urinary tract infection (UTI) is the second most common infection experienced by humans after respiratory and gastro-intestinal infections. Since the urethra is shorter in women when compared to men they are more prone to infections associated with the urinary tract. Although *E. coli* responsible for about 80 to 90 percent of infections, incidence of UTI due to *S. aureus* is usually considered as a secondary infection next to blood borne infections. Most common antibiotic treatment used against UTI is trimethoprim and cotrimoxazole for infective organisms like *E. coli*, *S. aureus*, etc.

Trimethoprim were tested individually against various isolates of *Staphylococcus aureus*. The study revealed that out of 18 isolates of *S. aureus*, 6 isolates were found to be resistant while 12 isolates were sensitive. Being a key enzyme in folate metabolism, it has been used as a drug target for treatment of various diseases as an antifolate target. This enzyme is targeted in UTI by trimethoprim and co-trimoxazole. In order to view the activity of DHFR in trimethoprim sensitive and resistant strains an activity assay of DHFR was carried out.

Activity of DHFR was found to be more in trimethoprim resistant samples as compared to sensitive samples. In order to know about the response of DHFR inhibitors towards the enzyme it requires the study of DHFR at molecular level.

Hence, Plasmid DNA of the clinical isolates of *Staphylococcus aureus* was processed for gene amplification with the help of primers designed for *dfrA* gene. PCR amplification results shows that bands of the amplicon size at 487bp corresponds to *dfrA* of *S. aureus* were obtained.

As there is a rise in MDR strains of *Staphylococcus aureus*, as is evident from the studies, it is necessary to look for new safe, cost-effective antifolate antibacterials from plants. Reviewing various literatures, the antibacterial efficacy of the phytochemicals was performed against *S. aureus* resistant and sensitive strains. It was found that some of the phytochemicals lead to an inhibitory action of TMP resistant bacteria.

Hence, Molecular docking studies were performed using software to elaborate the biological data obtained by our antibacterial assay of phytochemicals. The future prospective of the study involves the sequencing of *dfrA* gene and study of mutations if any, leading to development of plant based DHFR inhibitors as drugs.

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The Transformation Process of *Kawit* Carving as an Identity in the Regional Library

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Abstract- The purpose of this study is to explain the design process of Kawit carving into the identity of the North Kalimantan provincial library.

The design process used is *Divergence - Transformation - Convergence*. *Divergence* is the process of collecting data relating to the design using the *Literature searching* method and *Interview*. *Transformation* is the process of processing data with the design method of *transformation*, and *convergence* is the process of analyzing the results of the design carried out by the *check list* method.

The results of the analysis and data collection explain the elements of kawit carving that make their identity strong are the circular shapes in the middle and arches on each side, besides the methods that can be used in the transformation process are extended, broken down and reduced to produce building shapes.

Index Terms- Kawit Carving Transformation, Identity of Kalimantan Utara, Regional Library

I. INTRODUCTION

This article aims to explain the process and method of transformation to design a regional library with kawit carving as a design idea so that it can become an identity from the province of North Kalimantan.

A. Research Background

To be able to interact with the environment an architectural work is expected to be a reflection of the environment, so that the work can be an identity of the area where the object is built so that the values of the local culture are maintained into new forms, especially architecture.

To elevate and maintain the local identity of the object of this design, the form of Dayak Kenyah Kawit carving is used as a form to ornament on the architectural objects of the library that will be designed with the concept of identity that is present. This concept is an embodiment of regional identity that is adapted to the current situation, or renewed through a transformation process without reducing the values or meanings contained therein. The concept of identity that can be achieved can be achieved through the process of transforming forms, using materials, to modern structures.

The relationship that explains between Kawit carving and the library is the nature or philosophy of the two objects, the first is that the library is universal as a place to accommodate various kinds of information and is used by various groups and the Kawit carving philosophy as a reminder of unity among people from various circles especially amidst the rush of migrants who migrate to North Kalimantan.

II. LITERATURE REVIEW

A. Kawit carving

Kawit carving is an ornament with a curved and circular shape. Curved lines and circles take the basic motifs of fern plants or nails stylized in such a way that they do not resemble the original shape.

The existence of curved ornaments and interconnected circles in the Dayak Kenyah community became a symbol of the endless descendants of the Dayak people who could unite the Dayak community. Circle ornaments symbolize each of the Dayak chiefs and sub-tribes in Kalimantan. The ornament of this curved line and circle teaches about brotherhood.

To interpret this Kawit carving, it can be viewed in terms of semiotics which explains that a sign can be described through three levels of meaning, namely:

a) Definition of Denotation

The meaning manifested through the existence of curved and circular line ornaments is a symbol of the unity of all Dayak communities in Kalimantan as something that must be maintained. Curved lines are shaped like tendrils and ferns that grow in the forests of Borneo.

b) Meaning of connotation

The meaning to be conveyed through the ornament of curved lines and circles is as a symbol of all interconnected Dayak chiefs, intertwined with one another with lines that are connected to each other.

c) Social aspects

Curved lines and circular shapes symbolize descendants and every dayak chief in Kalimantan. The curved shape and inner circle of ornament are used as symbols of unity among Dayak people.

In ornamentation it is used as a reminder that unity among the Dayak people is important, especially when there are increasing numbers of migrant tribes and the influences they carry, as a reminder that they must also be able to maintain their traditions and characteristics amidst many external influences.



Fig. 1. Kawit Carving

B. Regional library

The Regional Library is a library located in the provincial capital which is given the task of collecting, storing, preserving and utilizing all printed works and recorded works produced in the area.

This design thesis chooses the North Kalimantan regional library to be the object of design, it aims to answer the issue of increasing the reading interest of the people of North Kalimantan, especially among SCA (State Civil Apparatus). The design of this library object is a plan of the local government to be built in the city of Tanjung Selor, Bulungan Regency, North Kalimantan so that it can become an icon of the city as the Provincial Capital and is expected to be a representation of the area where the library was built.

C. Theory of transformation

J.P Steadman in his book Architectural Morphology (1983) describes the method of geometry to explain the proportions of the human head and face.

This method begins by drawing a rectangle which is then divided by lines placed on parts of the face such as chin, eyes, eyebrows, nose and so on. This method explains how a different set of faces can be produced by changing the relative distance of the pattern of lines on the rectangle.

This method is also applied to the transformation process of kawit carving to get alternative designs that are able to become identities from the province of North Kalimantan.

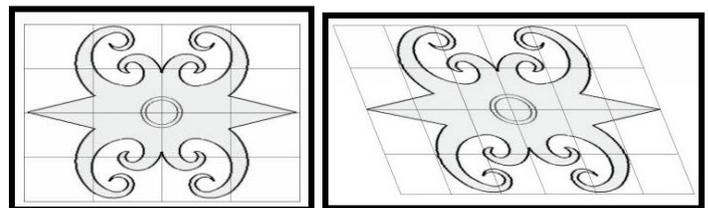


Fig. 2. Transformation with geometry methods

The next transformation uses several types of 'deformation' rectangular coordinate systems: on curva then simple enlargement or reduction is carried out, by stretching one or the other from the axis. In this way it illustrates how the evolutionary process of the same species can be produced through a simple transformation process.

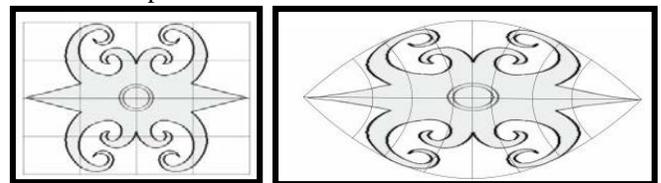


Fig.3. Transformation results with geometry shifts at the bottom

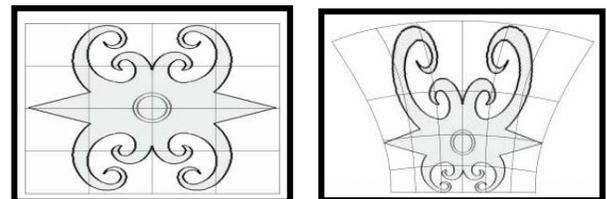


Fig. 4. The transformation results by forming curva on the side

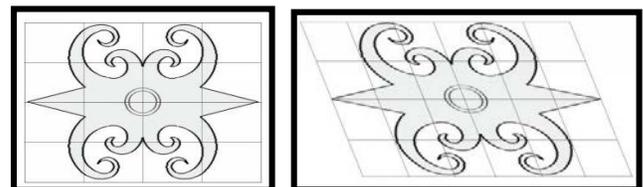


Fig.5. Results of transformation by forming curva at the top and bottom

a) In his book *Form, Space, and Order Architecture* D.K.Ching (1996) describes several theories that can be done in the transformation process, namely by:

a) Dimension changes

A form can be changed by replacing one or several dimensions and still maintaining its identity as a member of a form.

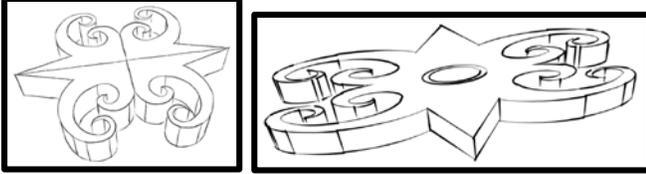


Fig. 6. Transformation results by changing dimensions

b) Change with reduction

A form can be changed by reducing a portion of its volume. Depending on the number of deductions, a form can maintain its original identity or be changed to another form.

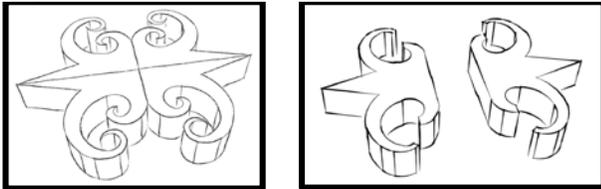


Fig. 7. Transformation results by means of reduction

c) Changes with additions

A form can be changed by adding certain elements to the volume of the object. The nature of the addition process and the relative size and size and added elements will determine whether the original form identity can be maintained or changed.

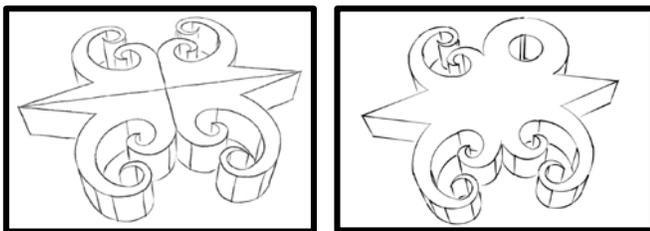


Fig. 8. Transformation results by adding shapes

d) Combining of geometric shapes

If two geometric shapes are different or opposite their orientation and penetrate each other's boundaries, then each form will compete to get supremacy and dominance visually.

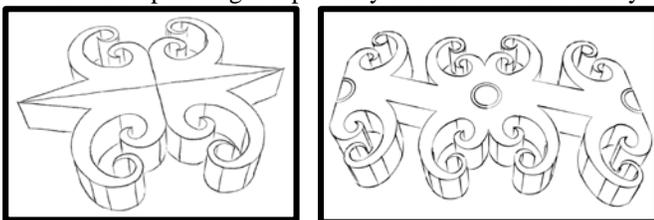


Fig. 9. Transformation results by combining forms

D. Theory of identity

According to Hartati (2013) in her writing that discusses National Identity and Regional Identity as National Unity: regional identity is a characteristic possessed by a region, philosophically dissecting the area with other regions. Based on this understanding, each region in Indonesia has its own identity in accordance with the uniqueness, nature, characteristics, culture, and character of the area.

In looking at the overall visual character, Berry (1980) mentions several physical elements related to the formation of building characters, namely physical elements in the form of:

- a) Shape / basic shape of the building itself
- b) Form windows and doors / openings
- c) Use of roof angle / roof slope
- d) Building materials
- e) Markers on buildings
- f) Building color
- g) Vertical elements
- h) And horizontal elements

In his theory, Shirvani (1985) mentions several physical elements related to the formation of visual characters, namely the shape and time of the building can include the quality related to the appearance of the building, namely:

- a) Building height
- b) Building severity
- c) Style
- d) Scale
- e) Material
- f) Texture
- g) Color
- h) Signage

From the results of the discussion above about identity, it can be concluded that identity is an important factor in an architectural approach that refers to locality and cannot be generalized and gives meaning to a place.

III. METHODOLOGY

The design process uses the method proposed by (Jones, 1970, Design Methods) about the design process of Divergence - Transformation - Convergence. The purpose of using this method is to adapt to the design situation where the problems in the design have not been clearly identified so that it requires the right design process to determine design problems until the completion of the design, besides that the methods used in this process support the exploration of design and collection data.

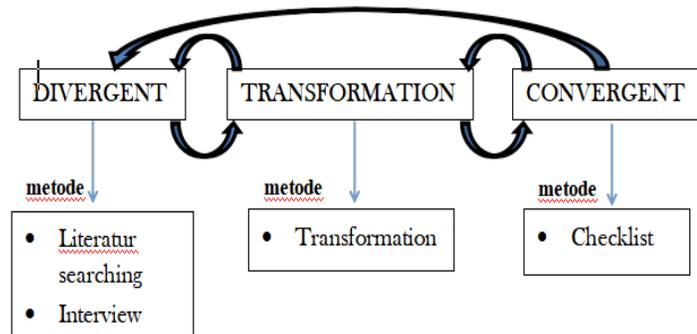


Fig. 10. Design Process

A. Divergent

In short, the Divergent process functions to rearrange or restructure existing problems by identifying parts of the design situation, this allows for a better change in problem solving.

a) Literature Searching

This method is to find useful information that can affect the output of the designer without costing and delaying work.

This method is done by searching literature data related to design objects, related concepts, related theories, locations, and other aspects that will affect the design results.

b) Interviewing Users

Search for information about objects that are explored that are only known by users, certain sources or information that is limited in nature.

In this method, conduct interviews with speakers related to Kawit carving material, history, and the meanings contained therein later.

B. Transformation

This process is the stage of making patterns from the data that has been collected. The purpose of this process is to process the results of the data collection process and transform it into a concept. At this stage, the implementation of schemes and

concepts becomes a more concrete form. The output can be a collection of images that can be understood. The rational method is used in this stage to make the design scheme form a more detailed architectural physical form.

a) Transformation

Transformation methods can be interpreted changes from original objects into new objects. Both changes that do not have or show similarity or similarity with the original object, or new changes that still show the instructions of the original object. Either by sliding, cutting, reduced and added in certain parts.

C. Convergent

The last part of these three processes is convergent, the purpose of the design is to progressively reduce uncertainty until only one of the many possible alternatives is chosen and secondary alternatives left as the final solution to be used.

a) Checklist

The method used in this process aims to enable the designer to use knowledge of requirements that have been found to be relevant in the same design situation.

IV. ANALISYS AND CONCEPT

a. Konsep Ide Bentuk

To maintain the values of local culture on the object of this design must be determined a concept that can accommodate local values with modern so that it becomes an attraction for a library and regional icons. From this goal a concept is defined which is the identity that is present. This concept is an embodiment of regional identity that is adapted to the current situation, or renewed through a transformation process without reducing the values or meanings contained therein. This concept can be achieved through the process of transforming forms, using materials, to modern structures.

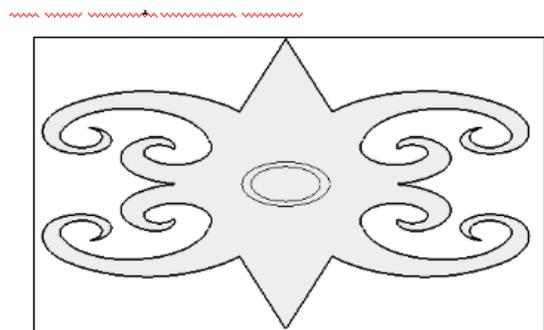


Fig. 11. The concept of building shape ideas

The part of the picture above undergoes proses of change by extending to the engraving section, then the part is broken down and moved so that it becomes like the image below.

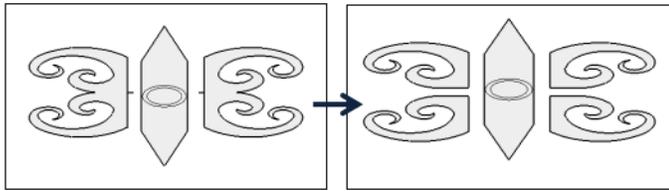


Fig. 12. Change by breaking down the kawit carving

From the changes in Figure 14 a reduction is made and broken down in the form of carvings, then in the middle part of the circular carving changes the scale to be bigger in figure 15.

This section will be the center of the building's shape which is a result of transformation with a symmetrical shape.

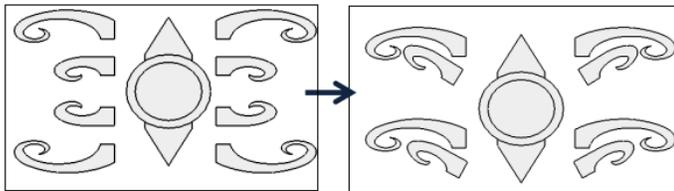


Fig. 13. The shape of the enlarged circle is then moved

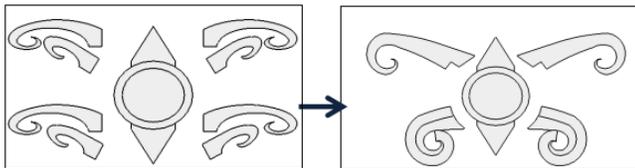


Fig. 14. The displaced form is then added to the inner side

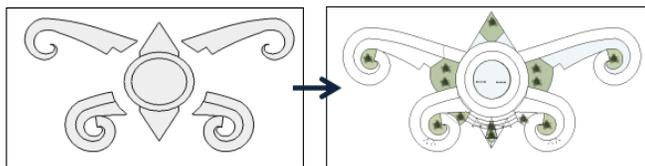


Fig. 15. The process of combining the form and surrounding environment

b. Konsep Ruang Luar

The concept of outer space uses a form of transformation results separated by the D.K Ching method. The whole form is separated into several parts, then the curved shape of the carving is separated from the whole shape. The results of the separated form are processed by shortening the ends and then being used on plants that limit the parking area and park on the edge of the site.

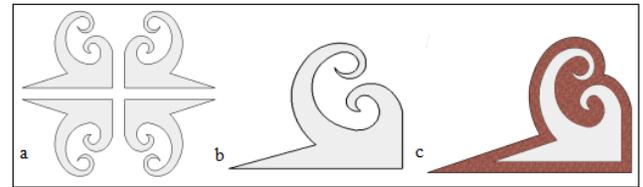


Fig. 16. The transformation process is separated

This form serves to cover the tree area on the site with the type of boxwood plant to make it easier in the pruning process in accordance with the desired shape.

c. Konsep Fasad

Changes to this form of kawit carving have become more complex to maintain the identity of this carving which then changes to the function and material, which was originally an ornament on the wall then used as sun shading, then the initial material which is wood in this design using aluminum composite panels.

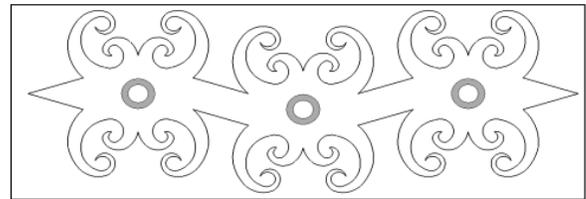


Fig. 17. Transformation with the addition method

Forms that have undergone a transformation by combining are then transformed again by being separated, reduced and added to produce more complex formations to form an ornate carved whole.

Fig. 18. Transformasi dengan metode penambahan dan pergeseran

Fig. 19. Transformation on the parts of sun shading

The results of this transformation process are more complex because each form on the carving undergoes a transformation and is then combined into one part taken from the basic form of kawit carving.

The results of the transformation are then applied to the facade with a parametric method, from the basic square shape that is perforated with different sizes then made by becoming gradations from solid parts to transparent parts.

V. RESULT AND DISCUSSION

A. Aplikasi Bentuk Bangunan

The forms of kawit carvings that have been transformed are implemented in buildings through building forms, floor plans and circulation, facades and outer space. In addition, it explains about space zones in buildings that are divided into public zones for visitors and private zones for managers.

In realizing this carving as an identity in the library, there are several parts of the building that can show the identity of kawit carvings, including buildings that maintain the curved shape of kawit carvings, with some changes but do not eliminate their identity.



Fig. 20. The look of the building that shows the shape of the kawit carving



Fig. 21. Implementation of curved shapes from kawit carvings on buildings

VI. CONCLUSION

The processes carried out to achieve the objectives of this design are generally summarized into several points, among others :

1. Collect data about design objects, namely kawit carvings and regional libraries. The process of collecting data is done by the literature method searching and interviewing users.
2. Perform a design process with a transformation method that produces the identity of kawit carvings through the shape of the building, parametric patterns of facades, patterns in outer space, and imagery of facades into buildings.

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Value Chain Analysis in Domestic Aquaculture: Case Study of Swamp Eel (*Monopterus Albus*) Culture in An Giang Province, Vietnam

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Abstract- Unbalance income distribution among actors of value chain has been concerned in a recent year. This study was carried out to map the distribution channels, and to clarify cost-benefit distribution among nodes of value chain of swamp eel in An Giang province. A total 302 stakeholders who are involved in value chain were interviewed in dominant areas of swamp eel culture in An Giang province. The survey results show that eel products are consumed via 5 marketing channels, of which, the traders distribute 84.4% of eel products but farmers create low profitable margin ratio. Eel farmers purchase products to wholesalers could get the highest price (\$6/kg). Channel of export generates the highest net added value at \$4.1/kg. The highest profitable margin ratio of farmers is found in the channel of farmer → wholesaler → supermarket/wholesale market (107.7%/cycle). In conclusion, there is requirement in sharing risks and net profits throughout the chain throughout development the linkage model in production chain from input to output to improve efficiency and sustainable production.

Index Terms- Added value, value chain, swamp eel, An Giang.

market as tasted and rich of nutritious (protein accounts for 18.4%) [5]. However, the current model of eel farming in An Giang province is still facing many difficulties, such as lack of breeds, feeding by trash fish, and diseases [6]. The challenges come from distribution channels as they resulted in significant difference between the actors participating in the chain. There are many intermediaries participating in the chain and incurred additional costs in production and business. Some previous studies on the value chain in the fisheries sector identified that the high gap in selling price from farmers to consumers is due to lack of linkages among actors in the product value chain [7, 8, 9]. Therefore, research on eel value chain in An Giang province is necessary. At the national/local level, as the dominant participation of the poor in the value chain, the low amount and value of products that the poor sell in the value chain, and unbalance distribution of income in compare to other actors are presented clearly [10]. The objective of this study is to analyze the current status of the eel value chain by mapping the marketing channels and clarifying profit distribution among actors, thereby proposing solutions for improving efficiency of entire value chain of eels in An Giang province.

I. INTRODUCTION

The Vietnam's aquaculture has increased sharply in a recent year, producing 3.86 million tons over 1.1 million ha, and perceiving \$6.7 billion export value in the year of 2017 [1]. This important role is due primary to freshwater aquaculture, especially *Pangasius* catfish in the Mekong Delta. Since growing in food safety and quality of the international customers, aquaculture certification has emerged as one of governance tools. However, current certification are not appropriate for small producer level because criteria are not viable at this scale [2]. Small-scale producers are trying to diversify production by variety of species which more appropriate to their capacity, relying primarily on their own land. The similar situation happen in An Giang province where locates in the Mekong Delta. The province ranks 4th in area (3,406 km²) and the most crowded population (2.2 million people). Apart from *Pangasius* catfish, the industry turned to industrial and highly intensive production. Swamp Eel (*Monopterus Albus*) is one of species that has been growing strongly in recent years. Eel farming area in 2015 was 21.03 ha, producing 1,067 tones [3, 4]. Eels have a stable consumption

II. MATERIAL AND METHOD

A. Study Sites and Field Survey

Fig 1 shows the map of An Giang province, specifically districts where field research was conducted from September 2017 to October 2018. Semi-structured questionnaires were used for interview in selected districts and city in An Giang province. The question focused on production, operation, and how they purchase their products. Financial indicators such as selling price, production costs, and revenue were main dimensions. Interaction among actors, input suppliers, buyers, and other actors of the value chain also was necessary for the study. Stakeholders' perceptions and knowledge on situations, problems that they found and future perspectives were recorded carefully during the interviews. The discussion and analysis were developed involved in the study based on stakeholders' answers, therefore, participation of stakeholders and reposal in their answers are driven for the results. For that reasons, working through fisheries authorities is very essential while doing field observation. Local leaders play their role in introducing potential stakeholders who are willing to

participate in the research. Initially, the authorities gave a list of eel farmers who are currently culture such species. The authors and staff work together to pick out potential stakeholders for interview. In additionally, respondents were asked to identify other potential respondents whenever possible. By following this

B. Data Processing Method and Analysis

The collected primary data were cross checked through multi-informal conversation to observe participants' behaviors before entering and coding in the computer. Descriptive statistical methods are used to calculate the mean, standard deviation, variance, maximum, minimum, frequency, and percentage values. These number and figures are very important to represent for the overall. Analyse value chain is reasonable complex and vary points of views. Mapping the value chain using tool 2 provided by Berg et al (2003) in "Making Value Chains Work Better for the Poor: A toolbox for Practitioners of Value Chain Analysis" [10]. Tool of mapping the value chain was created to comply with three goals: 1) Better understanding connections between actors, 2) Demonstrate interdependency, and 3) Look beyond people involvement in the value chain. To analyse costs and margins distribution among actors mapped in the value chain, tool 3 in this toolbox was referred together with other guidelines and toolbooks, such as Becker, Tram, and Tu (2009); Kaplinsky and Morris (2003) [12, 13]. Loc and Son (2016) adapted from these guidelines and toolbox, and giving suggestions for the costs and profits analysis in the value chain as follow [14]:

+ Added value = selling price - buying price/total cost

+ Net added value (or profit) = added value - additional costs

+ Intermediate costs of eel culture farmers include costs of breeding, feeds and fuel (electricity, water and petrol); pond improvement; perishable materials and items, prevention and treatment and loan interest payments.

+ Additional costs of collectors, traders, wholesalers, and supermarkets include transportation cost, family and hiring labors, asset depreciation, and fuel costs.

Exploratory study for qualitative data through SWOT analysis was conducted to analyze strengths (Strengths), weaknesses (Weakness), opportunities (Opportunities) and challenges (threats) on the linkages among actors in the value chain.

III. RESULTS AND DISCUSSION

A. Description and Function of Actors Involved in Swamp Eel Value Chain

In the first objective of the study, we identified stakeholders involved in the value chain and their functions in the whole chain. The results show that eel aquaculture industry is a combination of functions and services by 5 actors like eel growing farmers, local traders, eel wholesalers, product retailers, super markets and wholesale markets (Fig. 2) in order to distribute products from farm-gate to the ready ultimate customers both domestic and

"snow-ball" sampling method, a total 302 holders involved in eel value chain were interviewed over the province, including 30 feed and drug suppliers, 32 breeding and nursing sites, 180 culture farms, 58 traders and wholesalers, 2 Supermarkets (Table 1).

export. Beside activities involved to transfer of goods through buying and selling functions, feed and drug suppliers, and breeding and nursing sites are functional agents of input suppliers for aquaculture.

Traders of feed and drugs for eel culture is functional agent of input providers for production. Survey results show that each trader yearly provides 3.5 tons for eel culture. Currently, dedicated feed for eel farming has not yet produced in Vietnam, therefore, feed of *Pangasius* catfish (protein content of 30-35%) is used alternatively. The average revenue of feed and drug trader is around \$11,2725/year, corresponding to the profit of \$2,941/year and the profit margin rate is 19.8%.

Eel breeding and nursing sites play an important role in providing eel breeds to commercial eel farmers. Breeding production in An Giang province is operated small-scale with averaged 5 pairs of eel brookstocks/production cycle, equivalent to 25-30 pairs of broodstocks/year. The productivity of eel breeds is about 144.6 heads/m²/cycle with the average size being 362 heads/kg. Breeding and nursing sites need production cost of roughly \$22.3/m²/cycle, corresponding to the production cost per breeding head being \$0.15. Selling price of eel breed is \$0.28/head. Hence, average income of breeding and nursing site is \$41.3/m², and net profit is \$19.3/m².

Eel farming households are key pleyer in the value chain as they are primary production. Furthermore, since then, completed products are transferred, and added value is created [14]. The average farming area is 150 m²/household. The farmers practice relatively appropriate stocking density of 61.8 heads/m². The farming period is 256 days/crop, and production could reach 7.8 kg/m², equivalent to 1.4 tons/household/year. Over 63% of eels can survive after stocking. At the point of harvest, commercial eels of type 1 (>200 grams/head) accounted for 70.6% of total harvested eel production. The total cost is a combination of operational cost and fixed cost [15], which is \$24/m²/cycle, equivalent to the production price of \$3.1/kg, which are comprised of feed cost. The farmers sell their products at \$6.1-7.6/kg, and generate a total added value, i.e. net profit of \$3.0-4.5/kg.

Traders have intermediary roles of buying eels from farmers and selling products to wholesalers, and/or to retailers at the local market. This sub-sector works efficiently with the average purchase and sale volume being 12-14 tons/year. They purchase at the price of \$6.1/kg. The additional costs include transportation, ice, labor, transaction fee, etc., being about \$0.15/kg. As they do not take ownership of products, the additional costs exclude purchase price. The added value or net profit is \$0.38/kg.

Eel wholesalers have functions of purchasing products from both traders and farmers. After that, they transfer products for retailing in the in-province supermarkets, other wholesale markets in Ho Chi Minh City and export. The purchasing volume of each

wholesaler is 300 tons/year. The average purchasing price is \$6.64-6.67/kg. Additional costs per kg are \$0.15-0.24, so value added per kg is \$0.68-0.8, which generate profitable margin ration being 3.4-4.4 times.

Small-scale retailers who sell eels at local markets have the function of direct sales to local consumers. Their sales are taking place from retail stall hired at the local market. The average operation volume is small it just 0.3-0.8 tons/year as the household-run business, with the input price of \$6.67-7.59/kg, and selling price is \$0.5-1.5 higher than buying price. After reducing the additional cost (at only \$0.05-0.06/kg), the retailers earn \$0.45-1.45/kg, and the profitable margin ratio is 7-22 times.

Availability of eel products in the supermarkets in the province is an emerging new phenomenon of aquaculture value chain. The majority of eel products in the supermarket system in An Giang province come from wholesalers at the price of \$7.6/kg, and after that reselling to final consumers in the province at a high price of \$9.86/kg. This difference in selling price as the aquatic product in the supermarkets are frequently better quality and more freshness [16]. An average purchase volume is 32 tons/year of each supermarket. The additional costs are \$0.43/kg, and earn net added value of \$1.88/kg, which create profitable margin being 4.4 times..

B. Mapping Marketing Channels of Eel Products

Mapping marketing channels were taken into account after recognition key players in the chain. Marketing channels are various routes of product flows from raw material to final product [17]. The flows that goods, services or information go through make mapping channels be complex and difficult. Of which, mapping the volume of products passes on number of actors can be quantified [10]. We mapped and quantify the eel products in the value chain in the study site as follow (Fig. 2).

The information in the Fig shows that eel products go through many channels and five dominant channels are displayed in the Table 2. More than 88% of eel harvested is sold to traders before passing on other actors. Because a typical characteristic of freshwater aquaculture is small-scale and year-round, traders are very functional in collecting products from fragmented farms and low quantity [16]. From this node, 73% is passed on wholesalers and subsequently purchased by retailers, wholesale markets in Ho Chi Minh city. Only a small portion at 15.3% is sold to retailers before be consumed by local consumers. The wholesalers buy fresh eel products directly from large-scale farms at 11.6% of input amount. It is better for them to buy products from traders as this intermediary gather product and classify to what extent. After that, 49% goes to domestic customers via retailers and supermarkets. Only 3.3% of eel product is exported and this channel is the shortest channel. Farmers, traders, wholesalers, retailers and wholesale market in Ho Chi Minh city are the vital intermediaries and operate the value chain because they generate and constitute the major net profit of the chain.

C. Economic Analysis among Different Actors in Major Marketing Channels

Channel 1: Eel Farmer → Trader → Retailer → In-province consumption

According to channel 1, eel products are passed on three players before being consumed by local customers within the province. The actors generate the total value added of \$4.03 per kg, of which farmers could create the highest value, at \$3.05/kg (accounting for 75.8% of the total added value of the whole chain). It is followed by traders, at \$0.53/kg (accounting for 13.2%), and retailers make the lowest added value of \$0.38/kg (accounting for 11.0%). As regard the net profit or net added value, the actors involved in the chain earn \$4.25/kg. Of which farmers receive the highest net profit, while retailers earn net profit amount at approximately \$0.38 per. As the highest additional costs that traders spent for products, they earn the lowest profit/kg. From the analytical results in the Table 3, the highest profitable margin ratio per production cycle belongs to eel culture farmers (92.0%), followed by traders (6.0%), and retailers (5.7%). Because raising eels requires a long production cycle, at 9-10 months, the cycle of capital flow is long, and it carries high risk. While traders and retailers have short cycle of capital turnover (1-2 days), and less risk in production. This proves that the net profitable margin ratio of eel farmers is lower than other actors in channel 1 if considering a whole production cycle.

Channel 2: Eel Farmer → Trader → Wholesaler → Retailer → In-province consumption.

This is the longest chain of eel products with five actors involved in the whole chain. Therefore, the total value added of channel 2 is high as selling price be jumped gradually in each node of the chain. Of which farmers generate the greatest added value, accounting for 50.8% of whole chain. It is followed by retailers who contribute 25% of added value. Wholesalers and traders create added value of 15.4% and 8.9% of the whole chain, respectively. Similarly, the net added value of the whole chain and profitable margin ratio are shared un-equivalently among actors at proportions being like added value.

Channel 3: Eel Farmer → Wholesaler → Supermarket → In-province consumption

Only 11.6% of original products is consumed via this channel. Such channel generate the greatest net added value at \$6.09/kg, of which the highest net value is received by farmers (56.5%), followed by supermarkets (30.4) and the owner receives the lowest net value in the channel this (13.1%). According to this channel, eel farmers have the highest rate of profit (107.7%). As the participation of supermarket in retail market, the value added is much increased. Such player shows their function in packaging and displaying products [16], hence, additional cost of supermarket is the highest at \$0.42/kg.

Channel 4: Eel Farmer → Wholesaler → Wholesale market → In-province consumption

This channel passes 32.3% eel products to consumers, and generates added value of \$4.87/kg. Of which, farmers create the highest added value, at \$3.55/kg, accounting for 72.9%, the lowest

added value per kg is generated by wholesale market, accounting for 19.6%. The net added value of the whole chain is \$4.44/kg, of which the highest net added value is received by the farmers (77.5%), followed by the wholesalers (16.2%), and the lowest is wholesale market (6.3%). In terms of profitable margin, eel farmers have the highest ratio (107.7%).

Channel 5: Eel Farmer → Wholesaler → Export

This is the shortest channel of the value chain with two actors, i.e. eel farmer and wholesaler before going to be consumed globally. The total net value-added of the whole chain is \$4.10/kg, of which farmers receive 73.7%. For this channel, eel farmers have the highest rate of profitable margin (103.4%), and the wholesalers have a profit margin of 11.8%.

In summary, eel farmers who sale their products to wholesalers receive the highest profitable margin ratio than selling to traders. Considering to net added value, consuming through supermarket generates the highest value up to \$6.09 per kg. The majority of value chain analysis focuses to improve profit of farmers, and be onward upgrading efficiency of whole chain [10]. The study shows that this figure ranges from 54 to 80% of whole chain, the very high sharing of farmers in net added value in comparison to other value chains of freshwater species such as snakehead fish (30%) [18], black tiger shrimp (70-80%) [8], white leg shrimp (30-40%) of net value [19].

D. Vertical and Horizontal Linkages among Actors in the Eel Value Chain in An Giang Province

Collaboration in breeding and supplying: 65.6% of eel breeding producers has collaborates in producing and consuming of eel seeds. Among them, 71.4% of eel producers have been associated with the seed traders who collect eel seeds for nursing before selling directly to farmers. Meanwhile, 19.0% of breeding producers has linked to commercial eel farming households to sell eel fry. Especially, 4.8% of breeding producers collaborate to scientists in research and improving breeding process. In addition, there are 4.8% of them is in collaboration to relevant authorities in order to transfer technique and train farmers in application of VietGAP certification in eel breeding.

Primary production, eel farmers, is key node in linkage network of the value chain via input – output dimension [12]. Around one third of farmers has collaborated to input suppliers such as feed and drug suppliers, seed providers. More than 24% of them has good relationship to intermediaries in order to pass products to final consumers. In which 5% of the linkages is formalized via signing contracts of selling to traders. Farmer organization is one of good arrangement to link small-scale farmers and on behalf of the interests of farmers [20]. There are 31% of commercial eel farming households who are cross-linked together (horizontal linkages) in information sharing, and application of VietGAP standards through cooperatives and farmer clusters.

E. Advantages and Disadvantages of Eel value Chain

The value chain of eel products depicted several constraints and opportunities. The field study, therefore, organized several structured SWOT analyses, gathering different stakeholders together in different functions. Analysis of SWOT matrix and propose solutions for developing linkages of commercial eel farmers with the actors in the value chain are presented in Table 8.

These are in generalized forms like threats and weaknesses in eel value chain with key actors, e.g. farmers and other intermediaries in former case, and infrastructure development, increased input supplies and value addition in the later. However, value chain study alone can't dissect the entire industry to understand all sorts of constraints and opportunities under holistic approach [21]. The table of SWOT matrix above show several suggestions for the better eel production in order to stabilize and enhance linkages between commercial farms and other actors. These solutions focus on major problems as below:

- It is necessary to have policies to encourage the consumption of commercial eel through consumption contracts between commercial eel farmers and wholesalers or supermarkets. Especially, such contracts must be associated with safe and clean production models, non-residues of antibiotics, ensuring food safety and hygiene (e.g. VietGAP). Besides, it is necessary to orient to processing or preliminary processing to export commercial eel to some international markets
- It is necessary to have a policy to support development of vertical links between input providers such as feed, aquatic medicine and seed supply in the commercial eel farming. This policy should focus to control the quality of input components in the process of eel farming according to clean production standards such as explicit origin of feed and drug, and be included in the approved list of the authorities. Breeders must be quarantined to ensure quality and strict disease control.
- Encourage to implicate advanced science and technique in production such as clean eel farming model that manage environment better.
- Allocation credit policies as well as investment funds in order to support production capital with preferential interest rate for eel farmers, and implication of programs and projects of linkage formation in production chains from input to export processing.
- The State needs a stage of trade promotion to increase the export of eel products to the international market.

IV CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

There are 5 main distribution channels in the eel value chain in An Giang province. Of which, 84.4% of products is consumed via traders, and 11.6% is passed through wholesalers. The majority of eel products is consumed domestically.

Direct selling to wholesalers brings farmers higher financial efficiency (profitable margin ratio of 103.4-107.7%) than selling to traders (92.2%).

Distribution of net profit among actors in the value chain is uneven and unreasonable. The shortcomings in the current value chain are: (i) Low capacity to link among actors in the chain (vertical links), as well as among the actors involved in the value chain (horizontal links); (ii) High production costs and unstable markets; (iii) Low diversified value added products, and export markets has not been focused.

B. Recommendations

The Government and related authorities need to consider to build typical link model across the chain to improve production capacity and stabilize eel production for actors throughout the whole chain. It is necessary to invest in science and technology for processing value-added products of eels as well as to pay attention on trade promoting to expand export markets including fresh and processing value added eel products.

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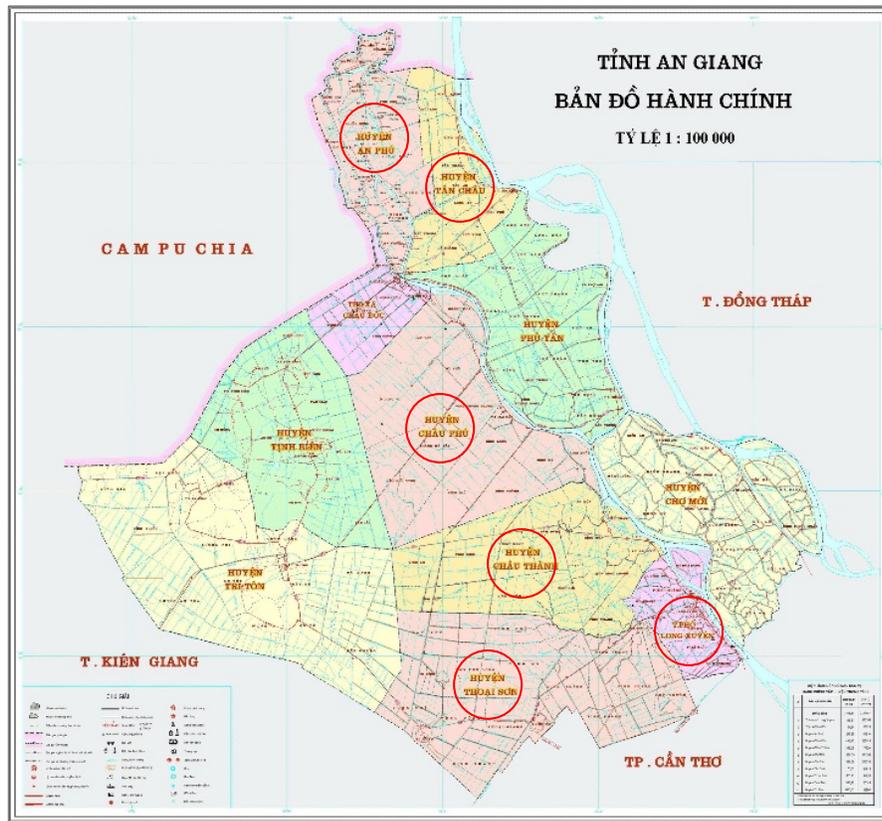


Fig. 1. Map of An Giang Province Shows Location of Field Survey
 (Source: People Committee of An Giang, 2018) [11]

Table 1. Study Sites and Distribution of Respondents

Stakeholders	Feed & drug suppliers	Breeding & nursing sites	Culture Farmers	Traders & wholesalers	Super market	Total
Long Xuyen city	7	2	30	10	2	51
Chau Thanh	5	15	30	10	-	60
Thoi Son	5	30	10	-	45	
An Phu	5	15	40	10	-	70
Chau Phu	3	-	20	10	-	33
Tan Chau	5	-	30	8	-	43
Total	30	32	180	58	2	302

(Source: Field survey, 2018)

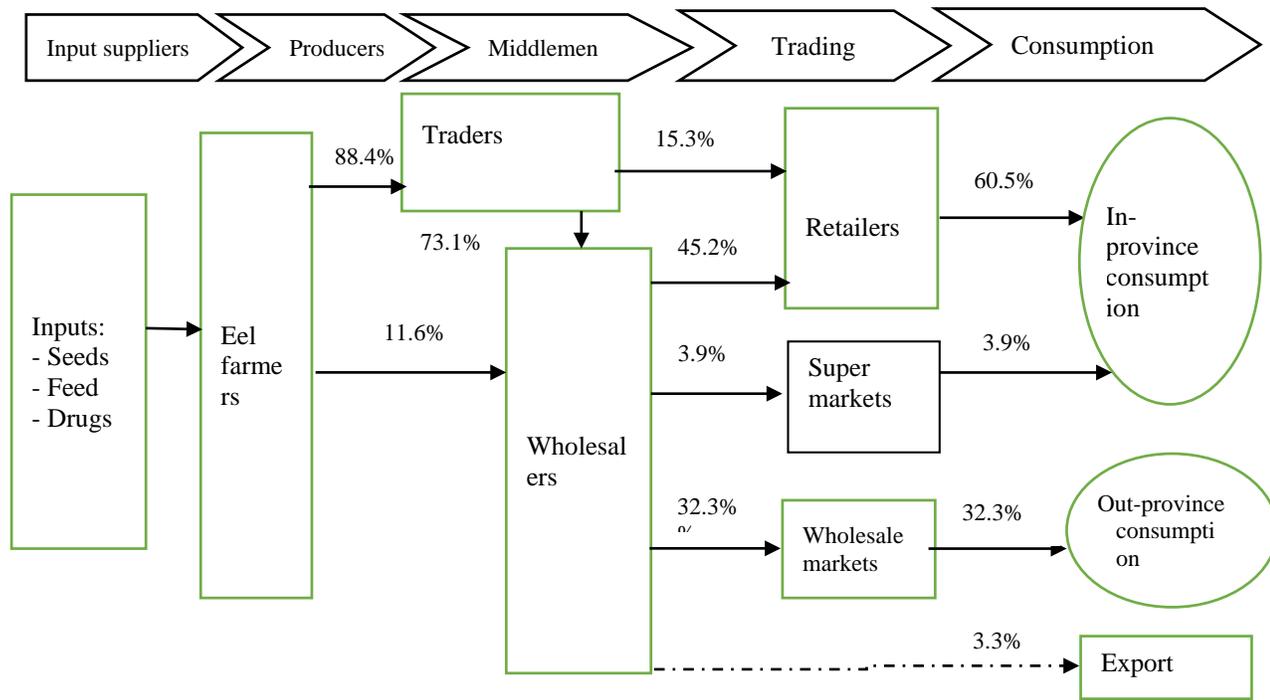


Fig. 2. Mapping the Distribution Channels of Eel Value Chain in An Giang Province

(Source: Developed by authors, 2018)

Table 2: Marketing Channels of Eel Products Crossed Key Actors

Channel – 1	Eel Farmer → Trader → Retailer → In-province consumption
Channel - 2	Eel Farmer → Trader → Wholesaler → Retailer → In-province consumption
Channel – 3	Eel Farmer → Wholesaler → Super market → In-province consumption
Channel – 4	Eel Farmer → Wholesaler → Wholesale market → Out-province consumption
Channel – 5	Eel Farmer → Wholesaler → Export

(Source: Developed by authors, 2018)

Table 3: Cost-profit Distribution in Channel 1

Indicators	Farmer	Trader	Retailer	Total
Revenue/selling price (\$/kg) (I)	6.14	6.67	7.11	
Total cost (\$/kg) (II = III +IV)	3.20	6.29	6.73	
Intermediate cost/buying price (\$/kg) (III)	3.08	6.14	6.67	
Additional cost (\$/kg) (IV)	0.11	0.15	0.06	0.33
Added value (\$/kg) (V = I – III)	3.05	0.53	0.45	4.03
% Added value	75.80	13.20	11.00	100
Net profit/net added value (\$/kg) (V-IV)	2.94	0.38	0.38	3.70
% net added value	79.50	10.20	10.30	100
Profitable margin (net added value/Total cost) (%)	92.00	6.00	5.70	

(Source: Developed by authors, 2018)

Table 4: Cost-profit Distribution in Channel 2

Indicators	Farmer	Trader	Wholesaler	Retailer	Total
Revenue/selling price (\$/kg) (I)	6.14	6.67	7.59	9.09	
Total cost (\$/kg) (II = III +IV)	3.20	6.29	6.90	7.65	
Intermediate cost/buying price (\$/kg) (III)	3.08	6.14	6.67	7.59	
Additional cost (\$/kg) (IV)	0.11	0.15	0.24	0.05	
Added value (\$/kg) (V = I – III)	3.05	0.53	0.92	1.50	6.01
% Added value	50.80	8.90	15.40	25.0	100.0
Net profit/net added value (\$/kg) (V-IV)	2.94	0.38	0.69	1.44	5.45
% net added value	54.00	6.90	12.60	26.50	100
Profitable margin (net added value/Total cost) (%)	92.00	6.00	9.90	18.90	

(Source: Developed by authors, 2018)

Table 5: Cost-profit Distribution in Channel 3

Indicators	Farmer	Wholesaler	Supermarket	Total
Revenue/selling price (\$/kg) (I)	6.64	7.59	9.86	
Total cost (\$/kg) (II = III +IV)	3.20	6.79	8.01	
Intermediate cost/buying price (\$/kg) (III)	3.08	6.64	7.59	
Additional cost (\$/kg) (IV)	0.12	0.15	0.42	
Added value (\$/kg) (V = I – III)	3.56	0.95	2.27	6.78
% Added value	52.40	14.10	33.50	100
Net profit/net added value (\$/kg) (V-IV)	3.44	0.8	1.85	6.09
% net added value	56.50	13.10	30.40	100
Profitable margin (net added value/Total cost) (%)	107.70	11.80	23.10	

(Source: Developed by authors, 2018)

Table 6: Cost-profit Distribution in Channel 4

Indicators	Farmer	Wholesaler	Wholesale market	Total
Revenue/selling price (\$/kg) (I)	6.64	7.59	7.95	
Total cost (\$/kg) (II = III +IV)	3.20	6.87	7.67	
Intermediate cost/buying price (\$/kg) (III)	3.08	6.64	7.59	
Additional cost (\$/kg) (IV)	0.11	0.24	0.08	0.43
Added value (\$/kg) (V = I – III)	3.55	0.95	0.36	4.87
% Added value	72.90	19.60	7.50	100
Net profit/net added value (\$/kg) (V-IV)	3.44	0.72	0.28	4.44
% net added value	77.50	16.20	6.30	100
Profitable margin (net added value/Total cost) (%)	107.70	10.40	3.70	

(Source: Developed by authors, 2018)

Table 7: Cost-profit Distribution in Channel 5

Indicators	Farmer	Wholesaler	Total
Revenue/selling price (\$/kg) (I)	6.50	7.59	
Total cost (\$/kg) (II = III +IV)	3.20	6.79	
Intermediate cost/buying price (\$/kg) (III)	3.08	6.64	
Additional cost (\$/kg) (IV)	0.11	0.15	0.26
Added value (\$/kg) (V = I – III)	3.42	0.95	4.37
% Added value	71.60	28.40	100
Net profit/net added value (\$/kg) (V-IV)	3.30	0.8	4.10
% net added value	73.70	26.30	100
Profitable margin (net added value/Total cost) (%)	103.40	11.80	

(Source: Developed by authors, 2018)

Table 8: SWOT matrix of eel industry in An Giang province

SWOT	Opportunities	Threats
	<p>O₁: Wide markets</p> <p>O₂: High demand for eel artificial breeding</p> <p>O₃: Many studies on eel (disease and nutrition).</p> <p>O₄: Be concerned by relevant authorities.</p> <p>O₅: High efficiency, consume easily.</p> <p>O₆: Several studies on pellet for eel farming.</p>	<p>T₁: Impacts of weather and environment</p> <p>T₂: Less export markets</p> <p>T₃: Disease is increasing</p> <p>T₄: Lack of market information (price, grading, market demand)</p> <p>T₅: High production cost (standard compliance), unstable price</p> <p>T₆: Lack of trainings and conference on eel production</p> <p>T₇: Increasing in input factors</p> <p>T₈: Low competition due to shortage of added value eel products</p>
<p>Strengths</p> <p>S₁: Experience in production</p> <p>S₂: Owning artificial eel breeding in province</p> <p>S₃: Relative high selling price</p> <p>S₄: High density of eel traders and wholesalers</p> <p>S₅: Easy technique</p> <p>S₆: High quality due to standard compliance (VietGAP)</p>	<p>Offensive solutions (SO)</p> <p>S₁₋₄O₁₋₃: Invest in clean farming models to improve productivity, efficiency and quality assurance.</p> <p>S₅₋₆O₄₋₆: Step up the application of advance technologies to production, such as pellet processing, high-tech farming models, and trade promotion for export</p> <p>S₄O₁: Strengthen chain linkage across the chain.</p>	<p>Adaptive solutions (ST)</p> <p>S₁T_{1,3,6}: Develop trainings of clean farming models, climate change adaptation, and disease management.</p> <p>S₂₋₆T_{2, 5,8}: Invest technology to research added value products, reduce production costs, improve competitiveness of eel goods</p> <p>S₃T₄: Support to provide market information for farmers to orient production-oriented markets</p>
<p>Weaknesses</p> <p>W₁: Weak technique of eel breeding and farming</p> <p>W₂: Lank of investment capital</p> <p>W₃: Pellet feed can't completely replace live feed</p> <p>W₄: Weak linkages that resulted in unstable production</p> <p>W₅: Farmers do still not concern on artificial breeding</p> <p>W₆: There are no specializing agents selling food and drugs for eel farming</p>	<p>Adjustment solutions (WO)</p> <p>W_{1,3,5,6}O_{1,2,4,6}: Improve production capacity for farmers</p> <p>W₂O_{1,2,4,5}: Low-interest credit support policy for farmers to invest in production</p> <p>W₄O₄: Building a typical linkage model of eel production and consumption chains in the locality</p>	<p>Defensive solutions (WT)</p> <p>W_{1,2,3,5,6}T_{1,2,4,5}: Reorganize eel production industry to improve efficiency, stabilize production and limit risks</p> <p>W₄T_{1,3,5,6}: Improve production capacity for chain actors through training courses</p> <p>W₁T₈: Invest in development of value-added products and market brand of eel products</p>

(Source: Developed by authors, 2018)

The Impact of Balconies on Natural Ventilation Performance of the Building. A case study in Phuentsholing, Bhutan.

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Abstract- Due to the presence of high temperature and humidity in the sub-tropical climate like Phuentsholing, residents are forced to use electro mechanical ventilation increasing the energy consumption by a building. Due to this cooling energy demand in buildings represent about 10% of the total energy consumed by the world. Phenomena such as global warming, population growth and longing for luxury living are the key reasons for an increase in energy demand. Particularly, due to the impact of global warming, many people have started to use mechanical system like HVAC for cooling spaces. However, these energy demands can be reduced by 5% to 6% by using natural ventilating mechanism. This paper investigates the impacts of the various type of natural ventilation in building and present the effectiveness of the balconies to induce natural ventilation in building employing Computational Fluid Dynamics.

Index Terms- Natural ventilation, Computational Fluid Dynamics (CFD), balcony; hot climate

I. INTRODUCTION

The consumption of energy by the world has increased by more than 50% in the last few decades [1] [2] due to increase in population and economic growth [3]. The increase in use of non-renewable energy has resulted with huge negative impact on the environment, causing global warming, climate change, etc. apart from incurring huge expenditures. Thus, the shift to natural energy resources, has gained more attention.

Globally, it was observed that the energy demand for heating and cooling of indoor air in a building is accountable about 50% of the total building's energy consumption [4]. In Australia, buildings are considered as the third largest energy consumer following the transport and manufacturing sectors [5]. Due to high consumption of energy with huge negative environmental effects, many governments and agencies have made Energy efficiency policies and approaches a priority in building construction industries in the form of guidelines and regulation [6] [7]. Adopting and implementing passive cooling strategies in hot climate and passive heating in cold climate are considered as one of the energy efficient strategies which can significantly reduce energy demands from the building [8].

One of the effective passive cooling strategies in reducing buildings' energy foot print in hot climatic zones in natural ventilation. According to Nazari (2014) [9], natural ventilation is much more effective in mild climates with temperature ranging from 18 to 28 degree Celsius. Natural ventilation also provide thermal comfort with a healthier indoor environment with minimum expenditure. It is observed that 30% to 40% less energy is consumed by naturally ventilated buildings compared to mechanically ventilated buildings [10] [11]. Natural ventilation in the building can be achieved by various methods and balconies are one the most commonly used strategy to induce natural ventilation in tropical climate buildings [12].

This paper reviews different types opening and their contribution on the performance of natural ventilation in a building and study the effect of balconies on the natural ventilation of the building by using Computational Fluid Dynamic (CFD).

II. NATURAL VENTILATION

Dynamic pressure and static pressure differences in an environment are considered as the driving forces of natural ventilation. Therefore, higher pressure differences result in higher ventilation rate. This dynamic pressure difference is due incident wind whereas the static pressure difference is the result of a temperature gradient known as buoyancy or stack effect. It can also be driven by a combination of both static and dynamic pressure differences [13]

When the wind strikes the surface of a wall, it creates the positive pressure on the windward side and negative pressure on the leeward side causing huge pressure difference. Therefore, having openings at the external walls, directs the external air to flow through the internal spaces from positive pressured zones to the zone with negative pressure [14]. With increase in pressure difference, the indoor airflow rate increases. Moreover, parameters like building shape and orientation, wind speed, wind direction and surrounding environments also affect the pressure distribution on the building façade [15].

It was also found that the temperature difference affects the air density that produces buoyancy forces and makes the air flow from

high-density regions (lower temperature) to low-density regions (higher temperature). Buoyancy driven ventilation is categorised into two main groups: mixing ventilation and displacement ventilation [16]. In mixing ventilation, the single opening acts as both supply and exhaust, in which fresh cool air enters the enclosure from the lower part and the warm stale air escapes from the upper part of the same opening. Whereas, in displacement ventilation, it has two openings located at different heights, where fresh air enters from the lower opening and warm air exits from the upper one which is usually located near the ceiling [17] as shown in figure 1.

The buoyancy forces and the stack effect are created due to the location of openings at different heights with indoor and outdoor temperature differences in a room. The pressure difference is also created by wind forces depending on the direction of the incident wind. It can either reinforce (Figure 2-left) or oppose (Figure 2-right) the buoyancy forces.

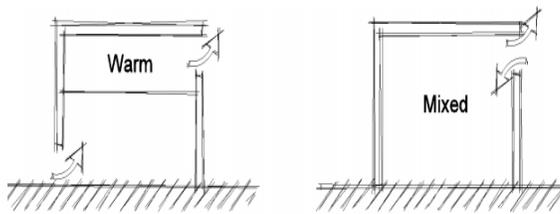


Figure 1: Buoyancy-driven ventilation: displacement ventilation (left) and mixing ventilation (right)

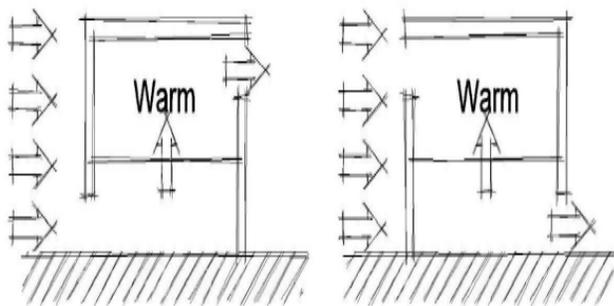


Figure 2: Buoyancy-driven ventilation: displacement ventilation (left) and mixing ventilation (right)

III. ADVANTAGES AND DISADVANTAGES OF NATURAL VENTILATION

Natural ventilation is one of the main determinants of indoor thermal comfort conditions and quality especially in hot climates [18] replacing hot air inside a space with cooler air from outside by a natural means reducing energy demands and environment pollution. It was also found that about 30% of the energy used by the building sector is used for space conditioning [19]. Furthermore, a study has found out that natural ventilation decreases the chance of airborne infection by 6-28% compare mechanical ventilation in hospitals [20]. In terms of installation and maintenance costs, natural ventilation is much more cost-effective than mechanical ventilation, especially for residential buildings [21].

Regardless of the aforementioned advantages, there are limitations during the application of natural ventilation in buildings such as:

limited control and noise pollution from outside. In contrast to mechanical ventilation, it is highly depended on natural forces such as wind speed and direction [22]. Thus, ventilation rate cannot be easily adjusted by the occupants as per requirement by users. Therefore, in extreme hot climates, overheating in some days will be unavoidable [21]

Moreover, the dependence of building ventilation performance on the wind requires adequate consideration of building location, orientation and designs to facilitate natural ventilation which adds additional challenges to the building designers. Furthermore, open windows used for natural ventilation make the enclosed spaces prone to outside noise and pollution, especially in high-traffic areas and regions close to pollution sources [23]. Despite all the limitations of natural ventilation in buildings, passive cooling system still remains an attractive solution for space cooling.

IV. TYPES OF VENTILATION

Researchers have observed that two openings opposite or perpendicular to each other would enhance the ventilation performance [24]. The arrangement of openings' here refers to their form, size, and location on the façade. According to [25] the placing of two openings far apart improves the ventilation performance compared to the case with two adjacent openings. Similarly, Yin and his group in 2010 [26] have pointed out that relative openings' heights also contribute to the performance of natural ventilation. They have also found that the same level of inlet and outlet results in better ventilation in most of the cases.

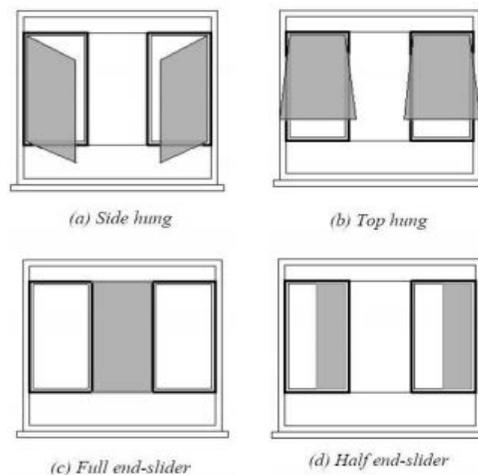


Figure 3: Window types examined by Gao and Lee

The study carried out by [27] found that a larger inlet accompanied with a smaller outlet would improve the ventilation rate. Moreover, the rectangular windows with smaller width to height ratio would enhance the efficiency of natural ventilation mechanism [28]. Heiselberg and his friends [29] have found that in winter, the bottom-hung windows are effective for both single-sided and cross ventilation configurations, whereas in summer, the full end slider and side-hung windows performed better for cross ventilation. It was also found that the side-hung windows are most appropriate for single-sided ventilation when type of windows as shown in figure 3. were analysed using CFD [24].



Figure 4: Window types examined by Grabe et al. (2014):
a) double vertical slide window, b) turn window, c) bottom-hung window, d) awning window, e) horizontal pivot window, and f) vertical pivot window

Similarly, Grabe and his group [30] investigated the ventilation performance for buoyancy driven ventilation of six different window types as shown in figure 4 and concluded that horizontal pivot windows presented the best ventilation performance while tilt windows were proven to be the worst. This findings were supported by [31] that side-hung windows performed better for windward conditions while bottom-hung windows showed a better overall performance, when they carried out an experiment on natural ventilation by developing semi-empirical models for a ventilation performance of abovementioned window types under various wind directions.

V. BALCONIES AND WING WALLS

Another facade design feature that affects the performance of natural ventilation in building is balconies and wing walls. Balconies of buildings located in subtropical climates not only create private outdoor space but also play a vital role in indoor air movements [32] by controlling the internal air velocity [33]. This is supported by study carried out by Chand and his group [34], where that have found that provision of a balcony increases wind pressure.

Wing walls are another building feature that affects natural ventilation by creating pressure difference. Givoni [35] has demonstrated that the addition of wing walls to single-sided ventilation would significantly improve the natural ventilation and indoor air circulation. It was found that wing wall walls at the 45° wind direction has a best performance in creating air movement.

VI. SIMULATION AND OBSERVATION

For this particular experiment, a bedroom of a residential unit in Phuentsholing was identified. Phuentsholing is located in the southern part of Bhutan at 26°49'N to 26°54'N Latitude and 89°20'E to 89°28'E Longitude and at an altitude of 293m above mean sea level [36]. The external window of the room is located on a windward side and door on the opposite wall. The boundary condition for the inlet window and the outlet door is set respectively. For the inlet window the boundary condition with an average wind velocity of 1.5m/s, average temperature of 23°C and humidity of 60% in Phuentsholing is considered. For the outlet door, the out let pressure of zero is set as its boundary condition. The figure 5 and Figure 6 shows the plan, elevations and 3D view of the model room with and without a balcony. The dimension of the room is 3.2m length X3m width X3.15m height.

After that CFD has been used to study the efficacy of the balcony on natural ventilation by simulating the model on two different cases:

1. Case I- bed room without balcony
2. Case II- bedroom with balcony

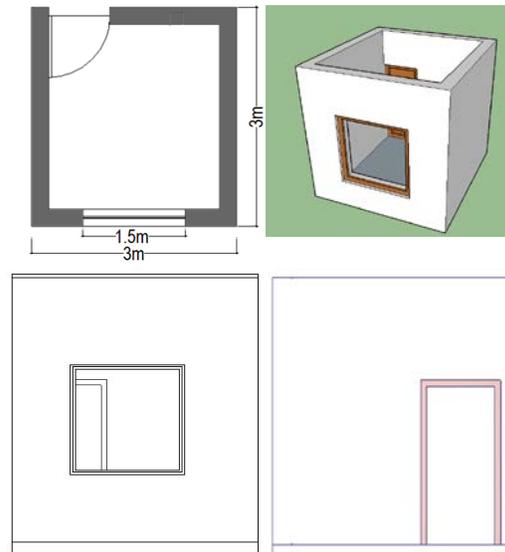


Figure 5: a) Plan, b) View, c) Front Elevation & d) Rear Elevation of case -I

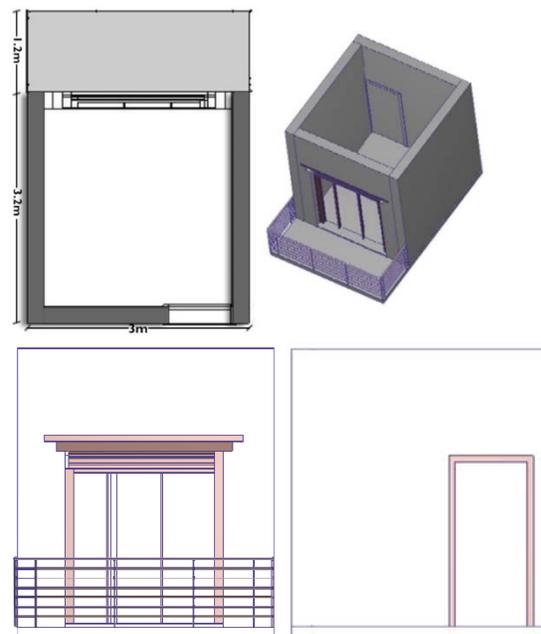


Figure 6: a) Plan, b) View, c) Front Elevation & d) Rear Elevation of case -II

The mesh was then generated in CFD and then the model was simulated for the result. Figure 6 shows the result of the CFD simulation at a different height of planes in case-I. The highest speeds recorded happened in the centre of the room from the window to the corner and the side of the door (up to 1.5 m/s). The velocity of the wind inside the room are observed to be different depending upon the height as shown in figure 7 and figure 8.

The result was recorded for three different heights; 0.5m, a height of the person in sleeping position, 1.2m, a height of person sitting on the chair and 2 m, a height of standing person.

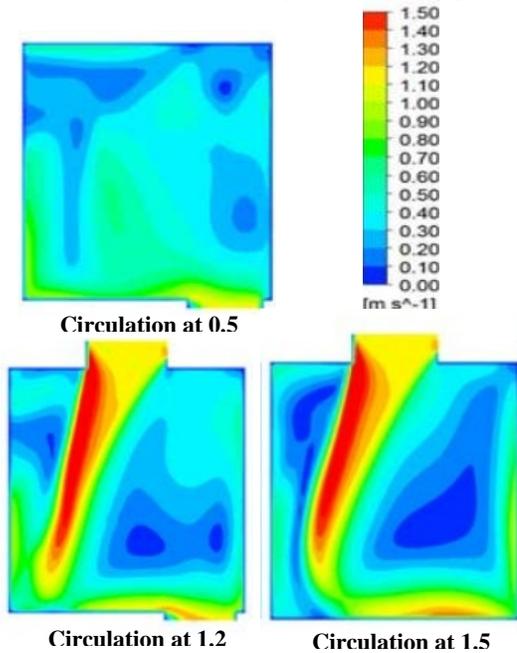


Figure 7: Velocity contour on the horizontal plane found on different heights in case -I

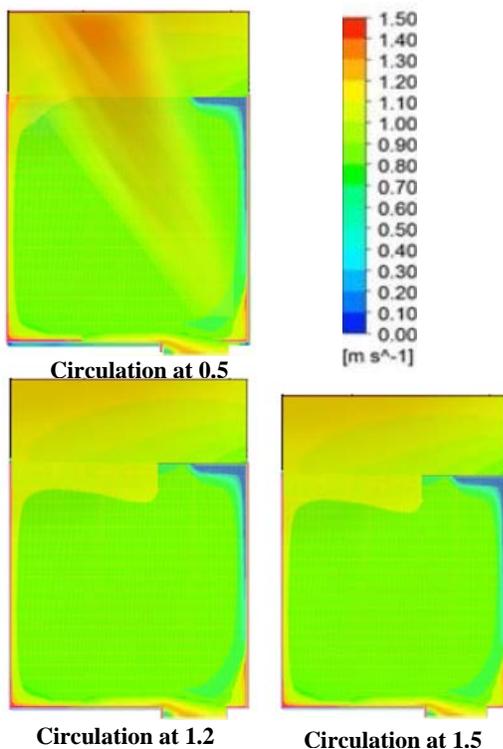


Figure 8: Velocity contour on the horizontal plane found on different heights in case -II

In case 1, the minimum air movement in bedrooms was observed at the height of 0.5m where there is opening for an inlet, as the sill height of a window was 600mm above floor level. And maximum velocity and irregular distribution of air movement at a height of

1.5m above floor level. While in case 2, the maximum air movement was observed at the height of 0.5m. It is observed that the provision of balconies changes the indoor air distribution, and it can maintain relatively better air movement in the lower part of the room compare to upper levels.

Similarly, in case 2, due to the provision of balconies, it reduces the average air velocity causing uniform distribution of air inside the room. While in case 1, it was observed that the high velocity of air movement was seen near the opening and creating an uneven distribution of air movement velocity inside the room.

VII. CONCLUSION

From this study, it is concluded that natural ventilation plays a vital role in increasing the wellness of people inside the room by replacing the stale air with fresh air from surrounding apart from reducing the initial and operation cost of the building. It also reduce the energy demand of the building reducing the negative impact on the environment by reducing the emission of greenhouse gases from mechanical ventilation equipment. Moreover, the provision of balconies in building facades in subtropical climatic regions like Phuentsholing not only increase the ventilation rate of a building but also maintain the uniform distribution of air velocity in the room, providing more comfort to the dwellers by replacing the stale air with fresh air from outside with constant velocity of air movement.

VIII. ACKNOWLEDGEMENT

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The Implementation of Problem Based Learning to Improve Student' Activities and Learning Outcomes in Social Science

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Abstract-This study aims to describe the improvement of students' activities and learning outcomes of fourth grade students at Putat Gede State Elementary School, Surabaya. This research is a classroom action research which carried out in three cycles. The subjects in this study were fourth grade students of at Putat Gede Sate Elementary School, Surabaya, Academic Year 2018/2019 which consist of 24 students. Data collection technique are observation, learning outcomes tests and documentation. Students activities in learning process of cycle I was 71.86%, increased to 81.90% in cycle II, and 85.83% in cycle III. Student learning outcomes in the first cycle showed an average value of 74.41, the percentage of classical completeness was 70.83% and increased to 78.32 in the second cycle with a classical completeness percentage of 79.16%. The average of Cycle III which contains of students scores is 82.63 and the percentage of classical completeness is 87.50%. Based on the results of the study it can be concluded that the aimplementationof Problem Based Learning learning can improve students' activities and learning outcomes fourth grade students at Putat Gede State Elementary School, Surabaya.

Index Terms-Problem Based Learning, Students' Activities, and Learning Outcomes.

I. INTRODUCTION

Learning activities are a dynamic process to achieve a predetermined goal [1]. Social science (IPS) is a simplification of the various disciplines of social sciences and humanities including basic human activities that are organized and presented scientifically [2]. Based on the observations result which conducted at fourth grade students at Putat Gede State Elementary School, Surabaya, there were several problems in Social Science learning process which identified as follows: (1) the lack of learning media used by the teacher, (2) the low students' motivation in learning social science, (3) the less source books in social science learning process, (4) the low student learning outcomes. This case is proven by the results of student tests on Social Science and only 12 students were able to reach the Minimum Completion Criteria (KKM). The average score of Social Science learning outcomes is 68.36 and it is far from the Social Science's the Minimum Completion Criteria (KKM) which is implemented in 75. The low activities and learning outcomes is caused by monotonous and meaningless learning.

Problem Based Learning as one of the learning models is developed from the learning concept of discovery or Discovery Learning Jerome Bruner which is considered as the capability of achieving social science goals. Learning discovery is a learning processes which includes: information process, transformation, and evaluation [3]. Based on the research problem, the objectives of this study are as follows: (1) Describe the activities of students during Problem Based Learning in Social Sciences class at fourth grade of Putat Gede state elementary school, Surabaya, (2) Describe teacher activities when Problem Based Learning is implemented in social science at fourth grade of Putat Gede state elementary school, Surabaya, and (3) Describing student learning outcomes which has been implemented by using Problem Based Learning in social science at fourth grade of Putat Gede state elementary school, Surabaya.

In this study, the researcher presented a relevant literature review. The first study by Yuniara & Surya, "Application of Problem Based Learning to Students' Improving on Mathematics Concept of Ability" [4]. The results of this study indicate that the Problem Based Learning model can improve the activities and learning outcomes of mathematics in seventh grade of MTs Aisyiyah Medan. Second research by Yewa, Elaine H.J. & Gohb, K., "Problem-Based Learning: An Overview of its Process and Impact on Learning" [5]. The results showed that Problem Problem Based Learning had a large influence on learning outcomes compared to conventional learning. Students can collaborate with friends in solving problems so they can make learning meaningful.

The significance different of this reseach is the location of this this research. This study was in fourth grade of Putat Gede state elementary school, Surabaya. Another difference is seen from the subjects and the material. The subjects of the previous studies are Mathematics subjects, while in this study the subjects used are Social Science in Natural Resources. This study is about the students' activities and learning outcomes while taking social scienceby using Problem Based Learning model. By implementing Problem Based Learning model, it is expected to be able to improve students' activities and learning outcomes of social science of fourth grade of Putat Gede state elementary school, Surabaya.

II. METHODS

The design and methods in this research are classroom action research. Hopkins interpreted classroom action research as a combination of research with substantive action, which is carried out in inquiry or an effort of an understanding of what happened [6]. The design of this study refers to the Kemmis&Taggart model which consists of several cycles, each cycle consisting of four stages: 1) planning, 2) action, 3) observation, 4) reflection [7].

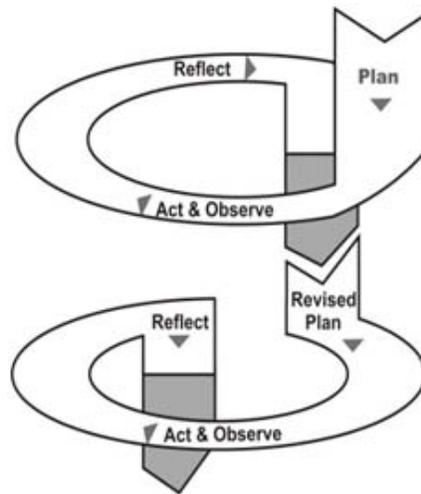


Figure 01. Action Research Model

The subjects were all fourth grade students of Putat Gede State elementary school, Surabaya in academic year 2018/2019 with 24 students. They are 10 female students and 14 male students. The material is taken in this study is natural resources uses. Data collection techniques include observation, learning outcomes tests and documentation. Data analysis was quantitative analysis techniques with percentages. There are two kinds of data analysis in this observation which are teacher's activity observation data and students' activities observation data. Analysis of observation data was obtained by giving scores on every aspect which observed during the learning process in each cycle. Analysis of observation data of teacher and student activities by using the following formula: $P = \frac{f}{N} \times 100\%$

Information:

p= the frequency of occurance percentage

f = the number of teacher/ students' activities that appear

N = Activity score

Student learning outcomes in each cycle in the study were analyzed individually and classically. Determination of the level of completeness of individual learning was measured based on the KKM of social science is 75. Furthermore classical learning completeness was achieved if $\geq 80\%$ of all students in the class were thoroughly achieved. To determine the test results of student learning outcomes, it use the following equation:

$$\text{Value} = \frac{\text{Total Score}}{\text{Maximum Score Amount}} \times 100$$

After calculating the score of learning outcomes and the average learning outcomes of social science in one class, the next step is to find the percentage of students' classical completeness towards the learning process. For the completeness analysis of students' classical learning towards the learning process expressed in the percentage with the following equations:

$$p = \frac{\Sigma \text{ students who complete the learning process}}{\Sigma \text{ students}} \times 100\%$$

To make it easier in knowing the level of its success, a range of assessment criteria is made for teacher activities, student activities and student learning outcomes in the classical model as follows:

Table I: Criteria for student learning activities and outcomes [8].

80% - 100%	= excellent
61% - 80%	= Good
41% - 60%	= Enough
21% - 40%	= Less than enough

The indicators of successful research in this study are: (1) this study is said to be successful in the learning process if student activities achieve $\geq 80\%$ of all observation aspects. (2) this study is said to be successful in the learning process if the teacher's activities achieve $\geq 80\%$ of all observation aspects, and (3) the study is successful if 80% of the students have learning outcomes with a minimum score of 75. The score is accordance with the Minimum Completion Criteria (KKM) determined in social science at Putat Gede State Elementary School, Surabaya.

III.RESULT AND DISCUSION

In this section, the results of this research are explained on the implementation of Problem Based Learning model to improve the results of students' activities and learning outcomes in social science of natural resources. This classroom action research is carried out in 3 cycles with the allocation of 3x35 minutes per meeting. The first cycle is held on October 1, 2018, the second cycle on October 8, 2018, and the third cycle on October 15, 2018.

Problem Based Learning is carried out in five phases. The first phase provides problem orientation to students. The teacher displays information about the use of natural resources and displays the problems that arise. The second phase organizes students for doing research. Students are divided into 6 groups. The third phase is created to help independent and group investigations. The teacher helps students to get information. The fourth phase develops and presents artifacts and exhibits. Each group writes about their problem solving which is the data obtained from the internet or books in the library, then all groups present the results of the discussion in front of the class. The fifth phase analyzes and evaluates the problem solving process. Each group writes down what problems are faced during the learning process and in solving the problem. Observations are carried out when learning activities take place with the following data:

Table II. Recapitulation of Teacher and Students' Activities

No	Cycle	Teacher's activity percentage	Students' activities percentage
1	Cycle I	70,62%	71,86%
2	Cycle II	80,10%	81,90%
3	Cycle III	87,25%	85,83%

From the results of observations in the first cycle, the percentage of the implementation of teacher activities was 70.62%, so it was necessary to continue in the next cycle. In the second cycle obtained a percentage of 80.10%. It shows that an increase of 9.48% from the first cycle. In cycle III the percentage of 87.50% increased by 7.4%. This percentage has fulfilled the indicator of success in the study which is determined by 80%.

From table 3, it is known that in the first cycle the achievement of student activities was 71.86%. This percentage has not yet reached the indicator which determined in this study is 80%. It means students have not applied Problem Based Learning learning activities yet. In the second cycle the percentage of activities achievement is 81.90% and it is an increase of 10.04% from 71.86% criteria which is a "good" criteria in the first cycle to be 81.90% with "very good" criteria in the second cycle. The success percentage in the second cycle has reached the success indicator which determined in this study which is 80%. However, there is one aspect that has a low score, that is the aspect of asking questions. In the third cycle, the percentage of classical student activity was 85.83%, and get increase to 3.93% from the second cycle. The percentage of student activities reach the success indicators which is set in this study so that this research stops in the Third cycle.

The learning outcomes test in this study is a test of students' cognitive learning outcomes which is done by giving a test at the end of each lesson. The recapitulation of student learning outcomes from cycle I-III can be seen in the following table;

Tabel III. Recapitulation of Students Larning Outcomes in Cycle I-III

No	Cycle	The average score of learning outcomes	Classical Completeness percentage
1	Cycle I	74,41	70,83%
2	Cycle II	78,32	79,16%
3	Cycle III	82,63	87,50%

Based on Table III, it is known that in the first cycle was 17 students from 24 students completed the learning process and 7 students did not complete the learning process. The percentage of classical completeness and the average score in the first cycle has not yet reached the success criteria which is determined in this study is 80% so this research is continued in cycle II. One of the factors

that effect the low achievement of the KKM is the lack or the low of mastering the concept of learning material so that students still get difficulties in doing presentation and doing exercises.

In the second cycle was 19 students from 24 students completed the study and 5 students did not complete the learning process. The average learning outcome in the second cycle was 78.32 with a classical completeness percentage of 79.16%. The average value of learning outcomes obtained in the second cycle which has been able to achieve the minimum completeness criteria which is 75 but the percentage of classical completeness obtained in the second cycle also still does not reach the indicators which determined in this study so this research continues in third cycle.

Cycle III was 21 children completed in the learning process and 3 students did not complete in the learning process. The average student learning outcomes is 82.63 with a percentage of classical completeness is 87.50% which indicates that the indicator has been achieved in the third cycle, because it has achieved the success indicators which is determined in this study that is $\geq 80\%$, and the average learning outcomes reach the minimum completeness criteria. Based on the results of the research and the description above, it can be said that the application of Problem Based Learning can improve social science learning outcomes of fourth grade students of Putat Gede state elementary school, Surabaya.

IV. CONCLUSION

Based on data analysis, the results of this research on increasing student learning activities and outcomes using the Problem Based Learning learning model at SDN Putat Gede I / 94 Surabaya Putat Gede state elementary school, Surabaya concluded as follows: 1) the percentage of implementation of teacher activities in the first cycle is 70.62% in the category of "good", and increased into 80.10% in the second cycle and 87.25% in the third cycle with the category of "very good", 2) students learning activities in the first cycle got a percentage of 71.86% in the "good" category get into 81.90% in cycle II and 85.83% in cycle III in the category of "very good", 3) student learning outcomes in the first cycle obtained an average score of 74.41 with a completeness percentage of 70.83%. In the second cycle, student learning outcomes obtained an average score of 78.32 with a completeness percentage of 79.16%. The third cycle of student learning outcomes obtained an average value of 82.63 with a completeness percentage of 87.50%. 4) Problem Based Learning is student-centered learning that can improve social science activities and learning outcomes.

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Effect of Agriculture GDP on Economic Active Population With Reference to Nepal

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Abstract- The impact of agriculture in developing countries like Nepal are in top priority, moreover agriculture is used to create employment and to increase the national income and per capita income. This research paper examines casual-relationship between Gross Domestic Product of agriculture and Economic Active Population with reference to Nepal. The data were drawn from Ministry of Finance and Central Bureau of Statistics from 1983/84 to 2016/17 in macro level. It estimates the output of production function where R-square 0.990 means that 99 percent Gross Domestic Product of agriculture explained on the basis of economic active population and expenditure in agriculture sector of Nepal. So that, this is highly significant among them. Similarly to estimate the growth rate, where one percent increase in economic active population age (15 to 59) years leads to 0.630 percent increase in gross domestic product of agriculture in Nepal. Overall result shows that there has been significant impact of GDP of agriculture on macroeconomic variables.

Index Terms- Gross Domestic Product, Growth rate, Macroeconomic Variables.

I. BACKGROUND OF THE STUDY

Agriculture has been a major occupation for livelihood. With progress in science and technology, contribution of the agriculture sector to the economy is declining while that of industries and services sector is gradually increasing. The share of the agriculture sector in GDP is 28.9 percent while about two third of the population is engaged in this sector. Likewise, more than 40 percent of total land area is covered by forests. Progress in Agriculture and Forestry sectors could not be achieved to the desired level for failing to link these sectors with other sectors of the economy (Economic Survey 2016/17).

Oxford (2000) defines agriculture as the science or practice of farming. Anyanwu (1997) noted that agriculture means “involves the cultivation of land, raising and rearing of animals for the purpose of production of food for man, feed for animals and raw materials for industries.” It involves cropping live-stock, forestry, and fishing, processing and marketing of these agricultural products. While rising agricultural productivity has been the most important concomitant of successful industrialization. Among the roles conventionally ascribed to the agricultural sector in a growing economy do those of providing adequate food for an increasing population, supplying raw materials to a growing industrial sector, constitute the major

source of employment earning foreign exchange through commodity exports, and providing market for the products of the industrial sector?

In specific, agriculture GDP (Gross Domestic Product) is the total value of everything produced by all the people and companies in the country. It does not matter if they are citizens or foreign owned companies, if they are located within the country's boundaries. The government counts their production as GDP. Usually, GDP is the broadest quantitative measure of a nation's total economic activity. GDP in Nepal was worth 21.14 billion US Dollar in 2016. According to Asian Development Bank (ADB) Nepal's GDP growth in 2017 was 6.9%. Similarly, Economic Active Population ages (15 to 59) years is the proportion of a country's population that is involved in the production and distribution of goods and services, that is the labour force. According to the CBS (Central Bureau of Statistics) index Economically Active Population covered the ages from (15 to 59) years. Furthermore, Government Expenditure in Agriculture Sector of Nepal and their composition to develop an analytical framework for determining differential impacts of governmental expenditure on economic growth of Nepal. The primary purpose of this research article is that to establish the logical relationship among variables whether they are significance or not.

In Nepal, economy is estimated to expand by 5.9 percent in the current FY 2017/18. It was 7.4 percent in FY (Fiscal Year) 2016/17. In the current FY, the growth of overall agriculture production is estimated to limit within 2.8 percent mainly because of the paddy production, the major contribution having the share of 20.8 percent of total agriculture production, decreased by 1.5 percent due to unfavorable monsoon and floods in terai. Due to the improvement in trade and service sector, non-agricultural sector is estimated to expand by 7.1 percent in FY 2017/18. Overall economic activities are oriented towards positive directions as a result of conducive environment in investment due to stable government formed after the election of three tiers of government.

The annual economic growth has remained 4.3 percent on an average in the last decade. In this period, the average annual growth rate of agriculture and non-agriculture sector remained 2.9 percent and 4.9 percent, respectively. In the last decade, the contribution of agricultural sector to GDP has decreased annually. In the current FY 2017/18, the respective contribution of agricultural and non-agriculture sectors to GDP is estimated to remain at 27.6 and 72.4 percent. In the FY 2016/17, the contribution of agricultural and non-agriculture sector to GDP was 28.8 percent and 71.2 percent, respectively.

II. IMPORTANCE OF AGRICULTURE GDP IN NEPAL

The list of the importance of agriculture to Nepalese economy is endless. Therefore, the bulk of the work lies in the hands of the government and would be entrepreneurs to take advantage of the enormous benefit that is in the agriculture sector. Similarly, agriculture sector is also capable of reducing the country's level of unemployment on the account that the sector is labour intensive. It will also curb the effect of rural-urban migration which will help to decongest the urban areas and make life easier for people both in the rural or urban area. The government needs to implement agriculture policy and programs that help improving agro-based industry while raising production and productivity of the agriculture sector. Program is needed to encourage production and consumption of healthy food grains while promoting the use of organic pesticides in the agriculture system. Food sovereignty guaranteed by the constitution of Nepal requires to be ensured by raising the size of agriculture production while adopting scientific method in food grains and cash crops farming systems. Agriculture policy and programs have been geared towards this direction Wagle (2018).

This study explores what has happened in the Nepalese agriculture research and seeks to rebuild and extend the primal approach in GDP of agriculture production to analysis by Factor Analysis. The research recognizes that input such as government expenditure in agriculture sector of Nepal and economic active population ages (15to59) years used in agriculture production have distinct function and this must be accounted for explicitly in the simple and multiple correlations, whether they are significance or not. In Nepal, every agro-ecological zone, priority is given to food crops first such as rice, wheat, maize and millet and then to cash crops that is, vegetables, fruits, jute and cotton. People need food crops for meeting household needs and cash crops for income generation with regard to success stories of crop diversification. Many people/farmers have successfully adopted cultivation of different off-season vegetables like cabbage, peas, cucumber, and tomato etc using modern technology.

III. REVIEW OF LITERATURE

Numerous works have studied the Gross Domestic Product of agriculture and it's relationship with economic active population and government expenditure in agriculture sector of Nepal in the past. Literatures reveal three types of indices in practice such as global or international, national or Nepalese contest and regional for different objectives, methodology and conclusion. Numerous studies have been conducted to investigate the logical relationship between GDP of agriculture on economic active population and government spending in agriculture sector of Nepal. This section is divided into two parts.(a) review of theoretical foundation and (b) review of empirical studies. The theoretical review Numerous studies have been conducted to investigate the relationship between production function and other macroeconomic variables under classical hypothesis, while the empirical review examines both the short run and long run relationship between or among the variables under consideration. In this section, it is tried to review various studies research reports, articles and the reposts of national and international institutions in the area of production function in the agriculture sector of Nepal.

There are a few researches in this area in Nepalese contest. More appropriate and relevant literatures are included in here.

Acharya, U.P.(2018) argued that in The Journal of Economic Concerns Volume 9. Number 1 pp 96 has concluded that Agriculture is a primitive sector for the economic development of any country. Currently industrialized nation backed themselves by agricultural sector to attain the growth of their nation. The impact of agriculture in developing countries like Nepal is in top priority, moreover in means to use the agriculture for rural development. In this paper initially major three dimensions are selected and analyzed based on the statistical information. This research concludes that three dimension viz , rural poverty alleviation, major supplies of food and stimulants of economic growth of rural economy. Positively helps for the rural development.

Economic Survey (2017) revealed that Nepalese economy is passing through structural changes. The contribution of agricultural sector (agriculture, forest and fisheries) in total Gross Domestic Product is estimated to be 27.6 percent in the current FY 2017/18 which was 28.8 percent in the FY 2016/17. The annual growth rate of agriculture in the basic price level is estimated to be 2.7 percent in the current FY.

In the past two decades, the production of Nepalese agricultural sector has been increased by 3.2 percent. This growth has been 3.2 percent of India, 3.9 of both China and Bangladesh during this period.

Satyal, V.R. (2011) argued in the Economic Journal of Development of issues Vol.11 pp 1-18, Co-Supervisor Concluded that despite decade long investment and planning in Agriculture it is declining in terms of production and engaged labour force. If such structural shift were natural it would be satisfactory. However, in absence of sustainable development in other sector like service or industry, such shift could be very dangerous for the country whose primitive knowledge, life style, culture, religion are based on agriculture. This paper attempts to show the current disappointment in agriculture and analysis some causes for the decline with few recommendations for improvement.

Wagle, T.P.(2016) has written in research publication "Global Journal of Agriculture Research "on the research topic Government Expenditure in Agriculture Sector of Nepal : An Empirical Analysis, Volume 4, No.3,pp.1-12, July 2016 published by European Centre for Research Training and Development UK(www.eajournals.org) has mentioned that this study examines the logical relationship between Agriculture Production and Government Expenditure in Nepal. The empirical research has applied Cochrane-Orcutt auto-regressive model from panel data for the period 1983/84 to 2013/14 in averages. In this regard, the empirical evidence confirm that the expenditure in agriculture sector is the causes of economic growth in Nepal. More specifically, iteration five gives the D-W value is 1.697 to compared tabulated dL,dU values are 1.284 and 1.567 at the two independent variables. The D-W value lies between dU and 4-dU, where this is nearest to 2. So that, there is no auto-correlation among error terms. Fact finding to shows that, the checking results homogeneous with theory and healthy and strong of the conclusion.

Wagle,T.P. and Satyal,V.R.(2018) have concentrated in research publication "The Journal of Economic Concerns" on the research topic The Role of Agriculture in an Economy: A case of

Nepal, Volume 09, No 01, pp84-95, January-July 2018 in Nepal has described that this research paper summarizes information on the importance of the objectives of agriculture and agricultural policies based on previous studies. We focus on studies that examine logical relationship between production and investment in agriculture for the economic. Chow-test is concluded to determine the impact of expenditure on economic growth in agriculture sector of Nepal. This research has been analyzed over the period of 1983/84 to 2013/14 in macro-level of time-series data. The marginal impact is estimated of agriculture production means that one percent increase government expenditure in agriculture sector of Nepal leads to 0.98 percent increase in gross domestic product of agriculture. The overall results show that there has been significant impact of expenditure on macro-economic variables. So the conclusion is robustness.

IV. OBJECTIVE OF THE RESEARCH

The general objective of this research is to develop a multiple regression model so that existing methods of time series modeling and forecasting can be improved. The overall objective of the article was to generate statistics required for the development of agriculture GDP in Nepal. For this the specific objectives are set here in:

- To estimate the strength of linear relationship between production of agriculture and constant.
- To estimate GDP of agriculture production on economic active population and investment in agriculture at national level.
- To provide relevant statistics required for the development of food and agriculture production to planners, policy makers, and researchers.

So that, this research to develop a new paradigm for agriculture production analysis in Nepal.

V. METHODOLOGY AND DATA ANALYSIS

The quantitative research is based on inferential statistics, for testing objective theories by examining the relationship among variables with structural bases, and testing regression model by using deductive methods. In regression model, we establish the cause and effect relationship between GDP of agriculture production on constants. The study is mainly based on secondary data have been collected from the various issues of economic survey published by central bureau of statistics and Ministry of Finance. As the study is based on time series data from (1983/1984 to 2016/2017) in a macro-economic level.

To analyze the data SPSS Vs 20 is used for standard multiple regressions. Target variable GDP of agriculture production is put in the dependent variable and all other independent variables i.e. Economic Active Population ages (15to59) years and government expenditure in agriculture sector of Nepal are put in the independent variables, then to check in estimates and in model fit. The output window of SPSS pups up with several output sections, the output in Regression table serve our purpose for this study.

VI. MODEL SPECIFICATION

Given the foregoing discussion, the following model is specified in order to determine the impact of agriculture production on economic growth in Nepal. The relationship between gross domestic product of agriculture as an indicator of economic growth and economic active population ages(15to59) years and government expenditure in agriculture sector of Nepal are independent variables has been analyzed by applying the OLS method under which parameters have been estimated via regression models. The model is being used to test the hypothesis then there is significant impact of economic active population in the economy of the country. Then t-test, F-test, regression coefficients and coefficient of determination have been computed by using SPSS software version-20. In functional form, the multiple regression analysis is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + U_i \dots \dots \dots (1)$$

This is the population equation, where α, β_1, β_2 , are parameters.

Where, X_1, X_2 , are economic active population ages(15to59) years and government expenditure in agriculture sector of Nepal represents independent variables whereas Y is the GDP of agriculture production or dependent variable, and then U_i is the random error term.

The estimated regression line is

$$y = \hat{\alpha} + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{U}_i \dots \dots \dots (2)$$

We know that regression line passes through mean values of X and Y i.e. (\bar{X}, \bar{Y})

$$\bar{Y} = \hat{\alpha} + \hat{\beta}_1 \bar{X}_1 + \hat{\beta}_2 \bar{X}_2 + E(\bar{U}_i) \dots \dots \dots (3)$$

Subtracting equation (3) from equation (2), resulted as below

$$y = \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2 + \hat{u} \dots \dots \dots (4)$$

This is the estimated production function equation on various constants.

While U is the random error, with mean zero and constant variance.

The simple model is converted in to the Log-Log Models have been used to observe the effects of GDP of agriculture on the Independent variables. The data are constant prices have been tested in the following Models.

$$\ln(\text{GDP_agri})_t = B_0 + B_1 \ln(\text{Pop_LF}) + B_2 \ln(\text{Exp_agri}) + \dots \dots \dots (U_i) \dots \dots (5)$$

Where, $(\text{GDP})_t$ = Gross Domestic Product of agriculture with long period of time.

B_0 = Autonomous Constant i.e. in research inputs and output are approximately equal.

U_i = Error terms, in average is equal to zero.

VII. ANALYSIS OF HYPOTHESIS

Based on the above facts related to agriculture based population we will test a few hypotheses.

In linear regression, we tested for a significant relationship by looking at the t or F-ratio. In multiple regressions, the two ratios test two different hypotheses.

The t ratio and significance level in each row of the table of coefficients tell us whether to reject each of the null hypotheses. In this instance, at the 0.05 level of significance, we reject in both cases, due to the very low P-values. That is to say, both independent variables have statistically significant relationships among constants.

The F- ratio in a multiple regression is used to test the null hypothesis that all of the slopes are equal to zero:

H0: $\beta_1 = \beta_2 = 0$ There is no significance difference between GDP of agriculture and Economic active population with reference to Nepal. In other words, regression coefficients are independent to each other. Null hypothesis is true.

H1: $B_1 \neq B_2 \neq 0$ There is significant difference between GDP of agriculture and Economic active population with reference to Nepal. In other words, regression coefficients are dependent to each other, or the null hypothesis is not true.

Note that the alternative hypothesis is different from saying that all of the slopes are non zero. If one slope were zero and the other were not, we would reject the null in the F-test. In the individual significance test i.e. t-tests, we would reject the null in both independent variables, and we reject the null hypothesis or in other words, we accept the alternative hypothesis. In research, they are statistically significance at five percent level of significance.

VIII. REGRESSION:

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.995 ^a	.990	.989	.03302	.867

a. Predictors: (Constant), LNExp_agri, lnPop_LF
b. Dependent Variable: lnGDP_agri

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.199	2	1.600	1467.378	.000 ^b
	Residual	.034	31	.001		
	Total	3.233	33			

a. Dependent Variable: lnGDP_agri
b. Predictors: (Constant), lnExp_agri, lnpop_LF

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Beta	Lower Bound
1	(Constant)	.056	1.895	.029	.977	-3.809	3.920
	LNpop_LF	.630	.133	.439	4.742	.359	.901
	lnExp_agri	.170	.028	.560	6.049	.113	.228

a. Dependent Variable: lnGDP_agri

IX. DISCUSSION AND MAJOR FINDINGS:

Agriculture is in the mainstream in the development. It creates backward and forward linkages in economy. Forward linkages are mainly in the GDP of agriculture and food processing industries. Similarly, the main backward linkages are with the agricultural industries that produce animal feed and mineral industry for purchased fertilizers. Usually, various factors affect

gross domestic product of agriculture but the present study tests the logical relationship between GDP of agriculture and economic active population and government expenditure in agriculture sector of Nepal. In this process, a regression model was fit. The simple model was converted in to the Log-Log Models have been used to observe the effects of GDP of agriculture on the Independent variables. The data are constant prices have been tested in the following Models.

$$\ln(\text{GDP_agri})_t = B_0 + B_1 \ln(\text{Pop_LF}) + B_2 \ln(\text{Exp_agri}) + \dots\dots\dots(U_i)$$

Where, (GDP)_t = Gross Domestic Product of agriculture with long period of time.

B₀ = Autonomous Constant i.e. in research inputs and output are approximately equal.

U_i = Error terms, in average is equal to zero

The following result was obtained:

$$\ln(\text{GDP_agri})_t = 0.056 + 0.630 \ln(\text{Pop_LF}) + 0.170 \ln(\text{Exp_agri}) + \dots\dots\dots(U_i)$$

t _{cal}	= (0.029)	(4.742)	(6.049)
S.E.	= (1.895)	(0.133)	(0.028)
Significance	= 0.977	0.000	0.000
R ²	= 0.990	F _{cal} = 1467.378	D.W. = 0.867

The results of the present research article derived through the use of prescribed methodology. These are in accordance with the said objectives and are describe, discussed on the basis of regression results. In linear regression, we tested for a significant relationship by looking at the Collective significance test i.e. F-test and Individual Significance test i.e. t-test. Above empirical results to show that, F-test is statistically significance at five percent level of significance. Similarly, the t-ratio and significance level in each row of the regression table of coefficients tell us whether to reject each of the null hypotheses. In this instance, at the 0.05 level of significance, we reject null hypothesis in both independent variables, due to the very low P-value. This is to say, both independent variables have statistically significant relationships among constants.

While, in time-series data, to test the Durbin-Watson whose value is 0.867. If D-W value is less than 1, then to improve the model, Cochrane-Orcutt iteration ten procedure was applied. The iteration result with improvement considering the zero iteration to upto ten was taken as under.

R ² = 0.263,	Adj R ² = 0.187,	F _{cal} = 5.17
F _{0.05} (2,31) = 3.340	D.W. = 1.436,	k* = 2
d _L = 1.321,	d _U = 1.577,	No of observation = 34

4 - d_U = 4 - 1.577 = 2.422 i.e. nearest to 2. It concludes that 2.422 lies between d_U and 4 -d_U i.e. do not reject the null hypothesis. So that there is positive no auto-correlation among error terms of multivariate variables in agriculture sector of Nepal. In other words, figure to show that R-square is decreasing while; D.W. value is gradually increasing in real sense. In fact, robust error terms of Government Expenditure in agriculture sector and Economic Active Population are Independent to Economic growth of Nepal.

X. CONCLUSION:

The present study concludes that there is a significant impact of Gross Domestic Product of agriculture on Economic Active Population with reference to Nepal. The collective significant test i.e. F-test is 1467.378, which is higher than tabulated value F(2,31) is 3.34 at five percent level of significance. So it concludes statistically significance, this implies that agriculture production on economic active population and expenditure in agriculture sector of Nepal have a positive sign and thus denoting a positive relationship with GDP of agriculture (Economic Growth) which is expected to exist. Similarly for individual significance test (t-test) is also same nature, tabulated value of student t-statistic at five percent level of significance t(33) is 1.96 and calculated value for economic active population is 4.742, so that it is statistically significance, and tabulated value of expenditure is 6.049. It reveals that calculated value is higher than tabulated value, so it is statistically significance among them. Fact findings to show that the checking results consistency with theory and robustness of the conclusion.

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Annex-01
Large Size Secondary Time-Series Data

year	real_GDP	POP_LF	Exp_Agri
1983/84	84944.37	7953806	2257.2
1984/85	93045.33	8119245	2276.1
1985/86	95237.36	8288125	2713.6
1986/87	97810.66	8460518	3062.3
1987/88	97128.63	8636497	3675.5
1988/89	103497.03	8816136	4257.2
1989/90	109877.99	8999512	5047.04
1990/91	116212.92	9186702	5536.8
1991/92	118715.09	9377785	6515.6
1992/93	117451.46	9572843	7009.01
1993/94	116723.4	9576569	8058.9
1994/95	125598.16	9792042	8556.9
1995/96	125179.74	10012363	9689.6
1996/97	129950.57	10237641	10878.5
1997/98	135620.9	10467988	11249.5
1998/99	136775.72	10703518	13237.3
1999/00	140660.4	10944347	14513.1
2000/01	147542.9	11190594	15378.1
2001/02	155624.54	11442383	16392.5
2002/03	160422	11699836	17063.4
2003/04	165761	12310968	18362.1
2004/05	173734	12477166	19668.6
2005/06	179811	12645608	20859.1
2006/07	183015	12816324	22353.6
2007/08	184796	12989344	24332.3
2008/09	195559	13164700	30547.7
2009/10	201500	13342423	39151.9
2010/11	203752.9	13522546	47327
2011/12	214786.44	13705101	50046.5
2012/13	224730.25	13890119	52786.9
2013/14	227193.41	15091848	58369.2
2014/15	237521.88	16376446	61124.22
2015/16	240137.93	16817783	64009.28
2016/17	240205.94	17262195	67030.51

Sources: (i) Real_ GDP of agriculture: Economic Survey 2000/01, 2013/14, 2016/17, from Ministry of Finance.

(ii) Pop_LF(Labour Force) Population Census 1981, Volume I part I page no 299, In 1991 table-05, Population by five year age group. Similarly, 2001 Census Table 10, page 24 population by five year age group, and 2011 Census, page 65, Volume 01.

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USD/INR Future Price Predictive Modelling Considering Macro Economic Factors

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Abstract- Indian economy is sensitive towards the relation between Indian Rupee (INR) and US Dollar (USD) exchange rate (USD/INR rate). As US dollar strengthens against Rupee, Current account deficit (CAD) deteriorates and affects India's Gross domestic product (GDP) adversely. That is why it becomes important to predict the future USD/INR exchange rate to get an idea about the future representation of India's GDP. There are several macroeconomic factors which are considered to be affecting currency exchange rate such as GDP of country, Political stability and economic performance, Inflation rate, Terms of trade, CAD, Foreign exchange reserve (FOREX), Consumer price index for industrial worker (CPI-IW) and Brent crude oil price etc. This study is dedicated towards predicting future relation between USD/INR exchange rates. For our study, among above mentioned macroeconomic factors, we have considered GDP, Call money rate, Consumer price index for industrial worker, Brent crude oil price, FOREX and CAD. Data of each considered factors are gathered from Bloomberg terminal – A data compilation platform. For our study we have used quarter wise data of each parameter for the duration from January 2002 to September 2018. We have analysed data from quarter one 2002 to quarter four 2014 of each macroeconomic factors to build 63 different exchange rate predictive models considering one/two/three/four/five/six macroeconomic factors affecting currency exchange rate. USD/INR rate is predicted for quarter one 2014 to quarter two 2018. Among these models, best goodness of fit is chosen using Chi-square value and Akaike information criterion. Based on our study it is found that only three factors – CAD, FOREX and Call rate – influence USD/INR exchange rate the most. The study was done to make an attempt to formulate and establish a relationship between exchange rate and its variables and use predictive modeling to forecast the most accurate value of exchange rate in future.

Index Terms- Regression, USD/INR Exchange rate, Predictive Modelling, Hypothesis testing

I. INTRODUCTION

Karen Fernandes (2017) used multiple regression technique to verify the impact of inflation, forex reserves and interest rates on Exchange rate of the Indian rupee and Granger causality to study if there exists a causal link between the variables. The study was conducted using annual data of 6 variables viz. Gross Domestic Product (GDP), interest

rates, foreign exchange reserves, imports, exports and inflation for a period of 26 years i.e. from 1990-2016. Results indicated a uni-directional causal relationship between GDP and exports, GDP and Inflation rate and between Imports and inflation rate. The results of the Johansen Co-Integration test indicated that all the chosen variables were highly co-integrated in the long run.

Chandan Sharma and Rajat Setia (2015) used the fully modified ordinary least square, Wald's coefficient restriction and impulse response functions (IRF) to estimate the monetary model in the long- and short-run horizons. The IRF illustrated the importance of interest rate in controlling exchange rate volatility.

Gautam Kamble and Parmeshwar Honrao (2014) used Generalized Autoregressive Conditional Heteroskedastic (GARCH 1,1) model to establish the degree of exchange rate volatility between 2011 and 2013 in India.

Saritha (2016) concluded that domestic interest differentials and interest yield differentials, and the rate of change of foreign exchange reserves have a significant impact on the monthly average of the USD/INR exchange rate. A monthly time series from June 2007 to May 2012 was used for the purpose. It suggested that short-term and long-term relationship of NYSE ACRA, FOREX reserve, imports and exports of India exists with exchange rates of India.

Krishna Murari used the Generalized Autoregressive Conditional Heteroskedastic (GARCH) models to estimate volatility in the daily log rupee value. It estimated volatility of Indian rupee instability against four major world currencies, i.e., US dollar, pound sterling, euro and Japanese yen, using observations over a period of 13 years (2000 – 2013).

The exchange rate has direct impact on nation's international trade, economic growth as well as on their interest rate. It is important to understand what causes exchange rate fluctuations. Investors and policy makers constantly try to forecast the change of the exchange rate in an attempt to minimize the risk of holding currency.

Exchange rates float freely against one another. Valuations of currency are determined by the inflow and outflow of it in a country. A high demand for a particular currency means that value of that currency will increase. The highlighting reasons contributing towards the depreciation of Indian rupee are mentioned hereby.

Higher rate of Inflation indicated by Consumer Price Index makes Indian goods more expensive thereby causing a decline in exports of goods from India. Supply of dollars will decline resulting in weak rupee. Current account deficit widens when

imports are more than exports. Foreign currency goes out of the country.

Trade deficit increases the demand for dollars causing it to appreciate. India buys more crude oil than it sells i.e. it is a net buyer of the commodity. Price hikes in crude oil cause imports to be expensive. Rise in oil prices result in an increased import bill which further leads to the widening of current account deficit.

Call money market rate is the rate at which banks borrow money without collateral from other banks for one day (overnight basis). Lower interest rates as compared to US will lead to capital outflows resulting in increase in demand for dollars. A country's central bank holds currencies of foreign countries in the form of foreign exchange reserves. The most important reason why banks hold reserves is to manage their currency values. Reserve Bank of India intervenes in the currency market to maintain orderly market conditions. It can sell US Dollars in the open market to reduce the money supply. RBI is in-charge of the country's FOREX reserves and it fluctuates depending on various factors like Import-Export balance, USD/INR prices, etc. FOREX reserves also acts as a stabilizing agent for the exchange rate in times of market volatility as RBI quickly reacts to appreciation/depreciation of the currency by buying and selling of US bonds in dollar terms. As there several factors which one or other way affect the USD/INR rate, it becomes important to study which macroeconomic parameters manipulate the exchange rate the most.

II. LITERATURE REVIEW

Primary objective of this study is to analyse the various macroeconomic factors which are taken in consideration. Using this analysis we have to build different models with permutation and combination of macroeconomic factors. On this different model we have to perform hypothesis testing and find best goodness of fit. We have to find correlation between/among various macroeconomic factors involved in chosen model if any. We have to use these correlation factors to predict the future value of USD/INR rate.

III. METHODOLOGY

As seen in the introduction, we find that there were a number of factors affecting USD/INR rate. For the purpose of this research we've taken GDP, Call Money Rate, CPI-IW, Crude Oil, FOREX (Source: <https://www.rbi.org.in/scripts/ReferenceRateArchive.aspx>) and CAD as the parameters that significantly affect the exchange rate. So, USD/INR exchange rate will act as a dependent variable (y) and the 6 parameters considered will act as independent variables.

For the regression model to be efficient and reliable, data input should be as high as possible. In our research, data for call rate before 2004 wasn't available so data for all the parameters was taken from 01-01-2004 to 30-06-2018 i.e. Q2 of 2018 since GDP data wasn't available for Q3 2018. Since the exchange rate is in rupee terms, the Crude oil prices and FOREX reserves amount have been taken in rupee terms. Also, CAD is taken as a percentage share of GDP.

The data for Call rate and Crude oil prices were available in day-to-day basis. CPI-IW numbers were in monthly basis followed by GDP, FOREX and CAD data available on quarterly basis. For ease of calculations, data available for daily and monthly basis was converted to quarterly basis by taking an average for the said period.

All the data was then converted to percentage change compared to previous period in order to maintain data consistency. After the process of data cleaning is done, the final data can now be used as an input on which the linear and multiple regression models can be applied.

We will be using data from Q2 2004 to Q4 2014 in order to predict data for Q1 2015 to Q2 2018 and compare it with actual data to see the best for our research. The formula to be used for multiple linear regression model is:

$$Y = \beta_0 + \beta_1 * X_{i-1} + \beta_2 * X_{i-2} + \beta_3 * X_{i-3} + \dots \beta_n * X_{i-n}$$

Where,

Y = Currency quarterly return

β_0 = Intercept

β_i = coefficient value, $i = 1, 2, 3 \dots n$

X_i = Dependent variable (Various macro-economic factors), $i = 1, 2, 3 \dots n$

Open-source free programming software 'R' (Version- 3.5.1) is used for the calculation of intercept and coefficient values of each of model. As we have 6 parameters, the permutation and combination of all these parameters have given a total of 63 models. To find the best goodness of fit among these models, we further calculate Akaike's Information Criterion (AIC) which is an estimator of the relative quality of statistical models for a given set of data that is followed by a Chi-Square test on all the models.

We first select the model that is closest to 0 based on AIC and then narrow down our choices with the highest corresponding p-value of chi-square test. The model consisting of Call rate, FOREX and CAD was selected based on our research method. Going forward, to predict values from Q3 2018 to Q2 2020 we have assume a 1% increment and decrement on one parameter and calculated the correlation of this parameter with other two. The process is repeated with other two parameters and three final models were built.

IV. RESULT

$$Y_i = \beta_0 + \beta_1 * X_{i-1} + \beta_2 * X_{i-2} + \beta_3 * X_{i-3} + \dots \beta_n * X_{i-n}$$

Every parameter including currency quarterly average values were taken in terms of percentage return. Currency value was considered as Independent variable (Y) whereas other macro-economic factors were considered as dependent parameters (Xi). This is because value of currency was dependent on variation of macroeconomic factors. We have used single and multiple regression method to predict the future currency quarterly return for the duration quarter one 2014 to quarter two 2018. Following was the regression equation used for calculation:

$Y = \beta_0 + \beta_1 * X_{i-1} + \beta_2 * X_{i-2} + \beta_3 * X_{i-3} + \dots + \beta_n * X_{i-n}$
 Where,
 Y = Currency quarterly return
 β_0 = Intercept

β_i = coefficient value, $i = 1, 2, 3 \dots n$

X_i = Dependent variable (Various macro-economic factors), $i = 1, 2, 3 \dots n$

As we had six different macroeconomic parameters, using different permutation and combination we had built 63 different models. (Using combination as ${}^6C_1, {}^6C_2, {}^6C_3, {}^6C_4, {}^6C_5, {}^6C_6$)
 Now, let us consider model number 7 to predict the quarterly two 2002 currency price percentage returns: Brunt crude oil price and Call rate as

Independent variable (X_i).

So, equation becomes: $Y = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2$ Where,
 Y = Quarterly currency return

β_0 = Intercept

β_1 = coefficient value of Brunt crude oil price

β_2 = Coefficient value of Call rate

X_1 = Brunt crude oil price quarterly return X_2 = Call rate quarterly return

We had used R programming - open source statistical software - to solve the equation and following results were obtained:

$\beta_0 = -0.01036$

$\beta_1 = 0.063426$

$\beta_2 = -0.005755$

Based on historical data: $X_1 = 11.6512726\%$
 $X_2 = -1.0024961\%$

$Y = -0.01036 + (0.063426 * 11.6512726\%) + (-0.005755 * -1.0024961\%)$

$Y = -0.2914370190169\%$

This value was multiply by actual average quarterly currency value (Q1 2002, Rs. 45.23) Q2 2002 predicted value = Predicted percentage return * Actual Q1 avg. currency value
 $= -0.2914370190169\% * 45.23$

$= 45.37$

Now this predicted Q2 2002 value was used to predict the Q3 2002 value, Q3 2002 value was used to predict the Q4 2002 value and so on. Similarly values till Q2 2018 were predicted. Same method was used and all the predicted values were tabulated in table 2. Below table 1 shows model number and parameters considered in it.

V. DATA ANALYSIS

Table 1: Model Number and macroeconomic factors taken as dependent variable

Model Number	No. of Parameters	para1	para2	para3	para4	para5	para6
1	1	CRUDE					
2	1	CALLRATE					
3	1	CPI					
4	1	CAD					
5	1	GDP					
6	1	FOREX					
7	2	CRUDE	CALLRATE				
8	2	CRUDE	GDP				
9	2	CRUDE	CPI				
10	2	CRUDE	CAD				
11	2	CALLRATE	GDP				
12	2	CALLRATE	CPI				
13	2	CALLRATE	CAD				
14	2	GDP	CPI				
15	2	GDP	CAD				
16	2	CPI	CAD				
17	2	CRUDE	FOREX				
18	2	CALLRATE	FOREX				
19	2	GDP	FOREX				
20	2	CPI	FOREX				
21	2	CAD	FOREX				

22	3	CRUDE	CALLRATE	GDP			
23	3	CRUDE	CALLRATE	CPI			
24	3	CRUDE	CALLRATE	CAD			
25	3	CRUDE	GDP	CPI			
26	3	CRUDE	GDP	CAD			
27	3	CRUDE	CPI	CAD			
28	3	CALLRATE	GDP	CPI			
29	3	CALLRATE	GDP	CAD			
30	3	CALLRATE	CPI	CAD			
31	3	GDP	CPI	CAD			
32	3	CRUDE	CALL RATE	FOREX			
33	3	CRUDE	GDP	FOREX			
34	3	CRUDE	CPI	FOREX			
35	3	CALLRATE	GDP	FOREX			
36	3	CALLRATE	CPI	FOREX			
37	3	GDP	CPI	FOREX			
38	3	CRUDE	CAD	FOREX			
39	3	CALLRATE	CAD	FOREX			
40	3	GDP	CAD	FOREX			
41	3	CPI	CAD	FOREX			
42	4	CRUDE	CALLRATE	GDP	CPI		
43	4	GDP	CPI	CAD	CRUDE		
44	4	CPI	CAD	CRUDE	CALLRATE		
45	4	CAD	CALLRATE	GDP	CPI		
46	4	CAD	CRUDE	CALLRATE	GDP		
47	4	CRUDE	CALLRATE	GDP	FOREX		
48	4	CALLRATE	GDP	CPI	FOREX		
49	4	GDP	CPI	CAD	FOREX		
50	4	CRUDE	CALLRATE	CPI	FOREX		
51	4	CRUDE	CALLRATE	CAD	FOREX		
52	4	CALLRATE	GDP	CAD	FOREX		
53	4	CRUDE	GDP	CPI	FOREX		
54	4	CRUDE	GDP	CAD	FOREX		
55	4	CRUDE	CPI	CAD	FOREX		
56	4	CALLRATE	CPI	CAD	FOREX		
57	5	CRUDE	CALLRATE	GDP	CPI	CAD	
58	5	CRUDE	CALLRATE	GDP	CPI	FOREX	
59	5	CALLRATE	GDP	CPI	CAD	FOREX	
60	5	GDP	CPI	CAD	FOREX	CRUDE	
61	5	CPI	CAD	FOREX	CRUDE	CALLRATE	
62	5	CAD	FOREX	CRUDE	CALLRATE	GDP	
63	6	CRUDE	CALLRATE	GDP	CPI	CAD	FOREX

Table 2.1 – 2.8: Predicted values of USD/INR rates

Table 2.1: Predicted values of USD/INR rates

Quarter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
45	64.54	64.58	64.78	64.54	65.09	64.45	65.75	65.55
46	65.05	65.10	65.55	65.05	66.43	64.83	65.69	66.59
47	65.54	65.63	66.36	65.54	67.75	65.41	67.07	68.22
48	66.07	66.16	67.13	66.07	69.22	66.15	68.26	69.92
49	66.59	66.70	67.94	66.59	70.49	66.77	69.79	71.56
50	67.03	67.24	68.74	67.03	71.93	67.35	69.07	72.41
51	67.46	67.78	69.57	67.46	73.49	68.05	69.78	73.97
52	68.03	68.33	70.49	68.03	75.20	68.92	70.08	75.48
53	68.67	68.88	71.42	68.67	77.06	69.87	70.52	77.19
54	69.58	69.44	72.40	69.58	79.04	70.40	71.72	79.36
55	70.19	70.00	73.36	70.19	80.98	70.89	72.36	81.23
56	70.81	70.57	74.30	70.81	82.88	71.71	72.23	82.70
57	71.48	71.14	75.22	71.48	84.74	72.12	72.57	84.34
58	72.07	71.72	76.18	72.07	86.58	72.92	72.59	85.81

Table 2.2: Predicted values of USD/INR rates

Quarter	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16
45	65.96	65.69	65.05	64.79	64.55	64.92	65.05	64.78
46	66.20	65.67	66.33	65.56	65.06	66.06	66.35	65.56
47	67.89	67.02	67.62	66.36	65.57	67.16	67.63	66.37
48	69.37	68.21	69.04	67.13	66.10	68.44	69.07	67.16
49	71.19	69.70	70.32	67.94	66.63	69.48	70.31	67.99
50	70.80	68.96	71.69	68.74	67.08	70.71	71.66	68.71
51	71.84	69.56	73.25	69.57	67.50	72.01	73.09	69.46
52	72.55	69.92	74.93	70.48	68.09	73.41	74.79	70.44
53	73.43	70.48	76.76	71.42	68.74	74.92	76.67	71.52
54	75.10	72.02	78.77	72.39	69.66	76.53	78.89	72.92
55	76.20	72.72	80.71	73.35	70.27	78.10	80.83	73.97
56	76.47	72.69	82.61	74.29	70.90	79.65	82.74	75.02
57	77.19	73.15	84.48	75.21	71.57	81.17	84.64	76.10
58	77.60	73.20	86.35	76.17	72.16	82.64	86.46	77.12

Table 2.3: Predicted values of USD/INR rates

Quarter	Model 17	Model 18	Model 19	Model 20	Model 21	Model 22	Model 23	Model 24
45	65.54	64.43	65.03	64.74	64.44	65.55	56.06	65.69
46	65.49	64.79	66.29	65.46	64.83	66.51	57.04	65.64
47	66.83	65.36	67.61	66.46	65.38	68.12	58.77	66.98
48	68.10	66.08	69.13	67.57	66.07	69.78	60.24	68.16
49	69.58	66.70	70.40	68.59	66.66	71.45	62.04	69.66
50	69.07	67.25	71.83	69.56	67.15	72.20	62.86	68.88
51	69.87	67.95	73.42	70.70	67.73	73.75	64.44	69.47
52	70.44	68.81	75.22	72.16	68.56	75.22	66.16	69.81
53	71.18	69.75	77.20	73.73	69.50	76.90	68.05	70.35
54	72.30	70.26	79.13	74.87	70.31	79.10	70.46	71.88
55	72.90	70.74	81.00	75.95	70.84	80.97	72.57	72.57
56	73.04	71.56	82.97	77.37	71.66	82.42	74.22	72.52
57	73.31	71.96	84.72	78.30	72.18	84.06	76.00	72.96
58	73.55	72.75	86.62	79.71	72.94	85.52	77.80	73.00

Table 2.4: Predicted values of USD/INR rates

Quarter	Model 25	Model 26	Model 27	Model 28	Model 29	Model 30	Model 31	Model 32
45	65.39	65.52	65.94	64.85	65.02	64.79	64.92	65.53
46	66.29	66.52	66.20	65.91	66.27	65.57	66.06	65.43
47	67.73	68.11	67.88	66.93	67.53	66.39	67.15	66.74
48	69.26	69.77	69.36	68.13	68.93	67.20	68.43	67.99
49	70.70	71.39	71.20	69.16	70.18	68.03	69.48	69.48
50	71.41	72.13	70.74	70.28	71.47	68.77	70.64	68.90
51	72.76	73.56	71.69	71.55	72.92	69.52	71.88	69.69
52	74.04	75.06	72.48	72.86	74.58	70.51	73.30	70.23
53	75.48	76.80	73.50	74.31	76.44	71.60	74.90	70.94
54	77.33	79.20	75.58	75.89	78.66	73.01	76.79	72.05
55	78.92	81.07	76.77	77.40	80.60	74.08	78.42	72.62
56	80.13	82.54	77.16	78.90	82.51	75.13	80.03	72.73
57	81.52	84.23	78.03	80.39	84.42	76.22	81.65	72.98
58	82.71	85.66	78.50	81.83	86.26	77.24	83.15	73.19

Table 2.5: Predicted values of USD/INR rates

Quarter	Model 33	Model 34	Model 35	Model 36	Model 37	Model 38	Model 39	Model 40
45	65.47	65.81	64.98	64.73	64.91	65.57	64.43	65.02
46	66.48	66.08	66.17	65.42	66.03	65.52	64.82	66.28
47	68.09	67.79	67.44	66.40	67.18	66.83	65.36	67.56
48	69.79	69.42	68.92	67.50	68.54	68.07	66.04	69.03
49	71.42	71.28	70.21	68.52	69.64	69.54	66.64	70.28
50	72.30	71.13	71.56	69.46	70.90	68.90	67.12	71.62
51	73.88	72.35	73.15	70.60	72.29	69.57	67.70	73.08
52	75.48	73.46	74.93	72.04	73.84	70.08	68.52	74.83
53	77.28	74.77	76.90	73.60	75.53	70.80	69.46	76.78
54	79.39	76.49	78.85	74.73	77.17	72.25	70.26	78.95
55	81.22	77.65	80.71	75.80	78.77	72.91	70.80	80.85
56	82.77	78.32	82.69	77.21	80.45	73.02	71.61	82.79
57	84.36	79.05	84.44	78.12	81.96	73.41	72.13	84.64
58	85.89	79.82	86.37	79.53	83.56	73.58	72.89	86.49

Table 2.6: Predicted values of USD/INR rates

Quarter	Model 41	Model 42	Model 43	Model 44	Model 45	Model 46	Model 47	Model 48
45	64.74	65.35	65.40	65.94	64.85	65.47	65.44	64.84
46	65.47	66.15	66.29	66.17	65.92	66.48	66.36	65.86
47	66.44	67.53	67.73	67.84	66.95	68.09	67.94	66.94
48	67.50	68.99	69.26	69.31	68.15	69.79	69.62	68.23
49	68.50	70.43	70.73	71.16	69.19	71.42	71.27	69.32
50	69.38	71.00	71.36	70.66	70.26	72.30	72.05	70.48
51	70.40	72.32	72.63	71.60	71.47	73.88	73.62	71.84
52	71.81	73.50	73.94	72.36	72.82	75.48	75.18	73.32
53	73.37	74.87	75.47	73.36	74.35	77.28	76.97	74.96
54	74.82	76.70	77.62	75.43	76.18	79.39	79.12	76.58
55	75.96	78.23	79.26	76.60	77.75	81.22	80.93	78.12
56	77.38	79.38	80.53	76.97	79.31	82.77	82.47	79.77
57	78.42	80.72	82.01	77.82	80.88	84.36	84.04	81.24
58	79.80	81.86	83.23	78.28	82.36	85.89	85.58	82.82

Table 2.7: Predicted values of USD/INR rates

Quarter	Model 49	Model 50	Model 51	Model 52	Model 53	Model 54	Model 55	Model 56
45	64.91	65.80	65.56	64.97	65.36	65.52	65.83	64.73
46	66.03	66.01	65.47	66.17	66.26	66.51	66.11	65.46
47	67.15	67.71	66.78	67.42	67.71	68.09	67.81	66.42
48	68.47	69.31	68.00	68.86	69.28	69.76	69.39	67.48
49	69.55	71.19	69.48	70.12	70.75	71.38	71.26	68.48
50	70.74	70.96	68.79	71.40	71.51	72.13	70.97	69.35
51	72.01	72.17	69.46	72.89	72.91	73.57	72.06	70.36
52	73.52	73.24	69.94	74.62	74.30	75.10	73.10	71.77
53	75.20	74.53	70.65	76.57	75.87	76.87	74.40	73.33
54	77.10	76.24	72.08	78.73	77.73	79.25	76.47	74.77
55	78.73	77.37	72.72	80.61	79.33	81.10	77.70	75.90
56	80.41	78.00	72.81	82.57	80.66	82.61	78.34	77.32
57	82.02	78.70	73.18	84.40	82.04	84.27	79.20	78.36
58	83.58	79.45	73.35	86.28	83.33	85.72	79.91	79.73

Table 2.8: Predicted values of USD/INR rates

Quarter	Model 57	Model 58	Model 59	Model 60	Model 61	Model 62	Model 63
45	65.36	65.31	64.84	65.37	65.82	65.46	65.34
46	66.15	66.10	65.88	66.26	66.06	66.38	66.13
47	67.54	67.50	66.94	67.70	67.75	67.94	67.53
48	69.01	69.00	68.21	69.24	69.32	69.58	69.02
49	70.48	70.47	69.28	70.71	71.19	71.23	70.49
50	70.99	71.10	70.38	71.35	70.86	71.90	71.02
51	72.24	72.48	71.65	72.63	71.94	73.36	72.31
52	73.46	73.78	73.10	73.96	72.97	74.86	73.57
53	74.91	75.29	74.74	75.52	74.25	76.62	75.08
54	77.01	77.15	76.58	77.66	76.30	78.99	77.17
55	78.59	78.69	78.16	79.30	77.50	80.83	78.76
56	79.80	79.96	79.81	80.60	78.12	82.33	80.01
57	81.22	81.29	81.36	82.07	78.96	83.97	81.43
58	82.39	82.56	82.92	83.31	79.66	85.44	82.64

AIC and Chi- square value of each model were calculated and tabulated in table number3

Table 3: The Akaike information criterion and Chi square value for each model

Model Number	Chi Square value	AIC value	Model Number	Chi Square value	AIC value
1	0.999	-152.448	33	0.038	-153.413
2	0.999	-150.461	34	0.369	-148.93
3	0.919	250.8734	35	0.050	-153.532
4	0.999	283.333	36	0.614	-147.44
5	0.040	-156.996	37	0.179	-153.154
6	0.996	-151.222	38	0.966	-149.265
7	0.981	264.3548	39	0.997	-147.638
8	0.038	262.3792	40	0.047	-153.442
9	0.609	252.852	41	0.597	-147.845
10	0.973	263.8711	42	0.265	-151.87
11	0.050	264.444	43	0.156	-151.791
12	0.919	-148.556	44	0.557	-151.818
13	0.999	-149.174	45	0.309	-147.297
14	0.256	230.9034	46	0.390	263.8679
15	0.048	248.0393	47	0.049	-151.874
16	0.871	247.0005	48	0.254	-151.592
17	0.964	-150.752	49	0.188	-151.482
18	0.997	-149.237	50	0.416	-146.997
19	0.040	-155.11	51	0.973	-147.295
20	0.589	-149.425	52	0.056	-151.775
21	0.997	-149.637	53	0.143	-151.444
22	0.048	-153.801	54	0.044	-151.444
23	0.741	-148.5997	55	0.376	-147.448
24	0.978	-149.161	56	0.606	-145.846
25	0.183	-153.408	57	0.227	-150.187
26	0.046	-153.787	58	0.209	-149.919
27	0.528	-149.281	59	0.254	-149.829
28	0.354	228.9106	60	0.152	-149.819
29	0.056	-153.714	61	0.407	-145.478
30	0.861	-147.297	62	0.055	-150.155
31	0.223	-153.461	63	0.208	-148.194
32	0.974	-148.819			

Model which had AIC value closer to zero and higher Chi square p-value was chosen. Based on observation model 39 which had AIC value - 147.683 and Chi square p-value 0.997 was chosen. Model 39 consists of Call rate, CAD and FOREX as microeconomic factors. So, result shows that these three factors contribute maximum in fluctuating USD/INR rate. Before predicting USD/INR rate from Q3 2018 to Q2, correlation between these three parameters were calculated and tabulated below in table 4.

Table 4: Correlation between Call rate, FOREX and CAD

	Call Rate	CAD	FOREX
Call Rate	1	0.093738	0.044855
CAD	0.093738	1	0.071009
FOREX	0.044855	0.071009	1

Next we assumed one factor to increase and decrease by 1% and found out expected percentage increase and decrease in other two factors using R programming.

Table 5: Correlation value of macroeconomic factors

Increase by 1%	Call Rate	CAD	FOREX	Decrease by 1%	Call Rate	CAD	FOREX
Call Rate	1%	0.0937%	0.0449%	Call Rate	-1%	-0.0937%	-0.0449%
CAD	0.0937%	1%	0.0710%	CAD	-0.0937%	-1%	-0.0710%
FOREX	0.0449%	0.0710%	1%	FOREX	-0.0449%	-0.0710%	-1%

As we already had intercept and correlation values pertaining to model 39, same values were used with corresponding microeconomic factors' predicted values of percentage increase/decrease. Let us consider there was 1% increase in Call rate. Using these values USD/INR exchange rates was calculated.

Y = Quarterly currency return

β_0 = Intercept

β_1 = coefficient value of Call rate

β_2 = Coefficient value of CAD

β_3 = Coefficient value of FOREX Predicted values of

X1 = Call rate quarterly return

X2 = CAD quarterly return

X3 = FOREX quarterly return

Following regression equation was used: $Y = \beta_0 + \beta_1 * X1 + \beta_2 * X2 + \beta_3 * X3$

$$\beta_0 = -0.0109851$$

$$\beta_1 = -0.001089$$

$$\beta_2 = -0.0044969$$

$$\beta_3 = 0.0008345$$

Based on predicted values:

$$X1 = 1\%$$

$$X2 = 0.09373834\%$$

$$X3 = 0.0448547\%$$

$$Y = -0.0109851 + (-0.0109851 * 1\%) + (-0.001089 * 0.09373834\%) + (0.0008345 * 0.0448547\%)$$

$$Y = -1.46380210485082\%$$

Now this value was multiply by Q2 2018 predicted value to get Q3 2018, similarly Q3 2018 value was used to predict the Q4 2018 value and so on. Similarly process was followed assuming CAD and FOREX to increase or decrease by 1% respectively. Using these values USD/INR rate were predicted and tabulated in table 5.

Table 6.1 – 6.3: Predicted values of USD/INR exchange rate

Table 6.1: Predicated values when Call rate is assumed to be increased/decreased by 1%

Quarter	Predicated Values (1% increase)	Predicated Values (1% Decrease)
58	72.89	72.89
59	73.95	74.76
60	75.04	76.69
61	76.13	78.66
62	77.25	80.69
63	78.38	82.77
64	79.53	84.90
65	80.69	87.08
66	81.87	89.32

Table 6.2: Predicated values when CAD was assumed to be increased/decreased by 1%

Quarter	Predicated Values (1% increase)	Predicated Values (1% Decrease)
58	72.89	72.89
59	74.32	74.39
60	75.79	75.93
61	77.28	77.50
62	78.81	79.10
63	80.36	80.74
64	81.95	82.41
65	83.56	84.11
66	85.21	85.85

Table 6.3: Predicated values when FOREX rate was assumed to be increased/decreased by 1%

Quarter	Predicated Values (1% increase)	Predicated Values (1% Decrease)
58	72.89	72.89
59	74.34	74.38
60	75.82	75.90
61	77.33	77.45
62	78.88	79.03
63	80.45	80.65
64	82.05	82.30
65	83.69	83.98
66	85.36	85.70

VI. CONCLUSION

Linear regression method helps to build model which predicts the values for dependent variable considering single or

multiple independent variables. The present study reveals that linear regression method has effectively been used to predict the future values of currency from Q3 2018 to Q2 2020. The developed model is built considering various macroeconomic

factors. Similar models can be modelled considering more macroeconomic parameters. The macroeconomic factors which were used as independent variable were carefully analysed ensuring data consistency. AIC value with p value of Chi-square is used in tandem to select the best goodness of fit among these models. Despite the fact that this study succeeded to model and predicts the expression values for the given data, the robustness of suggested model is not appropriately assessed to generalize the model. This work leads to many other applications such as the predicting value of one of the independent variables provided other factors are known. The inclusion of other macroeconomic factors into the model may improve the robustness of the proposed model.

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The role of change leadership on the transformation of the Kenya Police Service

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Abstract: The Kenya Police Service as an organization has been undergoing through a process of transforming itself with a view to becoming a more reliable and accountable organization. This study aimed at understanding the role of change leadership towards the transformation of the Kenya Police service. Data was collected by administering questionnaires to the employees across all the ranks in the Kenya Police service based in the Police headquarters. A sample size of 308 was arrived at using proportional allocation through a stratified sampling method. A response rate of 89% was realized. Descriptive statistics were used to obtain a general understanding of the Kenya Police Service demographic information. Further, inferential statistics such as correlation and regression were used to analyze the data and testing of hypothesis. R^2 value of 0.119 implied that 11.9% of the organizational transformation was influenced by change in leadership. These results revealed a significant positive relationship between change leadership and the transformation of the Kenya Police Service. The results presented in this study provide a compelling evidence for the importance of change in leadership towards the efforts of ensuring optimal organizational transformation for better service delivery in the Kenya Police Service.

Keywords: Organizational culture, Organizational Transformation, Change Leadership, Kenya Police Service,

1. Introduction

The Kenya Police Service has been undergoing through a process of organizational transformation in order to change itself to a more accountable, transparent, humane and responsive organization with a view to ensuring that its operations are congruent with the current Kenya Constitution. Previous studies have shown that, the performance of the Kenya Police Service lacked efficiency, transparency and accountability. Further, the studies have shown that, the Kenya Police Service is characterized by low morale, poor discipline and questionable integrity, a situation which affect employees' performance. Additionally, a lot has changed in the global arena in terms of policing practices and hence the need for a paradigm shift which aims at realizing global policing competitiveness.

There has been a great need to engage the leadership of the Kenya Police Service in open discussions for the purpose of looking for ways which are geared towards strengthening this important security organization and its oversight mechanism just the way it is provided for in the constitution.

Leadership is remarkably of great significance for organizational success in our today's dynamic world (Ellwood, 2010). As it is opined by Friedman (2006), on daily basis, the world is becoming flatter and therefore, the expansion of the modern world has set the prerequisite for many kinds of leaders so as to exercise leadership that is effective in this global village. Subsequently, this new world order requires leaders to be prepared in terms of having the traditional skills as well as cross-cultural skills for the purpose of navigating effectively the muddy waters of globalization.

Nevertheless, there is no clear cut definition for global leadership. For instance, this development is witnessed in the United States of America involvement in a United States Global Leadership Coalition (U.S. Global Leadership Coalition, 2014) where people like former Senator Kay Hagan have been active in the world network of at least four hundred businesses and Non-Governmental Organizations with leaders from various businesses, faith based and other sectors seeking resources to elevate diplomacy and defense for safety throughout the world.

1.1. Change leadership

Higgs and Rowland (2000) have described Change Leadership as the ability by a leader to influence the followers through personal encouragement, vision and motivation by accessing resources for the purpose of building a platform that is solid for change. As it has often been viewed by American Management Association (1994), Leadership is key to successful change. Further, as Burns (2003) pinpoints, change, is a constant feature of organizational life and the ability to lead it is seen as a core competence of successful organizations.

Burns (2003) posited, the world that we live in has been turned upside down where companies are investing more resources in technology and leadership expertise into regions that were once off limits by way of acquiring enterprises that are new where joint ventures are formed by creating new global businesses from the ground up. Many major companies are going through significant changes which include outsourcing, downsizing, reengineering, self-managed work teams, flattening organizations, and doing routine jobs with automation and computers (Robbin & Langton, 2010).

1.2. Organizational Transformation

Organizational transformation is a process in which leaders and followers help each other to advance to a higher levels of morale and motivation (Higgins, 2010). Transforming organizations into proactive entities reduces costs by eliminating duplication and non-value-added processes which is key to improving the bottom line and improving product and or service delivery concurrently. In this case, a transformational program will provide the opportunity of transforming an organization from being

reactive to proactive. Thus, organizational transformation is more than simply changing the way a company conducts its business because it is about changing the organizational culture with a view to adapting to the new challenges. This is a clear indication that an organization must implement strategies that will sustain its competitive advantage by making it remain ahead of the others.

However, in maximizing transformational efforts, Higgins (2010) argued that, leaders must learn how to align leadership and all employees with the new ways of transacting business with a view to sustaining the transformation. He further posited that, organizational transformation is a permanent commitment which is geared toward improving all levels of an organization in respect of the quality, customer service, development and participation. According to Alexander, Gagnon and Dichter (1993), many leaders in the contemporary world find themselves aggressively trying to transform their organizations by seeking radical performance improvement through behavioral change and capabilities throughout the organization. Nevertheless, it has been found out that, most leaders lack a proven way concerning thinking about the challenge.

Organizational transformation in Africa is a welcome breath of fresh air which sweeps across the continent. However, it is an involving process that calls for change. Hence, in order to deliver the desired transformation, Moja (2010) articulated that, a leader requires to focus on how the change process is driven. Kotter (1996) asserted that, as a leader leads transformation in an organization, he or she should be strong and unwavering in the commitment perspective from the top leadership or change leader including the team that drives and supports the change leadership process. This perspective is meant to gain acceptance and commitment of all stakeholders. According to Pawar and Eastman (1997), "Successful Change Leadership begins with an effective leader who is able to respond and lead the transformation initiative, which can be achieved through creating new systems and structures that can drive renewal and change in an organization".

The outcry for organizational reforms and transformation in Kenya is a fierce endeavor that has been championed by advocates of democracy, equality, equity, which include good leadership and governance. The call for organizational transformation has mainly focused on transforming the leadership, structure and governance of organizations to make those structures more humane, accessible and representative of the society at a large. Therefore, the cause of transforming organizations in public sector in Kenya emanated from the promulgation of the new constitution on the 27th August 2010, where a new dispensation in Kenya's constitutional, social, political and economic order was ushered in. As compared to the earlier Constitutions of 1963 and that of 1969 which faced radical alterations by amending the Executive structure resulting to minimal accountability, Kenya's Constitution of 2010 represents a major paradigm shift with the people, democracy, human rights and the rule of law being the central focus.

1.3. Kenya Police Service

The Kenya Police Service is an organization which is recognized and established in accordance to the constitution of Kenya which came to being in the year 2010. The Kenya Police Service is an entity that has been enacted by the Parliament in accordance to

chapter fourteen of the Kenyan constitution. In addition, the Service has undertaken an ambitious plan of Police reforms which is being championed by the National Police Service and which largely aims at transforming the entire National Police Service into an organization that ultimately will be a world class body characterized by efficiency, effectiveness and responsiveness to the needs and expectations of the citizens of the nation as well as the international community (The Kenya Police Service Strategic Plan 2015-2017). Therefore, this perspective is a paradigm shift in policing in the history of the independent Kenya.

Therefore, the plan focuses on the provision of services to the Kenyan people through the promotion of human rights as well as respecting the rule of the law. Therefore, the content of the plan suggests that, Police officers are willing to engage in democratic reforms of the institution. In post-independent Kenya, this is the first time that this important security organ has demonstrated such a dramatic shift. The plan recognizes that, institutional unaccountability, impunity and corruption are endemic within the Service and therefore, it gives these fundamental issues a priority. There are specific plans and strategies designed to indoctrinate change in the organizational corporate culture within the institution by dealing with impunity, corruption and improvement of accountability (National Police Service Strategic Plan, 2013-2017).

Studies have found out that, when this key institution fails to implement effective change leadership strategies, can lead to costly results. These consequences may include reduced engagement, retention, productivity and performance. Ultimately, an inability to introduce change not only hurts the bottom line but can also put the very future of the Kenya Police Service at risk. Further, studies have shown that, transforming an organization like the Kenya Police Service is ineffective without strong leadership (Wright & Pandey, 1999).

However, in order to consider and implement a solution in line with the broad reforms proposed in the Kenya Police Service, it is pretty imperative that the existing problems regarding the existing policy be identified (Republic of Kenya Economic Survey, 2005). Therefore, this study focused on examining how Change Leadership have impacted the transformation of the Kenya Police Service.

2. Theoretical framework and literature review

This study was mainly informed by the Kurt Lewin's change theory. This theory is one of the most significant theories of organizational transformation which is based round a 3-step process (Unfreeze-Change-refreeze) that provides a high-level approach to change. Lewin's further postulated that stagnation brings decline in many dynamic organizations. Thus reorganizations, adjustments and other changes are necessary within organizations. In a stable situation, people should overcome resistance by letting go the old habits and structures. This perspective though is a difficult assignment because change disrupts the old habits and structures because of their safety and predictability. This change which focuses on behavioral modification of people dwells on three stages namely: unfreezing where people realize that something is going to happen as they deal with strong emotions that include denial,

uncertainty and doubt. After unfreezing, people move to the changing state which is significant when change is implemented and then refreezing stage where the change is anchored or solidified with a view to having the people stick to the new way of life so that they can act according to the new situation (Mulder, 2012).

As Eisenbach, Watson and Pillai (1999) stated, Leadership is imperative to the Change Leadership process and it is underscored by the fact that change, by definition requires developing new systems after which the new approaches are anchored or solidified, while Change Management depends on the enactment of Leadership. According to 360⁰ (2017) citing Kotter (1995), transforming an organization is more than simply changing the way an organization conducts its daily business. Rather, Change Leadership entails changing the culture of an organization which largely is meant to adapt to the new challenges. This means that, an organization must implement strategies that will sustain its competitive advantage. However, an organization must learn how to align leadership and all employees with the new ways of conducting business with a view to sustaining the transformation in order to maximize the transformation efforts.

Kotter (1996) opined that, transforming an organization is a permanent commitment which is geared towards enhancing the quality, customer service, development and participation in all aspects of the organization. In this regard, top leadership plays a critical role in the efforts of transforming an organization. Thus, leaders should model the way by setting the direction and also in the provision of a company's vision as they motivate employees in overcoming the obstacles between what occurs today and what needs to occur in the transformation for the future. Leadership teams must inspire all levels of the organization to "want to" work toward the new outcomes and create a new future for the organization. Wanting to change and actually implementing change are two different things.

Subsequently, Anderson and Anderson (2001) pointed out that, transformational change happens at the core of the organization. This transformation as it is stated, has the potential to revolutionize the organization from the inside out. Further, Anderson and Anderson (2001) asserted that, for transformation to become a reality, the details are of the upmost priority. To them, it is about resources, timelines and budgets. It's about creating a vision for the future that has sustainable outcomes. Transformational efforts bring energy to the organization in the way of improvement and renaissance or rebirth. Creating an effective vision is the first step towards organizational transformation. Anderson and Anderson (2001) articulated the fact that, skill's mastery entails the aspects of developing a task fully.

In this respect, there is nobody who can specialize in one area by neglecting the rest because if one wants to be a masterful communicator, he or she will require sharpening both speaking and listening skills. Equally, a masterful golfer will have to be in a position of hitting both the long ball and the short ball excellently. The more one improves skills in an area, Anderson and Anderson

(2001) argued that, such a person/leader will exhibit developmental needs in the followership as it is opposed to the perspective of neglecting developmental needs which is a sign link that is weak.

Therefore, the principle of mastery lies at the heart of taking a multi-dimensional approach to transformation as this perspective suggests that leaders and consultants must become conscious of and competent in all of the different dimensions of transformation, even those that are not yet aware of or comfortable addressing areas that are “in new boxes”. Leading transformation masterfully requires that leaders and consultants attend to the dynamics of different aspects which include organizational structures, systems, and business processes and also those which are most familiar to organizational development in terms of internal reality, such as perception, feelings, interpersonal relationships, and culture (Anderson & Anderson, 2001).

3. Methodology

This study was based on positivism approach which empirically establishes a relationship between variables being studied by formulating hypothesis based on study objectives. Therefore, the study sought to be objective with facts testing relationships among variables empirically. This was realized as the researcher deployed hypotheses testing method which were based on the facts which were obtained from data collection exercise where the hypotheses were to be rejected or accepted.

The study adopted a descriptive explanatory design, where both qualitative and quantitative methods were used in the collection of data concerning the current status of the subject under the study (Mugenda & Mugenda, 2003). The target population of the study was 1349 respondents who were Police officers based at Police headquarters, Vigilance House which is along Harambee Avenue within Nairobi City County. The sample size was 308 respondents, a figure that the researcher arrived at using proportional allocation through a stratified sampling method. This was achieved by dividing the population into several sub-populations (strata) that are individually more homogeneous than the total population. In this case, a researcher is able to get a more precise estimate for each stratum and consequently being able to accurately estimate each component resulting to a better estimate of the whole population. Subsequently, this sample size was used in availing information through a questionnaire which was the research tool.

This study mainly used primary data that were collected through a semi-structured questionnaire adopted from similar transformational leadership studies and tailored to meet the needs of the present study. The questionnaire was administered to the employees across all the ranks in the Kenya Police service based in the police headquarters. To check for the reliability of the data collection instrument, Cronbach's Alpha technique was used in measuring the internal consistency where Alpha values range from 0 to 1, with the reliability increasing as the alpha value increases. The value was 0.780 for change leadership. Descriptive statistics were used to obtain the general understanding of the respondents' demographic information as well as to explain the distribution of scores in the scale Likert questions, while linear regression was used to test the hypothesis.

4. Results and discussion

The researcher distributed 308 questionnaires at the Kenya Police headquarters, Vigilance House which is along Harambee Avenue. In this case, out of the 308 questionnaires which were administered for the data collection to the respondents' population, a total of 273 questionnaires accounting for 89% were returned. After data cleaning, only 269 responses were used for the final analysis and according to Babbie (2004); Mugenda and Mugenda (2003), over 50% response rate is adequate for analysis, while over 70% is rated as a very good response rate. Therefore, based on this assertion, 89% response rate was consequently rated as very good and deemed suitable for the analysis.

4.1. Change Leadership

Table 1 provides a general profile descriptive statistics on Change Leadership parameters considered in this Study. The results showed that, the most dominant aspect of Change Leadership in the Kenya Police Service was that the institution has clear goals and objectives with a mean of 3.13, followed by clear vision in the ongoing Police reforms with a mean of 3.05. The least scored aspect was that the top leadership has created a sense of urgency in its reform agenda initiative which had an average of 2.81. However, it is worth noting that, the four aspects of Change Leadership evaluated were moderately dominant with an overall mean of 2.97.

Table 1: Descriptive statistics for measure of change leadership

Change Leadership	Mean	Std. dev	Overall Mean
The Kenya Police Service has clear Vision in the ongoing Police reforms and Change Leadership Initiatives	3.05	.29	
The Kenya Police has clear goals and objectives in its Organizational Transformation initiatives	3.13	.17	2.97
The Kenya Police Service top leadership has created a sense of urgency in its reform agenda	2.81	.18	
The Kenya Police top leadership has championed the ongoing reforms in the Kenya Police Service	2.87	.24	

4.2. Hypothesis testing

The results in Table 2 designate that the influence of Change Leadership on Organizational Transformation is statistically significant ($p < 0.05$). The results further show that, Change Leadership moderately correlate with Organizational Transformation up to 0.344 reflecting a weak positive relationship. R squared depicts that, Change Leadership explain 11.9 % variation on Organizational

Transformation. This proportion that is explained by Change Leadership resources was significant ($F=$ statistically 35.942, $p<0.05$). Based on these results, H_01 is not supported. The Study therefore rejected the hypothesis. In addition, the coefficient of Change Leadership is negative, denoting that, a unit change in Change Leadership results to a negative change of 0.344 on Organizational Transformation agenda.

Table 2: Summary of the results for regression Analysis on the effect of change leadership

MODEL SUMMARY						
Model	R	R square	Adjusted R square	Std. Error of the estimate		
1	0.344 ^a	0.119	0.115	0.329		
ANOVA						
Model	Sum of squares	Df	Mean Square	F	Sig	
Regression	3.886	1	3.886	35.942	0.000 ^a	
Residual	28.866	267	108			
Total	32.752	268				
Coefficients						
Model	Unstandardized Coefficients		Standardized Coefficient		T	Sig
	B	Std. Error	Beta			
1 (Constant)	0.609	-0.066			9.245	0.000
Change Leadership	-0.127	0.021	-0.344		-5.995	0.000

Predictor (Constant), Change Leadership

The Leadership in the Kenya Police Service has put in place an ambitious plan of transforming the Service with a view to ensuring quality service delivery to its customers based on preset achievable milestones. Therefore, it is imperative to acknowledge that, transforming an organization is a process depended on various parameters where Change Leadership is believed to be amongst the most important paradigm in defining the magnitude of Organizational Transformational in any organization (Higgins, 2010). The results from the study indicated that, indeed Change Leadership has a significant relationship as far as transformation of the Police Service in Kenya is concerned. This was supported by majority of the respondents acknowledging that the Leadership of the Service has championed the new reforms which are supported by a clear vision, specific goals and objectives which are aimed at the transformational initiative.

Subsequently, Change Leadership has introduced a new dimension of ideas geared towards the best practices in Leadership in ensuring effective service delivery. Therefore, it has been established that, prompt Change in Leadership is a well-intentioned undertaking for the purpose of transforming the Service.

5. Conclusion

The study concluded that, Organizational Transformation is highly influenced by Change Leadership, a perspective which implies that, there is need for the top Leadership within the Kenya Police Service to improve on the aspect of championing the new reforms as well as moving fast as far as the implementation of the reform agenda is concerned. This will ensure total adherence to the set objectives and vision towards the transformational initiative beyond self. In addition, high sense of commitment and leadership quest for reforms in the Service are being regarded amongst the major driving forces in terms of achieving quality service delivery. Subsequently, the transformational initiative should be quantified based on appraisal of the performance leadership as well as change in leadership, which are necessary in terms of the performance outcome being congruent to the expected results.

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Does Indian Banks are ready for Internal Ratings based Approach for Credit Risk?

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Abstract: The Basel III regulations have suggested reducing mechanistic reliance on credit ratings given by external Credit Rating Agencies under Standardized approach (SA) to Credit Risk Management. The committee recommended the implementation of revised SA and Internal Ratings based Approach (IRB) approach from 1 January 2022 to enhance the reliability in the calculation of risk-weighted assets (RWAs) and get better banks' capital ratios. The Standardized approach used by Indian Banks for Credit risk may not be helping the Indian banks in controlling the rising NPAs leading to increasing provisions, reducing profitability and capital ratios of Indian Banks.

Keywords: Banking, Credit Risk, Basel III, Standardized approach (SA), IRB approach.

Introduction:

The Basel committee on Banking Supervision (BCBS) provided two main approaches for calculating Credit Risk Weighted Assets as per Basel II regulations. They are Standardized Approach (SA) and internal ratings Based (IRB) approach. Under Basel III reforms the BCBS has suggested banks to conduct sufficient due diligence on loans given using external ratings and also suggested not rely on external ratings alone. The Basel committee has also recommended the implementation of revised Standardized approach (SA) and IRB approach from 1 January 2022. At present Indian Banks are using Standardized approach for credit risk as per RBI guidelines than using IRB approach for Credit Risk Management. Basel committee has recommended implementation of revised Standardized approach (SA) and IRB approach from 1 January 2022. As per new recommendations, banks using credit ratings as per Standardized approach (SA) to credit risk has conduct satisfactory due diligence and not to rely on external credit ratings alone . The Basel committee has also suggested the option of a more detailed internal risk weighting approach to rated corporate exposures. The current approaches to credit risk management in banks as per Basel regulations are

Standardized approach (SA) - Under the Standardized approach (SA) banks use a prescribed risk weight schedule for calculating Risk Weighted Assets (RWAs). As per new recommendations, banks using credit ratings as per Standardized approach (SA) to credit

risk has conduct satisfactory due diligence and not to rely on external credit ratings alone . The Basel committee has also suggested the option of a more detailed internal risk weighting approach to rated corporate exposures.

Internal ratings-based (IRB) approach - Under this approach, Effective internal ratings based approach approved by the banking supervisor can be used by banks for credit risk management.

Back Ground:

The alarming rise of NPAs of Banks in India from 2015 to 2018 has affected the profits and reputation of Indian Banks due to higher provision for NPAs.

The problem:

The alarming rise of NPAs of Banks in India from 2015 to 2018 has affected the profits and reputation of Indian Banks due to higher provision for NPAs indicating poor credit risk management of Indian Banks.

Review of Literature:

Andrew Campbell (2007) observes that ineffective internal control systems as the important factor in controlling the rising NPAs by banks in many countries. He also observes that bank management has to ensure that suitable risk measures were in place for the prevention of NPAs as per Basel guidelines on banking supervision. He emphasizes the need for effective system of banking supervision and regulation to prevent NPAs. Bank supervisors must be satisfied with the credit risk management process of banks with adequate internal controls for management of credit risks to prevent NPAs.

Meena Sharma (2005) observed that NPAs will decrease the profitability of the banks, decrease the credit growth in the economy. So Efficient Credit approval and review mechanism, sound legal framework and strong political will find better solution to the problem of growing NPAs of Indian Banks.

Objectives of the Study:

1. Analyze the Credit Risk Management practices of Indian Banks.
2. Suggest suitable Credit Risk Management framework to Indian Banks.

Methodology of the Study:

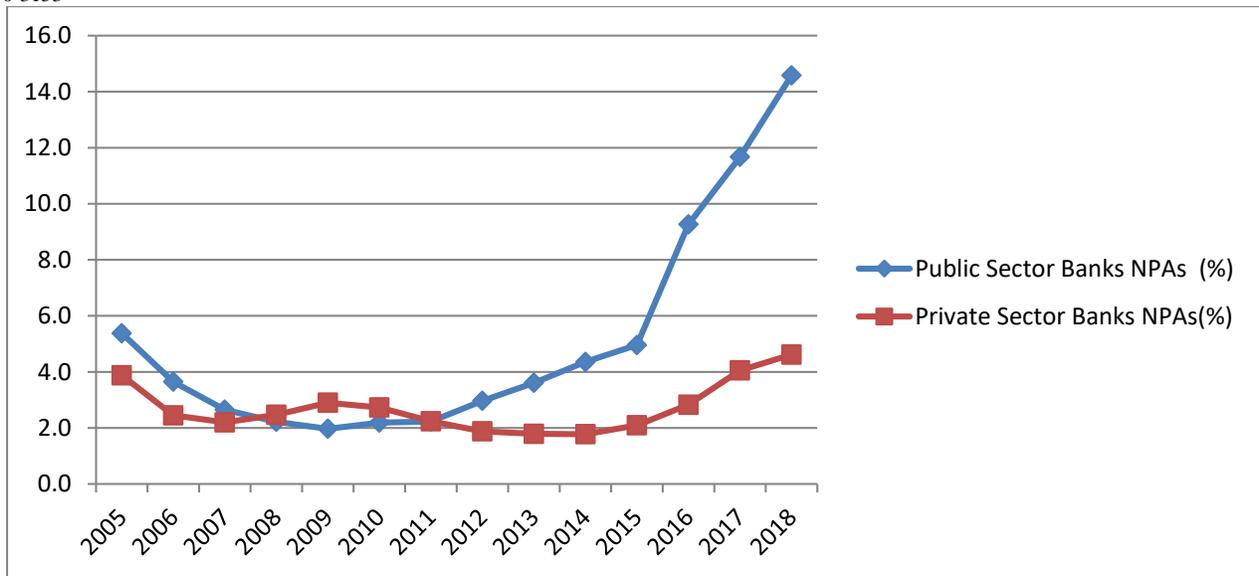
Analyze the data on existing NPAs, Credit Risk management practices of Indian Banks for the last three years by collecting secondary data from banks, RBI and internet sources.

Analysis, Interpretations and Suggestions:

Table 1: Gross NPAs of Indian Public and Private Sector Banks from 2005 to 2018

	Public Sector Banks Gross NPAs (%)	Private Sector Banks Gross NPAs (%)
2005	5.4	3.9
2006	3.7	2.5
2007	2.7	2.2
2008	2.2	2.5
2009	2.0	2.9
2010	2.2	2.7
2011	2.2	2.2
2012	3.0	1.9
2013	3.6	1.8
2014	4.4	1.8
2015	5.0	2.1
2016	9.3	2.8
2017	11.7	4.1
2018	14.6	4.6

Source: RBI

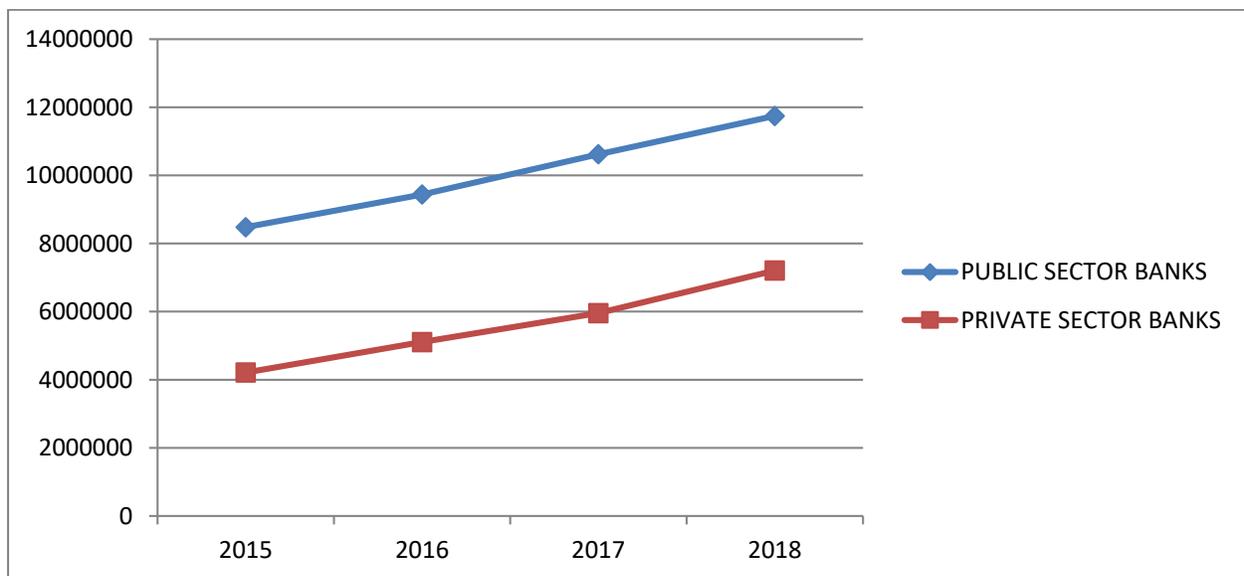


Graph1: Gross NPAs of Public and Private Sector Banks in India from 2005-2018

Table II: Public and Private Sector Banks advances to Sensitive sectors

	2015	2016	2017	2018
Public Sector Banks	8478012	9438330	10619911	11744076
Private Sector Banks	4213026	5105458	5955673	7204958

Source: RBI



Graph2: Loans and advances of Public and Private Sectors Banks to Sensitive Sectors from 2015-2018

Existing Credit Risk Management Framework in Indian Banks:

All the Banks in India are following standardized approach to credit risk in India prescribed by RBI as per Basel II guidelines. Basel III-Pillar 3 disclosures of Public and Private Sectors banks reveal that the industry wide exposures of both private and public sector banks have increased resulting in High level of NPAs during 2015-18. It indicates the weakness in analyzing the changing macro and industry factors by the banks current credit control systems in limiting their exposures to the respective sectors relying only on external risk ratings. It indicates the weakness in credit appraisal system, credit monitoring mechanism and governance followed at Indian banks leading to rising NPAs in public sectors banks.

Addressing the problem:

Over reliance on credit ratings for credit risk by external rating agencies as per Standardized approach is not helping the banks to monitor the loans and advances on timely basis for early recognition of problem loans. Reliance on external rating will have ripple effect on all the banks if the rating downgrade happens to the loan assets. Basel Committee has come up with revised SA and IRB approach to be implemented by banks effective from 1 January 2022. As per new recommendations, banks using credit ratings as per Standardized approach (SA) to credit risk has to conduct satisfactory due diligence and not to rely on external credit ratings alone . The Basel committee has also suggested the option of a more detailed internal risk weighting approach to rated corporate exposures. Effective internal ratings based approach approved by the banking supervisor helps the banks for better credit monitoring reducing the level of NPAs.

Conclusion:

Indian Banks has to implement effective internal risk rating systems approved by RBI as per Advanced Internal Ratings approach for managing credit risk resulting in a low level of NPAs.

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The Use of Edmodo In Blending And Segmenting Interactively

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Abstract- The impact of learning through the intergration of information and technology (ICT) has brought a big impact towards the teaching and learning (T&L) processess. This is in line with the growth of the Fourth Industrial Revolution era in which most educators need to move ahead in ensuring the way of learning English should be fun and enjoyable. One of the tool used is Edmodo, that offers the communication and collaboration of three main stakeholders interactively which includes teachers, pupils and parents. The targeted pupils who did not pass the English Literacy Screening (LBI) had been detected to have difficulties in mastering the blending and segmenting skills especially the sounds and words. Therefore, this study aims to determine the effectiveness of using Edmodo in blending and segmenting among 50 Year 2 pupils in two different schools, one in Setiu Terengganu and another one in Brickfields, Kuala Lumpur. Various interactive activities through this Edmodo application had been prepared so as to give the pupils opportunity to learn in a fun and enjoyable way such as Unleash Your Voice, Sketch Up and Vocab Games. Pupils can easily record their voice to complete the blending and segmenting tasks; sketch the letters and words as well as drawing and finally, pupils can enrich the English vocabulary through Vocab Games. Besides being monitored by the teachers, the parents also have the chance to keep on track with the pupils' progress and academic performance of the children. The data of pupils' performances were recorded to provide the evidence. This study used a quasi-experimental design to determine the effectiveness of using Edmodo in blending and segmenting. Pre-test and post-test were used for data analysis to determine pupils' learning outcomes. The final findings had proven that there is an improvement in pupils' English literacy performance. Thus, it is recommended that the usage of the modules through this Edmodo application should be applied in the teaching of blending and segmenting to boost confidence among pupils.

Index Terms- Blending, Edmodo, English Literacy, Segmenting.

I. INTRODUCTION

The use of technology in education has been widely spoken over the last decade. There are many facilities available in schools to expose teachers and pupils to the use of technology. This is because technology is not only expected to enhance interaction between teachers and pupils in the classroom but also impacts on out-of-school life (Iftakhar, 2016). A survey from researcher through interviews with primary school teachers found that most of them still practiced teacher-centred teaching methods. The lack of technology in the teaching method makes teaching and learning process passive and not innovative. Many studies have highlighted the use of technology in education but there are still obstacles that have yet to achieve the desired success. Time, finance, and effort among the factors discussed that contribute to the barriers to using technology in schools (Weston & Bain, 2010). The targeted pupils who did not pass the English Literacy Screening (LBI) had been detected to have difficulties in mastering the blending and segmenting skills especially the sounds and words. This study aims to determine the effectiveness of using Edmodo in blending and segmenting among Year 2 pupils in two different schools, one in Setiu Terengganu and another one in Brickfields, Kuala Lumpur. Integrating technology to classroom learning is considered challenging (Erben, Ban, & Castañeda, 2009). Thus, teachers should concern on the principles of applying technology in language classrooms. A number of principles should be completed to offer pupils with meaningful learning environment (Bersin, 2004).

English Literacy Screening (LBI), which was introduced by the ministry in 2010, is a remedial programme under PPPM specifically introduced to ensure pupils acquire basic literacy and numeracy skills at the end of three years of primary education. Early literacy skills are crucial for children as these skills can help the learning progress of children in future. Children who are left behind in acquiring early literacy skills tend to struggle with reading and writing. As a result, these children tend to receive less practice in reading and less exposure to content knowledge, vocabulary and other language skills than do children who learn to read early and well (Ehri, 2002).

In Malaysia, the mastery of early literacy skills has been a focus since the early years of the Malaysian education system and this issue was especially critical in the 1960s (Sani & Idris, 2013). Many programs have been implemented yet illiteracy among youngsters is still a real problem. In 2011, the Defence Minister of Malaysia, Abdul Latiff Ahmad, revealed that nearly 1,000 out of the 11,000 youths chosen for national service training (PLKN) were illiterate (Special Module for National Service Trainees: Malaysia, 2011). Besides, it was reported in The Star newspaper that three students were barred from taking their Primary School Assessment Test (UPSR), due to their weak academic performance (The Star, 2014). All these issues have led to the conclusion that a better program needs to be executed so that all the children in Malaysia have a stable foundation in early literacy skills. Hence, the Ministry of Education (MOE) has introduced the Literacy and Numeracy Screening 2.0 (LINUS 2.0) program. According to this program, pupils should master the basic skills after three years of their primary education (Sani & Idris, 2013)

Teaching in a primary school, you get to witness a variety of literacy skills from pupils ranging in ages from 6 years old, as preschoolers, right up to pupils who are 12 year olds, the Year 6s. Those pupils who have learning problems or disabilities need to have intervention as soon as possible. Latest reading study provides convincing evidence that pupils who start poorly in reading typically remain poor readers throughout their schooling and beyond (Pullen, Lane, Lloyd, Nowak and Ryals, 2005). There is a research to support the idea of clear and systemic teaching of phonemic awareness, blending and segmenting increase the pupils' ability to improve their understandings. This will improve pupils' word attack strategies and knowledge, which in turn increase their capability to read words in separation and within a prose (Peterson, 2002, Pullen et al, 2005, Qi et al, 2000, Smith, 2003).

Study supports the explicit teaching of segmenting words into their individual sounds and blending individual sounds into words (Smith, 2003). Why these two skills? Evidence supports that phonemic segmentation (e.g., HAT = H-A-T- and blending (e.g., H-A-T = HAT) are the most vital skills which can be taught to pupils to help increase their literacy levels (Qi and O Connor, 2000). Pupils must combine individual sounds to form a word to blend sounds (Vukelich, Christie, & Enz, 2012). Segmenting words is where pupils break up words into individual sounds (McGee, 2007). Phonological awareness is an expansive term, which refers to the consciousness of the sound structure of speech (Vukelich, Christie, & Enz, 2012). One way to help struggling pupils is to offer clear, systematic instruction in phonological awareness and word decoding (Torgesen, 2000). Pupils can then be taught letter-sound correspondences and know that spoken words represented by written words (de Graaff, Bosman, Haselman, & Verhoeven, 2009).

One of the social networking sites for learning purposes that teachers can permit pupils to freely operate in is Edmodo. It is considered Facebook for education because the developers of Edmodo designed the Edmodo interface similar to Facebook. Therefore, it can be considered that pupils who are already Facebook users can use Edmodo without problems. Edmodo is a free online learning management system that allows pupils and teachers to share and discuss texts, images, audio files, and videos safely (Hordequin, 2014). It can be accessed via a web browser or smartphone application. By using Edmodo in teaching and learning, it can provide some pedagogical benefits. It is a tool for enhancing learning because it permits pupils to post comments as well as send notes, links, files, alerts, assignments, events, and direct messages to the teacher. Introvert pupils can use Edmodo to interact with the teacher by asking questions personally and teacher can explain their doubts in the subjects learnt (Looi and Yusop, 2011). This helps to lessen the discomfort of having to ask in front of other pupils. Moreover, Edmodo can motivate learning environment by allowing teachers to reward pupils with badges. Besides, parents are able to check pupils' progress by using Edmodo for Parents.

Most of the pupils who did not pass The English Literacy Screening (LBI), having difficulties in mastering the blending and segmenting skills. The innovative modules used through Edmodo can improve Year 2 pupils' ability to blend the sounds and segment the words interactively. Through Unleash Your Voice activity, pupils can record their voice doing the blending and segmenting tasks. This activity gives a voice to shy or anxious pupils who would go unheard in traditional classrooms. Edmodo breaks down barriers by giving pupils the confidence to communicate, all in a safe, private space. Pupils are instantly familiar with Edmodo's interface and can communicate more easily with each other and with the teachers.

Then, pupils are asked to sketch the letters, words as well as their drawing through Sketch Up! activity. By using their smartphones with Edmodo application, pupils can use sketch features to sketch. This feature can encourage pupils to use their creative side come up with artistic result. Vocab Games activity through quiz features enabled pupils to learn and enrich their English vocabulary. Quiz features include the ability for teachers to create quizzes, edit and load previously created quizzes, provide a quiz description, set the time limit for a quiz, and preview a quiz before sending it to their pupils. Edmodo supports five question types: multiple choice, true/false, fill-in-the-blank, matching, and short answer. When the pupils submit the quiz, the teacher is notified. Once the questions are automatically scored, the grades are populated into the teacher's Edmodo grade book.

II. METHODOLOGY

The study has been carried out on 50 pupils from Year 2 in two different schools, one in Setiu, Terengganu and one in Brickfields, Kuala Lumpur. They were then separated into controlled and experimental group. This study used a quasi-experimental design to determine the effectiveness of using Edmodo in blending and segmenting. Pre-test and post-test were used for data analysis to determine pupils' learning outcomes. The experimental class and controlled class were taught differently. In the experimental class, the pupils were taught blending and segmenting using Edmodo. However, in the controlled class, the pupils were taught blending and segmenting without

Edmodo. In order to see the differences in pupils' learning by using and without Edmodo, the data were collected from the results of the pre-test and post-test that were conducted in the beginning and at the end of the research.

The experimental class in the research was pupils of class A and there are 25 pupils in this class. In the pre-test, the pupils were asked to answer blending and segmenting questions. The pre-test was done in order to see the pupils' score before they were taught by using Edmodo. Based on the result of the pre-test, the mean score was 58.08 with the lowest score was 40 and the highest was 80. After the data were obtained from pre-test, the treatments for the experimental class were conducted by using Edmodo. After the treatment was done, the post-test was conducted.

From the post-test that was done, the result of the post-test showed that there was a difference compared to the result of the pre-test. The mean score of the pupils increased to be 72.64 with the lowest score was 52, while the highest score was 92. After the data were obtained from the pre-test and post-test, it was found that the range of the mean score from the pre-test to post-test was 14.56. The summary result could be seen as follows:

Table 1 Pre-test and post-test mean score for class A

Score	Mean
Pre-test	58.08
Post-test	72.64

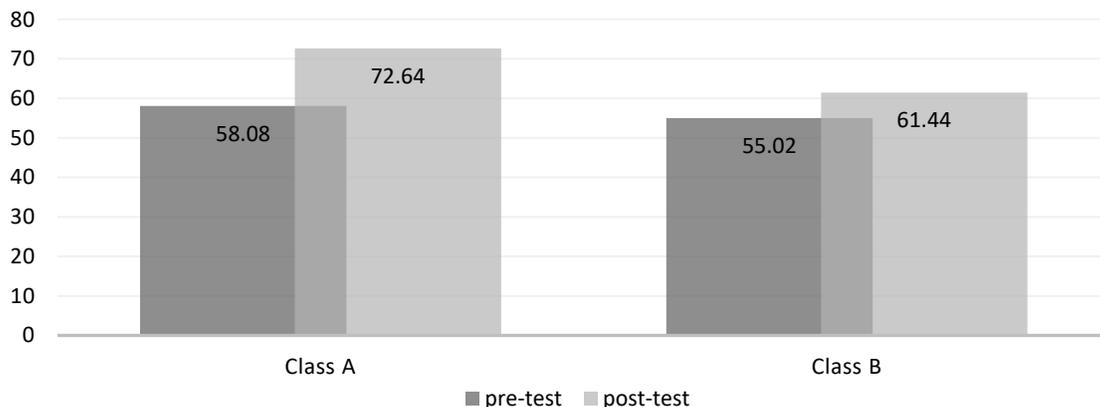
In this research, the controlled class was class B. This class consisted of 25 pupils. The pre-test was done in order to see the pupils' initial score. After the students were given normal lessons, they are asked to answer the post-test questions. The mean score of pre-test was 55.02 and post-test was 61.44. Median of the data was the value that separated between the highest and the lowest data. In this pre-test, the median of pre-test was 56, and post-test was 60. Modus was the scores that were frequently appeared which were 52 for pre-test and 64 for post-test. For the minimum score from the pre-test was 40 and post-test was 52. Meanwhile, the maximum score of both pre-test and post-test was 80. The summary result could be seen as follows:

Table 2 Pre-test and post-test mean score for class B

Score	Mean
Pre-test	55.02
Post-test	61.44

In order to provide more detailed data of result in this study, the summary bar chart below contained pupils' pre-test and post-test mean score in both classes.

Figure 1 Pre-test and post-test mean score in both classes



The above bar chart showed that both classes increased their score in post-test. However, the score in the experimental class increased significantly compared to the score in the controlled class.

III. FINDINGS

In the description of the data which was taken from 25 pupils of experimental class, Table 1 showed the description of the experimental class score. The mean score of pre-test was 58.08 before the Edmodo application was applied in the classroom. Moreover, the pupils' lowest score achieved was 40 and the highest score was 80. After the Edmodo application was applied, the mean score of post-test was

72.64 with the minimum score was 52 and the maximum was 92. Table 2 showed the description of the control class score that has the mean score of pre-test 55.02 with the highest score was 80 and the lowest was 40. In addition, the mean score of post-test was 61.44 with the maximum score was 80 and the minimum was 52. Based on the mean scores in experimental class and controlled class, it can be seen that both of classes has a little gap. During the treatments, the pupils in the experimental class blend and segment words through Edmodo to foster their skill. In addition, the researcher gave treatments to the pupils in the experimental class for about four weeks. Before that, the researcher introduced and gave the explanation about the use of Edmodo in the classroom in the first meeting. Also, the researcher gave a tutorial about how to register, join the group, download material, submit task, etc.

In data analysis, the collected scores of both pre-test and post-test from experimental and controlled class are analysed by using t-test. However, there are two things that needed to analyse before calculating the statistical hypothesis. The test of normality and test of homogeneity. Kolmogorov-Smirnov and Shapiro-Wilk table was used for the normality test. Levene Statistic test was used to calculate the homogeneity test.

After the normality and homogeneity test have been done, the collected data can be analysed to examine the hypothesis by using t-test. A hypothesis test was done to see whether or not there was a significant difference in the result of post-test after the treatment was conducted. The result will indicate the effectiveness of Edmodo on pupils' blending and segmenting skills. The results are shown in the following tables:

Table 3 T-test analysis of pre-test score in experimental class and control class

Score	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Standard Error	95% CI
Pre								-2.809
Test	1.779	0.189	1.018	48	0.314	2.880	2.830	8.569

From Table 3, it indicated the result of t-test analysis of pre-test score in experimental class and control class. In analysing this data, the equal variances assumed is used to read the result because the data is homogeneous as previously recognized. From the table, the independent sample test shows a result of p-value or sig (2-tailed) = 0.314. As this research refers to a significance value of sig $\alpha = 0.05$ (5%), therefore, the p-value is higher than the significance value. In other words, when p-value = 0.314 > sig $\alpha = 0.05$, so the null hypothesis is accepted while the alternative hypothesis is rejected. This indicated that there was no statistically significant difference of the pre-test result between the two classes.

Table 4 T-test analysis of post-test score in experimental class and control class

Score	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Standard Error	95% CI
Post								5.935
Test	0.463	0.500	4.277	48	0.000	11.200	2.618	16.465

From Table 4, it indicated the result of t-test analysis of post-test score in both experimental and controlled class. The equal variances assumed is also used to read the result and refers to a significance value of sig $\alpha = 0.05$ (5%). The independent sample test resulted in p-value or sig (2-tailed) = 0.000. From the result, it can be concluded that the null hypothesis was rejected and the alternative hypothesis was accepted because the p-value (0.000) was lower than sig $\alpha = 0.05$ (5 %). It also meant that there was a significant difference statistically between the experimental and control class in the results of post-test.

In addition to t-test analysis of pre-test and post-test scores, the gained scores of the pre-test and the post-test result are also analysed. Based on the gained scores, the independent sample test resulted in p-value or sig (2-tailed) = 0.000. From the result, it can be concluded that the null hypothesis is rejected and the alternative hypothesis is accepted because the p-value (0.000) is lower than sig $\alpha = 0.05$ (5 %). It also means that there is a significant difference between the gained score in experimental class and control class from their pre-test to post-test results.

From the data analysis, it showed that Edmodo give significant effect of pupils' blending and segmenting skills because the pupils' score after being taught by applying Edmodo is higher than before the treatment. Therefore, the use of Edmodo can be an effective tool in learning blending and segmenting.

IV. CONCLUSION

Based on the results, the positive achievement of the pupils proved that Edmodo can be used as an effective supplementary tool in the classroom because of its features and benefits. Edmodo allows teachers and students to stay connected without difficulty and many Edmodo features allow students to participate and get actively engaged. It can be said that Edmodo makes learning convenient and accessible for all. With Edmodo, a teacher can create and share multimedia resources to support students' learning and provide learning tasks to scaffold students' learning (Wallace, 2014). Students can access to all their online classes in one platform, and this helps to promote learning in any location and at any time via computer, tablets, or smartphones (Hammonds et al., 2013). It is clearly seen that Edmodo can encourage active participation in online class activities and students can access the site to use reference materials easily and conveniently.

However, it appears that using Edmodo could be time-consuming for some students who are not good at using technology. Another drawback of using Edmodo is that it is difficult to follow the procedures. From the study, some pupils suggested more training and detailed instructions from the teacher. This is similar to research conducted by Kongchan (2012) discussing that the teacher tended to overestimate pupils' digital skills, but in fact some pupils did not possess this ICT skill and so they found using technological tools like Edmodo procedure difficult to follow and that might discourage them to be involved. The research, therefore, suggested the need of Edmodo training for pupils. Similarly, the study of Thongmak (2013) shows that in order to successfully incorporate Edmodo into class, a teacher should train pupils who are not familiar with Edmodo. In addition, Lin and Fang (2010) found that some pupils might feel comfortable about learning that is mediated by computers; on the other hand, some may find it difficult to collaborate, interact or communicate with their peers in an environment that is unfamiliar to them. It indicates that there seems to be a link between pupils' learning styles and participation in a web-based learning environment and thus it is one of important points teachers should take into consideration when implementing technology into classrooms.

As a conclusion, Edmodo is an innovative tool that offers many educational benefits. Many useful features offered on the Edmodo platform can be used to encourage online learning environments and enhance classroom experiences. Pupils can access their lesson in any location at any time using smartphones or computer. This can encourage pupils to keep learning inside and outside the classroom.

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Assessing the Role of Green Marketing In Small and Medium Enterprises

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Abstract - This paper strived to explore the roles Green Marketing has on SMEs, taking into consideration the influences of marketing mix, sustainability and how they impact on SMEs. The specific objectives of the paper were to assess the roles of Green marketing benefits on SMEs and also to create customer awareness towards making purchasing decisions that would be beneficial for all stakeholders involved. This study used a content analysis approach. This is because of its major dependence on the secondary source data. Issues bothering on the environment are becoming a very passionate subject these days as pretty much everyone, the government and society has begun to be progressively mindful about these issues. This leads to a trend of green marketing used by firms as one of the strategies in order to gain profit and protect the tools of marketing mix of green marketing. Other than that, this paper shall discuss about Small and Medium Enterprises, eco labels and branding as this will attract more consumers. Lastly, firm will stand to benefit once green marketing strategy is applied.

Keywords: Marketing, Green Marketing, Sustainability Development, Green Marketing Tools, Small and Medium

I. INTRODUCTION

The term GREEN MARKETING became a force to be reckoned with in the early 1980s in Europe when some products and services were deemed to be of harm to the consumer and the environment. SMEs and even the government saw the need to go green and make products that would serve the environment with little or no harm. Green marketing which is also referred to as Eco-logical marketing, Environmental marketing and or Sustainable marketing, has now become the paradigm of every business that wishes to keep its environment free from. Many SMEs have started putting into practice, strategies on how they produce, develop, and market greens that can sustain their natural environment as well as still meet their customers' expectations, and still, make a profit for the SME. In Nigeria today, many firms have adopted the green notion and it can be seen in how they go about their business, how they care for the environment and also how they want their customers to view them in terms of their contribution to helping the environment stay safe.

The first-ever workshop on ecological marketing was held in 1975 by the America Marketing Association (AMA). The aim of the workshop by the AMA was to bring all stakeholders together to analyze the effects marketing had on the environment. The workshop broke ecological marketing into three (3) components, the marketing activities, the positive and negative effects of marketing and lastly the environmental challenges as a resulting of marketing. In defining green we might be addressing just a color but in going further to what does it mean to go green we might get a clearer definition. Going green means the persistence in seeking information and actual application that can lead to a friendlier environment and help the environment sustain its resources for now and years to come.

Green Marketing plays a very pivotal role in creating vast awareness on issues concerning the environment and helps in communicating the drives of customer demand for greener products. While many firms use green marketing to showcase the importance for sustainability and being socially responsible, others use it as a means for milking uninformed customers. Today, try to market goods and services that are not green is becoming more difficult. The world all over with the help of technology through internet gives information to the customers. Customers know the truth and firms have little or no choice than to move towards a more effective and efficient way of producing goods that are green in nature.

II. STATEMENT OF THE PROBLEMS

Green marketing is one of the imperative and present-day methodologies which is helping to bolster the connections between the SMEs, the environment agencies and the community. Though many terms to tag green marketing with larger SMEs, it is also a strategic tool for SMEs (Turyakira, Venter, & Smith, 2014), on how competitive they can be. Every SME despite the nature of its business, the size or structure should consider going green, as it will help the environment, the green consumers and also the SME.

The current debate on green marketing is When, Where and How to use and apply it. Many firms feel just by changing how they package a product means they are getting it right. Green marketing entails so much more than how a good is packaged. It branches as far as the entire production, to how the product is perceived and finally to the effects it has on the environment. The rampant confusion existing around green marketing is quite understandable because if gotten right can make massive returns for any organization, but marketers are seizing the unbelievable opportunity because it is still an untapped market to deceive and still do harm to the environment.

This research shall evaluate the impact green marketing has on SMEs i.e. an overview of how adopting green marketing would better serve SMEs, it would also ask questions bothering on what SMEs are doing to ensure that consumers understand the meaning and the term Green Marketing and finally, why SMEs need to adopt the term going forward so as to ensure a stable and healthy environment.

III. OBJECTIVES OF THE STUDY

The major objective of this study is to assess the roles of green marketing plays on SMEs. Other specific objectives of the study are:

- 1) Assess the impact of green marketing on SMEs, the factors that influence SMEs into deciding if the adoption would be of benefit to them as an SME, thus looking at it from the financial point of view of these SMEs.
- 2) Evaluate the role SMEs are playing in creating awareness of green marketing, thus educating their customers so as to be abreast of the term and functions.

IV. LITERATURE REVIEW

A. *Concept of Green Marketing*

The term Green Marketing cannot be overemphasized; there are so many definitions for green marketing. According to (Gbadeyan & Omelakan, 2015), Green marketing generally means the marketing of products and services that are environmentally ok for consumption and use. It is also the marketing of goods and services in an environment that is green. Green marketing analyses how a product is modified, the entire process of production and its changes, how the product is packaged and the changes in packaging as well as the fundamental changes to its advertising. One researcher emphasized that the concept of green marketing is also related to the concept of holistic marketing.

One can from this deduce that a product or service from its inception, making processes, introduction into the market place, getting to its final customer's and at the same time meeting its financial and environmental obligations is known as green marketing. At the inception stage the product about to be introduced has to first of all come from a company that understands the need to be green in nature. Terms like Phosphate Free, Recyclable, Refillable Ozone Friendly, and Environmentally Friendly are some of the things customers frequently link with green marketing, (Chaudhary, Tripathi, & Monga, 2011).

So many SMEs are trying to match up so as to meet customers' expectations. In his research (Chaudhary, et al., 2011) explained how green customers were will to pay for the best products as long as they were said to be green. The fact that many SMEs know individuals would pay the premium price for what they consider healthy, SMEs have now started bringing out goods and services even though are not green, a process called greenwashing. Irrespective of what SMEs do, consumer purchasing is on the up, people want healthy lifestyles are would always favor products that come across as green. Green marketing has now been adopted not only by large cooperation's but also SMEs who have identified the opportunities, the competitive pressures, governmental pressures, and social responsibility.

B. *Green Marketing and Sustainable Development*

Most SMEs that practice green marketing have corporate social responsibility and sustainable development as their watchword. Others are making immense efforts to implement and incorporate green marketing so as to attract more customers to their products and services, in also reduce unnecessary expenses and overheads. The awareness that business branding attracts customers and buys their conscience and loyalty have not gone unnoticed, SMEs are now adding more and boosting their efforts so as to develop sustainably. No one both the SMEs and the consumers are taking sourcing lightly, procurement of these green products have to be sourced and the way of taking into considerations, the safety of workers, how they are treated because they are involved in making these products so that the products meet sustainable standards is known as Ethical Sourcing. In ethical sourcing human rights of the workers must not be joked with so also how they are paid. Seeing they are involved in the day to day operations and manufacturing of these green products, it is of great advantage to the SMEs to make working conditions better and make sure the work place is safe and welcoming. Also treat them fairly so that focus of the overall goals of trying to meet customers' demands that are normally high, trying to reduce their expenses and boosting their brand name is achieved.

Every SME is socially responsible for how it relates to the environment. SMEs have to do business that contributes to the development of environmental social and economic benefits for all stakeholders. (Turyakira, et al., 2014) stated the main stakeholders include the environment, the community, the customers and employees. In light of all this, what is the impact of green marketing on SMEs? What role are they playing in assessing the roles of green marketing? Are all the 4Ps green marketing checked so as to give a broader view of the direction the SME is headed? The onus is on the SMEs to explore all the effects green marketing has on them and also the try to relate the importance to customers irrespective if they are fully abreast with benefits of an SME going green. SMEs, should not have to wait for the larger corporation to clean up every mess as government who are now very

much aware of green marketing and in as much as the government is concerned about this phenomenon, and have tried to regulate it, the benefits of producing products that toe the line of what the final consumer, the environment and SME need to go forward is of utmost importance.

C. Green Entrepreneurship

Green entrepreneurship is a relatively new issue that has gained momentum since the late 1990s growing at a steady pace (Lofti, Yousefi, & Jafari, 2018). Green entrepreneurship solves environmental problems by creating new products and technologies. The term thus is derived from combining entrepreneurship and environment terms. Researchers believe that there is no comprehensive definition of it. Another way it can be called is an environmental entrepreneur. This is a new type of entrepreneurship, that is committed to environmental compatibility. It is the combination the business passion with sustainability and other principles of the environmental movement which are compatible with the environment. A green entrepreneur aim is to profit from the green business. They are managers of the green products and technologies they introduce into the market.

D. Importance of Green Marketing

Recent surveys have shown that SMEs that make and enhance their existing products with the idea of their environmental safety are faring better than those who have little or no regards for their environment. This is further portrayed by the accessibility they have in venturing into new markets, the overall competitive advantage they have over other SMEs and most importantly their profit sustainability. The more Governments focus policies on environmental safety, public health and sustainability, the better it is for SMEs that choose to harness the potentials green marketing possesses. SMEs are establishing better strategies and although most SMEs in Nigeria are in their nascent stage. Nigeria whose major source of income generation is through the oil and gas sector and agriculture is now seeing the benefits of going green. Most SMEs have their factories close to the cities and this always poses a threat to the health of individuals. Research and development in terms of how to sustain the environment have seen these SMEs have a high level of efficiency and also they have adopted new policies and new technologies that lower emission and reduced pollution.

Some of the benefits of green marketing are a safer and green friendly environment. This generation and future generations to come face fewer environmental issues with the ultimate goal to be a risk free or harmless environment. The reducing of these harmful waste would also mean reducing massive costs that are always allocated to them. There would be long term growth for the companies as they can make profits. Though it might be expensive from the onset from the amounts of research, advertising and so on but as time goes on the expenses and costs shall reduce and there shall be improvements. The procedures to adopt the green philosophy is always key when entering into a new market. Marketing with a green mentality always affords the necessary competitive advantage a company needs over another company who are less green or are yet to adopt the idea of going green, that is to say that those companies who first start out as using green marketing or producing their products in a green way have an advantage over other SMEs who become green later. Even those working for companies that adopt green policies feel safer because they know they stand to benefit in a more healthy way. Thus, SMEs can market their products and services better if they project themselves as agents of the green mantra.

E. Small and Medium Enterprises and Green Marketing

It is noted that SMEs provides 70% of employment in developing countries and this includes Nigeria (Ogundele, Akingbade, Saka, Elegunde, & Aliu, 2013). The Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) through the Nigerian Bureau for Statics (NBS) had the statistics at 84% in 2013. It broke companies into Large, Micro, Small and Medium. SMEs are organizations that their staff threshold ranges from 5 - 250 employees. Small and Medium Enterprises (SMEs) are very crucial to any economy's development because their potentials are great for generating employment, improving technology locally, diversifying the output of the country , developing home-grown entrepreneurs and also aligning with large-scale industries. Nigeria today, has seriously underperformed in the SMEs sub-sector and this has tied the hands of SME to contributing to the economic growth and the fostering of development in the sector. There area few issues affecting the SMEs in the country such as a business environment that is not friendly, bad funding, weak managerial skills and limited access to technology that can match that of the western world.

So it is of immense importance for any government to pursue its policies through the SMEs. If half of the workforce is in the SMEs, then the possibility of those who purchase products would come from the working class. Eradicate the idea of waste and pollution, educate and enlighten the SMEs on the green projects and how they can key in and in the long run get the final consumer to accept products that are not harmful to them and also sustain the environment. According to (Amegbe, Owino, & Nuwasiima, 2017) where larger companies, often multinational enterprises, have been developing the capabilities needed to achieve the triple bottom line (i.e. expanding the traditional reporting framework to take into account ecological and social performance) over the last decades, SMEs in their view lacked the technical prowess or know withal, to tackle green challenges and their view on the future on innovation was more or less limited.

Green customers would appreciate products that are green in nature and this would affect how they go about their purchasing. The idea is that they are doing what they can to stay healthy and protect the environment. Investigations are ongoing on how to protect the environment better and it is now a clear case of all hands on deck in order to achieve sustainability.

(Delafrooz, Taleghani, & Nouri, 2014), stated that there is a significant relationship between demographic characteristics, cognitive psychology, personality and behaviors that help safe guard the environment. They believed that these factors affected the behavioural patterns of customers and made them relate differently to how they perceived products that to them affected the environment. In addition, they believed that by upsetting these various patterns there was a behavioural change that now has a positive change to how new marketing strategies are developed and pursued.

The lacuna still exists between the knowledge of the environment, the intentions of the SMEs, and the overall behaviour of the purchasing consumer. (Wahid, Rahbar, & Shyan, 2011) Concurred that studying on factors that would influence their green purchase behaviour is important to grasp their green purchase behaviour and make them the embassy in encouraging others (general public) towards green consumption (way to achieving sustainable development). (Aman, Harun, & Hussein, 2012) buttressed on the underpinning theory about the knowledge of the environment which is characterized by green purchase intentions, environmental knowledge, environmental concern and attitude

The attitude portrayed and the green consumption behaviour goes hand in hand. The way and which consumers purchase and consume is portrayed by their attitude towards a perceived product.

SMEs need to align their priorities to basically meeting these two stakeholders as well as maximizing their profits

- i. **Customer requirements:** SMEs would need to foster better relationships with their consumers, and fulfilling the customers' needs should be achieved without compromising on the basic fundamentals such as profit.
- ii. **Environmental considerations:** These sometimes clash with customer requirements, which is one of the major issues of green marketing. SMEs have to find a middle way between environmental concerns and customer needs.

SMEs can adopt marketing strategies that respect the core environmental concerns of their customers. The strategy describes the direction a business will use in pursuing and guiding the allocation of its resources and effort.

The strategies that SMEs adopt vary based on geographical locations, demographics and even socio-economic point of view. SMEs after extensive research decide on how best to pursue its objectives and the quickest way to not only maximize profit but customer's satisfaction.

F. Green Strategy

Various SMEs large or small have the various ways they strategize for their product to hit the market so as to get valuable returns. According to (Ahmad, 2014) Manufacturers should consider, among other things, how substantial the green consumer segment is for the SME; likely revenues increase by improving on greenness as perceived, and the possibility of suffering from financial loss if consumers judged the SME to be inadequately green. In addition, SMEs should play the pivotal role in ensuring that their green products bring in returns, satisfy their customers and also have a competitive advantage over their rivals.

(Ahmad, 2014) Further stated The strategies that should work best under different market and competitive conditions range from the relatively passive and silent lean green approach to the more aggressive and visible extreme green approach with defensive green and shaded green. According to (Solvalier, 2010) Lean Greens try to be good corporate citizens, but they are not focused on publicizing or marketing their green initiatives, how food giants like MacDonal'd's go about their strategy should be different from how Pepsi pursues theirs but the eventual result should bother on the environment impact, customer satisfaction, profitability and still have competitive edge over other rivals. This is no different from SMEs in Nigeria. They have to adopt various strategy mix. However, the decision-makers have to choose among the strategies that are the best fitting the SMEs objectives (Negulescu, 2014).

G. Green mix

The 4Ps of green marketing SMEs need to focus on are as follows:

- i. **Product:** The product developed by SMEs should be ecological products that do not contaminate the environment, but should make the environment safer and if possible remove all existing forms of existing damages to the environment. In other words, the producers of the product should offer products that rather than harm the environment it protects the environment. (Gbadeyan, & Omolekan, 2015) stated that ecological objectives in planning products are to reduce resource consumption and pollution and to increase conservation of scarce resources. The product strategy according to (Ogundele, et al., 2013) ranging from new product development, product line extension, branding, packaging and products of insurance service; General marketing strategy; Promotional strategy; The practice of social responsibility; Relationship marketing; Strategic marketing; Consumer attitude perception; Pricing strategy; Channel of distribution; Market orientation practice and International marketing practice
- ii. **Price:** The next phase after making the product is pricing, the prices for the goods may be a bit higher than most products that are not green but consumers would still pay due to the fact that what they stand to gain is far more reaching than going for cheaper and more harmful products. Pricing is very important when it comes to green marketing. (Gbadeyan, & Omolekan, 2015) stated Most consumers will only be prepared to pay additional value if there is a perception of extra product value. But not all customers consider pricing, many consider but others do not but rather choose an alternative that is environmentally friendly. In a given situation where customers have to choose between products of equal quality and value, the environmental benefit would determine the outcome of the customers' decisions.
- iii. **Place:** How the SME does its distribution logistics is very important. Marketing agricultural products and seasonal products are more beneficial than importing these products. How the SME goes about its ecological packaging is very crucial as customers would go out of their way to buy products that are green in nature. Marketers should choose locations that best serve them and the targeted market they plan to sell to. The location of the product must portray the brand message the SME plans to send out, the location must set the SME apart from their competition.
- iv. **Promotion:** Paid advertising, public relations, direct marketing, and on-site promotions and, sales promotions are various ways an SME can promote products and services to target markets. Media is a powerful tool any organization can use to position its products in the minds of its customers and also foster development. People would not buy harmful products as readily information on the product is available so as to avoid products that are destructive in nature. According to (Effiong, Inameti, Pepple, & Ernest, 2018) Armed with the right information, people can take preventative measures to shield themselves from harm and also take better care of their environment. Constantly reminding customers that the SME is ISO 14000 compliant. Thus making a visible impact on the environment by either sponsoring the natural environment or giving

out sales promotions as customers love when things go on sales. From the SMEs angle, they can begin to charge for extra baggage for products bought and even on the bags have some sort of green advertisement.

H. *Green Marketing Tools*

These tools make how customers perceive the product and also increase the awareness of the characteristics and attributes of the products. According to (Delafrooz, Taleghani, & Nouri, 2014) the consequence of this will guide consumers into purchasing environmentally friendly products, and careful application of these tools can alter how customers purchase behaviour.

- i. **Eco-Label:** This is where products are marked with labels so that customers can identify that their manufacturers conforms and follows environmental standards. Customer purchase behaviour is swayed by how far the label of a product appeals to that customer. Eco-labelling policy sits at the intersection of three powerful developments in environmental law and policy—the effort to craft effective policies to address unsustainable consumption, increasing deployment of informational regulation as a policy tool, and a new focus on individuals as potential targets of environmental regulation. (Czarnecki, Jönsson, & Kuh, 2018).

The unsustainable consumption is the belief that there is a need to address both the population and the consumption of sustainable development. Products and services being consumed have a massive impact on the environment, and whilst the effect of the consumption on the environment might be damning, sometimes it is not related. Might be due to lack of ready information and widespread advertising to caution on the impacts these consumptions have on the natural environment. (Czarnecki, Jönsson, & Kuh 2018) explained given the potential policy advantages of information regulation and dissemination, consumer interest, and perceived economics gains for firms, Eco labeling is on the rise worldwide.

However a consumer chooses his purchase, there might not be a direct link to the individual's attitude and behaviour, so might decide to buy irrespective of the impact on the environment. Their purchases are influenced by their high status, altruism or just to signal cooperativeness.

- ii. **Eco-Branding:** The American Marketing Association define a brand as a name, term, sign, symbol, or design, or the combination of them, intended to identify a particular good. According to (Delafrooz, *et al* 2014) This definition can be generalized for the eco-brand as well, eco-brand is a name, symbol or design of products that are harmless to the environment. Knowing the customers' purchases based on the brand the customer chooses is key for the SME. Branding is one of the most effective ways of selling goods to customers. It is also a very important factor when customers decide to buy. Brands are a true reflection of a company's image and global or social status as the bigger the brand the more power of persuasion the SMEs command. The brand is a key link between those that produce and those that consume. So, a brand that is eco-friendly would captivate the minds of the green customers in terms of their purchase intentions.

I. *Reason To be Green*

SMEs are going green marketing because of the following reasons:

- a. **Opportunity:** SMEs perception of the environmental marketing is an opportunity that can be used to achieve its objectives. In Nigeria today, many people have become conscious of what they consume. Other than just going to the gym to keep fit, they are becoming aware of the need for them to be green conscious. This is the opportunity that has been presented to these SMEs. Green marketers have now diversified to cater to the needs of their customers.
- b. **Social-Responsibility:** SMEs are now socially responsible and have moral obligations towards the environment and the customers.
- c. **Governmental-Pressure:** Governmental bodies such as NESRA and EPA are forcing firms to become or more responsible for protecting consumer and society. The Nigerian government has developed a framework of legislation and policies to reduce the production of goods having a harmful impact on the environment and the consumers.

J. *Challenges In Green Marketing*

Key green marketing challenges are as follows:

- i. **New Concept:** Green marketing is still a relatively new concept in Nigeria. People who are not living in urban areas still a lack of awareness and they cannot reap the full benefits of green marketing. The new green movement needs to reach the people and that might be time consuming and expensive.
- ii. **Cost Factor:** Recycling Green products are very expensive. Green marketing involves marketing of green products and services, green technology, green power and energy for which requires a huge investment in R&D programmes for their development and subsequent promotional programs and also advertisements which ultimately may lead to increased costs.
- iii. **Sustainability:** Profits at the initial stages are very low seeing that renewable and recyclable products and green technologies are more expensive. Hence the need for SMEs to plan for long-term and be long-sighted rather than adopting a short-term strategy, at the same time it should avoid falling into the lure of practices that are unethical to make profits in short term.

V. THEORETICAL REVIEW

Theoretical framework demonstrates the understanding of theories, and concepts of any research work. It is based on theories that exist in a particular field of inquiry that is related to any hypothesis of a study (Adom, Hussien, & Agyem, 2018). There are various theories relating to green marketing and the roles it has on firms but this paper would only be looking at the Technology Acceptance Model Theory (TAM).

Technology Acceptance Model

Technology Acceptance Model is one of the models that have been developed to provide a better understanding of the usage and adoption of information technology. It is presently a prominent theory used in modeling technology acceptance and adoption in Information systems research Propounded by Fred Davis (1985) in his doctoral thesis at the MIT Sloan School of Management.

TAM is an information systems theory that models how users come to accept and use a technology that will encourage economic growth. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. The factors are; perceived usefulness (PU) and perceived ease-of-use (PEOU). Consumers of green products with the help of technology can ascertain which product serves them better. Also organizations can alter their services so they are easy to use, like printing various manuals in different languages so as to help consumers read up on the product and its usefulness. One thing is certain; linking these variables towards satisfying customer needs would indeed get customers to trust better and thus gain their loyalty.

VI. EMPIRICAL REVIEW

Empirical studies on Green Marketing are readily available and everyday researchers are delving so as to gain more insight into the study. However, a few are worth mentioning. Turyakira et al (2014) in a research carried out in Uganda to test CSR factors influencing competitiveness among SMEs, observed that when government pressure on firms is constant, firms would take corporate social responsibility more and those who do not comply face serious sanctions that can be detrimental to the financial goals. CSR goes hand in hand with sustainable development as they both form the core of green marketing which are being environmentally responsible and also meeting needs that do not harm today or future generations to come.

VII. METHODOLOGY

This paper adopted a single source of data collection. According to (Abbas & Cross, 2018) the secondary source of data generation, includes the use of textbooks written by different authors on the subject matter, journals, magazines, information from the internet and other published and unpublished materials relevant to work. The paper conducted a qualitative content analysis on Green Marketing from over 20 articles relating to green marketing, spanning from 2010 – 2018. This time frame helped in understanding the backgrounds, current debate benefits and issues of green marketing.

VIII. CONCLUSION

The study fully focuses on assessing the roles green marketing play on SMEs. So many researchers have tried to link the relationship of these marketing to either financial performances or all round organizational performances. What is really given is that applying green marketing the right way would bolster firms performances and benefit all stakeholders involved (the SMEs, Customers, and the environment). The independent variables of green marketing which are the marketing Mix, the 4Ps have to maximise the outcomes of the dependent variable by altering the various tools in order to discover the impacts and interrelationships these mixes have on the SMEs. Price, Place, Promotion and Product would always be key factors in how a firm places to not only attract the customer but also position the product in the minds of the customer so at every given time the customer feels he is getting value for money.

The cost for the adoption of a greener market might initially be high but on the long run it saves money for organizations. Newer markets can be assessed and firms can outwit another competitively. Management can efficiently and effectively reduce the negative effects as well as increase the positive effects of green marketing activities. Firms that develop the idea of introducing goods that are environmentally friendly will perform better than others who do not. Sustainability and corporate social responsibility for any firm is key as they serve as the core for green marketing. Products developed should not be harmful today neither should they be harmful tomorrow. Every firm should feel the need to have that responsibility towards the environment, treat and nurture it like it is a product of theirs and market goods and services that not only make them profitable but make the environment a better place to live in.

IX. RECOMMENDATIONS

Green Marketing is now the new order of the day as companies across the globe are adopting its techniques. Firms who want to outwit competitors are applying various green strategies in order to maximise profit and meet customer demand. Management need to understand that it is ominous not to think green and customers whose needs and wants are unlimited can only be matched by healthy and environmentally friendly goods. SMEs should consider these going forward:

1. Getting their prices right is very key. Firms should endeavour to do proper analysis and place prices on goods so as to get massive returns, because prices influence customers purchase decisions. Customers are fully aware and would pay extra if they need to but also would back out if they feel they are being ripped off.
2. Firms should also offer personal beneficial products to customers. It is ok trying to be environmentally responsible but proving that goods and services would indeed help in customer's health would change how customers view the product and company as a whole and this would go a long way in getting the customers to be loyal to their brand.

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Breeding of *Lonchura punctulata* (Scaly-breasted Munia) from Sagaing University of Education Campus

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Abstract- Nests, eggs, clutch size, incubation and reproductive success of *Lonchura punctulata* (Scaly-breasted Munia) were observed from August 2017 to July 2018 at Sagaing University of Education Campus. Among the total of 57 nests, 41 nests (71.93%) were recorded as successful, 16 nests (28.07%) were observed as failure during the breeding season. Thirty five nests were found in *Mimusops elengi*, Ten nests were recorded in *Saugainvillea spectabilis* (Sekku - pan) Shrub, eight nests were observed in *Cycas sp* (monding). Small tree, Two nests were conducted in *Pterocarpus macrocarpus* (Paduk tree) Rose wood and Two nests were also recorded in *Casuarina equisetifolia* (Pinle kabwe). Among the total of 57 nests, 202 eggs and 105 hatchlings were observed during the breeding season.

Index Terms- Eggs, Juveniles, Hatchlings, Reproductive Success

I. INTRODUCTION

Birds are conspicuous found everywhere. They indicate seasonal symbol. Many ecologists feel that birds are one of the most visible indicators of the total productivity of such biotic system. Life history studies identified many important biological attributes by species (Bent, 1963 cited by Welty, 1982).

The Scaly-breasted Munia or spotted munia (*Lonchura punctulata*) is endemic to Asia and occurs from India and Sri Lanka, east to Indonesia and the Phillipines. The bird is listed as of Least Concern by the International Union for Conservation of Nature (IUCN). Scaly-breasted Munia usually clutch 4 to 6 eggs, but can contain up to 10. Both sexes build the nest and incubate the eggs, which hatch in 10 to 16 days. Juveniles typically to fledge in three weeks. Both sexes may reach sexual maturity as early as 7 months after birth in the captivity (from Wikipedia, the free encyclopedia).

Many different kinds of birds were found in Sagaing University of Education and its environs. It also supports a large variety of different flora and fauna. Scaly-breasted Munias are widely distributed throughout the year in Sagaing University of Education and its environs.

In Sagaing University of Education and its environs, information on the ecology of birds is very limited and the records of breeding of birds are also very scarce. The breeding of scaly-breasted Munia has been interested to study. Hence the present study has been undertaken at the Sagaing University of Education campus where these species are observed to be present throughout the year with the following objectives;

- to investigate the breeding of Scaly-breasted Munia and
- to determine the reproductive success.

II. MATERIALS AND METHOD

Study Area

Sagaing University of Education campus was chosen as the study area. The study area is the semi-forest type. The topography of the campus is slightly higher than the rural area and there is a lake at the left site of the Main building. Sagaing University of campus is organized with human settlements (University's staff houses), lecture buildings, small forest type with large trees and open place with bushes (Fig.1).

Study Period: The present study has been conducted from August 2017 to July 2018. It observes the nests of Scaly-breasted Munia searching and counted in the early mornings and early evenings. Direct count method was used during the study period.

Eggs and Clutch Size Characteristics

The eggs were recorded from the start to the end of incubation that was conducted by both parents. The color and shape of eggs were noted. The egg size could not be measured because handling the eggs might have effected their incubation during breeding season. If the hatching date and clutch size are known, the laying date can be estimated by back-dated system (Patterson, 1982).

In the study period, after the laying was completed, eggs of each clutch or clutch size were counted by direct method and recorded by digital camera during the breeding season.

Hatching Characters

After hatching, coloration and morphological characters of young were recorded.

Reproductive Success

A nest was recorded as successful, if one or more eggs were observed to be hatched. For the nest that failed, they were recorded as either predated or abandoned or lost for unknown reasons. If egg shells and remains of hatching were observed, they were considered as predated, and if nests with cold eggs for several days it was assumed as abandoned.

Breeding success is calculated by the following method

$$\text{Breeding success percentage} = (\text{nest with hatching successfully}) / (\text{all nests found}) \times 100$$

III. OBSERVATIONS AND RESULTS

Systematic Position of Study Species

Phylum - Chordata
Class - Aves
Order - Passeriformes
Family - Estrildidae
Genus - Lonchura
Species - *L. punctulata* (Linnaeus, 1758)
Common Name - Scaly-breasted Munia
Local Name - Sa-Wadi (Fig.B).

Nest Building and Nest Characteristics

Nest building by both sexes begin in August 2017. These were 35 nests constructed with dried leaves and grasses in the branches of (Khayay small tree). Ten nests were recorded in the branches of *Saugainvillea spectabilis* (Sekku-pan shrub). Eight nests were constructed with dried leaves, greases and roots in the (*Cycas* sp. (Mondaing) Small tree). Among the 57 nests, two nests were found in the branches of *Pterocarpus macrocarpus* (Paduk tree). And two nests were also observed in the branches of *Casuarina equisetifolia* (Pinle kabwe). The average trees height were measured (Table 4).

Egg and Clutch Size Characteristics

A total of 57 nests with eggs were recorded from August 2017 to July 2018 during the study period. The eggs are pure-white when fresh, but soon became cream to buff color. During the egg laying period, 202 eggs were found. Number of nests, eggs and percentage of total eggs were recorded (Table1) during the year from August 2017 to July 2018. In the study period, clutch size ranged from 1 to 7 eggs and mean clutch size were calculated (Table 2).

Incubation and Nesting Effort

During the breeding season, both male and female were also observed to remain together and incubate their eggs throughout the incubation period. Incubation period was observed to be 12 to 14 days. A total of 57 nests were observed during the study period. Among these, 41 nests (71.93%) survived till the hatching and 16 nests failed, (10.53%) were lost to predator, 6 nests (10.53%) were abandoned and 4 nests (7.02%) lost for unknown reason (Fig A, Table 3).

Hatchling

After hatching, the hatchlings were completely naked with closed eye so the hatchlings were observed as its altricial type (Fig.D). Juveniles seemed innocent and ignorant. They were bright cream in colour contrasting sharply with the dark conical beaks. The breast of these juveniles were obviously lacking in the scale patterns (Fig.E).



Fig. 1. Sagaing University of Education Campus

Table 1. Frequency of nest, number of eggs and percentage of total eggs of Scaly-breasted Munia during breeding season at Sagaing University of Education Campus

Number of eggs	Frequency nest	Total eggs	%
7	5	35	17.33
5	14	70	34.65
4	13	52	25.74
2	20	40	19.80
1	5	5	2.48
Total	57	202	100.00

Table 2. Mean clutch size of scaly-breasted Munia at Sagaing University of Education Campus

Mean Clutch Size	0.09
Range	1-7
Number of eggs	202

Table 3. Nest success and loss of scaly-breasted Munia at Sagaing University of Education Campus.

Nest numbers	Nest outcome	Nest
41	Successful	71.93%
6	Abandoned	10.53%
4	Lost (unknown reason)	7.02%
6	Predator	10.53%
Total = 57		100.00%

Table 4. Average height of trees in study site

No.	Trees, small tree and shrub	Average trees height feet
1	<i>Mimuscops elengi</i> (Khayay small tree)	7.5
2	<i>Saugainvillea spectabilis</i> (Sekku-pan shrub)	6.2
3	<i>Cycas sp</i> (Mondaing small tree)	3.5
4	<i>Pterocarpus macrocarpus</i> (Paduk tree)	18.5
5	<i>Casuarina equisetifolia</i> (Pinle kabwe)	15.5

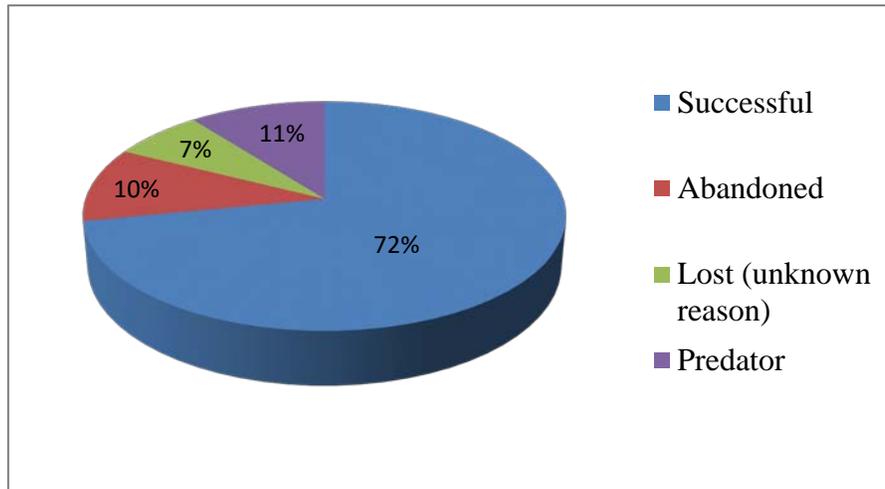


Fig.A. Nest success and loss of scaly-breasted Munia at Sagaing University of Education Campus.



Fig. B. Scaly-breasted Munia (Adult)



Fig.C. Nest with hatchlings



Fig.D. Hatchlings



Fig.E. Juvenile of Scaly-breasted Munia

IV. DISCUSSION

Scaly-breasted Munias form flocks of as many as 100 birds. Individuals communicate with calls that include a short whistle and a sharp chipping alarm note. (from Wikipedia, the free encyclopedia).

In the Sagaing University of Education and its environs, scaly-breasted Munia were found as flocks of as many as 30 birds before the breeding season. During the breeding season, pairing form of male and female were observed.

The breeding season is chiefly during the rains, but eggs are laid as late as December. Nests are made of bamboo leaves, straw, twigs, etc; when pampas grass is used, the white silky top is on the outside. The eggs usually 4-6 but once "at least 10" in number are white. The fledgling period is 18 days (Smythies, 1999).

During the breeding season, the nest opening is located to face downwind of the wind direction at the study site. Clutch sizes were observed 1 to 7 eggs. Both sexes share the incubation of the eggs and incubation period was conducted to be 12 to 14 days. Hatching period was recorded to be 18 to 21 days at the study site.

In the present study, the hatchlings were observed completely naked with closed eyes so the hatchlings were recorded as altricial type. Juveniles are a plain brown or buff below and lack of scale on the belly.

Fifty seven nests of scaly-breasted Munia were observed during the study period. Among the nests of scaly-breasted Munia, 41 nests (71.93%) survived giving rise to 104 hatchlings in the Sagaing University of Education campus.

Reproductive success may be influenced by other factors than food supply. These factors include predation, weather, flooding, pollution and disturbance (ICES, 2001 cited by Nwe Nwe Khaing, 2008).

V. CONCLUSION

This study has provided some information on the nest building, eggs, clutch size and hatching success of Scaly-breasted Munia. However, life history and ecology of birds were poorly Known at Sagaing University of Education Campus in which could be easily assessed for ecological study. Thus, from the result of present study it is suggested that there is still a need to have more specific information on Scaly-breasted Munia.

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Introductory of Excel Spreadsheet for comparative analysis of linearized expressions of Langmuir isotherm for methylene blue onto rice husk

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Abstract: Isotherm models are generally implemented to define characterize an adsorption process. Throughout the earlier studies associated with adsorption process, less attention has been paid to choice of linearization methods through the analysis by using Excel spreadsheet. The present study was established to investigate mathematical and statistical properties of these linear types and compare different statistical criteria to specify the best linear curves, fitted to experimental data. Toward these goals, the data obtained from an empirical study on methylene adsorption onto rice husk were applied. The excel software is a perfect tool for researchers to solve these linear equations since the Excel is frequently bundled free with new computers. Also, The simple user interface allows researchers to easily use the software without special learning. Due to all these reasons, the *Data Analysis toolpak*, an analysis tool incorporated into Microsoft Excel for Windows, was applied to analyze and find the best linear type fitted to experimental data from five different types of linear expression of Langmuir isotherm equation.

Keywords: Langmuir; Adsorption; Isotherm; Excel

Introduction

Synthetic dyes are broadly applied in manufacturing such as pharmaceutical, textiles, printing, plastics and paper etc. These industries result in serious water pollution by disposing these effluents into streams, rivers ponds, lakes and other municipal

sewer, since the factory discharge water are extremely coloration. In fact, the international environmental discharge standards of dyes are also becoming more severe, since the increasing concern for public health and water quality. Therefore, these industries are presently facing severe pressure to reduce the coloration from the factory discharge water. These industries have to remove these coloration wastes from these effluents before discharging them into water bodies to meet the international environmental standards (Hamdaoui and Naffrechoux 2007, Kaur and Kaur 2014, Sakr, Sennaoui et al. 2015, Talbi, Kabbaj et al. 2016). Some of them involve chemical oxidation, photodegradation, adsorption, electrocoagulation and reverse osmosis (Basker, Shabudeen et al. 2014). Currently, the adsorption technique is regarded as an substitute technique in comparison with the other treatment techniques. This technique offers many benefits including its easy control and operation, lower environmental impacts, lower costs, high regeneration potential of the adsorbents, less energy and chemical requirements (Chowdhury and Das Saha 2011, Begum, Golam Hyder et al. 2016, Sharififard, Rezvanpanah et al. 2018). There are many parameters affecting the process efficiency, the adsorbent is the most important one. The frequently used adsorbent is activated carbon owing to their extraordinary mechanical and chemical resistance and porous structure (Sharififard, Rezvanpanah et al. 2018). However, they are not cheap and not appropriate for developing countries. Due to these disadvantages of activated carbons, researchers are searching for cheap, affordable and available materials as adsorbents. Some of inexpensive adsorbents have been used include coconut husk, red mud, fly ash and saw dust (Basker, Shabudeen et al. 2014).

The adsorbate molecules attachment to the adsorbent surface by adsorption is a surface phenomenon, the mechanism of mass transfer dominate the rate of adsorption in adsorption equilibrium (Ullah, Nafees et al. 2017). To select appropriate adsorbents and optimize the adsorption efficiency for dye removal The investigation of the adsorbate molecules and adsorbents surfaces interaction at the interface of aqueous-solid can help to realize the adsorption mechanism, which is essential to select appropriate adsorbents and optimize the adsorption efficiency for dye removal (Lyubchik, Lyubchik et al. 2011). In other words, it is important to study the adsorption rate and adsorption equilibrium in optimization of the conditions of dye removal by the choosing materials (Khan, Riazi et al. 2000). The adsorption isotherm, which offers the idea relating to the amount of the adsorbate molecules adsorbed in the adsorbents surfaces as a function of the amount at equilibrium (Lyubchik, Lyubchik et al. 2011). The adsorption isotherm can be determined through the usage of the experimental data, the experimental data will be fitted with the suitable equations by numerical methods. Literature review shows that there are a number of predictive models which govern adsorption equilibrium and can be used to estimate the amount of adsorbate molecules adsorbed on the adsorbent surfaces, out of them the Langmuir isotherm model is the most frequently used (Ryu, Lee et al. 2001, Lyubchik, Lyubchik et al. 2011, Ebrahimian, Saberikhah et al. 2014, Ullah, Nafees et al. 2017).

In literatures, the linear regression analysis was commonly applied to determine the most fitted isotherm for dye removal (Kundu and Gupta 2006, Gimbert, Morin-Crini et al. 2008). This linear regression method is easily done by using Excel or similar spreadsheet software (Ncibi 2008, Hossain, Ngo et al. 2013, Huang and Shih 2016). In this study, statistical analysis with Excel was applied on 5 different types of linear expressions of the Langmuir isotherm equations to analyze the statistical results of these 5 different linear types on the basis of the experiment of methylene blue adsorption from its aqueous solution onto rice husk.

2. Materials and methods

The experimental data used in this research was got from the literature {Huang, 2016 #142}. Rice husk (RH) is used as adsorbent in the literature and the dye used in the literature was methylene blue (MB). The amount of dye adsorbed at equilibrium time (q_e) was calculated using the following equation (Djeribi and Hamdaoui 2008, Huang and Shih 2014):

$$\text{Amount adsorbed at equilibrium time } (q_e) = \frac{(C_i - C_e)V}{M} \quad (1)$$

where $V(L)$ is the volume of the adsorption solution. M is the amount of adsorbent used (g). C_i and C_e (mg/L) are respectively the initial and equilibrium concentrations of MB in the liquid solution, respectively.

2.1. The Langmuir model

The Langmuir isotherm equation assumes that the adsorption takes place at specific homogeneous sites within the adsorbent and is expressed as (Ho 2006, Hamdaoui and Naffrechoux 2007, Karadag, Koc et al. 2007) :

$$q_e = \frac{q_{\max} K_L C_e}{1 + K_L C_e} \quad (2)$$

Where q_{\max} (mg/g) is the maximum adsorption at the complete saturation of binding sites.; and K_L (L/mg) is the adsorption equilibrium constant of the Langmuir equation..

The linearized forms of Langmuir equation derived on the basis of Eq. [2] is expressed as :

$$\frac{C_e}{q_e} = \frac{1}{K_L q_{\max}} + \frac{C_e}{q_{\max}} \quad \text{type1} \quad (3)$$

Eq.[3] can be rearranged to obtain another 4 different linearized types of Langmuir expressions (Hamdaoui and Naffrechoux 2007):

$$\frac{1}{q_e} = \frac{1}{K_L q_{\max} C_e} + \frac{1}{q_{\max}} \quad \text{type2} \quad (4)$$

$$q_e = \frac{-q_e}{K_L C_e} + q_{\max} \quad \text{type3} \quad (5)$$

$$\frac{q_e}{C_e} = -K_L q_e + K_L q_{\max} \quad \text{type4} \quad (7)$$

$$\frac{1}{C_e} = K_L q_{\max} \frac{1}{q_e} - K_L \quad \text{type5} \quad (8)$$

3. Results and discussion

For the current study, the experimental data were fitted to the 5 different linearized forms of Langmuir equations described above and analyzed by the Data Analysis Toolpak in Excel. Values of regression statistics were showed in table1. From the table 1, the multiple R of types 2 and 5 are closer to 1 than the other three linear types. This results indicated that the data clusters of types 2 and 5 are around the regression line. R^2 is the squared correlation coefficient, which is also called the coefficient of determination. As observed from table 1, the expression of type 2 and type 5 had the R^2 value over 0.999 for the MB adsorption on RH, the R^2 values of type 3 and type 4 expressions are between 0.95 and 0.96 , and the R^2 values of type 1 expression are

between 0.98 and 0.99. The highest R^2 values of types 2 and 5 make them to be the best linear expressions of Langmuir equation among these five different types of linearized Langmuir isotherm equations. The values of *standard error* is used to evaluate the standard deviation about the regression. In fact, the standard error of the regression, also recognized as the standard error of the estimate. From table 1, it was observed that expression of type 2 and type 5 had the standard error values lower than 0.024 for the MB adsorption on RH, the standard error values of type 3 and type 4 expressions are higher than 0.02 and lower than 0.04, and the standard error values of type 1 expression are around 0.06. The low standard error values of type 2 and type 5 indicated that the distances between the experiment data points and the fitted values are smaller than the other three linear types. In fact, the standard error and R-squared in the goodness-of-fit section give you a numeric calculation of how well a model fits the experimental data. However, there are differences between the two statistics. Both of these measures, the R-squared offers the relative measure of the dependent variable variance that the model explains, and the values of R-squared are normally from 0 to 1. The standard error offers the absolute measure of the distance between the experimental data points and the regression line.

Table1: Regression Statistics for

	<i>Line1</i>	<i>Line2</i>	<i>Line3</i>	<i>Line4</i>	<i>Line5</i>
Multiple R	0.992345	0.999627	0.977407	0.977407	0.999627
R Square	0.984748	0.999254	0.955325	0.955325	0.999254
Adjusted R Square	0.979664	0.999005	0.940434	0.940434	0.999005
Standard Error	0.059962	0.024387	0.409062	0.046593	0.023986
Observations	5	5	5	5	5

The data analysis toolpak also offer the analysis of variance (ANOVA) table . The results were showed in table 2. In table 2, the output value of Significance F is the probability for retaining the null hypothesis , this values indicates the probability that the regression output could have been obtained by chance. A small Significance of F suggest that there is strong evidence for accepting the regression model. Normally, the validity of the Regression output will need the value less than 0.05. If Significance F is greater than 0.05, it's probably better to stop using this regression model. In table 2, the values of Significance F of these 5 different linear types are all less than 0.05, these low values of Significance F indicated that the regression output of these 5 linear types was not a chance occurrence. All these 5 linear types are acceptable to simulate the adsorption of MB by using RH.

Table 2: ANOVA

<i>Line1</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>

Regression	1	0.696424	0.696424	193.6993	0.000803
Residual	3	0.010786	0.003595		
Total	4	0.70721			
<i>Line2</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	2.388348	2.388348	4015.961	8.66E-06
Residual	3	0.001784	0.000595		
Total	4	2.390132			
<i>Line3</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	10.73466	10.73466	64.15213	0.004063
Residual	3	0.501994	0.167331		
Total	4	11.23666			
<i>Line4</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.139267	0.139267	64.15213	0.004063
Residual	3	0.006513	0.002171		
Total	4	0.145779			
<i>Line5</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	2.310567	2.310567	4015.961	8.66E-06
Residual	3	0.001726	0.000575		

Total	4	2.312293			
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The table 3 provides a summary of the model calculated from these 5 different linear types. The values for the X Variable 1 is the slope, and the values of *intercept* are identified as y-intercept. These values will bring into $y = \text{slope} * x + \text{intercept}$ to calculate the predicated values. In table 3, the P-Values provide the possibility that they are real results and did not occur accidentally. In fact, the P-Values of X Variable 1 is same as *Significance F*. In other words, the p-value is less than 0.05 indicated that your experimental data offer enough evidence to conclude that the regression model will fit the experimental data better than the model with no independent variables. In table 3, the P-values of these 5 different linear types are all less than 0.05, these low values indicated that the regression output of these 5 linear types was not a chance occurrence. All these 5 linear types are acceptable to simulate the adsorption of MB by using RH.

Table 3: The values for the model's coefficients

<i>Line1</i>								
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.944	0.042	22.55	0.000191	0.811	1.078	0.811	1.077
X Variable 1(Ce)	0.114	0.008	13.92	0.000803	0.088	0.141	0.088	0.141
<i>Line2</i>								
Intercept	0.086	0.015	5.61	0.011201	0.037	0.135	0.037	0.135
X Variable 1 (1/Ce)	1.016	0.016	63.37	8.66E-06	0.965	1.067	0.965	1.067
<i>Line3</i>								
Intercept	8.986	0.839	10.72	0.001737	6.318	11.65	6.318	11.65
X Variable 1 (qe/Ce)	-8.581	1.071	-8.01	0.004063	-12	-5.17	-12	-5.17

<i>Line4</i>								
Intercept	1.035	0.040	26.05	0.000124	0.908	1.161	0.908	1.161
X Variable 1 (qe)	-0.111	0.014	-8.01	0.004063	-0.16	-0.07	-0.16	-0.07
<i>Line5</i>								
Intercept	-0.084	0.016	-5.24	0.013536	-0.14	-0.03	-0.14	-0.03
X Variable 1 (1/qe)	0.983	0.016	63.3	8.66E-06	0.934	1.033	0.934	1.033

The Data Analysis Toolpak also offer the Residual Plot, Line Fit Plot, and Normal Probability Plot. The Residual Plots of these 5 linear types were presented in figure 1a-1e. The Line Fit Plots of these 5 linear types were presented in figure 2a-2e.

In the Residual scatter Plots, each point is one experimental data point where the accuracy of the prediction is on the y-axis. The values of y-axis indicate how bad the prediction was for that value. In fig 1a, the scatter plot displays a fairly random pattern. From the fig 1a, we can find the first residual is positive, the second is zero, the next two point are negative, and the last residual is positive. This random pattern shows that a linear type 1 offers a decent fit to the experimental data. In fig 1b, the first and second residuals are positive, the next two point are negative, and the last residual is positive. The scatter plot shows a fairly random pattern, it shows that a linear type 2 offers a decent fit to the experimental data. In fig 1c, the first residual is negative, the next three points are positive, and the final point is negative. The scatter plot shows a fairly random pattern, it shows that a linear type 3 offers a decent fit to the experimental data. In fig 1d, the first residual is negative, the next three points are positive, and the final residual is negative. The scatter plot shows a fairly random pattern, it shows that a linear type 4 offers a decent fit to the experimental data. In fig 1e, the first and second residuals are negative, the next two points are positive, and the final residual is negative. The scatter plot shows a fairly random pattern, it shows that a linear type 5 offers a decent fit to the experimental data. The fig 1a-1e, the scatter plots of residuals shows a fairly random pattern, suggesting that the relationship between the independent variables (x) and the transformed dependents variable (y) is linear. These figures suggest that the transformation of five linear types to achieve linearity were successful. Also, the residual distribution pattern of the linear type 2 and 5 were smaller than the other three linear types, it indicated that the transformed data of linear type 2 and 5 resulted in a better model.

Figure 1a. Ce Residual Plot

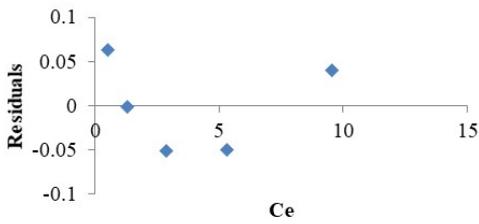


Figure 1b. 1/Ce Residual Plot

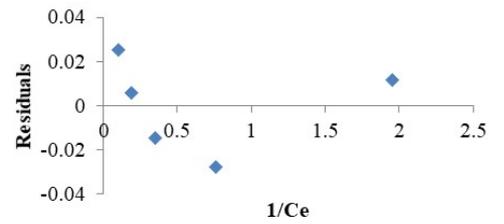


Figure 1c. (qe/Ce) Residual Plot

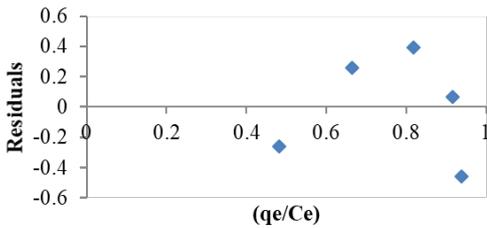


Figure 1d. q Residual Plot

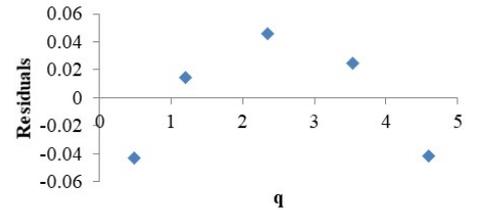
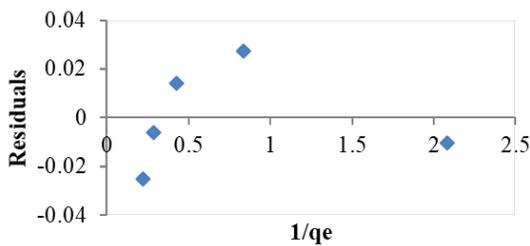


Figure 1e. 1/qe Residual Plot



The fig 2a-e were the graphs of the predicted values superimposed on the experimental data points, which will display how well the calculated values of these five different linear regression equation fits the experimental data. The predicted values and experimental data points of overlap were very high in fig 2a-e, suggesting that the transformation of five linear types to achieve linearity were successful.

Figure 2a. Ce Line Fit Plot

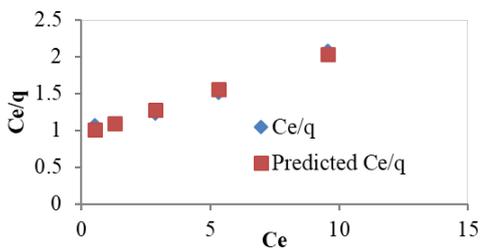


Figure 2b. 1/Ce Line Fit Plot

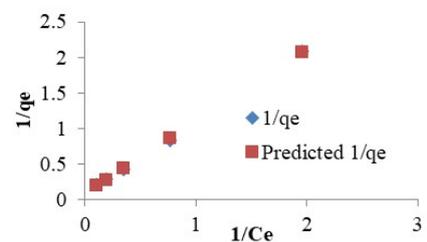


Figure 2c. (qe/Ce) Line Fit Plot

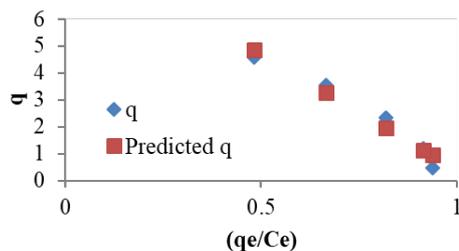


Figure 2d. q Line Fit Plot

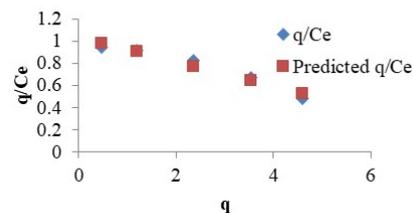
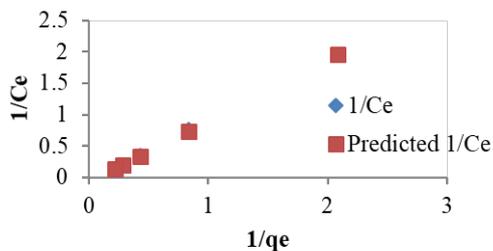


Figure 2e. 1/qe Line Fit Plot



From the previous research, the comparison between the experimental points and predicted values for the adsorption of MB onto RH by these 5 linear type of Langmuir isotherm equations indicated that the type 1 linear expressions of Langmuir isotherm equation can predict the experimental data very well {Huang, 2016 #142}. Although the type 2 and type5 linear expressions of Langmuir isotherm equation failed to predict the q_e values and C_e values for final point of the adsorption of MB onto RH. All these results indicated that the good predictive values are still available for most of the experimental data of these 5 linear types.

Conclusion

Isotherm is applying to predict and explicit the inert characters of biosorption of MB by RH. The experimental data have been modelled using Langmuir equations, which is a non-linear equation. The complexity of nonlinear equations increases the difficulty of modeling. In this context, linearization of non-linear modelling is a powerful technique used to fit the experimental data to the non-linear model. The invention of computers has made the modelling of data quick, reliable and easier for the users. This paper try to analyze the results obtained from 5 different linearization types of Langimur to find the suitable linear type for users with basic knowledge of excel and do not need a massive understanding of the mathematics behind the processes. The purpose of this research is to use Statistical Analysis with Excel to analyze the effect of linear transformation on the Langmuir isotherm equations. The function of data analysis toolpak of excel were applied to analyze the different linear types. From the *Regression Statistics* tables and ANOVA table, the output obtained from the data analysis toolpak by using these five linear forms of Langmuir equations indicate that the best-fit linear types of the same Langmuir isotherm equation were linear type 2 and type 5. The predicted q_e values and C_e values for the adsorption of MB onto RH by these 5 different linear expressions of Langmuir isotherm equations indicated that type 1 expressions provide reliable evaluates {Huang, 2016 #142}. However, the last point of predicted q_e values and C_e values of type 2 and type 5 expression of Langmuir isotherm equations were found to be the worse fit data of Langmuir isotherm equations. In fact, the good predictive values are still available for most of the experimental data of these 5 linear types. Compared to the computational complexity of the nonlinear form, linearization of nonlinear equations simplifies computational complexity by using the spreadsheet software. From the results, the data analysis toolpak can help researcher to judge goodness of fit from calculated estimates.

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Regulated Natural Solution Containing Calcium Ions

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Abstract- This paper shows how to prepare a solution containing high concentration of calcium ions and manipulate it to be appropriate for human health. This study shows how to obtain high concentration level of calcium ions from egg shells and lemon juice. The result was $C_m = 160\text{mg/l}$ of calcium ions in drinking water while $C_m = 240\text{ mg/l}$ of calcium ions in a solution containing distilled water, calcinated eggshells and lemon juice.

Index Term- Solution Containing Calcium Ions: Water liquid that has calcium ions (Ca^{2+}) dissolved in it. Labor Photometer: a machine measures the concentration of ions in mg/l

I. INTRODUCTION

Calcium is found in food, dietary supplements and in medicines (NIH, 2016). It is needed for proper nerve muscle functions, as well as forming strong bones. It is also required for vascular contraction, muscle function, nerve transmission, intracellular signaling and formal secretion. Yet 1% of calcium is needed to support the metabolic functions in the body and the rest 99% is in our teeth and bones (Beto, 2015). That's why the loss in calcium amount is a reason to the loss of bones which leads to increase the risk of osteoporosis especially in old individuals (Surgeon, 2004). Beside osteoporosis, calcium deficiency can cause rickets which is more commonly

associated with vitamin D deficiency (Sahay, 2012).

Several studies have investigated the role of calcium in weight management. The increase in calcium intake enhances body weight loss or fat loss. One of the explanations is that calcium from food intake might blind to small amounts of dietary fat in the digestive tract and prevent its absorption.

In contrary if calcium is taken in overdose, it will lead to many risks. Overdose of calcium causes bone pain, depression, irregular heartbeat, and prostate cancer. And because kidney has a role in cleaning extra calcium from the body, the overdose of calcium can harm the kidneys causing impaired kidney function and increases in 17% the risk of kidney stones (Maria Fátima, 2014).

To intake calcium naturally, several foods can be consumed such as, milk, yoghurt and cheese (table 1) (NIH, 2016).

Food	Milligrams (mg) per serving
Milk, reduced fat (2% milk fat), 8 ounces	293
Yogurt, fruit, low fat, 8 ounces	313-384
Cheese, cream, regular, 1 tablespoon	14

Table 1- amount of calcium (mg) in selected food

Egg shells are major source of calcium. The egg produces a great amount of residual shells which pose an environmental pollution as a result of microbial action. The most important ingredient of egg shells is calcium carbonate, which is 94-97% from the total composition and the others are phosphorous, magnesium, sodium, potassium, manganese, iron, copper and organic matter (Subhajit Ray, 2017).

Calcium carbonate (CaCO₃) that composes egg shells can't react or dissociate in pure water. However it can be changed into calcium oxide (CaO) by a process called calcination. Calcium oxide is a quick lime, very stable compound, and can form a slaked lime in the presence of water. It is extensively used for medicinal purpose (Tangboriboon, 2012).

Calcium ions in solution are better than calcium tablets for the human body. They are already dissociated into ions and easy to swallow it than calcium tablet

Recommended Dietary Allowance for calcium in mg/day according to Surgeon (2004):

Life stage group	Calcium mg/day
0-6 months	210
7-12 months	270
1-3 years	500
4-8 years	800
9-13 years	1300
14-18 years	1300
19-30 years	1000
31-50 years	1000
51-70 years	1200
> 70 years	1200
Pregnancy:	
<18 years	1300

19-30 years	1000
31-50 years	1000
31-50 years	1000
Lactation:	
<18 years	1300
19-3 years	1000
31-50 years	1000

Table 2- Recommended dietary allowance for calcium in mg/l

II. HYPOTHESIS

- Egg shells are a source for obtaining calcium ions naturally.

III. METHODS

Materials: Chicken Egg Shells, Coal, Labor photometer, lemon juice, Drinking water, beaker (500 ml), spatula, digital balance, graduated cylinder (10ml,300ml), watch glass.

Procedure:

a. Experiment 1:

Raw chicken egg shells were collected. The egg shells were washed with tap water until the white membrane was completely removed then dried at room temperature. After that the egg shells were crushed into a powder, and kept on a filter paper at room temperature. The dried egg shells were subjected to high temperature by defacing them in burned coal for 10-15 minutes. After that 96.5 g were taken from the obtained powder using spatula watch glass and digital balance and were inserted in a 300ml beaker. 10 ml of lemon juice and 300 ml of distilled water were measured using graduated cylinder, and then added to the powder in the beaker. Finally take 10ml from the prepared solution, insert them in the labor photometer to measure the

amount of calcium ions in the solution and record the result.

b. Experiment 2:

Take 10ml of drinking water and insert them in the labor photometer and record the result.

IV. RESULT

The concentration of calcium ions in 10ml of prepared solution is 240mg/l

Doc-1 value of mass concentration of calcium ions in the prepared solution using labor photometer



The concentration of calcium ions in 10ml of drinking water is 160mg/l

Doc-2 value of mass concentration of calcium ions in drinking water using labor photometer



Each 96.5g of CaCO₃ and 10ml of lemon juice give 240 mg/l, [m=C×V] 240mg of calcium ions in 1 liter. To increase the quantity needed according to the age and the case in order to obtain regulated solution the relation will be

$$\left[X = \frac{Y \times 96.5 \text{ g}}{240 \text{ mg}} \right]$$

X: mass of calcinated egg shells in g
Y: [mass of calcium ions needed – 160mg]

V. CONCLUSION

The egg shells are major source of calcium and according to the result using calcinated egg shells increases the concentration of calcium ions in drinking water by 240 mg/l.

VI. ACKNOWLEDGMENT

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Fault simulator of car engine

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Abstract- As we know any system when comes to existence has some limitations and faults. We are proposing to develop a E-training system which will train the user about the faults of a car engine and guide him/her about the necessary steps required to overcome the corresponding fault. Parameters like poor lubrication, Dirty oil, Spark knock, poor compression, coolant loss, clogged radiator and worn spark plug are known as engine faults. The simulator is developed using LabVIEW which will consist of different panels viz. the Main panel, About faults panel, Normal conditions panel, Guide panels, Fault simulator panel and Trainer kit panel. A trainer kit for fault diagnosis is implemented using switches and indicators which will guide the user about the necessary steps required to be performed to overcome the corresponding fault.

Keywords: E-training, Fault Simulator, LabVIEW, Indicators.

I. INTRODUCTION

Our project “Fault simulation of car engine” is dedicated on finding out faults which arises in any system having any physical or mechanical components. In our project we have considered different parameters which possess great importance in any car engine. The parameters such as ignition fault, overheat fault, low compression, spark knock, noisy engine, overshoot fault and poor lubrication are some of the common engine faults of an automobile. In Fault simulator panel the user changes the value of the devices like temperature meter, pressure gauge, decibel scale, rpm indicator and level indicators and observe the simulated faults in the 'fault indicator' window and 'other possibilities' window. In trainer kit panel the user selects the fault to be diagnosed and then pass various test cases through push buttons on the engine block diagram. After hitting the check button the results of diagnosis is observed through various indicators.

II. OBJECTIVE

Objective of this work is to develop an interactive teaching scheme for automobile engineers and beginners using virtual engine developed in LabVIEW. This facilitates the user to study engine parameters without having the physical engine. All the engine parameters can be included in the built vi (virtual instrument) using virtual instruments in LabVIEW.

III. PROBLEM STATEMENT

Detecting faults in a car engine is a complicated process and requires high level of expertise. Developing a system dealing with faults in a automobile engine

has to overcome various difficulties. Practical study of engine requires many devices and equipments, which increases the cost and maintenance, so this paper describes a simple solution to such problems using virtual instrumentation.

IV. LITRATURE SURVEY

Fault detection plays an important role in safety measures of any device. Abnormal events occurring in a process can be avoided by early detection of faults. There are several methods of faults detection. The literature survey of these methods and current state of research in the field is as explained below:

PROCESS MODEL-BASED FAULT DETECTION

The general scheme (Isermann 2006) employed for the model based fault detection is shown in Figure below. Based on measured input signals U and output signals Y , the detection methods generate residuals r , parameter estimates or state estimates which are called features. In comparison with the normal features, changes of features are detected, leading to analytical symptoms S . The process model approach for fault detection can be carried out using state observer/state estimation, parity equation, parameter estimator or neural network[13].

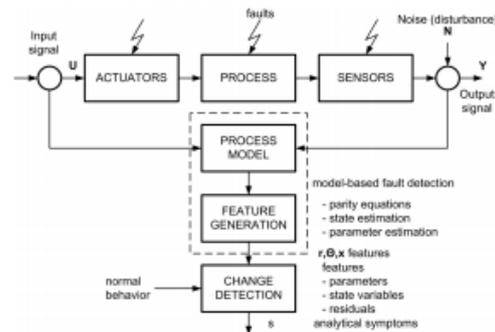


Figure 1: PROCESS MODEL-BASED FAULT DETECTION[1]

a. DATA BASED METHODS AND SIGNAL MODELS

Data based methods exploit only available experimental (historical) data. It includes various methods as spectrum analysis, Pattern recognition(neural networks)[7], Data analysis, Parametric models, Limit checking and Trend checking.

b. KNOWLEDGE BASED METHODS

In recent time there is a trend towards knowledge based and artificial intelligence methods like Expert systems, Fuzzy logic.

i. Expert system

Rule-based expert systems have a wide range of applications for diagnostic tasks where expertise and experience are available, but deep understanding of the physical properties of the system is either unavailable or too costly to obtain[14]. This approach offers efficiency for quasi-static systems operating within fixed set of rules. Main components of this approach are knowledge base and inference engine, Knowledge is represented in form of production rules[1]. Knowledge acquisition is always considered as one of the biggest difficulties in designing an expert system.

ii. Fuzzy Logic

The output of fault detection system needs not to be an alarm that takes two values, fault or no fault. Instead of simple binary decision fault/no-fault, fault severity of the system is provided to operators as the output of fuzzy controller[12].

V. SYSTEM DESIGN

Software used:

a. LabVIEW

LabVIEW stands for Laboratory Virtual Instrument Engineering Workbench. LabVIEW uses graphical programming approach that helped us to visualize different aspects of our application more clearly. Necessary devices required for our application were available through virtual instrumentation in LabVIEW this helped us in reducing system cost.

Entire system is developed using LabVIEW.

i. Main window: This panel helps user to select among different pages included in project.



Figure 2: main window

ii. About faults window: This panel provides information about the various faults occurring in an automobile engine.

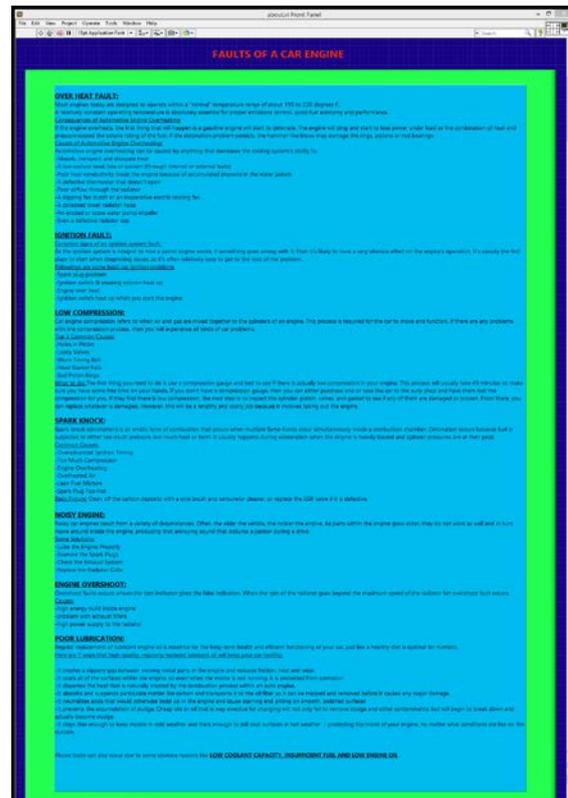


Figure 3: about fault window

iii. Normal conditions window: This panel provides information about the normal range of various engine parameters.

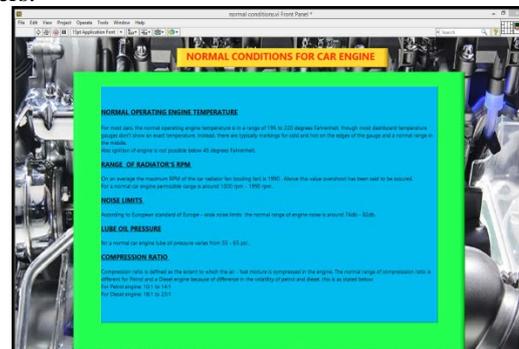


Figure 4: normal conditions window

iv. Guide to fault simulator: This panel help user to understand how to operate the fault simulator.

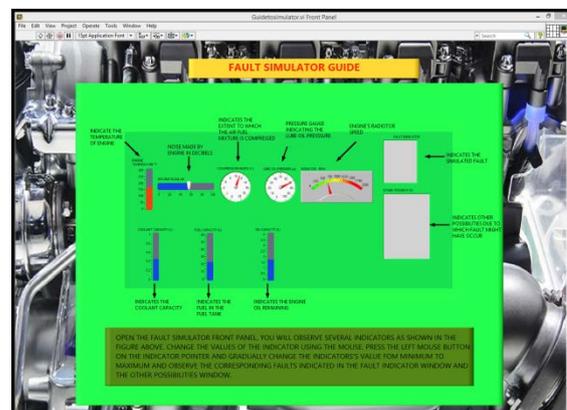


Figure 5: guide to fault simulator

v. Fault simulator window: In this panel user is allowed to change different engine parameters and observe the corresponding fault generated.

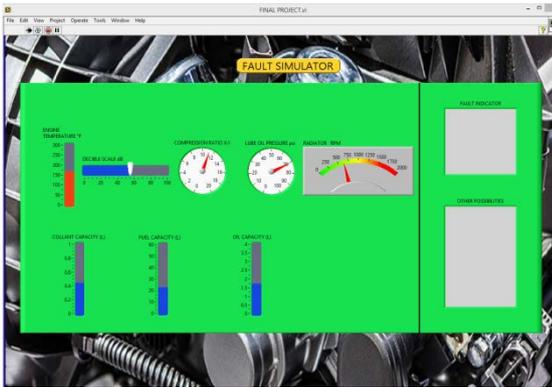


Figure 6: fault simulator window

vi. Fault diagnosis window: In this panel user selects the fault to be diagnosed and passes different test cases using the buttons provided. The sequence of the buttons pressed is recorded and after pressing the check button the results are displayed using various indicators.

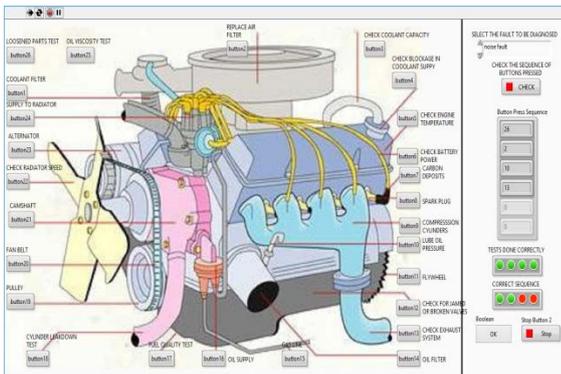


Figure 7: fault diagnosis trainer

b. Android application: Narrator's voice

Narrator's Voice, this application helped us to share our messages to user in different speech styles and languages. We have to type a text message, select the voice and language and this app returns the audio file [3]. We have used this application to provide sound effects in our project.

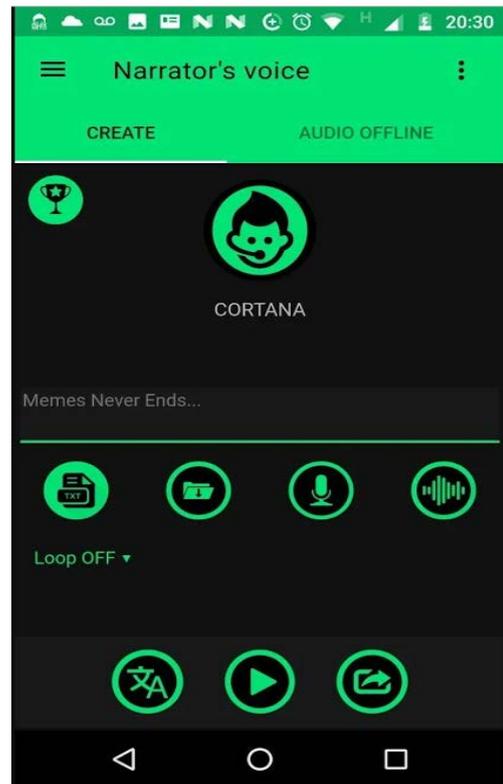


Figure 8: narrator's voice app[7]

VI. CONCLUSION

This paper is built with aspect of learning about car engine through an interactive application developed using LabVIEW. This would result in leveraging the logic to analyze any faults that occur in reality. This also provides better solution to beginners for engine related study. Using a virtual engine as an alternative to physical engine reduces the effective cost to a great extent.

VII. FUTURE SCOPE

Scope of this project can be extended to develop an android application for engine study. Different case studies can be developed for particular types of engines like 'V' engine, Jet engine, locomotive engine etc. Complete removal of dependency on physical engine for engine related study. The system can be focused more on getting the real time data from sensors, instruments that provides actual data.

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Phonic Game as an Approach to Improve Letters Recognition Skills

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Abstract- The first LINUS screening of reading has shown that the year 1 pupils at a rural school were struggling in grasping the basic literacy skills in reading, letter recognition. The purpose of this action research was to investigate the phonic game intervention in improving the letters recognition skill. This action research focused on 9 pupils of seven years old of the native tribe (Iban) of a school in rural area of Kapit. The data were collected with the use of pre and post-test. This research follows the Kemis and McTangart (1988) cyclic process of research. The focused skill were the ability to identify and distinguish letters of alphabet and their ability in associating sounds with the letters of the alphabet. The findings shows that intervention with the use of Phonic game helped in improving the pupils' ability to recognize letters and the sounds of the letters of the alphabet. The pupils retain the growth and improvement in their ability to identify and distinguish letters as well as associating sounds of the letters of the alphabet by passing the K1 and K2 level in their second LINUS screening.

Index Terms- Phonic game, early literacy, letters recognition, distinguishing, associating letters sound

I. INTRODUCTION

Early literacy is a growing concern among parents and educators as it serve as the basic foundation for young learners. There are 6 known early literacy skills and literacy skills are all the skills needed for reading and writing, such skills included are awareness of sounds in language, awareness of printed language and the relationship of letters and sounds. These skills act as an important basic before furthering to the next skills including word recognition such as vocabulary, spelling and reading literacy that is comprehension. According to Yunus, M.M. et. al. (2013), capability in English is highly prized in all field of interest, and students are aware that getting a good score in English greatly increases the chances to be accepted in major companies. Most young learners usually equipped with basic writing and reading letters first knowledge ever to be learnt at school, this is known as letters recognition and distinguishing letters with letters sound.

Letter recognition is well known to one of the important knowledge that young learners should master in order to proceed to word mastery. The important of it has been stress on since the foundation year, the pre-school. The more letters children can recognize and identify at an early age, the better their future reading achievement and the lower the risk of academic failure (Hurst, 2016). Letter recognition comprises of the sound and the name. In order to recognize the letter, the sounds of the letter need to be distinguished first. Therefore, in the mastery of letter recognition, phonics plays essential part as well.

The first LINUS screening of reading has shown that the year 1 pupils at a rural school were struggling in grasping the basic literacy skills in reading, letter recognition. There are twelve constructs in the LINUS reading instrument, with different level of skills being tested. The LINUS instruments assessing these twelve skills, namely, Construct 1: Able to identify and distinguish shapes of the letters of the alphabet, Construct 2: Able to associate sounds with the letters of the alphabet, Construct 3: Able to blend phonemes into recognizable words, Construct 4: Able to segment words into phonemes, Construct 5: Able to understand and use the language at word level, Construct 6: Able to participate in daily conversations using appropriate phrases, Construct 7: Able to understand and use the language at phrase level in linear texts, Construct 8: Able to understand and use the language at phrase level in non-linear texts, Construct 9: Able to read and understand sentences with guidance, Construct 10: Able to understand and use the language at sentence level in non-linear texts, Construct 11: Able to understand and use the language at sentence level in linear texts and Construct 12: Able to construct sentences with guidance (Kementerian Pendidikan Malaysia, 2014).

From the LINUS Construct, the letter recognition skill is at the first and the second construct. The results of the participants' school-based reading and spelling assessments show that participants in this study were struggling with their early literacy. The purpose of this action research was to investigate the phonic game intervention in improving the letters recognition skill. As such, it is important to provide effective reading instructions that will help develop their reading skills. The underlying assumption in this present study is that the phonic game strategy would boost their confidence and increase their interest in reading and spelling. The focused skill is to identify and distinguish letters of alphabet and their ability in associating sounds with the letters of the alphabet.

II. LITERATURE REVIEW

Most common study recognizes this skills as Alphabetic principle, which also take in account the importance of the involvement of phonics in recognizing alphabet. The alphabetic principle is the understanding that there are systematic and predictable relationships between written letters and spoken sounds (Texas Education Agency, 2018). In the context of this research, Malaysian students are still at an average proficiency level in the mastery of basic skills in reading and writing.

Despite spending 6 years in primary school, many students are having difficulty with reading and writing once they enter the secondary school. Hence, to overcome the problem, the Ministry of Education (MOE) has come up with an educational intervention program, the 'Literacy and Numeracy Screening' (LINUS) which was implemented in 2013 (Azman, H., 2017). LINUS2.0 aims to enhance the rate of literacy in English Language among Malaysian lower primary ESL learners. Sight words play a major role in reading skills. As Calhoun, E., Poirier, T., Simon, N & Mueller, L. (2001) stated based on the Picture Word Inductive Model, sight vocabulary is crucial to the literacy skills and with the help by phonetic and structural properties will encourage learners to enhance their input and output skills. Phonological aspects that contain rhyme and phoneme segmentation also help the learners to achieve success in the reading skill (Martin, K., Emfinger, K., Snyder, S. & O'Neal, M., 2007). In the LINUS module, sight words can be seen everywhere as they are being introduced and repeated frequently to enhance memorization and automaticity.

Learners will use the language either in daily life or in their formal situation as being literate in the language is very crucial. Identifying the letter in alphabet generates an important matter as the learners who are able to have this skill will grow better achievement in their reading and motor skills (Gupta, 2013; Martin, Emfinger, Snyder and O'Neal, 2007; Cusumano, 2006, as cited in Angela 2010). As teachers play a significant role in its execution, their beliefs and perception are valuable to help realize the effectiveness of the program's features. It will help the teachers to be focused on the target group and suitable methodology in enhancing these literacy skills.

It is stated by Tubah, H. & Hamid, Z. (2011) that the LINUS programe is the furtherance of the KIA2M programe which consists of twelve constructs that need to be achieved by the learners in the literacy skills. It also requires the teachers to guide the learners in mastering the skills and hence answering the constructs with the target accuracy. Being able to teach these learners, teachers have to guide them in the classroom although it is not stated in any research yet. Teachers have to come up with a special lesson plan to teach these learners with guidance from the Teacher's Module provided by the Ministry of Education (Bahagian Pembangunan Kurikulum, 2014). For this study, game is the considered to be the most common way to elicit students especially young learners' engagement with the learning. Therefore, it is crucial to strengthen the basic literacy first prior to the mastery of the sight words. Concurrent to that emerge the purpose of this study which is to investigate the phonic game intervention in improving the letters.

According to Ali, A., Aziz, Z., Majzub, R. (2011), game as part of early childhood education has the potential to provide preschool children with highly involvement and meaningful setting for learning reading and being successful in early literacy concept. The involvement of game in learning has become a trend now among the educators, particularly in learning language. According to Yunus, M. M., et. al. (2011), languages, especially English, have always had to be studied and used by children to involve and participate in games. The experiential learning theory explains how learners create their own learning through experiencing new situation and understanding. For school which English is not the first, second nor third language, it has become a daily practice for teachers teaching the targeted language to use any means of game in order to engage pupils with the learning. Phonemic awareness is the ability to hear, recognise and manipulate individual sounds or phonemes in spoken words (Nee, W. O. Y. & Yunus, M. M., 2017). Before young learners learn to read text, they need to become more aware of how the sounds in words work. In the teaching of phonic or widely call phonics instruction, game conjointly become the most common way to conduct it. Phonics instructions helps children attend to parts of words, including individual sounds and syllables (Lapp & Flood, 1997). It may increase pupils' motivation on reading when they can blend the letter sounds. Besides that, according to Kamarundzaman, N. S. (2014), it may increase pupils' spelling and speaking skill. This is because learning through phonics system is not only help reading proficiency but improve pupils' spelling and pronunciation as well.

In the Malaysian context of education, the important of phonics is essential that it is included in the Standard-Based English Language Curriculum for Primary Schools (SBELC) in 2011. It is important to point out that one of the basic principles of the SBELC is to provide learning that was fun, meaningful and purposeful (Prasad et al,2016). Young learners being at the state of human being where attention span is very short, what better way to engage young learners with fun and meaningful learning is none other than game.

III. METHODOLOGY

A. Purpose

The purpose of this action research is to investigate the phonic game intervention in improving the letters recognition skill. As stated earlier in this action research, the results of the participants' school-based reading and spelling assessments shows that participants in

this study were struggling with their early literacy skills of recognizing letters and distinguishing the sound of the letters of the alphabet. From these problem rise the following questions:

1. How do phonic instructions improve the pupils' letter recognition skills?
2. How does phonic game can boost the pupils' confidence in engaging with phonics instruction?

B. Research design

The data were collected with the use of pre and post-test and adopt the Kemis and McTanggart (1988) cyclic process of research. Parallel to the data collected methods which is the pre and posttest, the cycling is suitable for this research. The pretest is administered during the first cycle while the posttest is on the second cycle. The result then is treated with mean, and standard deviation in order to analyze the improvement made by the participants from the pre and post-test, respectively with first and second cycle.

C. Sampling

The sample are chosen from the year one pupils as they complement the characteristics of and emergent learner. All the pupils come from the background of native tribe (Iban) of a school in rural area of Kapit where English is less exposed. Therefore, by exposing the pupils with basic knowledge of English with association of game would help these pupils to be motivated to learn English. The participants consist of 5 male and 4 female of lower and average proficiency, with different level of constructs that they have passed during the first LINUS. The first LINUS result of all the participants has been set as the benchmark as the minimum result for this action research and also in targeting a higher result. Table 1 below shows the demographic data on the participants of this action research.

Table 1: Participants' Demographic Data

Pupil	Gender	Level of proficiency	The first LINUS result
P1	Male	Low	Did not pass
P2	Female	Low	Did not pass
P3	Male	Average	Pass construct 1 only (K1)
P4	Female	Low	Did not pass
P5	Male	Low	Did not pass
P6	Male	Average	Pass construct 1 only (K1)
P7	Female	Low	Did not pass
P8	Female	Low	Did not pass
P9	Male	Low	Did not pass

D. Procedure

Game has been widely known to be the most interactive ways to engaged pupils in learning. A Phonic game was created to adhered to the standard of the K1 and K2 construct which are, able to identify and distinguish letters of the alphabet and able to associate sounds

with the letters of the alphabet. Prior to the intervention, pupils have already been taught the letters of alphabet with pictures of items to represent the sounds of the letter.

The game mainly help to strengthening the sample's ability to recognize the letters and distinguishing them through sounds without appear to be drilling them with the input. The game is adapted from Cash Cab game, but instead of getting money for every correct answer, the samples was given point, and for wrong answer of more than three times, they are totally out from the game instead of from the cab. After all 34 letters taught to them the samples start to play the game as an enrichment activity. The game comprises 2 different types of question representing two construct that the samples need to achieve. Example of questions for the K1 construct is shown in Figure 1 below.



Figure 1: One of the type of Question for K1 Construct.

The question for K1 construct requires the samples to name each of the colored letters orally within the time limits begin. There are 20 questions for each level of construct. There are 5 ways of questioning that were asked, naming the colored letters in words, naming the colored letters in random orders of the alphabet, naming the missing letters in the order of alphabet, naming the letters in the selected shape, and naming the letter shown in 3 seconds.

The questions for K2 construct is shown in Figure 2 below.

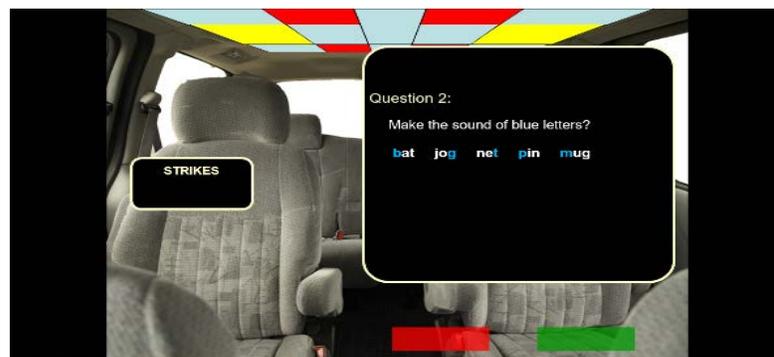


Figure 2 : One of the type of Question for K2 construct

The questions for K2 construct too were asked in 5 different way but for K2, the samples need to sound out the letters. The time limits for the questions for the second construct is much longer than the first construct.

IV. DATA ANALYSIS

Central tendency of descriptive statistics is selected to analyse the data of pre and post score of LINUS2.0 screening using Statistical Package of Social Sciences (SPSS).

Table 2: Data Analysis

Pupils	Pre-test score	Post-test score
P1	40	80
P2	50	100
P3	50	100
P4	10	60
P5	20	80
P6	50	100
P7	20	70
P8	20	50
P9	10	50
Mean (M)	3.00	7.67
Standard Deviation (SD)	1.73	2.06

Using Statistical Package of Social Sciences (SPSS), the following are the results of this analysis; pre-test, N=9, M=3.00, SD=1.73 and post-test, N=9, M=7.67, SD= 2.06. The results show that the pupils' scores are more consistent and higher during post-test.

V. IMPLICATIONS

After reflecting upon the results of the action research, there were several implications emerged. Students should be given opportunities to collaborate with one another in the classroom in order to achieve a goal, which here during the intervention, only the teacher conduct the game while the participants play. For a wider purposes and for future research, participants should be given the opportunity to conduct and handle the game among themselves. Playful competition is another way to gain student motivation, ultimately yielding successful results (Cardella, K,2013).

The intervention by using the game has help the sample in recognizing letters and distinguishing letters with the letters sound. It shown in their pre and post test score with a significant increase in their ability to recognize and distinguish letters in alphabet. It is shown in their second LINUS screening whereby most of them passed the first and the second construct of the screening and their amount of correct answer during the game, therefore this situation answer the first questions, on how phonic instructions improve the pupils' letter recognition skills. The participants also requested that the game is played again even after the intervention. Its shows that their excitement while playing the game, therefore this situation answer the second question of how phonic game does can boost the pupils' confidence in engaging with phonics instruction.

VI. CONCLUSION

The Phonic-LINUS Derivational game has indeed improved the samples ability to recognize and distinguish letter sounds. This will gradually help them in the next level of reading literacy, word recognition and sight words. The game has also improved their motivation in learning session, they improve in their participation to answer question by volunteering to be in the game. The game is also suitable to be used as a part of set induction in other lesson to refresh back the samples knowledge in their learning of alphabet or to be used as a teaching aids for the next lesson to keeps strengthening the samples ability in recognizing and distinguishing name and sounds of the letters of the alphabet.

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Anew host of dodder (*Cuscuta spp.*) Parasitizing Damas (*Conocarpus erectus*) in Khartoum and Gezira states- Sudan

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Abstract- The study was carried out at the field dodder during season 2017 - 2018 in Khartoum and Gezira states to determine its all host of *Cuscuta spp* distributed in the two states using Global Positioning System (GPS) in the survey. The survey covered several areas in two states. The results showed that dodder species founded parasitizing in the North, East and West Khartoum state. The results revealed that the dodder have different host plants and new host (Damas *Conocarpus erectus*). It was founded parasitizing 12 plants species belonging to 12 families. Among the most affected host plants, were 6 grasses, 2 vegetables Crops (Onion, *Allium cepa*) and Molokhia (*Corchorus oleratus*), lime trees (*Citrus aurantiifolia*), forge Crops (Alfalfa, *Medicago sativa*), forest trees (Ghoubish, *Guiera senegalsis*, Damas) and Orumentals (*Euphorbia Catharanthu svinca*).High percentage incidence (100%) were recorded in Damas, Alfalfa, Molokhia, - Ramtook (*Xanthium baraslicum*). Lowest percentage incidence was recorded in Lime 1%. Results of Gezira state indicated that the dodder was found Parasitizing on North, East and West of the state. The host of it was Onion, Lokh *Dicanthium annulatum* and Dahaser *Indigofera oblongifolia*. Lowest percentage incidence 6.2%, were observed in onion.

Index Terms- Cuscuta, Host range, Dodder, Percentage, Incidence

I. INTRODUCTION

Dodder (*Cuscuta spp.*), an annual holoparasitic plant of legume crops, which belongs to family *Cuscutaceae* ,is genus cosmopolitan occurrence , thus *Cuscuta* species are widely distributed and colonized diversity of habitats throughout the temperate and tropical zones (Belize,1987). Many species of *Cuscuta* have been introduced to different parts of the world due to similarity of their seed to those of commercial crops ,especially legumes like alfalfa (*Medicago sativa* L.) *Cuscuta species*, commonly known as dodder and it is one of the most invasive weeds, (Lowe et al., 2001).This survey was made in Khartoum& Gezira state.

Filed dodder have wide spectrum of hosts, although they favor less monocotyledonous species genus *Cuscuta* contains

three subs –geneses. Member of sub-genus destroy fruit trees, while the species in sub- genus *Cuscuta* represents a problems for hosts of herbaceous plants ,as well as sub- genus grammica infected plans weaken ,vegetative luxuriance is reduced ,as well as their fertility (Koskela et al., 2001 ,Fathoulla and Duhoky ,2008).In moderate climate ,filed dodder is maybe the most parasitic weeds of legumes. Genus *Cuscuta* belongs to family (*Cuscutaceae*).Many species that are hardly recognizable and are able to parasite numerous shrubby and woods species belong to this genus. Although the results of the mitochondrial genome analysis confirmed a link between the family Cuscutaceae phylogenetically belongs to family Convolvaceae .Stojanovic et al.,(2002), Stojanovic et al. (1993) The species of the genus *Cuscuta* (*Cuscutaceae*) are most obvious parasitic .Dodder are vien that usually have bright colors orange, yellow or red characteristics of calyx and corolla lobes are important, identifying 8 species (Musselman, 1984).New taxonomy of the genus *Cuscuta* exclude it from the family *Convolvulaceae* to a separate family .Dodder are abundant in Europe, Africa but less in Australia. It also present in Asia, commonly in south India to SriLanka and etas to china and Indonesia .It may have been introduced and become established occasionally. Holm et al. (1979) Classified *Cuscuta reflexa* as serious weed in Afghanistan, Nepal, India and Pakistan .In Sudan the study from (Andrews, 1956), Indicated that about four species of *Cuscuta*: namely *C. Planifora ten*: *C. hyaline* Roth: *C. klimanjara oliv* and *C. Cordofana*, while Musslman (1984), reported seven species and described their geographical distribution in country .He reported the occurrence of *C. pedicellata* ladeb, In Khartoum, Gezira and Bahr Al Gazal state, and *C. pedniflora Ten* .In southern Darfur and Red Sea state he found *C. Hyaline* and in the Northern States, Kassala, Northern Kordofan and Khartoum States. Musslman and Bebawi, (1983) reported *C.campestris* yunker, in Shambat and Toti Island and widely spread through much of Sudan as a contaminate of Lucerne seeds. Since Gaunter, (1950) review on the genus *Cuscuta* it is in considered as the most serious weeds in alfalfa, clover and other legumes. It also attacks other plants including flax and many ornamental plants .*Cuscuta campestris* infect tomatoes, onion, asparagus and cucurbits. Dodder species

vary in the number of different host species they can infect. *Cuscuta campestris* is the most widespread species in the world and the only parasitic weed of North America that has spread to the Old World (Dawson *et al.*, 1994). However, field dodder in Gezira, central Sudan, parasitizes onion, some vegetable crops, broadleaf weeds and it was found to infect lime trees; a woody species. (Jayasinghe *et al.*, 2004) .reported that field dodder parasitizes 161 species of different life-forms belonging to 59 families comprising 27 crops, 22 weeds, and 60 medicinal plants. Of the recorded hosts, 24 were trees, 42 were shrubs, 12 were creepers and 83 were herbs. The same authors indicated that *Cuscuta* differentiates between primary and secondary hosts and considered grasses as secondary host of *Cuscuta*. These indicated that habitat differences of the *Cuscuta* species can be responsible for the different host ranges (it only wraps around grasses but does not parasitize them) (Dawson, *et al.*, 1994; Holm *et al.*, 1997; Hutchison and Ashton, 1980; Parker and Riches, 1993). The same crop may serve as a host of several dodder species, and in some cases dodder can parasitize different plants simultaneously (Cudney *et al.*, (1992); Dawson, (1984); Peters *et al.*, (1988).In previous studies, field dodder infestation reduced tomato vegetative growth and the number of fruits per plant but had no effect on individual tomato fruit size or maturation (Lanini, 1992). The current research is aimed to: a) determine the natural host range of field dodder (*Cuscuta spp.*) distributed in Khartoum and Gezira states, b) evaluate the effects and estimate the percentage incidence in these states.

were categorized according to their families. For each survey *Cuscuta* incidence were evaluated .The percentage of infection was recorded for each host at each locality and the data were statistically analyzed. The calculations were based on the following formula:

$$\text{Incidence} = \frac{\text{No. of infected plants}}{\text{Total No. of plant inspected}} \times 100$$

II. MATERIALS AND METHODS

Survey

Two surveys were carried out during November 2017 to March 2018 in Khartoum and Gezira States to determine host range of *Cuscuta spp.* in the two States. Global *Positioning System* (GPS) using in the survey. Each survey includes some areas in each state.

The first survey was conducted in November 2017 in Khartoum State include: (Shambat, Alkabash, Alfaki- hashim, Algeli, Helat-koko, Alalaphon, Alslaet scheme, Jebal-Aulia, Sowba scheme, Gezira Slang, Algomuai scheme ,Omdurman Dar Alslam, Taglawi Scheme ,Gezira slang andToti) The other survey was carried out in March 2018 In Gezira State include areas: (Wad Alkawahala, Oum Treebat, Wad Alhandi, Shukaba , Wad Almagzoub, Alhasaheisa, Abu usher, Hantoob, and Almadina Arab)(Fig. 1) and The host plants of *Cuscuta spp.* were collected from different localities of two States Khartoum and Gezira identified by using recent standard books and scientist in weed science. The hosts

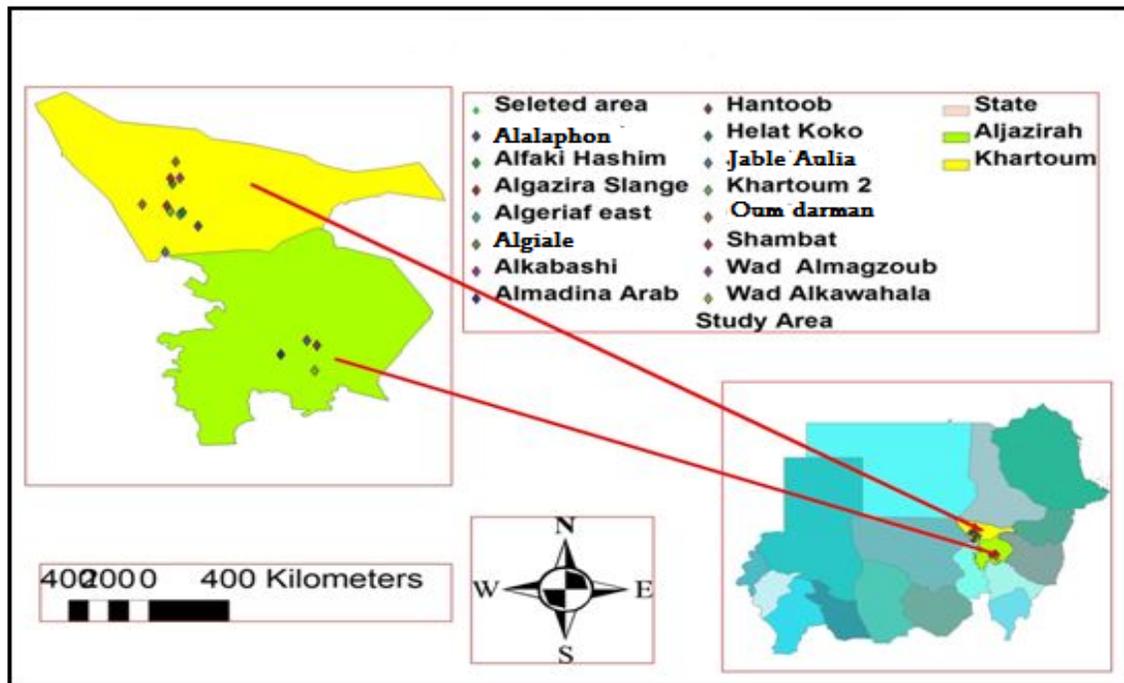


Fig. 1. Map of Khartoum and Gezira States showing the surveyed areas.

III. RESULTS

The results in **Table (1)** showed that dodder species founded parasitizing in the North Khartoum state (Shambat, Alkabash, Alfaki-hasham, Gezira Slang and Algeli).The South Khartoum (Sowba-west, Jebal-aulia, and Algomuai-Scheme), while in areas of Sowba, and Algomuia-Scheme infestation not recorded. Whereas, it was found in the East Khartoum (Alslaet-scheme, Helat-koko, and Alalaphon) parasitized on different host. On the other hand, it was found restricted on citrus plants especially lime at west Khartoum areas (Dar Alslam Om bada, Taglawi Scheme). The results revealed that the dodder have

different host plants, including weeds, crops , vegetables, ornamentals, and other plants throughout the agricultural areas in the Khartoum state. However, the most Parasitism was founded around rivers Nile and its tributaries (White and Blue) but it was not observed far away the Nile (**Fig. 2, 3, 4, and 5**)

Results of Gezira state areas South state (Wad Alkawahala, Oum Treebat, Wad Alhandi, and Shukaba,) indicated that the dodder was not present except in Oum Treebat, Wad Alhandi, and Shukaba areas. As for the Gezira North (Wad Almagzoub, Hantoob, Alhasaheisa, and Abu usher) the parasite only was observed in Wad Almagzoub and Hantoob areas (**Table 1, Figs 6, 7, 8 and 9**).

Table 1. Host Plants of dodder (*Cuscuta spp.*) recorded in Khartoum and Gezira states.

Locality/area	Coordinates	Altitude(m)	Host plant
Bahari/Shambat	N153850.1 E0323036.9	389	Alfalfa/Balloon plant/Euphorbia
Alsalam/Dar Alsalam	N153933.5 E0322043.0	424	Lime
Khartoum /Kartoum2/Toite	N153550.8 E0323209.3	387	Damas /Remet/ Alfalfa
Bahari(N)/Alkabash	N155309.9 E0323551.0	390	Alfalfa
Bahari(N)/Alfaki- hasham	N155011.8 E0323300.0	384	Alfalfa
East Nile/Helat-koko	N153531.3 E0323658.0	394	Ghoubish
East Nile/Alalaphon	N152818.4	396	Alfalfa / Dahaser

	E0324315.2		
East Nile/Algerif east	N153419.8 E0323554.3	384	Alfalfa
Jebal Aulia	N151455.1 E0322959.2	394	Ramtook/Molokhia/ Amoyogha
Algeli/Algeli	N160132.7 E0323410.0	390	Alfalfa
Kerri North/Slang	N155256.5 E0323211.2	385	Alfalfa
Gezira /Hantoob	N142634.8 E0333106.4	415	Alfalfa /Onion
South Gezira/Wad Kawahala	N141324.1 E0333024.7	419	Onion
North Gezira/Wad Almagzoub	N142858.8 E0332713.9	415	Onion
West Gezira/Medina Arab	N142144.1 E0331640.2	411	Onion/Lokh/Dahaser

Result in **Table 2** showed incidence of filed dodder. High percentage incidence (100%) were recorded in Khartoum state as the following (Khartoum2 Damas , Algile Alfalfa, jebal Auila Molokhia, Jebal Auila- Ramtook, and Jebal Auila- Amoghoga ,Toti Remet- Alalaphon,Alafalfa ,Shambat- Euphorbia and Shambat- Balloon plant), and Dar Alslam Om bada- Lime) respectively. In Geziar state were recorded high incidence

(Hantoob- Alfalfa, Almadina Arab -Onion, and Almadina Arab-Dahaser) respectively, However, the lowest incidence were recorded in Khartoum state as (Shambat Lime 1%, Alfaki hashem Alfalfa 2.4%, East Nile Algerif Dahaser 6.3%, and Gezier Aslange Alfalfa 6.3 %).Also the lowest incidence were recorded in Gezira state areas (wad Al kawahala- Onion 6.2%, Hantoob-Onion 14.3% and Wad Almagzoub -Onion 22.2).

Table 2. Incidence of *Cuscuta spp* in Khartoum and Gezira states.

No	Scientific name	Local name	Family	Incidence
1	<i>Conocarpus erectus</i>	Damas	Combretaaceaes	100%
2	<i>Guiera senegalsis</i>	Ghoubish	Combretaaceaes	70.9%
3	<i>Medicago sativa</i>	Alfalfa	Fabaceae	6.3%
4	<i>Medicago sativa</i>	Alfalfa	Fabaceae	100%
5	<i>Xanthium baraslicum</i>	Ramtook	Asteraceae	46%
6	<i>Tephrosia spp</i>	Amoyogha	Fabaceae	100%
7	<i>Corchorus oletorus</i>	Molokhia	Malvales	100%
8	<i>Xanthium baraslicum</i>	Ramtook	Asteraceae	100%
9	<i>Medicago sativa</i>	Alfalfa	Fabaceae	2.4%
10	<i>Medicago sativa</i>	Alfalfa	Fabaceae	100%
11	<i>Medicago sativa</i>	Alfalfa	Fabaceae	6.3%
12	<i>Medicago sativa</i>	Alfalfa	Fabaceae	100%
13	<i>Bergia cepansis</i>	Remet	Amaranthaceae	2.7%
14	<i>Citrus aurantiifolia</i>	Lime	Rutaceae	1%
15	<i>Catharanthu svinca</i>	Euphorbia	Apocynaceae	100%
16	<i>Medicago sativa</i>	Alfalfa	Fabaceae	25%
17	<i>Cardiospermum halicacobum</i>	Balloon plant	Sapindaceae	100%
18	<i>Medicago sativa</i>	Alfalfa	Fabaceae	37.5%
19	<i>Indigofera oblongifolia</i>	Dahaser	Fabaceae	37.5%
20	<i>Citrus aurantiifolia</i>	Lime	Rutaceae	100%
21	<i>Allium cepa</i>	Onion	Liliaceae	12.5%
22	<i>Allium cepa</i>	Onion	Liliaceae	6.2%
23	<i>Allium cepa</i>	Onion	Liliaceae	14.3%
24	<i>Medicago sativa</i>	Alfalfa	Fabaceae	100%
25	<i>Allium cepa</i>	Onion	Liliaceae	22.2%

26	<i>Allium cepa</i>	Onion	Liliaceae	100%
27	<i>Indigofera oblongifolia</i>	Dahasr	Fabaceae	100%
28	<i>Dicanthium annulatum</i>	Lokh	Poaceae	76.9%



Fig.2. The parasite on Damas (*Conocarpus erectus*) location: Khartoum2



Fig.3. The parasitic on Ramtook (*Xanthium barasilicum*) Location: Khartoum Jebal Auli.



Fig. 4. The parasitic on Balloonplant (*Cardiospermum halicacobum*)location:khartoum shambt.



Fig. 5.The parasitic on Alfalfa (*Medicago sativa*) Location: Hantoob.



Fig..6The parasiticon lime cutri(*Citrus aurantiifolia*) location :khartoum Dar alsam



Fig.7. The parasitic on Onion (*Allium cepa*) location Geziar Madina Arab.



Fig.8. Parasitic on Dahaser (*Indigofera oblongifolia*) location :Gezaira madina arab.



Fig. 9. The parasite on lokh (*Dicanthium annulatum*) location:gezaira madina arab.

IV. DISCUSSION

The results showed that dodder species founded parasitizing on different plant hosts in the different areas in Khartoum and Gezira states. The results revealed that the dodder

have different host plants and new host such as *Conocarpus erectus* in Khartoum State and showed that field dodder parasitizing 13 Plants Species belonging to 12 Families. Among these hosts, 6 grasses, 2 Vegetables Crops (*Allium cepa* and *Corchorus oleratus*), lime trees (*Citrus aurantiifolia*), forge Crops

(*Medicago sativa*), and forest trees (*Guiera sp*) and ornamentals (*Euphorbia sp*). However the results were findings in agreement with Zaroug *et al.*, 2010. who Founded dodder parasitizing 19 plant species belonging to 12 families among the most affected hosts, were 5 vegetable crops (onion, tomato, chickpeas, Jews mallow and salad rocket).and fruit trees (lime) also were agreement with Jayasinghe *et-al* (2004) who reported that field dodder parasitizes 161 species of different life-forms belonging to 59 families comprising 27 crops, 22 weeds, and 60 medicinal plants. Of the recorded hosts, 24 were trees, 42 were shrubs, 12 were creepers and 83 were herbs, the same authors indicated that *Cuscuta* differentiates between primary and secondary hosts and considerable grasses as secondary host of *Cuscuta* .these indicted that habitat differences of the *Cuscuta* species can be responsible for the different host ranges. Furthermore, it was found that the reason why dodder parasitize plants from various life, forms in different proportion is not (only) the active host choice, but the characteristic features of the habitats .Dawson.*et al* .,1994; Holme *et.al.*, 1997; Hutchison and Ashton 1980;they reported that dodder mainly parasitizes alfalfa ,but also attacks some horticulture crops, legumes and broadleaf weeds ,though it is seldom found on woody plants, grasses, or cereals. The incidence persnce of filed dodder were estimated to according of infection evelueted and recorded as the following (total number of plants infected related to the total number of plants inspected (infection %). High percentage incidence (100%) was recorded in Khartoum state (Khartoum 2, Algile, jebal Auila, Toti, Alalaphon, Shambat, and Dar Alslam Om bada). On the other hand, lowest percentage incidence was recorded in Lime at Shambat area (1%). Results of Gezira state indicated that the dodder was found Parasitizing on North, South and West of the state. The host plants of it were Onion, Lokh, Alfalfa and Dahaser. Highest incidence (100%) was recorded in Gezira state at Hantoob and Madina Arab, while the lowest incidence was recorded at wad Al kawahala area (6.2%).

V. CONCLUSION

The study explained the levels of susceptibility to dodder in Khartoum and Gezira states. The high level of diversity host range to this pest suggests a potential threat to human interests in their cultivation in dodder-infested fields. It will be essential to understanding the basis of the *Cuscuta*-host interaction and may thus, advance knowledge about this parasitic weed in general. From this foundation, new strategy for controlling parasitic weeds may evolve.

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Direct Product of B-Algebra Using Some Cycles of Aunu Permutation Pattern; Application in Graph Theory

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Abstract

In this paper we provide another method of constructions of direct product of B-algebra using a class of AUNU Permutation Pattern, were we used cycles of AUNU permutation pattern for the construction of direct product of B-algebra which yield some result, the pattern was also applied in graph theory.

Keywords: AUNU Groups, AUNU Patterns, B-Algebra, direct product of B-algebra, Graph.

1. Introduction

Algebra is a very wide area of study and it has so many classes such as BF and B –Algebra, in this research we limited our work on B-Algebra.

B-algebra is non-empty set X with a binary operation “ $*$ ” and a constant 0 that satisfied the following axioms.

- i. $x * 0 = x$
- ii. $x * x = 0$
- iii. $(x * y) * z = x * (z * (0 * y))$

$\forall x, y$ and z in X (Negger and Kim, 2002)

Another proof of the relationship of B-algebra with Group using the observation that the zero adjoint mapping is subjective, moreover a condition for an algebra defined on real numbers to a B-algebra using analytical method was found and in addition certain other facts about commutative B-algebra was reported by Allen *et al*, (2003). The direct product of B-Algebra was investigated by Angeline and Endam (2016), in which they introduced some properties. The detailed application of this algebra can be found in Park and Kim, (2001); Cho and Kim, (2001) Angeline *et al* (2016); introduced two canonical mapping of the direct product of B-algebra and obtained some of their properties.

2. Some Basic Defination

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In order to make reader a friendly reading and provide good understanding of the method and results of the paper, some basic notations are briefly discussed in the section following.

2.1. B-algebra:- A B-algebra is a non empty set x with constant 0 and binary operation “*” satisfying the following axioms.

$$B1 \quad x * x = 0$$

$$B2 \quad x * 0 = x$$

$$B3 \quad (x * y) * z = x * (z * (0 * y))$$

For all x, y and z in X

2.2. Sub Algebra: - Let $(X, *, 0)$ be a B-algebra. A non empty subset N of X is said to be sub algebra if $x * y \in X \forall x, y \in N$

2.3. Direct product of B-algebra: - let $A = (A, *, 0_A)$ and $B = (B, *, 0_B)$ be two B-algebra, define the direct product of A and B to be the structure $A \times B = (A \times B, *, (0_A \times 0_B))$ where $A \times B$ is the set $\{(a, b) : a \in A, b \in B\}$ whose binary operation * is given by $(a_1, b_1) * (a_2, b_2) = a_1 * a_2, b_1 b_2$.

2.4. Aunu Numbers: There are two types of Aunu Numbers; The (123)-avoiding class obtained from a recursion relation (Ibrahim and Audu 2005) as follows:

$$N(A_n(123)) = \frac{P_n - 1}{2}$$

Give rise to: 2, 3, 5, 6, 8, 9, 11, 14,

Corresponding to the length of 5, 7, 11, 13, 17, 19,

The sequence in (2) is called the Aunu numbers correspond to the (123)-avoiding class of permutation.

Where $N(A_n(123))$ is the number of the class of numbers expressed as permutations, that avoid (123) patterns while P_n is the n^{th} prime number $n \geq 5$.

On the other hand the (132)-avoiding class of Aunu permutation patterns is obtained from a relation (Ibrahim 2006, Ibrahim 2004) as follows:

$$N(A_n(132)) = n + (m - 1), m \leq n.$$

Give rise to: 5, 7, 9, 11, 13, ...,

Corresponding to the length of 3, 4, 5, 6, 7,

The sequence in (5) is called the Aunu numbers corresponding to the (132)-avoiding class of permutation.

3. Construction of Direct Product of B-Algebra Using Aunu Permutation Pattern of (123)-Avoiding Pattern

Let $A = (A, *, 0_A)$ and $B = (B, *, 0_B)$ be B-algebra. Defined the direct product of A and B to be the structure $A \times B = (A \times B, (0_A, 0_B))$, were

$A \times B$ Is the set $\{(a, b): a \in A \text{ and } b \in B\}$ whose binary operation* is given by $(a_1, b_1) * (a_2, b_2) = (a_1 * a_2, b_1 * b_2)$.note that the binary operation is componentwise. Thus, the properties (I),(II) and (III) of $A \times B$ from those of A and B. Angeline, J. V & Endam, C. E (2016). Direct Product of B-Algebra.

Hence the construction easily follows.

(123)-avoiding Pattern

Proposition.

Let $\Omega = \{1,4,2,0,3\} \subset Z_5$ be a first cycle of B-algebra of order $p = 5$, were $p \geq 5$ under binary operation “ \times ” then $\Omega \times \Omega$ is a direct product of B-Algebra under \times .

Proof

For a $\Omega \times \Omega$ to be a direct product of B-Algebra

Then, regarding $\{1,4,2,0,3\}$ as elements to construct a table of direct product of B-Algebra

Table 1: Operation table of Z_5 of direct product (123)

\times	1	4	2	0	3
1	1	4	2	0	3
4	4	1	3	0	2
2	2	3	4	0	1
0	0	0	0	0	0
3	3	2	1	0	4

Theorem

If Ω_1 and Ω_2 are two different AUNU numbers that are B-algebra then the direct product of two B-algebra is also a B-algebra.

Proof

Suppose Ω_i be a family of the product of a finite B-algebra then $\Omega_i, \{i = 1,2,3, \dots n\}$ for $i = 1,2, \dots n$ then the direct product of B-algebra of Ω_i is defined by $\prod_{i=1}^n \Omega_i$ where the π is the direct product given by $\Omega_1 \times \Omega_2 \times \Omega_3 \times \dots \times \Omega_n$ that is for any

$(a_1 a_2 a_3 \dots a_n) \in \Omega_1$ and $(b_1, b_2, b_3, \dots b_n) \in \Omega_2$ then $\prod_{i=1}^n \Omega_i = (a_1 a_2 a_3 \dots a_n) \times (b_1, b_2, b_3, \dots b_n) \in \Omega_2$ where \times is the binary operation on $\prod_{i=1}^n \Omega_i$

$$\begin{aligned} &(a_1 \times b_1), (a_2 \times b_2), \dots, (a_n \times b_n) \\ &= (a_1 a_2 a_3 \dots a_n) \times (b_1, b_2, b_3, \dots b_n) \\ &= \Omega_1 \times \Omega_2 \end{aligned}$$

Then the results follow

4. Application to Graph Theory

Example 1. Suppose a function g is defined on B-algebra Ω , that is $\Omega = \{1,4,2,0,3\}$ by $g(x) = 3x + 2 \forall x \in \Omega$. then the following pairs of point were obtained from the function $V(G) = \{(1,0), (4,4), (2,3), (0,2), (3,1)\}$

Adjency matrix

$$B = \begin{bmatrix} 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

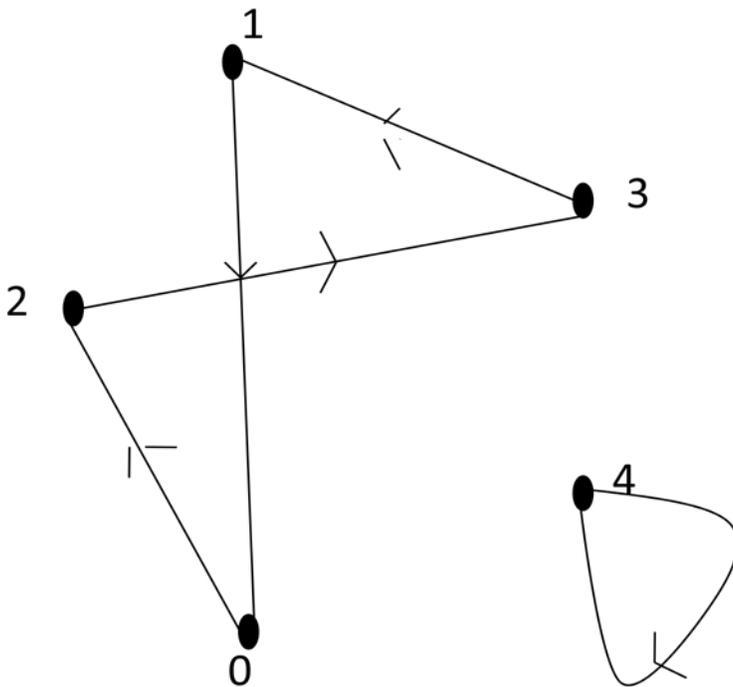


Fig 1

Example 2. Suppose a function g is defined on B-algebra Ω , that is $\Omega = \{1,4,2,0,3\}$ by $g(x) = 3x - 2 \forall x \in \Omega$. then the following pairs of point were obtained from the function $V(G) = \{(1,1), (4,0), (2,4), (0,3), (3,2)\}$

Adjency matrix

$$B = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

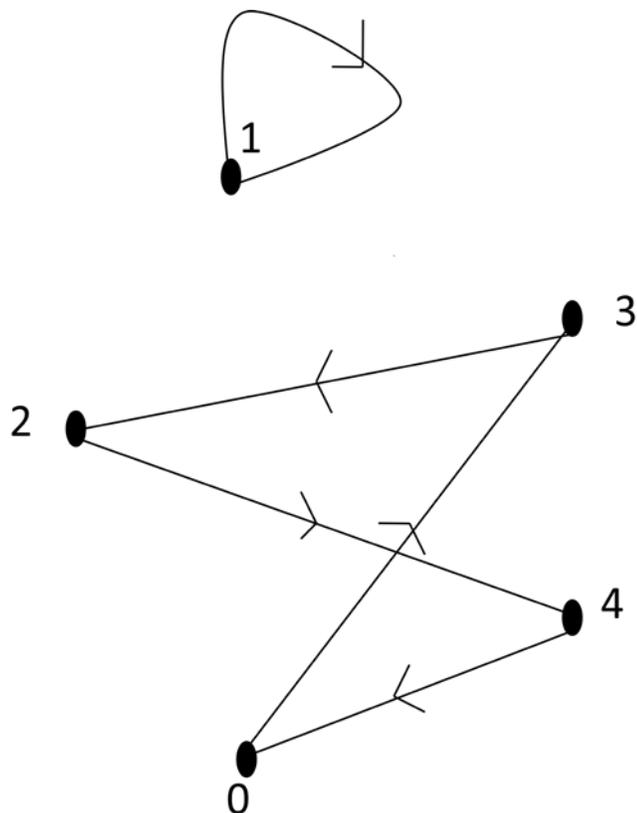


Fig 2

Conclusion

We have used (132)-avoiding pattern of AUNU Permutation Pattern to construct a direct product of B-algebra. This has been achieved by considering the direct product on sequence of the (132)-avoiding pattern of AUNU Permutation Pattern which gives a Square table see operation table; the product of two B-Algebra will give another B-Algebra.

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A Review of An Energy Efficient Communication Scheme for Low Power Wireless Network

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Abstract— In this paper we are going to develop of a new energy efficient communication scheme for wireless sensor network (WSN) which is based on the gray code technique. Gray code technique simultaneously saves energy at both the transmitter as well as receiver because time required for the transmission of is minimum. Wireless sensor networks typically require low cost devices and low power operations. We propose a new energy efficient communication scheme for wireless sensor networks that is based on the ternary number system encoding of data. 0 and 1 bit values are known as *energy based transmission* scheme. In wireless sensor network it is very difficult to charge or replace the usable batteries. So, to maximize node or network life span is very important. Thus energy efficient communication is main objective of WSN. This energy efficient communication technique can be used in many sectors such as remote healthcare, wireless sensor network for agricultures, industrial process monitoring and environmental monitoring.

Keywords—, *Technology Energy-efficient communication, Gray encoding, Silent communication, Wireless Sensor Network. sensor networks*

I. INTRODUCTION

Today Wireless Sensor Networks (WSNs) are used in many industries. WSN consist of a large number of sensor nodes. These sensor nodes are self-organized

with sensing, computation and wireless communication capabilities these are used to provide information about the status of a specific system . Physical or environment parameter such as temperature, pressure, vibration could be measured by using these sensors. The information is sent wirelessly and received by central location for further analysis and usage. Maximizing node or network lifetime is primary objective in WSN because it is very difficult to charge or replace exhausted batteries. Thus energy efficient communication is very important part in WSN to reduce the device recharging cycle period and hence provide connectivity for longer duration. A major source of power drain in such networks is communication, energy efficient communication protocols that can be implemented with low hardware and software cost/complexity are thus of paramount importance in WSN stored the device recharging cycle periods and hence provide connectivity for longer durations at a stretch.

In this paper, a new data transmission mechanism is proposed to save data transmission energy and time by using gray code. By using this technique it will save energy and time both at transmitting end and receiving end due to shortening of the transmission duration.

II. REVIEW OF RELATED WORK

Energy based Transmission (EbT) scheme was proposed in [4], not only utilize non-zero voltage level for both 0 and 1. They keep both transmitter and receiver switched on for the entire duration of transmission of data. To reduce energy consumption researches focus on the MAC layer design [5], [6], [7], optimizing data transmission through intelligent selection of paths.

A new communication scheme called Communication through Silence (CtS) [8], involves the use of silent periods opposed to EbT. In CtS a minimal amount of energy is used to deliver information between sensors along with use of silence. There are some disadvantages in CtS like exponential in communication time. So an alternative strategy, Variable Based Tactic Communication (VarBaTac) was design in [10], that uses a variable coding base to control the trade-off between network throughput and energy is saving. VarBaTac is used to minimize the delay introduced by CtS. But there is no idea about the energy saved by CtS and VarBaTac for noisy channels.

New strategy RBNSizeComm [9], [11], which combines the concept of CtS and VarBaTac. RBNSizeComm recodes binary coded data using a redundant radix based number representation and then use silent periods for communicating the digit zero. By using the redundant binary number system (RBNS) that utilizes the digit from the set- 1, 0, 1 to represent a number with radix 2, significantly reduce the number of non zero that need to be transmitted. Low-Energy Adaptive Clustering Hierarchy (LEACH) [12], uses localized coordination to provide scalability and robustness for dynamic network and incorporates data DATA fusion for the routing protocol to reduce the amount of information that must be transferred to the base station.

To improve the performance ternary number system encoding of data called as Ternary with Silent

Symbol (TSS) is design in [16]. In this system data is converted from binary to ternary by using silent symbol strategy. Aim of this strategy is save the energy simultaneously both at transmitter and receiver. An efficient algorithm for conversion from binary to ternary and vice versa is used that does not involve any division or multiplication but only addition. Spatial correlation model was developed in [13] are based on the locations of sensor nodes or statistical features of sensor nodes data. To detect the damage occurs gradually, a semantic clustering model was design in [14], this model was based on fuzzy systems which find out the semantic neighbourhood relationship. This type of spatial correlation model is not accurate to pinpoint the location of sensor node. New model [15], resolve the drawbacks of spatial correlation model. In this model Pearson Correlation Coefficient was used to measure the correlation between sensor node data.

III. PROPOSED ENERGY EFFICIENT DATA TRANSMISSION METHOD

A new method for energy efficient transmission of data are design which is gray code method. In this techniques energy required for the data transmission is minimized as well as time required for data transmission is also less than the available systems.

A. Gray Code Technique:

In gray code techniques data is transmitted using silent periods means energy is used only at the time of transmission of 1 and at the transmission of 0 energy is not used. In the previous system to transmit the data, it is transmitted in the form of binary number. But in the proposed system data is transmitted in the form of gray code because number of 1 obtain in the gray code is less than the number of 1 obtain in the binary code so energy used for the data transmission is less than the previous system. The Number of transmission of the 1 in a binary code system

in binary number is 3 and number of 1 in gray code is 2, therefore energy consumed for binary code is greater than the gray code. At the receiving end also data is received in the form of gray code so at this end also energy is consumed

B. Algorithm:

Binary to Gray Conversion algorithm:

- 1) The M.S.B of the gray code is equal to the first bit of the given binary number.
- 2)) Now the second bit of the code is exclusive-or of the first and second bit of the given binary number i.e. if both the bits are same the result obtain is 0 and if they are different the result is 1
- 3) . The third bit of gray code is exclusively equal of the second and third bit of the given binary number. Thus the binary to the gray code conversion is performed.

Gray to Binary Conversion algorithm:

- 1) The M.S.B of the binary number is equal to the M.S.B of the given gray code.
- 2) Now if the second gray bit is 0 the second binary bit is similar as the previous or the first bit. If the gray bit is 1the second binary bit is 0.
- 3) This step is repeated for all the bits to do gray code to binary

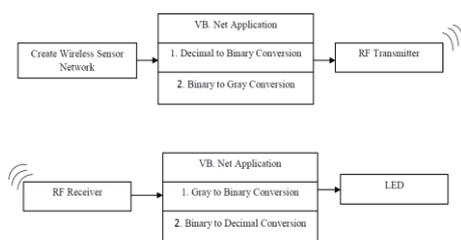


Figure 1: Block Diagram Of Gray code system

IV. SYSTEM ARCHTECTURE

- 1) To create WSN it need to configure some sensor (eg. Temp sensor) can be used to collect data from as like many sensors can be used. Data obtain is converted into digital signal by 10 bit internal ADC which generate decimal output up to 1024 decimal value. As

it collects data from surrounding it is also called as sensor node.

- 2) Decimal number is directly given to a conversion centre (PC or server) where an algorithm or function will convert decimal number into binary signal. i.e. either using any of the three techniques. The decimal (base ten) number system has 10 possible values (0, 1, 2, 3, 4, 5, 6, 7, 8 or 9) for each place value. In contrast, the binary number system has two possible value represented as 0 or 1 for each place value. Since the binary system is the internal language of electronic computer, serious computer programs should understand how to convert from decimal to binary. Following are the simple steps how to convert these numbers.

- Short division by two with remainder.
- Write the integer answer (quotient) under the long division symbol, and write the remainder (0 or 1) to the right of the dividend.
- Continue the divided until you reach 0.

- 3) Once the number is obtain then that no is needed to be convert into gray as per our energy save technique for data transmission. For to convert it into gray it need to compare each MSB with nearest binary bit of data using X-OR logic. Then fill that data to an array and then once it get a final number to store the string.

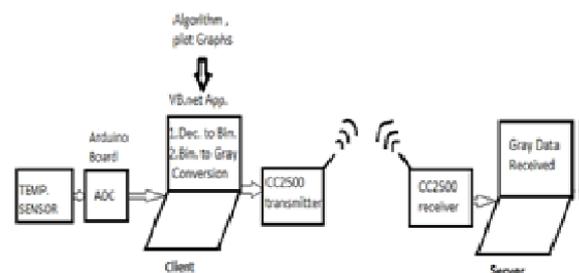


Figure 2: Proposed System

4) Stored number is then given to transmitter node connected immediately to server using a microcontroller and CC2500 transceiver via a USB port to start serial communication.

5) CC2500 will receive the data obtained and then it shall be converted into a string, thus generate a complete sensor node.

6) Again at receiver side data is converted from gray to binary using a C++ function and a direct decimal value is obtained.

7) Decimal value obtained is display as temperature output on either on a LED or a computer

Table 1. Comparison of TSS, RBNSiZeComm, and Proposed system

Sr. NO	Method Name	Energy Received At	Energy Saved In %
1	TSS	Transmitter and Receiver	20% -36.9%
2	RBNSiZe Comm	Transmitter	33% - 62%
3	Proposed	Transmitter and Receiver	50% - 70%

V. SYSTEM REQUIREMENT SPECIFICATION

i. Software Requirements

- a) Visual Studio 2005/8/10
- b) .net Frame Work 2.0 and above
- c) OS Xp Service pack 2 and above

ii. Hardware Requirements

- a) 512 MB RAM
- b) 40 GB HDD
- c) Pentium processor with 1GHz processing Speed
- d) RF transmitter
- e) Microcontroller ARDINO board

V. CONCLUSION

In this paper we represent the new energy efficient communication scheme that can saves energy simultaneously at the transmitter as well as receiver

side. The basic of gray code method is, encoding the source data in gray code number system, coupled with use of silent periods for communicating the 0's in the encoded message and the transmission is possible in gray code format. This reduces the device recharging period. Our proposed implementation can saves the energy and extend the battery life device.

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ATHOUR'S PROFILE

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Constant Multiplication and its Existing Techniques

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Abstract: - Finite impulse response (FIR) filtering is a ubiquitous operation in digital signal processing systems and is generally implemented in full custom circuits due to high-speed and low-power design requirements. The complexity of an FIR filter is dominated by the multiplication of a large number of filter coefficients by the filter input or its time-shifted versions. Over the years, many high-level synthesis algorithms and filter architectures have been introduced in order to design FIR filters efficiently. The aim of this article is to discuss about constant multiplication, its types and the existing constant multiplication techniques.

Keywords:- Common subexpression elimination, constant multiplication, digit recoding, directed acyclic graph, FIR filter, hybrid algorithm, multiple constant multiplication, single constant multiplication.

I. INTRODUCTION

An FIR operation is described by the following equation:

$$y(n) = \sum_{k=0}^{M-1} h(k)x(n-k) \quad (1)$$

where $h(k)$, $k = 0, 1, 2, \dots, M-1$ are the impulse response coefficients and M is the filter length (number of coefficients). According to Equation (1), the output $y(n)$ depends only on the present and past input values. FIR filters are popular because of its advantages such as linear phase response.

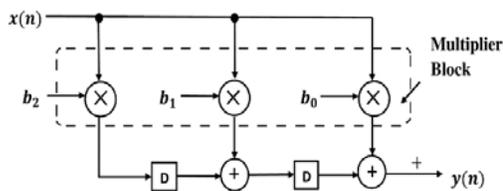


Figure 1. Transposed Direct – Form

Here an input is multiplied by all the coefficients in a multiplier block at the same time. The multiplications are performed in

parallel which are suitable for FPGA implementation. Further, it allows common intermediate multiplication terms to be shared among the constant multiplications.

The fundamental operations of a Finite Impulse Response (FIR) digital filter are multiply and accumulate (MAC). DSP systems are limited in terms of speed, area and power. Often these are antagonistic constraints and a trade-off depending on the design goals. So instead of using purpose multiplier where any two variables can be multiplied, multiplierless techniques are introduced. Here, the multiplication by the fixed coefficients can be implemented using shift and add/subtract operations only. Shifts can be implemented in hardware using wires and hence incur no cost. Furthermore, the number of adders can be reduced if the partial products are shared among the coefficients. This can reduce cost such as area and power.

II. TYPES OF CONSTANT MULTIPLICATIONS

1. SCM (SINGLE CONSTANT MULTIPLICATIONS)

SCM is the implementation of multiplication by a single constant. Here, the multiplication $y = cx$ of a variable x by a constant c is decomposed into additions, subtractions and shifts. The objective of SCM is to find the minimum number of operations.

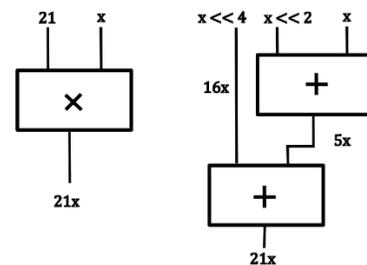


Figure 2. Multiplication using add and shift

Consider the multiplication $21x$. This can be expressed using adds and shifts as $21x = 10101_2 x = x \ll 4 + x \ll 2 + x$. A partial product is formed after every addition. This

decomposition of the multiplication can be improved after encoding the constant into representations such RADIX- 2^r

2. MCM (MULTIPLE CONSTANT MULTIPLICATIONS)

The SCM can be extended where a variable x is multiplied by several constants c_1, \dots, c_n in parallel i.e. $y_i = c_i x$ with $1 \leq i \leq n$.

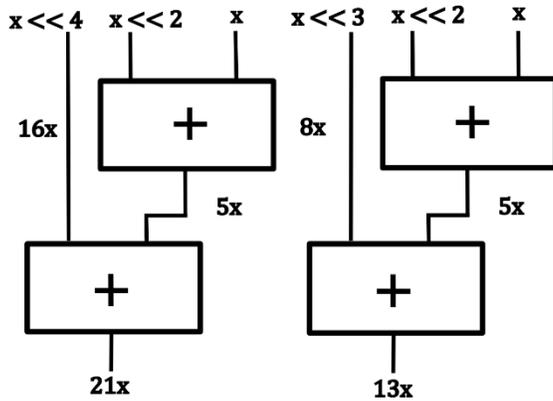


Figure 3. Multiplications of two constants $21x$ and $13x$

SCM algorithms can solve MCM problems and vice-versa. However, there is a difference: in SCM intermediate terms can be shared within the constant, whereas; in MCM intermediate terms can be shared within and between constants. Thus, SCM algorithm can be fine-tuned to solve the SCM problem better. This sharing results in greater potential savings as the number of constants increases.

III. EXISTING MCM ALGORITHMS

1. DIGIT RECODING

In these algorithms, the number is recoded into representations such as canonic signed digit (CSD), minimal signed-digit (MSD), double base number system (DBNS) and RADIX- 2^r . The decomposition of the constant is obtained directly from the digit representation. These are the fastest and they have low computational cost. Canonic signed-digit (CSD) representation is a signed-digit (SD) system with the digit set $\{1, 0, -1\}$. -1 is generally represented as $\bar{1}$. CSD has the following properties - adjacent bits are non-zero; CSD representation is unique; CSD contains minimum number of non-zero bits; on average CSD contains about 33% fewer non-zero digits than the binary two's complement representation. For an N -bit constant, the number of additions is bounded by $(N + 1) / 2$ and tends asymptotically to an average of $N / 3 + 1 / 9$. These results in a saving of 33% in add operations. CSD is widely used for constant multiplications even though a number of heuristics exist.

2. COMMON SUBEXPRESSION ELIMINATION

Subexpression elimination is applied to multiplication of a variable with a set of constants at the same time. Hartley (1991) introduced CSE representation which allowed the use of pattern search algorithms. CSE algorithms are performed on constants represented by a number representation such as SD and DBNS. It then examines all possible subexpressions i.e. the shift and add operations of constant implementations and finds redundant operations. The 'best', which is usually the most common, is selected to be shared among the constant multiplications.

An exact CSE algorithm to Hartley (1996) is presented in (Aksoy et al., 2014) which can handle binary, CSD and MSD representations and can also specify delay constraint. It showed that binary representation provides greater sharing of patterns allowing better are-efficient implementations whereas MSD is to be used while minimizing delay.

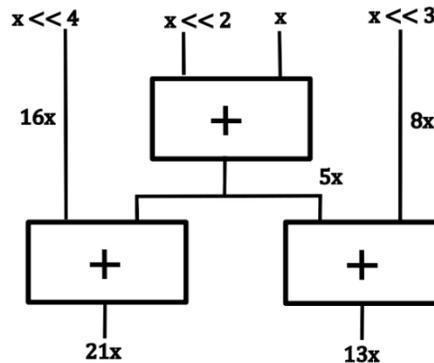


Figure 4. Common Subexpression Elimination

Figure 4 shows how partial terms can be shared among the coefficient multiplications. Here, a common sub pattern or subexpression $5x$ is found in the representation of the constant multiplications $21x$ and $13x$.

3. DIRECTED ACYCLIC GRAPH

Multiplication by a constant which is decomposed into shifts and adders is represented using directed acyclic graphs. Each vertex has an in-degree of two except for one vertex which has in-degree zero. That vertex is referred to as input vertex or source vertex and corresponds to the input of the multiplier. Each vertex has out degree larger than or equal to one except for one which has out-degree zero. That vertex is referred to as the output vertex and corresponds to the output of the multiplier. Each edge is assigned a value of $\pm 2^n$ representing a multiplication of the value of the initial vertex of that edge by a value and corresponds to a shift and a subsequent addition or subtraction. Each node represents one addition or subtraction depending on whether an incoming node is labeled as $+2^n$ or -2^n .

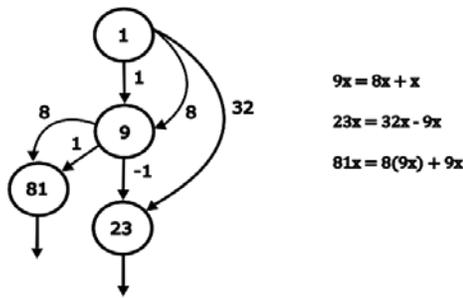


Figure 5. Directed Acyclic Graph

4. HYBRID ALGORITHM

Some algorithms like (BIGE) (Thong and Nicolici, 2011) combine features of CSE and DAG. It is an exact SCM algorithm based on DAG and CSE which guarantees optimality through an exhaustive search for constants up to 32 bits. The algorithms and heuristics presented above are designed mainly to minimize the number of adders or area. However, some algorithms consider both the minimum number of adders which represent area and adder-depth i.e. the number of adders in a maximal path which represents delay of the multiplier. The algorithm in (Kang and Park, 2001) allowed a trade-off between number of adders and the number of adder- depths i.e. between area and speed. Such algorithm showed lower resource usage with 54.1% reduction on average and similar performances compared to other adder graph methods.

IV. CONCLUSION

The fundamental operation of FIR filter and the reason of using multiplierless techniques in FIR filter has been discussed. Also, different types of constant multiplier and its different algorithms or techniques have been explained using suitable examples.

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A Stakeholder analysis of PET wastes management in Kigali, Rwanda.

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Abstract- PET Plastic containers are the most used way of packaging beverages and other liquids in Kigali due to they are inexpensive, lightweight, strong, durable, corrosion-resistant materials, with high thermal and electrical insulation properties, their diversity of polymers and the versatility of their properties results in many societal benefits. However, their current ways of usage and disposal in Kigali are not sustainable. They can result to a multitude of health and environmental problems such as accumulation in landfills and in natural habitats, they can cause physical problems for wildlife resulting from ingestion or entanglement in plastic and also the leaching of chemicals from plastic products. The durability of plastic wastes in the environment and their potentials to transfer chemicals to wildlife and humans are dangerous. Generally, the system of Solid waste management in Kigali, especially PET waste management is a procedure that involves and affects numerous stakeholders. It requires an effective communication and collaboration among stakeholders if an improvement is to be made in the system. Throughout this study, the main stakeholders were identified with their roles, power and interest as a result of Stakeholder Analysis (SA) application. In addition to that, by using Social Network Analysis (SNA) the researcher was able to map the existing connections concerning partnerships, collaborations and the sharing of information among identified stakeholders. The findings show that though there are some well-functioning relations gaps were found in the communication and collaboration network system since some of the relations are weak, dormant or non-existing, therefore the researcher suggest a development of an extensive communication strategy that will engender effective communication and collaboration in the PET management system in Kigali. It was found that this system also lack strategic directions and innovations which limits its ability to attract and retain strategic partnerships. The Researcher recommend the formulation of strategic plan (1-3 years) and suggest of yearly themes to further enable the formation of strategic and targeted partnership to improve the current PET waste management system.

Index Terms: PET wastes management, Social network Analysis (SNA), Solid waste management. Stake holder Analysis (SA).

Introduction

1.1 Background:

Polyethylene was discovered in March 1933 by Reginald Gibson and Eric Fawcett, two research chemists at ICI's Winning-ton Laboratory in the UK, and it was first synthesized as a low-density resin (LDPE) in 1935. Polyethylene manufacturing processes have since become more sophisticated and cost-effective. Currently, there are about 25 different processes for manufacturing the range of PEs and metallocene-catalyzed polyethylene (mPE). The latter has superior toughness and is one of the most recent and the fastest growing processes. Polyethylene is presently the second most widely used class of resin globally. There are several different grades of

PE classified according to the average density of the resin linear LDPE (LLDPE), 0.925 g cm^{-3} ; LDPE, $0.930\text{--}0.935 \text{ g cm}^{-3}$; medium density polyethylene (MDPE), $0.93\text{--}0.945 \text{ g cm}^{-3}$; HDPE, $0.945\text{--}0.965 \text{ g cm}^{-3}$ [1].

Rwanda is an African country located in the east central part of Africa, which capital city is Kigali. Geographically Kigali is situated on latitude $1^{\circ} 57'S$ and on longitude $30^{\circ}04'E$, with population density of 1600 per km^2 . It covers an area of 730 km^2 and serves about 1,223,000 people and Kigali's. Currently GDP per capita is 724\$, a 3 fold increase from 2000 and the GDP target is \$1,240 by 2017 [2]. Kigali is currently facing problems of solid waste management due to lack of proper amenities ways of recycling processes and proper ways of waste disposal which is affecting both the environment and human health for nowadays as well as the future. Currently the majority of all generated solid waste are collected and taken to Nduba dumpsite which receives about 400 tons per day of unsorted waste or 140,000 tons per year [3].

About 70 %, of waste generated are mainly made by organic waste, approximately 13% of non-recyclable /inert wastes, approximately 5% PLASTIC (plastic bottles), approximately 5% of cartons, 1% of metals, approx. 1% electronic waste and

Approximately 1% of hazardous waste. The average waste generation is between 1800 and 2000 t per day [4].

Plastic containers in Kigali are mainly made from PET and they are the most used way for packaging beverages and other liquids due to they are inexpensive, lightweight, strong, durable, corrosion-resistant materials, with high thermal and electrical insulation properties. Their diversity of polymers and the versatility of their properties results in many societal benefits [1]. However, their current ways of usage and disposal in Kigali are diverse and not sustainable it can result in accumulation of waste in landfills and in natural habitats, physical problems for wildlife resulting from ingestion or entanglement in plastic, the leaching of chemicals from plastic products and the potential for plastics to transfer chemicals to wildlife and humans.

Although many studies have been done regarding solid waste management systems in Kigali City ([3],[5] , [2], [6],and [7]),there is no reported study which was focused on a stakeholder analysis of the management of plastic waste in Kigali.

Stakeholder analysis is the process of identifying individuals or groups that are likely to affect or be affected by a proposed action, and determining their potential impact on the action or what impact the action could have on them [8]. This information is used to assess how the interests of those stakeholders should be addressed in a project, policy, program, or other action. A stakeholder is any person or organization, who can be positively or negatively impacted by, or cause an impact on a process [9]. For this particular study we have divided out stakeholders into the following roles: Government as policy makers and regulators, Transportation and PET wastes management companies, manufacturing and PET packaging companies, private sectors and others.

1.2 Problem statement

Rwanda is a country located in the east central part of Africa, which capital city is Kigali. Geographically Kigali is situated on latitude $1^{\circ} 57'S$ and on longitude $30^{\circ}04'E$, with population density of 1600 per km^2 . It covers an area of 730 km^2 and serves about 1,223,000 people. And Kigali's Currently GDP per capita is 724\$, a 3 fold increase from 2000 and the GDP target is \$1,240 by 2017 [2].

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approx.1% electronic waste and approximately 1% of hazardous waste. The average waste generation is between 1800 and 2000 t per day [10].

Plastic containers in Kigali are mainly made from PET, and they are the most used way for packaging beverages and other liquids. This is due to their inexpensive, lightweight, strong, durable, corrosion-resistant materials, with high thermal and electrical insulation properties. The diversity of polymers and the versatility of their properties results in many societal benefits. However, their current way of usage and disposal in Kigali are diverse, alarming and are not sustainable[10]. PET bottles can result in accumulation of waste in landfills and in natural habitats, they can cause physical problems for wildlife resulting from ingestion or entanglement in plastic. It's also evident that the leaching of chemicals from plastic products and the potential for plastics to transfer chemicals to wildlife and humans is a serious problem to consider[11].

Generally, the system of Solid waste management in Kigali, especially PET waste management is a procedure that involves and affects numerous stakeholders. It requires an effective communication and collaboration among stakeholders if an improvement is to be made in the system. Poor communication between stake holders and inaccessibility to information, lack of follow up to the implementations of laws and strategies, unawareness of the impacts of PET Bottles to the environment and health at large are one of the main causes to poor management of PET wastes management and failing to know whose responsibilities are is the big problems in regard to PET waste management in Kigali.

It's on this context that the researcher would like to assess and analyze every person or organization, who can be positively or negatively impacted by, or cause a change in regard to PET bottles waste management process in Kigali.

1.3 Research objectives:

- i. To identify various stakeholders in PET waste management system in Kigali.
- ii. To determine their roles and interest in the process of PET management.
- iii. To assess the power of stakeholders and their relationship
- iv. Assess the Information access and sharing of stakeholders.
- v. Determine the gap and Identify a strategy to be used to close the gap in regard to PET waste management.

1.4. Theoretical significance and Practical significance

Practically the study will be of great importance to government and local authorities in decision making considering management of plastic waste. This will enable us to identify the key stake holders in regard to the issue of plastic waste management who can play a major role to improve the MSW management especially PET waste in terms of policy making, implementation and follow up.

Theoretically, The Study will serve as a guidance and reference point for academics and other researchers, as mentioned above for stakeholder analysis.

2. Literature review

2.1 Stakeholder analysis

Stakeholder analysis determines whose interests are relevant in the process of setting up and implementing a given policy or program[12] .it delineates aspects of social and natural phenomenon affected by a decision or action, identifies individuals, groups and

organizations who are affected by, or can affect those parts of the phenomenon, and prioritizes these individuals and groups for involvement in the decision-making process [13].

According to [14], this analysis is also used in project development from different sectors of activity. SA as a tool for policy analysis has its roots in the early work of policy scientists, who were concerned with the power distribution and the role of interest groups in the decision-making and policy process [15]. Given that participatory methods are broadly seen as essential to address the difficulties of environmental policy and decision-making, SA is one of the most common approaches for better understanding of the interests of the main parties [16]. For instance, SA can be used to understand the environmental systems by defining the aspects of the system under study, to identify who has a stake in those areas of the system, and to prioritize which stakeholders must be involved in the decisions [17]. As global and environmental change has come to the forefront in recent times, particularly in relation to waste management, stakeholders can now include several other stakeholders apart from the conventional investors and shareholders. Thus, the importance of being aware of who the relevant stakeholders are, and how they might be managed appropriately in the waste and environmental management fields [18].

Social network analysis (SNA)

According to [19], he described SNA as an approach that focuses its attention on how the relationships among stakeholders constitute to a framework or structure that can be studied and analyzed in its own rights. Furthermore, the network perspective assumes that: (a) relationships among stakeholders are important; (b) stakeholders are interdependent rather than autonomous; (c) a relationship between two stakeholders accounts for a flow of material or non-material resources; and lastly, (d) network structures enhance or inhibit stakeholders' ability to act [20]. SNA uses a network model and graph theory, and the role of the analyst is to examine the stakeholders and the patterns characterizing their relationships within the network [21]. United States of America; [22], proposed a network model that can be used to select the sustainable technology from patent documents; in a study focused on bio-plastics production; [23] Ghali et al. (2016) analyses the potential role of online social networking to stimulate social connections and enable the material flow's compatibilities, to foster the formation of industrial synergies; and [24] (Kreakie et al. 2016) suggested internet-based social networks as effective approaches for building stakeholder networks among conservation and natural resource management professionals.

Stakeholder Analysis (SA) and Social Network Analysis (SNA)

Overall on one hand SA deals with stakeholder's attributes, and on the other hand, SNA clarifies the structure of relationships between those stakeholders, which render those methodologies complementary and its combination a significant contribution [25]. The combination of SA and SNA is not a new approach and has been applied in several study fields such as, institutional, political and social analysis, organization, human resources and business planning, natural resources, urban and project management, among others [9]. Additionally, there is evidence showing environmental benefits in applying stakeholder approaches to environmental or waste management systems. This approach are used to investigate how stakeholders' networks function [18].

3. Research methodologies

A literature survey on stakeholders of PET waste management systems was conducted, to categorize the stakeholders within Kigali. As a result, six groups, according to different sectors of intervention, were selected to be analyzed in the study: Government, Private Waste Management Companies, Operation management of Nduba dumpsite, Plastic waste generators, Plastic Packaging and

importing companies, Private sector. Afterward, constituents of each group were identified, and a list of 22 potential stakeholders was produced.

3.1 Data collection

After identifying the six groups of stakeholders and the 22 corresponding constituents, a series of self-administered questionnaires and through email, using a structured questionnaire were conducted. 250 questionnaires were distributed in total and got back 167 respondents from all groups in total. 6 from the Government, 4 respondents from Private Waste Management Companies, 1 from Operation management of Nduba dumpsite, 149 Plastic waste generators (including Household and commercial waste generators), 5 from Plastic Packaging and importing companies, 2 Private sectors.

Questionnaires Generally focused on the assessment of the respondents' knowledge about PET wastes effects on the environment, PET management system in Kigali and the stakeholder's involvement in it. it also focused on stakeholders' power and interest, their views in regard to the access to information, the existing partnerships and collaborations, and sharing of information among other stake holders.

3.2 Data analysis

Microsoft Excel was used to structure and organize the data and then construct the power versus interest grid, and the diagrams representing sharing and access to information as outputs of the Stakeholder analysis[19] .

Stakeholders in the upper two quadrants are those with higher power to influence or affect the system players but with varying levels of interest. those on the right-side bear significant interest in the system. Stakeholders in the two lower quadrants are those with lower but with different interest level. On the left side they have less interest while in the right side they have significant interest in the management system of PET management in Kigali.

4. Results and discussion

4.1 Stake holder identification

This part focus on the Introduction of different stakeholders, their missions, Functions, policies and laws regarding the issue of plastic bottles wastes management in Kigali. Stakeholder analysis have become increasingly a popular tool to analyze the relationship among users, managers, policy makers and researchers who have a stake and the ability to influence or change the actions and aims of an organization, project or policy directions. the main aim of stakeholder analysis is to gauge the relevance of stakeholders to a particular project or policy[15].

While conducting the analysis, the position, interest, influence, interrelations, networks and other characteristics of stakeholders are taken into consideration with reference to their past, present positions and future potential. This process comprises of methods for: i) identification of stakeholders; ii) Classifying stakeholders based on their roles and interest and iii) investigating relationships between stakeholders [8].

Identification and classification of stake holders

Classification	Stakeholder identification
	MINIRENA

Government/ policy makers	REMA MINEACOM RURA RSB CITY OF KIGALI COPED
Private Waste Management Companies	UBUMWE AGRUNI COCEN
Operation management of Nduba dumpsite	RWANDA RESERVE FORCE
Plastic waste generators	LOCAL DISTRIBUTORS AND SELLERS HOUSEHOLD AND COMMERCIAL WASTE GENERATORS
Plastic Packaging and importing companies	INYANGE JIBU COCA COLA SULFO AMAZI YA HUYE UNDPR
Private sector	PSF FONERWA

The above list of stakeholders is divided into three main groups which are the Government that are mostly described as decision makers regarding plastic waste management in Kigali, those includes Rwanda Ministry of Environment and Natural Resources (MINIRENA), Rwanda Environment Management Authority (REMA), Rwanda Utilities Regulatory Authority (RURA). The second group is composed of companies and NGO'S in charge of collection, transportation and management of solid waste in Kigali, and this includes COPED which is in charge of collection and transportation of solid waste from different municipalities in Kigali and dispose them at Nduba dumpsite. Currently, Reserve force is in charge of the management of Nduba dumpsite. The third part is composed of producers of plastic bottle wastes, those includes companies that imports Plastic bottled beverages in Kigali, the local distributors and sellers, it includes also consumers of plastic bottled beverages who finally generate plastic bottles them as wastes. In additional to that, there are other companies and NGO's that are associated to plastic waste management issue in Kigali and they can be interested or affected in one way or another by any change of policy regarding plastic waste management, those includes Rwanda's Green Fund (FONERWA) which funds environmental and climate change projects.

Government and decision makers

Rwanda Ministry of Environment and Natural Resources (MINIRENA)

The ministry of environment and natural resources has a mission to ensure protection and conservation of the environment, specifically they are responsible of regulating the sector and related sub-sectors through the development of laws and regulations to ensure rational utilization of natural resources and ensure protection of the environment and conservation of natural ecosystems.

MINIRENA is also responsible of Monitoring and evaluating the implementation of sector and sub-sectors policies, strategies and programs through:

- a) Setting up and implementation of appropriate mechanisms and systems for monitoring and evaluation of environment and climate change situation in the country as well as in the region;
- b) Monitoring and assessing the implementation and mainstreaming of policies and laws that enhance the protection of environment and the rational utilization of natural resources in all cross-cutting sectors in the country;
- c) Monitoring the sector performance indicators and consolidating the data from decentralized institutions;
- d) Submitting to the government periodic and annual reports on the impact of the sector policies, strategies, programs and projects on sustainable national social economic development.

Rwanda Environment Management Authority (REMA)

The alarming rate of environmental destruction as a result of population pressure, serious erosion, pressure on natural resources, massive deforestation, pollution in its various forms etc. necessitated the Government, to form REMA to coordinate, supervise and regulate environmental management for sustainable development in Rwanda.

Rwanda Environment Management Authority (REMA) is non-sectorial institution mandated to facilitate coordination and oversight of the implementation of national environmental policy and the subsequent legislation. And it has a key role to play towards the achievement of the national goal of sustainable development as set in out in the National Development Vision 2020.

It works with and through public, private sector and civil societies to achieve its objectives. Thus, the structure of REMA accommodates operational links at these levels in order to enhance services delivery to its stakeholders. REMA structure is flexible enough in order to cope with various challenges at central, decentralized and international levels. Two types of environmental management functions below, have to be given thorough consideration in the process of preparing the structure of REMA:

- Sectorial Environmental Management Functions relating to specific natural resources or environmental services such as agriculture, water, mining, forestry, waste management etc.
- Coordination and integration of environmental management functions in relation to cross-cutting issues such as monitoring and evaluation of environmental policy and implementation of environmental legislation, these are a prelude of REMA.

Mandates, roles and functions of REMA are clearly stipulated in the Law No 16/2006 of 03/04/2006 .

REMA operates under the Ministry of Environment and Lands (MINELA), and is headed by the Director General who is responsible for the implementation of policy and framework legislation relating to environment.

Rwanda Utilities Regulatory Authority (RURA)

Rwanda Utilities Regulatory Authority (RURA) was initially established by the Law n° 39/2001 of 13 September 2001 with the mission to regulate certain public Utilities, namely: telecommunications network and/or Telecommunications services, electricity, water, removal of waste products from residential or business premises, extraction and distribution of gas and transport of goods and persons. It has been established with a mandate to regulate sanitation services. Therefore, it is responsible for improvement in the delivery of sanitation services including waste disposal and management. RURA is the only body that gives consent to any city or town, company, sector cell, public/private to acquire and operate a dump site. [6] Since RURA sets standards for all goods made and imported inside the country, this implies that they can also play an important role in the implementation of any policy in guard of plastic waste management in Rwanda.

RSB

The Rwanda Standards Board (RSB) is a public National Standards Body established by the Government of Rwanda, whose mandate is to develop and publish National Standards, carry out research in the areas of standardization, and to disseminate information on standards, technical regulations related to standards and conformity assessment, metrology for the setting up of measurement standards, among others. The Organizational Structure of RSB therefore comprises four Divisions: National Standards Division, National Quality Testing Laboratories, National Metrology Services and National Certification Division. RSB is committed to providing standardization, conformity assessment and metrology services that improve competitiveness of Rwanda products and services within the region and internationally.

MINEACOM

Following a Cabinet Decision on October 7th, 2016, the Ministry of Trade and Industry together with the Ministry of East African Community was merged to form the Ministry of Trade, Industry and East African Community Affairs (MINEACOM). The goal of MINEACOM is to achieve Rwanda's 2020 vision through civil society and private sector engagement. This means facilitating business through regional integration and ensuring the growth of a productive, middle class of entrepreneurs as part of a service and knowledge-based economy

the Ministry of Trade and Industry together with the Ministry of East African Community is in charge of all imports and trades inside of the country. It was established by the government of Rwanda with an ambition to become a lower middle-income country, in order to operate as a service-based hub by the year 2020. To achieve this goal implies that there should be exploitation of the opportunities that are available together with creating a dynamic and competitive private sector for which institutional capacity can flourish.

COLLECTION TRANSPORTATION AND MANAGEMENT OF PLASTIC WASTE.

In 1999, orderly waste collection and transportation started in Rwanda by one company called COPED (Company for Environment Protection and Development) which was the only company dealing with solid waste collection and transportation at that time and it was operating only in the city of Kigali. but currently, waste collection companies and cooperatives are present in different areas and orderly waste collection system has expanded in most districts of the country. After the collection of wastes they are all transported at Nduba dumpsite located in Nyanza district of which Rwanda reserve force (**RDF**) is currently managing its operations.

Beside COPED which has recently started to recycle plastic waste materials, there is COCEN which is the only recycling company in the whole city. It handles community household waste converting it to Biomass fuel briquettes to be used in households and compost of organic fertilizer useful in crop production.

PET manufacturing and packaging companies

Plastic manufacturing and packaging companies are one of the main stakeholders. Their profit is very much affected by any decision taken on plastics and they also have the potential to influence policy implementation on either way. Their consultation will be key to finding appropriate means of dealing with plastic waste. The consumers are the main generators of plastic waste; they are most often not involved in decision making and their role in waste management has been overlooked. Separation at source is key to MSWM and this can only be achieved if consumers are properly informed, their involvement will be key to achieving waste separation and the use of alternatives identified.

Others

Since the country has not implemented a proper full and systematic waste management framework, Kigali city has partnered with UNDP project for support in the areas of technical, financial and maintenance techniques regarding waste management. UNDP have been developed with the aim of: developing a socially, sustainable and environmentally friendly waste management framework, it is supposed to conduct a feasibility study on Fukuoka Method for the current Kigali landfill facility, to provide support to IRST in the production of high quality of combustible briquette, to create an institutional framework that brings all stakeholder in working together to fulfil the waste management actions plans at both national and local level. in addition to that UNDP is supposed to organize stakeholders meetings, workshops and sensitization in regard to proper waste management in order to provide and improve public awareness about waste management, they are in charge of daily maintenance of Nduba landfill, they have in their duty to design and construct a new sanitary landfill with recycling facilities.[26]

https://books.google.com/books?id=dLckCwAAQBAJ&printsec=frontcover&dq=subject:%22Environmental+policy%22&hl=en&sa=X&ved=0ahUKEwiJv7_m-NXeAhXaJDOIHZi7C2wQ6wEIUzAH#v=onepage&q&f=false

Rwanda's Green Fund (FONERWA) is a groundbreaking environment and climate change fund. Its purpose is to be the engine for the next 50 years of green growth in Rwanda, while serving as a touchstone for Africa and the rest of the world. Its strategy is to provide unheralded technical and financial support to the best public and private projects that align with Rwanda's commitment to a green economy in order to accelerate goals of national sustainable economic development.

PSF

The Private Sector Federation – Rwanda (PSF) is a professional organization, dedicated to promote and represent the interests of the Rwandan business community. It is an umbrella organization that groups 10 professional chambers. It was established in December

1999, replacing the former Rwanda Chamber of Commerce and Industry. PSF is a key role player enabling the private sector to respond to Rwanda’s vision for its future. As the country’s flagship business institution, private enterprises look to PSF to address or facilitate solutions to business constraints that they face and represent their interests during dialogues with the government.

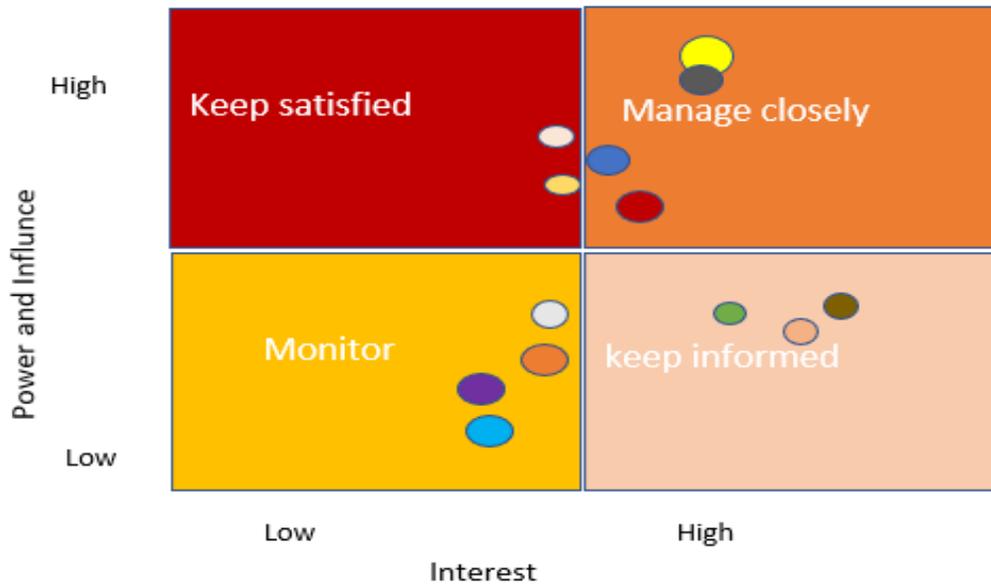
Stake holder name potential roles, Influence/power and interest

No.	Stake holder	Major role	Example of stake holders	Power/ Influence	Interest
1.	Ministry of Environment and Natural Resources	They play an important role in policy formulation, implementation, monitoring and evaluation they also provide action plans on a national level in regard to environment protection and sustainable development.	MINIRENA	Very High	Very High
2.	Environment Management Authority	Coordination, supervision and regulation of environmental management for sustainable development in Rwanda.	REMA	Very High	Very High
3.	Rwanda Standards Board	Develop and publish National Standards, carry out research in the areas of standardization, and to disseminate information on standards, technical regulations related to standards and conformity assessment, metrology for the setting up of measurement standards, among others.	RSB	High	medium
4.	Rwanda Utilities Regulatory Authority	1.Regulate certain public Utilities including removal of waste products from residential or business premises. they regulate sanitation services; therefore, they are responsible for improvement in the delivery of sanitation services including waste disposal and management. 3.Responsible to give consent to any city or town, company, sector cell, public/private to acquire and operate a dump site.	RURA	High	Low

5.	Ministry of Trade, Industry and East African Community Affairs	Regulates, approve, and monitor all imports and trades inside of the country. Issues permitting conditions of PET virgin bottles imported from outside of the country and all plastic bottled beverages trades inside of the country.	MINEACOM	High		
6.	Rwanda reserve force	Control all operations and activities of Nduba dumpsite				
7.	Private Waste Management Companies	1.They collect and transport waste from homes and office places to the dumpsite. 2.They sort out wastes at dumpsite level. 3.Responsible for recycling wastes. 4. Responsible for converting waste into energy.	COPEDE, COCEN, UBUMWE, AGUNI	High	Low	
8.	Packaging Companies	Bottling and packing of water and other drinks for sale. Import virgin PET from outside of the country	INYANGE, NIL, AMAZI YA HUYE, AKANDI, Jibu	Medium	Low	
9.	Local distributors and sellers	They buy and sell PET bottled beverages. They comply with the waste management rules.		Low	Low	
10.	Household and commercial waste generators	Consumers of plastic bottled water and beverages. Pay the monthly waste fees and comply with Waste Management rules.		Low	Low	
11.	City of Kigali	Responsible for general Waste Management in Kigali through Administrative and Legal Responsibilities		Medium	High	

12.	Scavengers		
13.	Private sector	They sponsor and provide for environmental activities. They provide training for environmental teachers, Set-up activities for public education and raising awareness.	Medium Low

4.2 Stake holder power and influence map



List of stake holders	Influence/pow	Interest(1-5)
1 Ministry of Environment and Natural Resources	4	2
2 Environment Management Authority	4	2
3 Rwanda Standards Board	2	1
4 Rwanda Utilities Regulatory Authority	3	-2
5 Ministry of Trade, Industry and East African Community Affairs	3	1
6 Rwanda reserve force	-2	3
7 Private Waste Management Companies	-2	4
8 Packaging Companies	-3	3
9 Local distributors and sellers	-3	-2
10 Household and commercial waste generators	-2	-1
11 City of Kigali	3	-1
12 Scavengers	-1	-2
13 Private sector	-3	-3

Power /Influence: the capacity of stakeholder to influence the PET management system in Kigali city.

Interest: the interest the stakeholder has on the PET management system in Kigali.

(-5: very little power /No interest) – (+5: very significant power/ Strong interest)

Gap analysis and recommendation

In the essence of PET waste management in Kigali Stakeholders with High influence/power and high interest should be managed closely and they must have good relations with the project itself or with any policy to be introduced or implemented if it is to be a success. Stakeholders must collaborate together and have a good communication at all stage of PET management project or policy implementation. In this particular research Government as policy makers and regulators were found to be of high influence, while packaging companies were found to be of high interest but the influence is low. Local distributors, house hold and companies waste generators were found to be of low interest and low influence but still they can be affected by any change in management practice or policy in regard to PET management.

Stakeholder intercommunication and information sharing network map

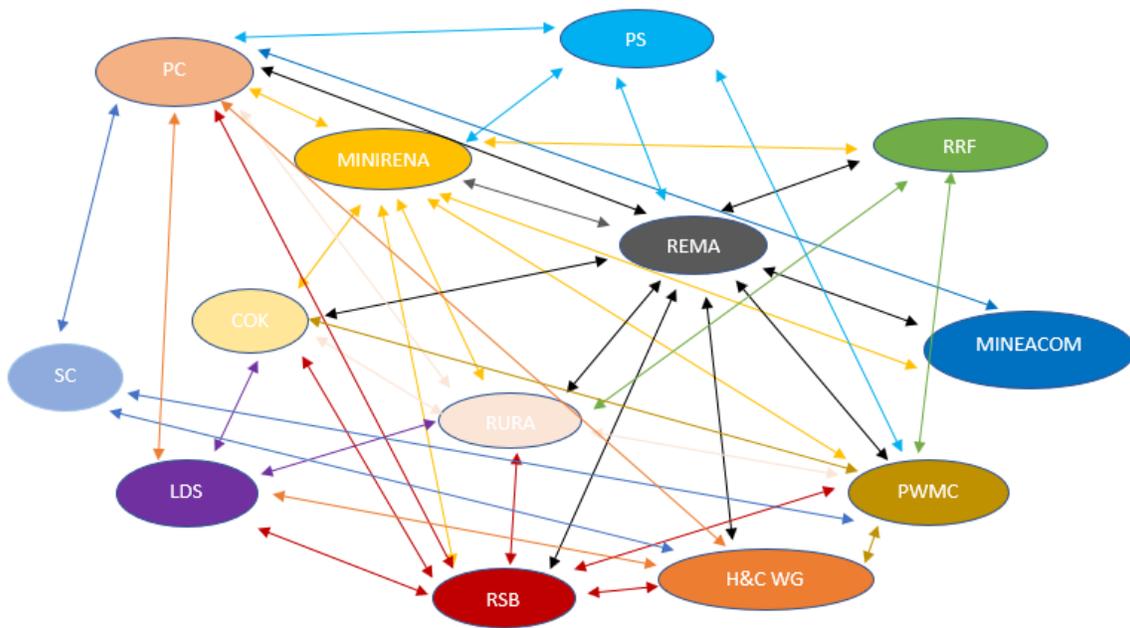


Table of abbreviations

REMA	Environment Management Authority	RSB	Rwanda Standards Board
RURA	Rwanda Utilities Regulatory Authority	LDS	Local distributors and sellers
RRF	Rwanda reserve force	SC	Scavengers
MINEACOM	Ministry of Trade, Industry and East African Community Affairs	COK	City of Kigali
PWMC	Private Waste Management Companies	PS	Private sector
H&C WG	Household and commercial waste generators	MINIRENA	Ministry of Environment and Natural Resources
PC	Packaging Companies		

A gap was found that however relationships and networks exist among most institutions, the communication level between stakeholders is still ineffective due to some of the links in the stakeholder network were weak or not functioning at all.

Therefore, to optimize communication between the government, waste management companies and household generators, the researcher recommend developing an extensive stakeholder communication strategy that will include establishment of a Joint Forum

for Observer-Member communication, a periodic evaluation of stakeholder outreach efforts, and the dedication of resources to stakeholder outreach through the creation of a designated Stakeholder Outreach Officer position within Kigali.

The second Gap that was determined was that the PET management system in Kigali lack of strategic directions and innovations, which limits its ability to attract and retain strategic partnerships. The Researcher recommend the formulation of strategic plan (1-3 years) and suggest of yearly themes to further enable the formation of strategic and targeted partnership and also to adapt quickly with digital innovations.

For improvement of PET waste management in Kigali system, the importance of stakeholder participation should be recognized in specific aspects of project preparation addressing the interest of stakeholders both to enhance the environmental, economic and social development identifying relations between stakeholders that can be built upon to improve success in policy implementation or project execution. assessing the most appropriate way that different stakeholders should participate at different stages of the project's system.

Stakeholders are "key persons, groups or institutions with an interest in a project or policy". And they can be affected rather directly or Indirectly, either positively or negatively, by the implementation of a project or policy.

An effective relationship between the various stakeholders within a stakeholder framework is very important and stakeholders are likely to be successful when they are interdependent instead of autonomous.

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A Rare Case of Extraovarian Mixed Sex Cord Stromal Tumor Presented as Broad Ligament Mass Synchronous Ovarian Mass Pathologic Pattern Reveals a Mix of Mesonephric and Mullerian Origin

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Abstract- A 30 yrs female presented to opd with a mass abdomen. Fnc of the mass showed papillary-adenocarcinoma. She had undergone b/l excision of the mass, which was a broad ligament mass, revealed on laparotomy. HPS and IHC revealed to be malignant high grade mixed sex cord stromal tumor (granulosa and fibroma type).

I. CASE PRESENTATION

A 30 yrs female presented to opd with mass abdomen since 1 month. Patient was apparently alright 1 month back to start with she developed mass abdomen, associated with abdominal discomfort, anorexia since 1 month. She has no history of fever, or vomiting, constipation, haematemesis or melena. Her bladder habits normal.

General examination

Patient was of normal built with no pallor and lymphadenopathy. All vitals stable.

Systemic examination

P/A- the mass suprapubic firm to cystic

Non tender with restricted mobility. P/V & P/R the mass was felt separate from uterus firm to cystic in consistency, uterus retroverted.

CHEST/ CVS- S1, S2 normal

CNS- conscious oriented

Investigations – hb-10 gm/dl

Tlc-8000/dl

TPC-1.3 LAKHS/dl

Urea-15mg/dl

Creatinine-.83mg/dl

Na-135mmoles/l

K-3.7mmoles/l

HIV, HBsag, HCV negative

ALP-67

ALBUMIN-2.9

Usg- A well defined inhomogenous hypoechoic mass of approx 12 x 10 x 10 cm is seen in right lower abdomen. The mass is close to but separate from ovary and free from uterus, right kidney, liver

and gall bladder. No calcification/echo free area is seen within the mass.

Fnc well differentiated papillary adenocarcinoma

Cect - large well defined heterogeneously enhanced mass lesion in right lumbar and pelvic region (broad ligament fibroid/ gist). B/l ovaries and uterus normal. With minimal fluid collection.

Surgery - it was broad ligament mass (b/l) + omental nodules. b/l ovaries and tubes and uterus normal. B/l excision of mass + omentectomy.

hps – high grade malignant tumor epithelial tumor with focal areas of spindle cells

IHC - the discordance between clinical and pathological context we prefer a confirmation by IHC.

EMA was positive suggestive of mullerian origin. Calretinin and Inhibin strongly suggestive of granulosa cell tumor. Broad ligament mass vimentin positive, ema, calretinin positive. CK -7 +, WT1+, CD99+ favours mullerian origin. Calretinin, CD99 is positive in sex cord stromal tumor. Vimentin positive in favour of mesenchymal component.

Received etoposide + carboplatin

paclitaxel + cisplatin. During treatment the mass reappeared and did not respond to chemotherapy. She presented again with mass abdomen.

GENERAL EXAMINATION

O/E – moderate pallor, no icterus, no lymphadenopathy, no pedal oedema

P/A - 28 wks size mass variagated consistency ill defined borders restricted mobility non tender, ascites +

- P/V P/R - uterus ns, nodules, the lower limit of mass felt and the fornix were full.

INVESTIGATIONS-

- CA 125 - 18.3 iu/ml
- Inhibin A - 2.8 iu/ml

- CECT ON 8/5/18 –CECT 15 x12 CM abdomino pelvic mass
- omentum involved, nod deposits
- Left lower lobe of lung 4.2 x 3 mm
- 10 x 12 mm lesion in liver.
- Upper gi endoscopy normal
- Inhibin A -27.2iu/ml
- Afp -1.97, bhcg - .23IU, CEA - 6.5IU
- Ldh - 492IU

SURGERY

- plan - laparotomy , TAH +BSO and excision of the mass. IMPRINT SMEAR- high grade malignancy
- **Iop** findings - haemorrhagic ascites ,solid irregular variegated mass 20 x15 cm in the pelvis was separate from the ovaries .was found adherent to bowel. Sigmoid adherent to tumor.B/ ovaries surface irregular. Multiple peritoneal , diaphragm and liver surface tumor deposits
- Imprint- revealed to be high grade malignancy
- Specimen sent for hps and ihc
- Hps - gross – abdominal tumor 20 x 15x 10 cm. surface nodular cut section partly solid and partly cystic with haemorrhagic areas.Uterus and cervix unremarkable

- right ovary 4x2.5x2.5cut section solid and cystic containing clear fluid left ovary 3x2.5X 1.5 cm cut section solid and grey.
- microscopic examination –malignant undifferentiated tumor(similar to the first biopsy)in the abdominal mass
- presence of tumor in both ovaries
- absence of surface deposits
- b/l tubes endomyo and cervix free of tumor
- IMP-malignant mix sex cord stromal tumor.
- IHC panel negative for – CK 7, CK 20, CDX2, TTF-1,WT1,EMA,CD10,Inhibin, synaptophysin and melanin
- Focal **strong** positive punctuate positive in tumor cells- chromogranin and SMA , CK.
- Chromogranin positive is suggestive of mesonephric component.Calretinin -positive
- Imp - adult granulosa tumor of extra ovarian but mix muellerian ,coelomic and mesonephric origin.

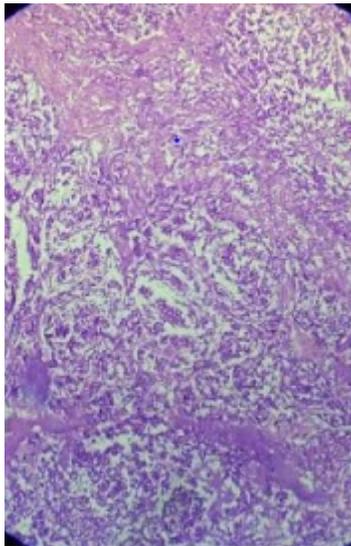


fig-1 the abdomino-pelvic mass. description- (fig1)the mass of size 15x20 cm, greyish yellow,with solid and cystic ,haemorrhagic areas

+



Fig(2)(synchronous ovarian mass)



hps- a malignant undifferentiated tumor (morphology similar to previous hps, in nthe abdominal mass)
presence of tumor in both ovaries
surface free
MIX SEX CORD STROMAL TUMOR
fig(3)

CLINICAL DIADNOSIS - interpretation of the hps and ihc and anatomic location, and the initial presentation of the tumor and its recurrence pattern, reveal it to be an high grade extra ovarian mix sex cord stromal, propably of mullerian and mesonephric origin, associated with b/l synchronous ovarian tumor.

DIFFERENTIAL DIAGNOSIS - these tumors are to be differentiated from other small cell carcinomas. Undifferentiated sarcomas endometrial stromal sarcoma, lymphoma, by a panel of ihc inhibin, ck, ema chromogranin CD10. They are to be differentiated from primary broad ligament carcinoma, which has a pappillary arrangement of cells, with foci of transistional cells. as the intial fnac showed a adenocarcinoma, but absence of transistional cells, this excludes primary endometroid broad ligament carcinoma
Extraovarian mix sexcord stromal can arise in locations other than ovary, and is said to derive from mesenchyme of genital bridge.

MANAGEMENT- hysterectomy and b/l salpingoopherectomy; eith tumor debulking Role of adjuvant chemotherapy and radiotherapy is unknown.

DISCUSSION - The patient presented as b/l broadligament mass with normal uterus and b/l ovaries. There are number of tumor markers, like calretinin, inhibin +ve to confirm it to be a granulosa type. The positive stain for vimentin and spindle cells favour a stomal fibrous component. CD 99 +ve favours sexcord tumor. In view of the intial presentation, b/l ovaries were normal in gross and imprint cytology and repeated Cect of b/l ovaries normal.

The weakly positive WT1, and chromagranin, ck and sma, favours mix origin muellerian, coelomic and mesonephric origin. Rarely can develop from extra ovarian site, they, broad ligament, retroperitoneum, mesentery, liver/adrenals. (1) histogenetic origin from ectopic stromal tissue from mesonephros (2).

GCTs vary in their gross appeararance. Most are partly solid and partly cystic (3). Microscopically, the tumor cells resemble normal granulose cells. they are small round or oval nuclei with fold longitudinal grooves and the folds they show a predominate trabecular and diffuse pattern, which was pattern in the above case. (4) a very interesting theory of ovulation and extra ovarian origin of ovarian cancer, as in this case, with a synchronous ovarian cancer, i.e ovulation providing and chemotactic

environment for attraction of tumor else where(5).SDF-1 secreted by the granulosa cells aids in chemotaxis of ,embryonic germs cells,other tissue specific cells outside, like the broad ligament in this case. This has been proved in animal models.

The interaction of sdf-1 and cxcr4 activates downstream signaling pathways that can result in chemotaxis, cell proliferation and survival, migration and gene transcription(6).After ovulation ovarian stroma collagenIV provides a scaffold for adhesion of extra ovarian malignant cells.(7)(8).the above theory could explain the synchronicity of ovarian tumor in the case.

A possible dual origin of extra ovarian GCT,i.e from the the coelomic and mesonephric origin has also been proposed(9). Mesonephros or its influence seems to be necessary for creating the sexcord.this may also explain the origin of sex cord stromal tumors being limited to the broad ligament, the retroperitoneum and the adrenal, all of which differentiate close to mesonephros and mesonephric duct.(9)

The morphological differential diagnoses of gct includes undifferentiated carcinoma, small cell carcinoma and endometrial stromal sarcoma.the characteristic immunostains and histology has been described above . Extra-ovarian sexcord stromal in the broad ligament is a rare entity. The histogenetic origin of sexcord is thought to be from the ectopic gonada stromal tissue,with sex cord originating from the mesonephros. A possible dual origin from both the coelomic and mesonephros

has been proposed. Review literature reveals cases of extraovarian gct in broad ligament ,retroperitoneum.Cases of gct from a muellerian cyst in broad ligament has been reported.

Prognosis- high chances of recurrence and relapses.17% relapses occur in more than 10 years of diagnosis(5)

This case showed a resistance to first line of adjuvant chemotherapy(etoposide+carboplatin), there was progression of disease. The case is reported for its rarity and to describe its relevanceto histogenetic origin and clinical practice.

ABBREVIATIONS - GCT – GRANULOSA CELL TUMOR

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CONFLICTS OF INTERESTS

There are no conflicts of interest of the authors on the case report.

HIGHLIGHTS

granulosa cell tumor can arise in locations other than ovary and is said to be derived from mesenchyme of genital ridge Ihc and the typical histological findings help to confirm granulosa cell tumor

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ELT in Nepal: Exploring the Paradigm Shift

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Abstract- This article is an overview of English Language Teaching in Nepal. It tries to explore the situational aspect of teaching and learning language. In the beginning, it has looked into historical aspect under the introductory part. Then it discusses the paradigm shift in teacher education in Nepal. Similarly, major global ELT trends are dealt within it. ELT paradigm shift in Nepal is also discussed. Generally, this article deals with paradigm shift in ELT in Nepal linking with major global ELT trends. Changes in ELT in Nepal such as teaching styles, materials, sources of learning and linking the teaching learning of English with ICT have been revealed in this article. Finally, this article concludes the ELT Paradigm shift in Nepal.

Index Terms- English language teaching, paradigm shift, ELT trends

Introduction

The influence of English language in the education system in Nepal is very great. English language teaching started in Nepal in the Rana regime. When the Ranas came into power, there was initiation of the English language teaching in Nepal (Shrestha, 2008). English was taught to the children of Ranas in Durbar High School then. Frankly speaking, Jung Bahadur Rana started English language in Nepal systematically after returning back from England. In the beginning, it was just limited to Durbar High School. But later on, even the children of commoners in Nepal were allowed to have an access to English education. English was incorporated in the school level as well as college level curriculum. English began to be taught as one of the compulsory subjects upto Bachelor's level. It happened as a result of the realization of the importance of English. It is also studied as an optional subject from Certificate level or +2 level to Master's level.

Paradigm Shift in Nepal in Teacher Education in Nepal

General teacher training formally started in Nepal in 1951, with the establishment of the College of Education (now the Faculty of Education at Tribhuvan University). This was also the beginning of English-language teacher education too, and was mainly for secondary level school teachers. There was no application of technology in the classes. Students had limited sources for reading. For a long time, there was not any use of student centered methods and students had not the access of self-learning strategies for their benevolence. Teachers were not applying the diverse types of materials. If we study and look at the teaching and learning of English language teaching previously existed in Nepal, we do not find the newness and student oriented. Although the government had put the English language in the school syllabuses, there was not availability of

materials and the teachers were not trained and skilled for teaching it earlier. There was not concept of using technology for the effectiveness of teaching and learning English. But the trend has changed. Use of technology has become the integral part of teaching and learning English currently. Regarding this, Bhattarai (2010) has pointed the need of using technology in English language classes. He states that:

Cyber culture is part of our life so technology will create virtual worlds and learning modes are changed abruptly and totally. Teacher education is incomplete without resorting to the use of technology (e.g. radio, mobiles, ICT, etc.). The electronic media has erased the geographical distance and historic time so the modes of teaching and ways of learning are totally different from what they used to be before. An English Language Teacher, like any other should be equipped with this Knowledge.

If we look at the history of English language teaching in Nepal in the respect of government aided schools almost 20 years back, teaching and learning of it used to be from grade 4. But later the trend has got changed, it started to be taught from Nursery level or grade 1. There was no concept of technology-enhanced language learning. There was higher influence of grammar translation in the beginning in Nepal. After that the trend of ELT moved to direct method in it. Then structural language teaching and audio-lingual methods existed. The communicative approach has dominated English language teaching, it has firmly established itself on a worldwide basis and there are good historical reasons for this with purpose of language is communicative competence, and that communicative functions and notions set in situations are an integral aspect of the equation. Language is no longer seen as abstract grammatical rules, but of having applications in social contexts and as such it is not just about 'grammar' but also about functions and notions.

More recently Kumaravadivelu's work (2001) attempts a shift in ELT by identifying limitations associated with CLT methodology and arguing for a focus on particularity, practicality and possibility within a post-method paradigm. This has influenced the English language teaching in Nepal also. The concept of teaching English for specific purposes has got initiation in Nepalese ELT context. Teaching English for academic purposes has also influenced the scenario of ELT in Nepal. The concept of multilingualism is heard. The concept of English as a foreign language is changed as English as an international language. The concept of critical applied linguistics is being started in the pedagogy for dealing with problems emerging in the Nepalese ELT.

Moreover, Jacobs and Farrel (2001) say that some changes come in paradigm shifting of language education. These changes are associated with the shift in the second language education paradigm. The eight changes are learner autonomy, cooperative learning, curricular integration, focus on meaning, diversity, thinking skills, alternative assessment, and teachers as co-learners. When we talk about paradigm shift in ELT, the following major global trends are better to be connected with it.

Major Global ELT Trends

In the journey of English language teaching, there are different trends. These trends are changed in the field of teaching and learning English. Different scholars, linguists and researchers have shown different trends and goals of it. Sun (2014) denotes that there are changing perspectives on English teaching and learning, changes in goals of English teaching and learning, changes in approaches to teaching, changes in teaching content, curriculum design, and assessment, expanding the dimension of communicative competence, changing views of an effective English educator, rapid development and integration of information technology in ELT, and changing roles and increasing responsibilities of teachers.

Recently, I have been assigned to deal with major trends in the global ELT field. I think that trends in today's ELT field can be broken down into three major categories: globalization, localization, and interdisciplinary collaboration. The ELT situation in the world is being changed time and again. It depends on needs of learners, goals of language teaching and learning and the pace of time for the consumption of language. For such changes, the following trends are existed in the globe of ELT.

- Changes in perspectives on English language teaching and learning
- Changes in goals of English language teaching and learning
- Changes in teaching approaches
- Changes in teaching content, curriculum design, and assessment
- Expanding the dimension of communicative competence
- Changes in views of an effective English educator
- Early start in learning English
- Rapid development and integration of information technology in ELT
- Changing roles and increasing responsibilities of teachers

Paradigm shift in ELT refers to changes in perspectives on English language teaching and learning. The ELT field is seen dramatic over the last 50 yrs. English is not just the second language anymore of non-native speakers. With this awareness, acronyms for the field have also evolved from ESL (English as a Second Language) to ESOL (English for Speakers of Other Languages), TESL to TESOL, Western English to English as an International Language (EIL). Nowadays, more and more research and discussions are focused on the issues of "World Englishes" and ELF (English as a Lingua Franca) rather than simply referring to any English spoken outside of the U.S.,

Canada, the U.K., and Australia as EFL (English as a Foreign Language).

ELT Paradigm Shift in Nepal

The paradigm shift in second language education has led to many suggested changes in how second language teaching is conducted and conceived. In this section, we consider major changes associated with the shift in ELT. Jacobs and Farrel (2001) state the eight changes in ELT such as learner autonomy, cooperative learning, curricular integration, focus on meaning, diversity, thinking skills, alternative assessment and teachers as co-learners.

Learner autonomy involves learners being aware of their own ways of learning, so as to utilize their strengths and work on their weaknesses (Canagarajah, 1999). Cooperative learning, also known as collaborative language learning, consists of a range of concepts and techniques for enhancing the value of student-student interaction. Curricular integration serves to overcome the phenomenon in which students study one subject in one period, close their textbook and go to another class, open another textbook and study another subject to get opportunities to see the links between subject areas.

Meaningful chunks can be supportive in language learning. In second language, "meaning" should be understood in terms of the meaning of individual words and whole texts, as well as the meaning that particular topics and events have in students' lives (Halliday, & Matthiessen, 1999). Diversity has different meanings. One meaning lies in the fact that different students attach different connotations to the same event or information (Brown, 1994). Another aspect of diversity in second language involves the mix of students we have in our classrooms in terms of backgrounds, e.g., ethnic, religious, social class and first language, sex, achievement levels, learning styles, intelligences and learning strategies.

Today, thinking skills are seen as an essential part of education, because information is easily obtained, so the essential task is now to use that information wisely. Likewise, new assessment instruments are being developed to compliment or replace traditional instruments that use multiple choice, true-false and fill-in-the-blank items (Goodman, Goodman, & Hood, 1989). They are often more time-consuming and costly, as well as less reliable in terms of consistency of scoring. The concept of teachers as co-learners involves teachers learning along with students. Teachers learn more about their subject areas as they teach, as well as learning about how to teach (Bailey & Nunan, 1996; Freeman & Richards, 1996).

ELT in Nepal cannot be different from the paradigm shift which has appeared in the field of language teaching. It is associated with the major trends of English language teaching. Gradually, many changes have influenced the teaching and learning of ELT in Nepal. The textbooks, teaching styles of teachers, learning ways of learners, teaching learning materials and other related sources have tremendously changed. From the perspective of globalization, English as foreign language has transformed as English as an international language (EIL). The learning of language is beyond the wall of classroom. The dependency of learners on teachers has reduced. The concept of multilingual education has been started by the government of

Nepal. There have developed the new concepts of English as EAP, ESP and so forth.

Academic Courses

The academic courses have been leaped from olden type of exercises, materials, methodologies and mechanisms into the functional and communicative ones. If we look at the book of the course 'Our English' of class 9 and 10, for example, drastic changes can be found. The learner sides are focused rather than teachers. Pair work, group work, self- assessment, and so many personal language activities are highly designed in the curriculums. Communicative perspective is truly focused in those books. The main focus of the texts in Nepal is on purpose, content, instruction and assessment. Earlier the texts by native speakers were included in the textbooks in Nepal. Now the trend is changed and many texts from Nepali contexts and texts by Nepali writers have been put in the textbooks in Nepal.

The Use of ICT and Technology

In Nepal, ELT is also being dealt with ICT programs and their uses for language learning. English language is used to breathe and get depth of content by staggering from Google, wikis, blogs and textbooks. There is the concept of creating open source type classroom in which everyone can contribute and the focus on computer assisted learning for enhancing English language learning. In the 21st century, the goals of ELT have changed from focusing solely on developing language skills and mimicking native English speakers to fostering a sense of social responsibility of students. Students should be treated as language users.

ELT cannot be considered successful when students do not know about global issues or care about societal problems, or worse yet, in the future use the language skills they have learned for such destructive activities as participating in global crime networks or damaging the environment (Brown, 2007). In Nepal, the government has focused e-learning centres in different parts to emphasize English language learning and is planning to implement ICT education throughout the country. Cell phone and e-mail systems are used in some of the academic institutions in Nepal for assigning homework and checking with feedback. Teaching English is not simply to prepare students to imitate native English speakers as language learners but to produce fully competent language users, critical thinkers, and constructive social change agents as Crystal (2004), & Brown (2007) noted.

Focus on Principled Eclecticism

ELT in Nepal has to be related to shared workspace, content creation and collaborative learning. Now, ELT discussions are more focused on eclectic approaches rather than on a single method or approach. Larsen-Freeman (2000) has used the term principled eclecticism to describe a coherent and pluralistic approach to language teaching and learning. Likewise, there is need of this method in Nepal for selling our future products in the world market of employment. The main characteristics of principled eclecticism (Kumaravadivelu, 2001) which we also can put in the scenario of English language learning in Nepal are to maximize learning opportunities, facilitate negotiated interaction, encourage learner autonomy, increase language awareness, activate self-discovery to utilize

learning and communication strategies, contextualize language input, integrate language skills, ensure social relevance and raise cultural consciousness.

Changes in Teaching Content, Curriculum Design, and Assessment

Today, the use of L1, as well as the use of a variety of accents in listening activities and assessments, is encouraged in teaching and learning. Currently, ELT classroom is interdisciplinary. The hot topics nowadays are CBLI, CLIL, ESP and EAP that we need in Nepal's curriculum. With such changes, now more and more programs require English teachers to use cross-curricular, cross-disciplinary content in teaching. Curriculum designs are more content-based and theme-based with emphases on both language and content knowledge. The learning outcomes or learning standards are much broader and includes not only language skills, but critical thinking, learning strategies and related content knowledge and skills in the real world. Today, standards, accountability, and assessment have become a major focus of the educational reforms in ELT in Nepal.

Changes in Views of an Effective English Educator in Nepal

An English teacher has many roles in terms of teaching English in our country. Rather than just focusing on theoretical part, we need to make teaching learning of English effective and goal oriented. The teacher should focus on effectiveness of learning English. Students have to be oriented towards successful and fruitful learning of English. The content does not have to be imposed as stuff, but as learning tool. The teaching should be effective English educator for the betterment of learners' needs and intentions.

Changing Roles and Increasing Responsibilities of Teacher

The responsibility of English teacher is to be supportive in the ELT classes. The trained and skilled teachers play significant roles to encourage learners for learning the language, but not about it. Activeness and participatory habit of the teacher can arouse learning situation and environment. In the globalized world, most of the communication is done in English, as the medium of teaching. As everyone knows that it is comprehensive or World Wide Language, where the present world is forging ahead by connecting itself to others for carrying out their harmonious relationships. To acquire good communication skills or to excel in communication skills, one has to acquire expertise in all the four skills such as listening, verbal communication, interpretation and inscription skills a student has to develop interest towards the subject or language before acquiring it. In this regard, the teacher plays various roles, for example learner, facilitator, assessor, manager and evaluator in attracting the student's attention by creating interest among the students.

Communicative Language Teacher

Communicative language teaching (CLT), or the communicative approach, is an approach to language teaching that emphasizes interaction as both the means and the ultimate goal of study (Savignon, 2000). Language learners in environments utilizing CLT techniques, learn and practice the target language through the interaction with one another and the

instructor, the study of "authentic texts" (those written in the target language for purposes other than language learning), and through the use of the language both in class and outside of class. In our ELT classes learners converse about personal experiences with partners, and instructors teach topics outside of the realm of traditional grammar, in order to promote language skills in all types of situations.

In 1966, Dell Hymes developed the concept of communicative competence. Communicative competence redefined what it meant to "know" a language; in addition to speakers having mastery over the structural elements of language, they must also be able to use those structural elements appropriately in a variety of speech domains. This method also claims to encourage learners to incorporate their personal experiences into their language learning environment by focusing on the learning experience in addition to the learning of the target language. For the implementation of this method, the English teachers in Nepal have to apply the materials with the concept of CLT and be aware about the application of participatory approach.

Conclusion

Although Nepal has a long history of teaching English language, there was no concept teaching English communicatively earlier. There was hegemony of GT method and traditional teaching materials and resources. Day by day new methodologies are being developed and new trends of teaching English have come into existence. With the pace of time, ELT in Nepal has to run for the ease of language learning for learners. ELT has to be up to date, and it has to maintain the needs of the learners. ELT in Nepal is trying to meet the learning goals of learners contemporarily. English language teaching is being accessed with technology enhanced language learning. ELT in Nepal has influence of paradigm shift emerged worldwide. The curriculum, teaching styles, learning styles, materials and sources are in the process of paradigm shift. The shift of ELT in Nepal has moved from grammar translation method to communicative language teaching along with the new concept of computer assisted teaching and ICT usage in the classroom.

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Construction of B-Algebra on Cycles of Aunu Permutation Pattern

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Abstract

Application of some algebraic properties of B-Algebra in AUNU Permutation Patterns was developed. Then the cycles AUNU Group were applied to form a table that satisfied some properties of B-algebra and some relevant theorem that will back our constructions was proposed. We also applied B-algebra in graph theory where we obtained a directed graph its adjacency matrix

Keywords: AUNU Groups, AUNU Patterns, B-Algebra, Permutations, AUNU Number and Graph.

1. Introduction

AUNU permutation pattern are a class of (123) and (132)-avoiding permutation pattern with special properties associated with succession schemes. These patterns have been used extensively in formulation of different structures such as group, graph and in study of different algebra schemes such as cyclic designs and circuit design see Mustapha and Ibrahim, (2013); Ibrahim, (20005); Magami *et al*, (2012). Some other theoretic properties of the AUNU Pattern and AUNU group were identify and discussed especially in relation to integer modulo group see Usman and Ibrahim, (2011). Ibrahim and Saidu, (2016.) Present non-associative and non commutative properties of 123-avoiding pattern of AUNU permutation pattern. The research describe how non associative and non commutative properties can be established by using the Cayley table on which a binary operation is defined to act on the 123-avoiding and 132-avoiding pattern of AUNU permutation using a pairing scheme. The result have generate larger matrix from permutation of point of the AUNU Pattern of prime cardinality see

2. Some Basic Definition

2.1. B-algebra-: A B-algebra is a non-empty set X with constant 0 and binary operation “ $*$ ” satisfying the following axioms.

$$B1 \quad x * x = 0$$

$$B2 \quad x * 0 = x$$

$$B3 \quad (x * y) * z = x * (z * (0 * y))$$

For all x, y and z in X

2.2. Sub Algebra: -Let $(X, *, 0)$ be a B-algebra. A non empty subset N of X is said to be sub algebra if $x * y \in X \forall x, y \in N$

2.3. Commutative: - A B-algebra $(X, *, 0)$ is said to be commutative if $a * (0 * b) = b * (0 * a) \forall a, b \in X$ otherwise it is not commutative.

2.4. Center of X : - let $(X, *, 0)$ be a B-algebra define $Z(X) = \{x \in X | x * (0 * y) = y * (0 * x) \forall x, y \in X\}$ we call it center of X .

Note that $0 \in Z(X)$

2.5. B-algebra $(X, *, 0)$ is cyclic B-algebra if there exist $x \in X$ such that $X = \langle x \rangle_B$. the B-algebra $(z, -, 0)$ is cyclic since $X = \langle 1 \rangle_B$.

2.6. AUNU Numbers: - There are two types of AUNU Numbers; the (123)-avoiding class obtained from a recursion relation as follows:

$$N(A_n(123)) = \frac{P_n - 1}{2}$$

Give rise to: 2, 3, 5, 6, 8, 9, 11, 14 ...

Corresponding to the length of 5, 7, 11, 13, 17, 19 ...

The sequence 2, 3, 5, 6, 9, 11, 14... is called the AUNU numbers corresponding to the (123)-avoiding class of permutation.

On the other hand the (132)-avoiding class of AUNU permutation patterns is obtained from a relation (Ibrahim 2004, Ibrahim 2006) as follows:

$$N(A_n(132)) = n + (m - 1), m \leq n. \text{ and } n, m \geq 3$$

Give rise to: 5, 7, 9, 11, 13 ...

Corresponding to the length of 3, 4, 5, 6, 7 ...

The sequence 5, 7, 9, 11, 13... is called the AUNU numbers corresponding to the (132)-avoiding class of permutation

Where $N(A_n(123))$ is the number of the class of numbers expressed as permutations, that avoid (123) patterns while P_n is the n^{th} prime number $n \geq 5$.

Notation and Method of Application

Throughout this research we shall adopt the use of the following basic notations and symbols for the purpose of both theoretical derivations and in establishing some fundamental result arising there from.

Let $\Omega_{(132)} = \{n + (m - 1)\}$ for $\{m \leq n \in \mathbb{Z}^+\}$ and $n = \{3,4,5, \dots p\}$

Then,

$$\Omega_{(132)} = \{5,7,9, \dots p\}$$

Is called AUNU number of the 132-avoiding pattern

Let the partition of $\Omega_{(132)} * \Omega_{(132)} \in Z_p$ where Z_p is the integer modulo p and the binary operation $*$ donates addition and subtraction.

Then $\theta: \Omega_{(132)} * \Omega_{(132)} \rightarrow Z_p$ such that $|\theta| = x$ where θ defines a mapping from $\Omega_{(132)} * \Omega_{(132)}$ to Z_p such that Z_p restrict elements of $\Omega_{(132)} * \Omega_{(132)}$ to integer modulop, for some prime number $p \geq 5$. It follows that $|\theta: \Omega_{(132)} * \Omega_{(132)} \rightarrow Z_p| = x$, where in this case, $x \in Z^+$.

3 Application in AUNU Permutation Pattern

Proposition:

Let $\Omega = \{0,1,2,3,4\} \subset Z_5$ be a cycle of AUNU group of order p , were $p \geq 5$ under binary operation “*” then $\Omega_{132} * \Omega_{132}$ is a B-Algebra under *.

Proof

For a $\Omega_{132} * \Omega_{132}$ to be a B-Algebra it must satisfy at least two condition of B-Algebra

Then, regarding $\{0,1,2,3,4\}$ as an element to construct tables satisfies some properties of B-algebra.

Table 1: operation table of cycle

*	0	1	2	3	4
0	0	0	0	0	0
1	1	0	0	0	0
2	2	1	0	0	0
3	3	2	1	0	0

4	4	3	2	1	0
---	---	---	---	---	---

Hence the zero elements represent diagonal element also the table form lower triangular matrix

Then $(\Omega; *, 0)$ is a B-algebra.

Theorem

Let $(\Omega, *, 0)$ be an AUNU number of the (132) and (123)-avoiding pattern with binary operation ‘*’ and constant 0 then Ω is a B-algebra satisfying the following condition.

$$B1. x * x = 0$$

$$B2. x * 0 = x$$

$$B3. (x * y) * z = x * (z * (0 * y)), \forall x, y, z \in \Omega$$

Proof

For any $x, y, z \in \Omega$

If $x * z = y * z \Rightarrow x = y$ means that the element x and y are unique in Ω .

Therefore

Absorption law

Uniqueness of identity

$$x * x = 0 \Rightarrow x = -x$$

$$x + x = 0$$

$$x = -x$$

$$x + (-x) = 0$$

From condition 2 of B-algebra

$$x * 0 = x$$

$$y * 0 = y$$

$$x * 0 = y * 0 \Rightarrow x = y$$

From condition 3 of B-algebra

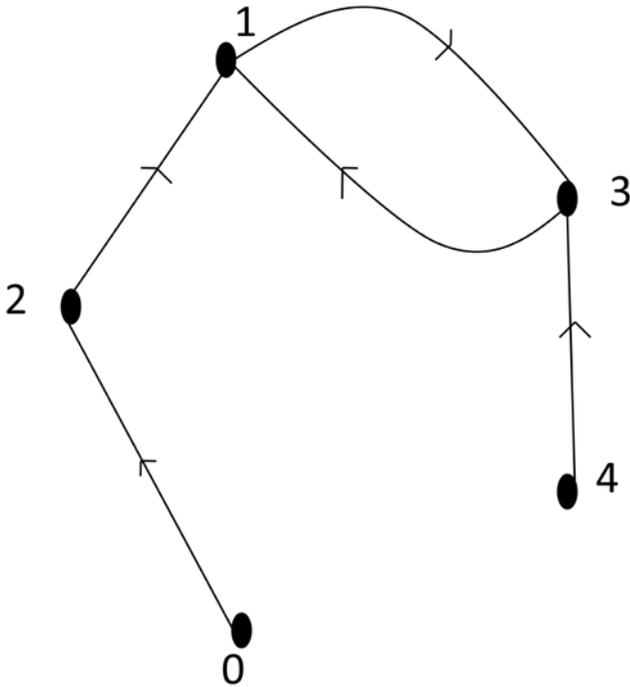
$$\begin{aligned} (x * y) * z &= x * (z * (0 * y)) \\ &= x * (z * 0) * y \\ &= x * (y * (0 * (0 * z))) \end{aligned}$$

$$= x * (y * z)$$

Therefore the RHS yield the LHS and result follows. By the absorption law that is $ax = ay \Rightarrow x = y$

4. B-Algebra in Graph Theory

Example 1. Suppose a function g is defined on B-algebra Ω , that is $\Omega = \{1,2,3,4,0\}$ by $g(x) = x^2 + 5x^3 + 2 \forall x \in \Omega$. then the following pairs of point were obtained from the function $V(G) = \{(0,2), (1,3), (2,1), (3,1), (4,3)\}$

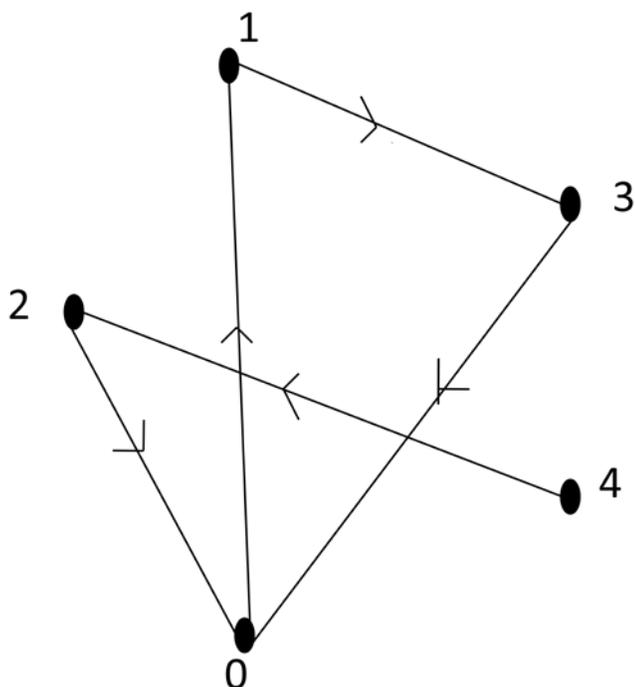


Graph 1

Adjacency matrix

$$A = \begin{bmatrix} 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

Example 2. Suppose a function g is defined on B-algebra Ω , that is $\Omega = \{1,2,3,4,0\}$ by $g(x) = x^2 + 2 \forall x \in \Omega$. then the following pairs of point were obtained from the function $V(G) = \{(0,1), (1,3), (2,0), (3,0), (4,2)\}$



Graph 2

Adjacency matrix

$$B = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

Conclusion

This construction has explored the application of AUNU Permutation Pattern, where the cycle of (132) - avoiding pattern was used in table 1 which satisfied properties of B-algebra, the zero element in the table represent diagonal element and again table form a lower triangle matrix. The B-algebra was applied in graph where a directed graph was obtained see graph 1 & 2 and their adjacency matrix.

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Enumerative Techniques for Bishop Polynomials Generated by a θ° Board With an $m \times n$ Array

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Abstract: *The bishop polynomial on a board rotated in an angle of 45° is considered a special case of the rook polynomial. Rook polynomials are a powerful tool in the theory of restricted permutations. It is known that the rook polynomial of any board can be computed recursively, using a cell decomposition technique of Riordan. This independent study examines counting problems of non-attacking bishop placements in the game of chess and its movements in the direction of $\theta = 45^\circ$ to capture pieces in the same direction as the bishop with restricted positions. In this investigation, we developed the total number of ways to arrange n bishops among m positions ($m \geq n$) and also constructed the general formula of a generating function for bishop polynomial that decomposes into n disjoint sub-boards B_1, B_2, \dots, B_n by using an $m \times n$ array board. Furthermore, we applied it to combinatorial problems which involve permutation with forbidden positions to construct bishop polynomials in a combinatorial way.*

Key words: *r-arrangement, combinatorial structures, Chess movements; Permutation; Arrangements with restrictions; Rook polynomials.*

1.0 Introduction

The rook polynomial is a powerful tool in the theory of restricted permutations (Abigail, 2004). However, in comparison with the bishop polynomial, a special case of the rook polynomial, has not been established (Skoch, 2015). Furthermore, Bishop (Rook) polynomials provide a method of enumerating permutations with forbidden position. Kaplansky and Riordan in 1946 started this study, with applications to card matching problems. Riordan, in his book is considered the first systematic analysis, and remains a classic treatment of the subject (Riordan, 1958). The series of papers by (Joichi, Goldman, & White, 1978; Goldman, Joichi, & White, 1977; Goldman, Joichi, Reiner, & White, 1976; White, Goldman, & Joichi, 1975) have expanded the field by applying more advanced combinatorial methods. More recently, (Laisin, 2018; Michaels, 2013) and (Ono, Haglund, & Sze, 1998; Haglund, 1996) also made investigations into various connections of rook polynomials to other parts of mathematics: hypergeometric series, enumeration of matrices over finite fields, and group representation theory. Furthermore, rook polynomials are also closely related to matching theory, chromatic theory and various other graph-theoretic topics (Chung & Graham, 1995; Farrell & Whitehead, 1991; Goldman, Joichi, Reiner, & White, 1976). In combinatorics proper, rook polynomials have been related to various permutation statistics (Butler, 1985) and the inverse problem has been solved for Ferrers boards in Mitchell, Preprint. It has long been known that the rook polynomial of any board can be computed recursively.

Nevertheless, in combinatorial mathematics, a bishop polynomial is a generating polynomial of the number of ways to place non-attacking bishops on a board that looks like a checkerboard; that is, no two bishops may be in the same diagonal. The board is any subset of the squares of an $m \times n$ rectangular board with m rows and n columns; we think of it as the squares in which one is allowed to put a bishop. Even though, Combinatorics is a young field of mathematics, starting to be an independent branch only in the 20th century. However, combinatorial methods and problems have been around ever since. Many combinatorial problems look entertaining or aesthetically pleasing and indeed one can say that roots of combinatorics lie in mathematical recreations and games. Nonetheless, this field has grown to be of great importance in today's world, because of its use for other fields like physical sciences, social sciences, biological sciences, information theory and computer science (Michaels, 2013; Berge, 1971).

The game of chess is an amazingly complicated game with a seemingly infinite number of scenarios. The rules that govern the game of chess have proven to be an attractive area of inquiry to mathematicians the world over. The game is played on an 8×8 checkered board and two players take turns moving their pieces around the board. The objective is to “checkmate” the opponent’s king, which means the king can be attacked on the next turn, and no matter how the opponent moves his pieces, there is no way to prevent the king from being attacked. The two players, each starting with 8 pawns, 2 rooks, 2 knights, 2 bishops, 1 queen, and 1 king. These pieces differ only in the way they are allowed to move around the board and “attack” other pieces. For example, rooks can move and attack as many squares that are unoccupied along its row or column. Bishops can move and attack only along diagonals for as many squares

that are unoccupied (Skoch, 2015). However, based on the rook movement, the theory of rook polynomials was introduced by Kaplansky and Riordan, and developed further by Riordan. The term "rook polynomial" was coined by John Riordan (Riordan, 1980). Despite the name's derivation from chess, the impetus for studying rook polynomials is their connection with counting with forbidden positions. The rook polynomial is a generating polynomial of the number of ways to place non-attacking rooks on a board that looks like a checkerboard; that is, no two rooks may be in the same row or column. The rook polynomial $R(x, B)$ (Laisin, 2018; Barbeau, 2003) of a board B is the generating function for the numbers of arrangements of non-attacking rooks, i.e.:

$$R(x, B) = \sum_{k=0}^{\infty} r_k(B)x^k$$

given that, r_k is the number of ways to place k non-attacking rooks on the board B .

Unlike the rook that moves in vertical rows and horizontal columns, the bishops move diagonally along the black or white squares on a chess board. Therefore, the bishop tends to capture pieces up or down along the diagonal it is placed, meaning that any piece along that diagonal can be captured by the bishop. To have non-attacking bishops on a board means that no two bishops must be on the same diagonal. To solve the problem of bishop placement with non-attacking bishops on an $m \times n$ board, the need to use the generating function of the bishop polynomial come into play.

If B is a board of size $m \times n$. The bishop polynomial of board B is denoted as $\mathfrak{B}(x, B)$ for the number of ways to place n non-attacking bishops on the board. The other pieces follow different rules for movement, but our study will focus on the strength of a bishop movements.

2.0 Preliminaries

Definition 2.1

Rook: A rook is a chess piece that moves horizontally or vertically and can take (or capture) a piece if that piece rests on a square in the same row or column while a bishop is a chess piece that moves diagonally and capture a piece if that piece rests on a square in the same diagonal (Chung & Graham, 1995; Goldman., Joichi, Reiner, & White, 1976; White, Goldman, & Joichi, 1975).

- a. Board: A board B is an $m \times n$ array of n rows and m columns. When a board has a darkened square, it is said to have a forbidden position.
- b. Bishop polynomial: A bishop polynomial on a board B , with forbidden positions is denoted as $\mathfrak{B}(x, B)$, given by

$$\mathfrak{B}(x, B) = \sum_{i=1}^k b_i(B)x^i,$$

where $\mathfrak{B}(y, B)$ has coefficients $b_i(B)$ representing the number of ways to place n non-attacking bishops on the board B . However, on an $m \times n$ board B , we have $b_0(B) = 1$ and the bishop polynomial with explicit coefficients is now:

$$\mathfrak{B}(x, B) = \sum_{k=0}^{\min(m,n)} \binom{m}{k} \binom{n}{k} k! x^k = \sum_{k=0}^{\min(m,n)} \frac{n! m!}{k! (n-k)! (m-k)!} x^k.$$

Nevertheless, with the limitation that, "bishops must not attack each other" is removed, in this case one must choose any k squares from $m \times n$ arrays. Then, we have;

$$\binom{mn}{k} = \frac{(mn)!}{k!(mn-k)!} \text{ ways.}$$

Suppose $m \neq n$, then, the k bishops will differ in some way from each other, however, the results obtained will be multiplied by $k!$, for the k bishops. Then, we have;

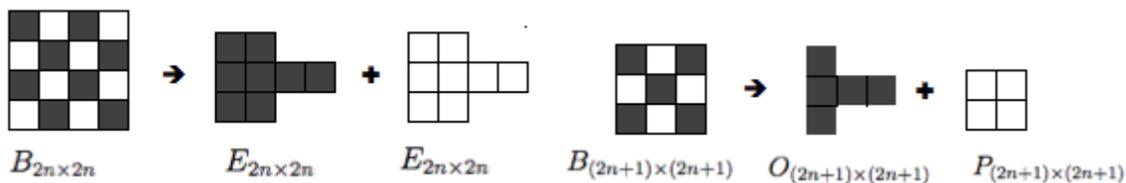
$$\binom{m}{k} \binom{n}{k} k! = \frac{n! m!}{k!(n-k)!(m-k)!} \text{ (Vilenkin, 1969).}$$

Definition 2.2 Square odd boards,

$B_{(2n+1) \times (2n+1)}$ can be broken down into two sub-boards: one with even number of cells – denoted as P board or $P_{(2n+1) \times (2n+1)}$ and the other with an odd number of cells – denoted as O board or $O_{(2n+1) \times (2n+1)}$.

Bishop polynomial of the P and O boards are expressed as $P_{(2n+1) \times (2n+1)}(x)$ and $O_{(2n+1) \times (2n+1)}(x)$

Thus, $B_{(2n+1) \times (2n+1)}(x) = P_{(2n+1) \times (2n+1)}(x)O_{(2n+1) \times (2n+1)}(x)$



Decomposition of $B_{(2n) \times (2n)}$ and $B_{(2n+1) \times (2n+1)}$ (Abigail, 2004; Shanaz, 1999).

Definition 2.3

P board coefficient is given by;

$$b_k(P_{(2n-1) \times (2n-1)}(x)) = b_k(P_{(2n-3) \times (2n-3)}(x)) + 2(2n - k - 1) \times b_{k-1}(P_{(2n-3) \times (2n-3)}(x)) + (2n - k)(2n - k - 1) b_{k-2}(P_{(2n-3) \times (2n-3)}(x))$$

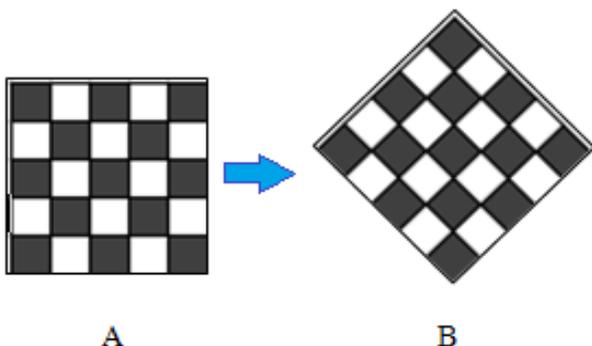
where $n \geq 3$; $2 \leq k \leq 2n - 3$ and $b_1(P_{1 \times 1}) = 1$; $b_1(P_{1 \times 1}) = 4$; $b_2(P_{3 \times 3}) = 2$. Note for all $k > 2n - 2$; $b_k(P_{(2n-1) \times (2n-1)}(x)) = 0$ (Abigail, 2004; Shanaz, 1999)

2.2 The Bishop Polynomial

A bishop moves only diagonally without restriction in the distance of each move. Here, the bishop polynomial is the generating function of the number of arrangements of k non-attacking bishops (k-bishop placement) on a $m \times n$ board:

$$\mathfrak{B}(x, B) = \sum_{i=0}^k b_i(B)x^i$$

where b_k denotes the k^{th} coefficient of the bishop polynomial. While bishops move in diagonal rooks move in straight lines, they differ in the direction of movement. However, the movement of the two can be related through a 45° rotation of the board. Tracing out the path of a bishop after a 45° rotation, gives the path of a rook piece. In the Figure below, the bishop polynomial of board A is the rook polynomial of board B.



Tilting board 45° converts bishop move (in A) to a rook one (in B). Given that a rook moves only vertically or horizontally, it can only occupy squares of the same colour (in board B above). Thus, the white board (consisting of white cells) and black board (consisting of black cells) are disjoint sub-boards of the overall board B. In particular, for even boards $B_{m \times n}$, note that $R(B_{white}) = R(B_{black})$. Therefore, $R(B) = R(B_{white}) \times R(B_{black})$ for all square board B (Skoch, 2015; Abigail, 2004).

Lemma 2.1 Forbidden Positions

The number of ways to arrange n-rooks among m-positions ($m \geq n$) such that order is maintained, is given by;

Case i. when $m \neq n$

$$r(x, B) = 1 - \frac{r_1(B) \binom{m-1}{n-i}}{\binom{m}{n}} + \frac{r_2(B) \binom{m-2}{n-i}}{\binom{m}{n}} - \dots (-1)^i \frac{r_i(B) \binom{m-i}{n-i}}{\binom{m}{n}}$$

$$= \frac{1}{\binom{m}{n}} \sum_{i=0}^n (-1)^i r_i(B) \binom{m-i}{n-i}$$

Case ii. when $n = n$.

$$r(x, B) = 1 - \frac{r_1(B) \binom{n-1}{n-1}}{\binom{n}{n}} + \frac{r_2(B) \binom{n-2}{n-2}}{\binom{n}{n}} - \dots (-1)^i \frac{r_i(B) \binom{n-i}{n-i}}{\binom{n}{n}}$$

$$= \frac{1}{\binom{n}{n}} \sum_{i=0}^n (-1)^i r_i(B) \binom{n-i}{n-i} \quad (\text{Skoch, 2015}).$$

Lemma 2.2

If B is a board of darkened squares that decomposes into two disjoint sub-boards $B_i : i = 1 \text{ and } 2$, then $\mathfrak{B}(x, B) = \mathfrak{B}(x, B_1)\mathfrak{B}(x, B_2)$ (White, Goldman, & Joichi, 1975).

3.0 Main Results

Theorem 3.1

The number of ways to arrange n bishops among m positions ($m \geq n$) through an angle of $\theta = 45^\circ$ for movement on the board with forbidden positions is;

$$\mathfrak{B}(y, B)P_{(m, n)} = \sum_{k=0}^n (-1)^k b_k^\theta P_{(m-k, n-k)}$$

Proof

The proof of theorem 3.1 follows immediately from Lemma 2.1 in arranging n bishops among m positions ($m \geq n$) through a direction of movement in an angle of 45° with forbidden positions is as follows;

Case 1 $m > n$

$$\mathfrak{B}(y, B)P_{(m, n)} = P_{(m, n)} - b_1^\theta(B)P_{(m-1, n-1)} + b_2^\theta(B)P_{(m-2, n-2)}$$

$$- b_3^\theta(B)P_{(m-3, n-3)} + \dots (-1)^m b_m^\theta(B)P_{(m-n, 0)}$$

$$= \sum_{k=0}^m (-1)^k b_k^\theta P_{(m-k, n-k)}$$

Case 2 $m = n$

$$\mathfrak{B}(y, B)P_{(n, n)} = P_{(n, n)} - b_1^\theta(B)P_{(n-1, n-1)} + b_2^\theta(B)P_{(n-2, n-2)}$$

$$- b_3^\theta(B)P_{(n-3, n-3)} + \dots (-1)^n b_n^\theta(B)P_{(0, 0)}$$

$$= \sum_{k=0}^n (-1)^k b_k^\theta(B)P_{(n-k, n-k)} \quad \blacksquare$$

Theorem 3.2 (n-disjoint sub-boards with movements through an angle of 45°)

Suppose, B is an $n \times n$ board of darkened squares with bishops that move through a direction of an angle of $\theta = 45^\circ$ then, $\mathfrak{B}(x, B)$ for the disjoint sub-boards is;

$$\mathfrak{B}(x, B) = \sum_{i=0}^n \prod_{k=0}^n \mathcal{X}_{B_{j,k}}(x)^i b_i^\theta(B_j), \quad j = 1, 2, \dots, n$$

Proof,

The proof of theorem 3.2 follows immediately from Lemma 2.2 it follows that, the total number of bishops b_i^θ on the board is;

$$\mathfrak{B}(x, B) = \sum_{i=0}^n \prod_{k=0}^n \mathcal{X}_{B_{j,k}}(x)^i b_i^\theta(B_j), \quad j = 1, 2, \dots, n$$

$$= \mathfrak{B}(x, B_1) \times \mathfrak{B}(x, B_2) \times \dots \times \mathfrak{B}(x, B_n)$$

The decomposition of the board into n disjoint sub-boards B_1, B_2, \dots, B_n , is;

$$\mathfrak{B}(x, B_1) = \sum_{i=0}^n (x)^i b_i^\theta(B_1) = 1 + x b_1^\theta(B_1) + x^2 b_2^\theta(B_1) + \dots + x^n b_n^\theta(B_1)$$

$$\mathfrak{B}(x, B_2) = \sum_{i=0}^n (x)^i b_i^\theta(B_2) = 1 + x b_1^\theta(B_2) + x^2 b_2^\theta(B_2) + \dots + x^n b_n^\theta(B_2)$$

⋮

$$\mathfrak{B}(x, B_n) = \sum_{i=0}^n (x)^i b_i^\theta(B_n) = 1 + x b_1^\theta(B_n) + x^2 b_2^\theta(B_n) + \dots + x^n b_n^\theta(B_n)$$

The nth coefficient of

$$\mathfrak{B}(x, B) = \mathfrak{B}(x, B_1)\mathfrak{B}(x, B_2) \dots \mathfrak{B}(x, B_n) = b_0^\theta(B_1)b_n^\theta(B_2)b_{n-1}^\theta(B_3) \dots b_{n-i+1}^\theta(B_n) + b_1^\theta(B_1)b_{n-2}^\theta(B_2)b_{n-3}^\theta(B_3) \dots b_{n-i}^\theta(B_n) + \dots + b_n^\theta(B_1)b_{n-1}^\theta(B_2)b_{n-2}^\theta(B_3) \dots b_0^\theta(B_n)$$

This shows that when there is a non-attacking bishop on B_1 there are n bishops on B_2 and $n-1$ bishops on B_n . This continues until we have n bishops on B_1 , there are no bishops on B_2 and 1 bishop on B_n . Thus

$$\mathfrak{B}(x, B) = \mathfrak{B}(x, B_1)\mathfrak{B}(x, B_2) \dots \mathfrak{B}(x, B_n) = \sum_{i=0}^n \prod_{k=0}^n \chi_{B_{j,k}}(x)^i b_i^\theta(B_j), \quad j = 1, 2, \dots, n \quad \blacksquare$$

4.0 NUMERICAL APPLICATIONS

Example 4.1

A general matching service has eight positions; A, B, C, D, E, F, G, and H with eight army officers; p, q, r, s, t, u, v and w . After analyzing their personalities and strategies he decides that p should not be matched with A, B, D, F, and H, q should not be matched with B, D, F, G, and H, r should not be matched with F, G, and H, v should not be matched with E, F and H, w should not be matched with E, F, G, and H. Use a bishop polynomial to determine the number of ways in which the general can match his army.

Solution

We make figure 1 as the chessboard representing the permutation with forbidden positions as decided by the general.

Thus, we arrange figure 1 such that no army among the eight positions is non-attacking to each other through a direction of movement in an angle of $\theta = 45^\circ$ with forbidden positions, thus, we have figure 2;

However, figure 2 is the arrangement of eight armies such that no two armies should attack each other. Now, applying the bishop polynomial on the board consists of the forbidden positions we get fig.2.

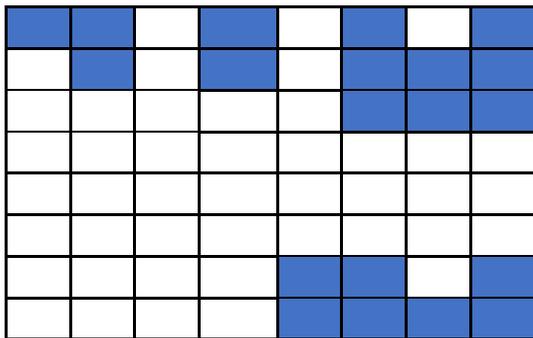


fig.1

⇒

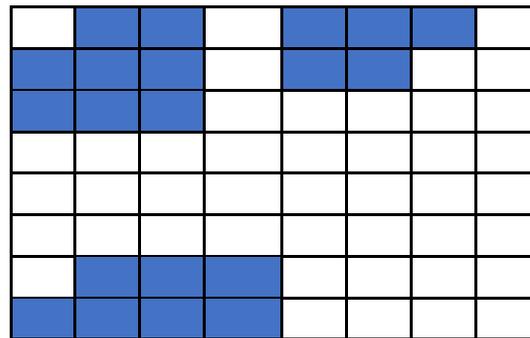
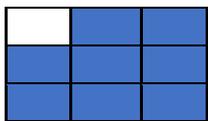
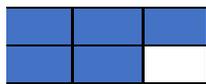


fig.2

Then, we have that, the 8×8 board can be decomposed into three disjoint sub-boards $B_i : i = 1, 2 \text{ and } 3$, such that, $\mathfrak{B}(x, B) = \mathfrak{B}(x, B_1)\mathfrak{B}(x, B_2)\mathfrak{B}(x, B_3)$.



B_1



B_2



B_3

Applying the bishop polynomial on the board with forbidden positions we have that $B_i : i = 1, 2 \text{ and } 3$, for each sub board is given by;

For the sub-board B_1 , we have;

$$\mathfrak{B}(x, B_1) = \sum_{i=0}^3 b_i^\theta(B_1)(x)^i = 1 + 8x + 3x^2 + x^3$$

For the sub-board B_2 , we have;

$$\mathfrak{B}(x, B_2) = \sum_{i=0}^3 b_i^\theta(B_2)(x)^i = 1 + 5x + 2x^2 + x^3$$

For the sub-board B_3 , we have;

$$\mathfrak{B}(x, B_3) = \sum_{i=0}^3 b_i^\theta(B_3)(x)^i = 1 + 7x + 2x^2 + x^3$$

Thus, the number of bishops on the 8×8 board that decomposed into three disjoint sub-boards $B_i : i = 1, 2 \text{ and } 3$, is given by,

$$\mathfrak{B}(x, B) = \mathfrak{B}(x, B_1)\mathfrak{B}(x, B_2)\mathfrak{B}(x, B_3).$$

$$\mathfrak{B}(x, B) = (1 + 8x + 3x^2 + x^3)(1 + 5x + 2x^2 + x^3)(1 + 7x + 2x^2 + x^3)$$

Here, the bishop polynomial is a generating function of the number of arrangements of 9 non-attacking bishops (9-armies placement) on a 8×8 board, to give;

$$\mathfrak{B}(x, B) = 1 + 20x + 102x^2 + 123x^3 + 28x^4 + 213x^5 + 107x^6 + 36x^7 + 7x^8 + x^9$$

Therefore, we have 9 armies to arrange in 9 positions ($m \geq n$) through a direction of movement in an angle of 45° with forbidden positions. Thus, the total number of ways for the arrangement is given by;

$$\mathfrak{B}(x, B)P_{(9,9)} = \sum_{i=0}^9 \prod_{k=0}^3 \mathcal{X}_{B_{j,K}}(x)^i b_i^\theta(B_j)P_{(9-k,9-k)}, \quad j=1,2,3$$

$$= 1 + 20 + 102 + 123 + 28 + 213 + 107 + 36 + 7 + 1 = 638 \text{ ways}$$

The general can match his army in 638 ways.

Conclusion

Bishop polynomials are not just interesting for their own sake. They have a variety of applications because they directly relate to permutations with restricted positions. This means that bishop polynomials can be used in everything from cryptography to combinatorial design theory.

In this paper we were able to develop the total number of ways to arrange n bishops among m positions ($m \geq n$) and also to construct a bishop polynomial that decomposes into n –disjoint sub-boards B_1, B_2, \dots, B_n by using an $m \times n$ array board. Furthermore, we applied these results to obtain the total number of bishops and the maximum number of arrangements for the k non-attacking bishops can be obtained on an $m \times n$ array board.

Recommendations

Further study can be carried out with the bishops on three-dimensional boards. In addition, further studies could also examine what would happen to rook and bishop polynomials by changing the shape of the boards.

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The Shift Toward Electronic Administration in Government Institutions in Libya to Meet the Challenges of the Digital Age

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Abstract

One of the most important aspects in modern societies which was suffering from insufficiency in the traditional administration considered as E-administration or E-management. The e-administration is modern alternative that keep pace with recent developments which work to provide assistance to costumers in different sectors, meet their management demands and seeks to achieve their satisfaction in getting higher and easier capabilities to manage their life affairs. The orientation towards e-administration isn't a modern form of life we obtain to adopt it, but it is an urgent need to our societies and motive to that administrations to work on developing themselves and solve their management problems by avoiding the traditional style and orientation towards flexible and electronic style. E-administration plays main role in bringing different changes in the administrative work, which contributed to the development in a lot of administrative work stages and its methods and providing information through an appropriate time and at the lowest cost that is why it can improve performance and achieve better quality.

Keywords: E-management, governance institutions, ICT, Libya

Introduction

The application of electronic administration in government institutions in developing countries such Libya is still facing many difficulties and problems arising from the process of change, which prevent the use of the data of the technological age and its role in the development and construction pursued by these countries in all areas, thus creating a gap between the department of government and the use of modern technology.

So to meet the best use of the modren technology, it is time for the decision makers in Libya to start preparing the needs required for this use.

This research paper tries to explain innovations in expansion of E-government in Libya for making a point in which direction Libya is moving. The study aware that in the 21st century, many countries are providing services to their citizens using the Internet. The chief motive is that these services could be reached by majority of the populace whether they are living in rural or metropolitan regions. 179 out of 192 United Nations members accounted that they have developed tactics to execute E-government systems. In countries such as Libya, where the inhabitants are stretched over a huge physical region, the require to organize services by means of the internet is incredibly obvious. However, since the accomplishment of such deployment would be extremely costly, its success is incredibly significant to ensure continuous investment and improvements. This is predominantly significant in the circumstance of Libya, where E-government is a recently realized novelty. As a result, it is clear to learn aspects that might assist or weaken the recognition of E-government services in Libya. The most considerable matter for the accomplishment of E-government is the level to which the people accept these services.

The paper also reviews necessary stages and processes of E-government expansion in Libya:

- The first phase is the citizen-centric government initiatives; people can entrance government data online. This is the data distribution and data-sharing stage. The suggestion is to give instantaneous data to make out to the assurance of the community.
- The second stage is to set aside connections. In this step of improvement, there is various points of connections taking place among the government and the citizen. Lots of governments nowadays have accepted Access and Identity Management (IAM), systems to facilitate and smooth the progress of such communication.
- The final stage is the citizen-centric E-government ripeness. That is about attractive the contribution of the people in the dissimilar features of government supervisory in a practical fairly than an unfriendly manner. Supervisory is no longer the kingdom of a handful of officials or a small amount of people from politic. Supervisory is deeply predisposed by the society who can radiate their votes to contour the course of action that preside over their lives. At this point of improvement, government websites are topically or costumers-group leaning, tolerant by approaching about the elements they hand out. These sites distance manifold organizations and manifold stages of government, are additional instinctive to utilize, and attain crosswise compound directs impeccably.

The aim of this research is to analyse the drivers and barriers impacting on e-administration implementation in government institutions in Libya to cope with the requirement of the digital age. The main objectives of this research that arise as a result of the above aim are:

1. The reason for the shift toward electronic administration in Libya.
2. The areas of application of the electronic administration in government institutions.
3. Requirements for the application of the electronic administration in government institutions.
4. Obstacles that limit the application of the electronic administration in government institutions.
5. The skills required in the administrative body of electronic administration in government institutions.
6. Training needs for human component in the electronic administration.
7. Evaluation of the ICT gap in Libya

This paper follows the descriptive method and analytical method through the description of the current reality of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions as well as the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya.

The researcher followed the descriptive analytical approach and the field study method being the most corresponding to the current study.

In order to achieve the research objectives, a research methodology that allows for the collection of secondary data through a literature review adopted, and for primary data to be gathered during a fieldwork exercise. The overall approach is of a single case study focusing on the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya, chosen because case studies allow for rich data to be collected about the issue under investigation. The descriptive and deductive methods applied and also the methods of the questionnaire and SPSS statistical methods implemented.

The study society is represented in the most important government institutions in Libya.

The entries of the sample are represented in about 300 respondents from the personnel in the mentioned administrations.

The survey consists of two types of questions:

1. The demographic characteristic which is represented by four questions regarding to gender, age, occupation level and number of years of experience
2. The questions about the impact of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions as well as the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya.

The questionnaire contains following parts:

- Part I includes General Information about the participants and gives data about their gender, age, occupation and the number of years they have worked in the given field meaning their experience.
- Part II is comprised of the questionnaire questions related to the level of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions in Libya.
- Part III is comprised of the questionnaire questions related to the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya.
- Part IV is comprised of the questionnaire questions related to the impact of the level of ICT development on the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya .

This study questionnaire has been addressed to the employees in the Libyan government institutions for the purpose of defining the role of the application of the electronic administration and e-management implementation to meet the challenges of the Digital Age in Libya .

The sample is selected as the following Table No 1:

	Number of questioners	Percentage
All questioners	350	100%
Collected questioners	300	85%
Questioners not suitable for analysis	6	1%
Analyzed questioners	294	84%

To test the relation between the gender and the opinion of the respondents, the **Chi-Square is used as following:**

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.223 ^a	3	.527
Likelihood Ratio	2.190	3	.534
Linear-by-Linear Association	1.814	1	.178
N of Valid Cases	294		

Table No 2 : **Chi-Square Test**

A. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .87.

To test the relation between the age and the opinion of the respondents, the **Chi-Square is used as following:**

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.784 ^a	9	.027
Likelihood Ratio	14.881	9	.094
Linear-by-Linear Association	.548	1	.459
N of Valid Cases	294		

Table No 3: Chi-Square Tests

A. 6 cells (37.5%) have expected count less than 5. The minimum expected count is .39.

Representing the results of the validation of study hypotheses

Main hypothesis:

There is a statistically significant impact of the level of the ICT development on the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya .

Sub- hypotheses:

The first hypothesis:

There is a rise in the level of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions in Libya.

The second hypothesis:

There is an increase in the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya.

Table No 4 : Testing Sub-hypothesis 1

There is a rise in the level of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions in Libya.

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	I don't know
Improve productivity and increase capacity of government.	Frequencies	59	227	8			
	Percentage %	33	64	3			
Reduce the overall costs of the organization and efficiency gains.	Frequencies	82	196		16		
	Percentage %	62	31		7		
Improve of quality of decision and policy making.	Frequencies	45	214	19	16		
	Percentage %	20	62	11	7		
Improve collaboration among different departments.	Frequencies	119	175				
	Percentage %	47	53				
Improve quality of services delivery to business and	Frequencies	102	156	21	10		5
	Percentage %	32	45	11	7		5

customers.							
Reduce human performance errors.	Frequencies	66	174	24	30		
	Percentage %	29	53	7	11		
Reduce data collection, processing and storage.	Frequencies	97	147	22	18		10
	Percentage %	26	50	14	7		3
Improve the organization's business process.	Frequencies	174	78	22	20		
	Percentage %	34	31	7	28		
Network and community cohesion.	Frequencies	14	18	21	154	87	
	Percentage %	3	14	19	38	26	
Promote the use of ICT in other sectors of the society.	Frequencies		8	26	125	129	6
	Percentage %		7	21	36	33	3
Provide protection, security and confidentiality of information.	Frequencies	17	234	14	12	12	5
	Percentage %	12	69	7	4	5	3

The decision: In this test, we explore the level of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions in Libya
After all calculations and statistical analysis on the sample under the study and extracting results from it can be concluded that there is an increase in the level of the ICT development which will benefit the modernization and improving the business performance to increase the possibility of future success of the government institutions in Libya. This proves that the sub-hypothesis 1 is valid and true.

Table No 5: Testing Sub-hypothesis 2

There is an increase in the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	I don't know
The weakness of some managers in the feasibility of applying electronic administration.	Frequencies	6	175	7	96	8	2
	Percentage %	4	43	7	38	5	3
Weak preparation and training of staff to use electronic techniques.	Frequencies	90	181		12	2	9
	Percentage %	28	54		10	3	5
Decreased confidence of the administration in its ability to use electronic management applications.	Frequencies	72	191	14	12		5
	Percentage %	14	71	7	5		3
Weakness some employees recognize the idea of e-administration for fear of losing their jobs.	Frequencies	63	188	14	17		12
	Percentage %	15	66	7	9		3
Lack of sufficient knowledge of electronic management techniques.	Frequencies	100	153		14	24	3
	Percentage %	38	40		5	15	2
Shortage of staff specialized in the operation and maintenance of computers.	Frequencies	94	165	19	16		
	Percentage %	24	54	12	10		
Some employees fear responsibility in the event of an electronic device malfunctioning.	Frequencies	79	158	19	19	10	9
	Percentage %	27	49	9	9	3	3
Implementing e-administration	Frequencies	124	147	5	15	3	

requires a higher level of knowledge among the employees.	Percentage %	33	48	4	14	1	
Complexity in understanding the processes and systems among the employees.	Frequencies	109	167	5	8	5	
	Percentage %	34	47	3	13	3	
Disagreement of some departments to change and poor connectivity between the departments of institutions.	Frequencies	89	182	16	4		3
	Percentage %	35	59	4	1		1
Absence of law and regulations for the application of e-administration	Frequencies	14	17	124	136		19
	Percentage %	3	3	37	52		5

The decision: in this test, we explore the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya

After all calculations and statistical analysis on the sample under the study and extracting results from it can be concluded that there is a rise in the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya. This proves that the sub-hypothesis 2 is valid and true.

Table No 6 : Testing main hypothesis

There is a statistically significant impact of the level of the ICT development on the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya .

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	I don't know
The main of technical constraints for e-management implementation in government institutions is speed of change in information technology and the difficulty of compatibility.	Frequencies	107	158	12	8	9	
	Percentage %	22	48	14	4	12	
Poor infrastructure required to implement e-management.	Frequencies	95	186	3	1		9
	Percentage %	22	62	5	2		9
The weakness of the programs of protection of data and information.	Frequencies	59	183	16	19		17
	Percentage %	15	57	5	16		7
The weakness of the telecommunication service in the institution.	Frequencies	65	169	27	31		2
	Percentage %	19	50	12	18		1
Lack of accurate and integrated databases.	Frequencies	144	134		16		
	Percentage %	47	43		10		
Insufficient computer hardware available in the government institutions.	Frequencies	103	153	15	15	4	4
	Percentage %	28	48	9	9	3	3
The weakness of the follow-up and development of the software applied.	Frequencies	104	186	4			
	Percentage %	35	62	3			
The indicative of a lack of evidence described the mechanisms for the application of electronic administration.	Frequencies	130	124	14	18	8	
	Percentage %	35	34	10	14	7	
Unstable power supply.	Frequencies	103	175	16			
	Percentage %	33	60	7			
The scarcity of the existence of a backup system when a fault happened.	Frequencies	8	18	107	145	10	6
	Percentage %	7	17	22	35	14	5
Easy penetration of the Internet.	Frequencies	3	12	99	175	3	2
	Percentage %	4	11	36	43	4	2

The decision: in this test, we explore the impact of the level of the ICT development on the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya .

After all calculations and statistical analysis on the sample under the study and extracting results from it can be concluded that there is a statistically significant impact of the level of the ICT development on the level of the application of the electronic administration and e-management implementation in government institutions to meet the challenges of the Digital Age in Libya. This proves that the main hypothesis is valid and true.

Results

The paper presents citizen's satisfaction with this service and can help Libyan authorities to use superiority criterion to judge their service deliverance method, observe and institute original associations that could come out as hypothetical input. Moreover, this research explores difficulties that may be expected throughout E-government development efforts and presents alternatives for overcoming them.

With this research it is meant to make available facts, terms, and requirements for establishing E-government in Libya in order to present the best solution for the work that has to be done to develop E-government. This work was motivated by an ambition to influence E-government teaching, previously organized in the developing world, to make the most of the possibility for success. Here is as well presented the way how government should influence a change of the system inside its organizations as instrumental of transparency and information substitute what would help to improve deliverance of government services to populace, superior government connections with production and commerce, civilian empowerment throughout admittance to information and contribution in managerial and well-organized government executive.

Conclusions

Government at all levels face a major challenge in attempting to turn the ownership structure of the large companies in order to open them to the market for attracting investors, but also not to lose profits which had so far. It has to wage between social costs and benefits into practical implications for project choice.

The importance of this research lies in the following points:

The importance of this paper, above all, laying in recognizing the elements and processes which would help authorities understand the key issues influencing people's needs as well as their approval with the services provided and also using the quality criteria to grade government's service delivery process. Furthermore, the importance in offering facts, terms, and requirements for establishment of E-government in Libya, to indicate the best solution for the emerging issues and actions to be taken to develop E-government and further bring benefit to the society.

Recommendations

- Among the processes taking place in the majority of the modern world, Libya has to shift from the traditional ways of communication and service deliverance by the governments towards electronic ways of communication.
- The presented contemporary knowledge is supposed to be used in a mode favorable for the regime and general public.
- As an alternative of spotlighting on the practical manner of the E-government, the focus is supposed to be on forming a framework that can efficiently respond to citizens' needs.
- E-government has to keep up with transforms in the inner and outdoor environments to advance citizens' awareness by providing them with computers and internet courses and facilitating them to compact with the E-government services.
- The governments should parallel work on reducing if not entirely eliminating the obstacles preventing them to accomplish the goal of establishing efficient E-governments. These obstacles are many, ranging from political and communal to economic and technological.

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The Effect of Competency, Motivation, Compensation On the Employee Performance of Pt. Xyz Ciputat Timur

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Abstract

This objective of this research is to examine the influence of competency, motivation and compensation to the performance in the PT. XYZ Ciputat Timur. The research is causality using survey approach. Data was collected by distributing questionnaires to all employee servants who employee performance in the PT. XYZ as 40 people. Methods of data analysis using descriptive statistical analysis, classic assumption testing, validity and reliability testing and hypothesis testing by multiple regression analysis techniques were processed using by SPSS for Windows programs. Based on the results of testing the coefficient of determination resulted in adjusted R-Square of 0,839 or 83,9 %, demonstrating the influence of variable competency, motivation, compensation and work environment to the employee performance, where as 16,1 % are affected by other factors not examined in this research variables or other factors that have not been studied in this study such as work culture, incentives, leadership style, etc. These results showed that: (1) Simultaneously, competency, motivation and compensation to the performance have a effect to the performance in thePT. XYZ; and (2) Partially, competency, motivation and compensation to the performance have a effect to the performance in the PT. XYZ.

Keyword: Competency, Motivation, Compensation, Employee Performance PT. XYZ.

Preliminary

PT. XYZ is one of the governmental office in Indonesia where the scope of the business activities is engaged in implementing regional government at sub-district level. Subdistricts are led by Camat who the duties are responsible to the Mayor through the City Secretary. Sub-district head domiciled as the implementer of the regional government at the district level, who has the duty of implementing the authority of the government delegated by the Mayor and other government duties.

To achieve the company goals, it is needed an employees who are in accordance with the requirement desired by the company and have the ability to do the tasks which have been assigned by the company. The company will strive to

improve the performance of its employees, hoping that the employees are able to achieve the goals.

However, what happened at PT. XYZ is the problem employee performance. That is triggered by the lack of competence, motivation and compensation so that performance has decreases every year.

Theoretical Review

According to John Miner in Sudarmanto (2015) performance is the quantity of output, and two things related to the aspects of individual behavior, namely time utilization in work (levels of compliance on working hours), and cooperation.

According to AA, Anwar Prabu Mangkunegara (2017: 9) that "Employee performance" (work performance) is the work result both in quality and quantity achieved by an employee in accomplishing his duties in accordance with the responsibilities has given to him".

There are several indicators about working criteria which can be used to quantify the level of employee performance, namely: quality, quantity, time utilization in work, cooperation with others in work.

According to Edison et.al (2016: 17) Competence is the ability of individuals to implement a job correctly and having an excellence based on matters related to knowledge, skills, and attitude.

According to Edison et.al. (2016: 145) to fulfill the element of competency, an employee must have the criteria which are knowledge, skill, attitude.

According to George R. Terry in Sedarmayanti (2017: 257) motivation is the desire existed in an individual which stimulates to do an action.

Regarding to the types of motivation, the motivation theory which is quite popular among management practitioners is Maslow's Theory or often referred to as Maslow's Need Hierarchy Theory (AA Anwar Prabu Mangkunegara, 2017: 63): This theory basically states that someone behaves in a certain way because it is driven by various kinds of needs that must be fulfilled. Maslow classifies human needs into five types that are arranged in a hierarchy, namely physiological needs, security needs, belonging needs, self-esteem needs, the need to actualize themselves.

According to Mondy (2008: 4) compensation is the total of all benefits received by employees as a service price which they have provided. The general purpose of giving compensation is to attract, retain, and motivate employees.

Basically, there are many indicators that affect employee compensation for an organization. According to Mondy and Noe (2008: 211) explained that compensation has several dimensions, namely: Direct Compensation (consisting of salary, wages, incentives, bonuses) and Indirect Compensation which consists of *payment for time not worker*, *Hazard Protection*, *Legally required payment*.

Theoretical Framework

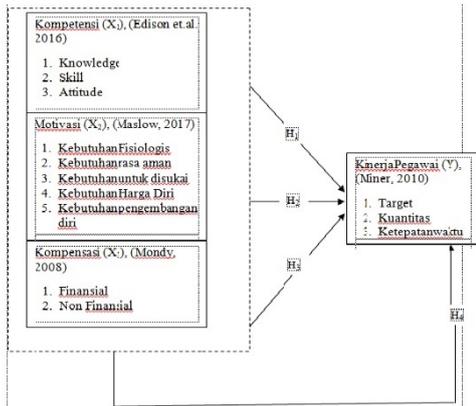


Figure 1 Theoretical Framework

Research Hypothesis

Based on the formulation of the problem and associated with the theoretical foundation used, the researcher can express the following hypothesis:

- H1: Competency affect employee performance.
- H2: Motivation affect employee performance.
- H3: Compensation has as effect on employee performance.
- H4: Compensation has an effect on employee performance.

Research Method

The population of respondents who will be reviewed in this study are all PNS (government employee) at PT. XYZ with a total population of respondents are 40 employees and the *sampling* technique which used in this study is using *sample jenuh* is the entire population in this study used as a sample.

Result & Discussion

Tabel 1. Deskriptif Total Skor Variabel Kompetensi (X₁), Motivasi (X₂), Kompensasi (X₃), dan Kinerja Pegawai (Y)

Descriptive Statistics					
	N	Minimu m	Maximu m	Mean	Std. Deviation
Kompetensi	40	20.00	40.00	30.2750	4.83570
Motivasi	40	42.00	57.00	50.3000	5.21438
Kompensasi	40	40.00	63.00	54.5250	7.04559
Kinerja Pegawai	40	13.00	35.00	29.5500	6.39691
Valid N (listwise)	40				

Based on table, the *descriptive statistic* above is obtained an illustration of the description of each dimension of the Competency variable (X₁) indicating the minimum value of the respondent's answer is 20 or 2.5 (3) which means low neutral, maximum value of 40 or 5 means strongly agree, the average value of the respondent's answer is 30.28 (4) which means agreeing with the standard deviation value of 4.835 (the standard deviation is very low).

For Motivation variable (X₂) shows the minimum value of respondent's answer is 42 or 3 means very neutral, maximum value of 57 or 4 means agree, the average value of the respondent's answer is 50 or 4 which means agree with the standard deviation value of 5.215 (deviation the default is very low).

And for Employee Performance variable (Y) shows the minimum value of the respondent's answer is 2 means disagree, the maximum value of 5 means strongly agree, the average value of the respondent's answer is 4 means agree with the standard deviation value of 0.196 (the standard deviation is very low).

1. Instrument Test Validity Test

Tabel 2. Hasil Perhitungan Uji Validitas Skala Kinerja Pegawai (Y)

Pertanyaan	Nilai r hitung	Nilai r tabel	Kriteria
KP1	0,452	0,312	Valid
KP2	0,398	0,312	Valid
KP3	0,648	0,312	Valid
KP4	0,574	0,312	Valid
KP5	0,409	0,312	Valid
KP6	0,369	0,312	Valid

The results of validity test above, it reveals that all items in the employee performance in this study are valid, showing by r value, calculating from each questions has a *pearson correlation positive* value and is is greater than the r value. (Table 0.312). So it was concluded that every question concerning competency, motivation, compensation, and employee performance was able to reveal something that could be quantified in the questionnaire in this study

Reliability test

Tabel 3. Rangkuman Reliabilitas Kompetensi (X₁), Motivasi (X₂), Kompensasi (X₃) dan Kinerja Pegawai (Y)

No.	Variabel	Nilai Cronbach Alpha	Nilai Standar	Keterangan
1.	Kompetensi (X ₁)	0,894	0,700	Reliabel
2.	Motivasi (X ₂)	0,802	0,700	Reliabel
3.	Kompensasi (X ₃)	0,913	0,700	Reliabel
4.	Kinerja Pegawai (Y)	0,871	0,700	Reliabel

Sumber : Data diolah oleh penulis (2018)

It can be noticed that the *Cronbach's Alpha* value obtained by competency is 0.894, the motivation variable is 0.802, compensation variable 0.913 and employee performance variable 0.871. So it can be concluded that the *cronbach's alpha* from each variable is greater than 0.70 and this indicates that all variables are reliable. In other words, competency, motivation, compensation, and employee performance variables are reliable due to the respondent's answer from the statement in the questionnaire are consistent and stable time to time

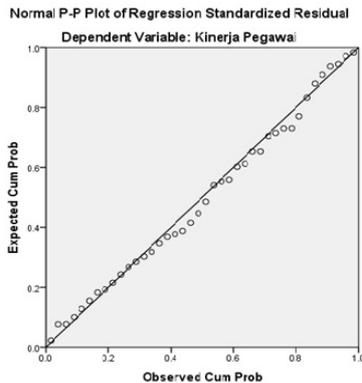
2. Classical Assumption Test
Normality Test

Tabel 4. Uji Normalitas Unresidual Data Regresi Berganda Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		40
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	2.56306777
Most Extreme Differences	Absolute	.066
	Positive	.066
	Negative	-.045
Test Statistic		.066
Asymp. Sig. (2-tailed)		.200 ^{c,d}
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		
Sumber Output : SPSS 22		

Based on table 4, it shows that the Kolmogorov Smirnov value is 0.066 and the *Asymp.sig* value is 0.200. Because the value of *Asymp.Sig* 0.200 is greater than $\alpha = 0.05$, then H_0 is accepted. This means that the data in multiple regression are normally distributed or the unresidual value of multiple regression models is normally distributed.

While the proving of normality of multiple regression models with graphs can be presented as follows:



Gambar 3. Grafik Linieritas Data Regresi Berganda Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

The data on the histogram graph follows the normal line, and the distribution of data on the normal p-plot graph is located around the diagonal line. It can be concluded that the tested data has **normal data distribution**

Multicollinearity Test

Tabel 6. Uji Multikolinieritas Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

Model	Collinearity Statistics	
	Tolerance	VIF
1 (Constant)		
Kompetensi	.865	1.156
Motivasi	.521	1.921
Kompensasi	.582	1.718

a. Dependent Variable: Kinerja Pegawai
Sumber Output : SPSS 22

It can be noticed that the competency variable (X₁) shows a tolerance value of 0.865 and a VIF value of 1,156. The motivation variable (X₂) shows a tolerance value of 0.521 and a VIF value of 1.921. The compensation variable (X₃) shows a tolerance value of 0.582 and a VIF value of 1.718 so that it can be concluded that the three independent variables used show tolerance values > 0.10 and VIF values < 10, this means that there is no multicollinearity between compensation, leadership, and environment work used in the regression model.

Heteroscedasticity Test

Tabel 7. Uji Heterokedastisitas dengan Uji White antara Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

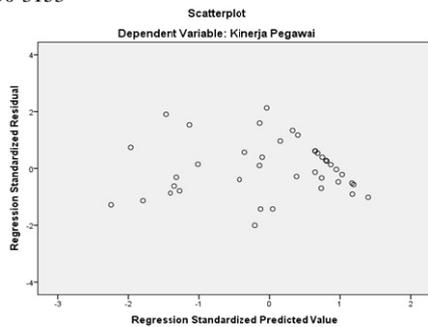
Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.471 ^a	.222	.051	1.77233

a. Predictors: (Constant), Kompetensi*²Motivasi, Kompensasi Di Kuadratkan, Motivasi Di Kuadratkan, Kompetensi, Kompetensi Dikuadratkan, Kompensasi, Motivasi

Sumber Output : SPSS 22

Based on table 6, the summary model above shows the R² value of 0.222 with the number N = 40, then obtained the value of C² = 40 x 0.222 = 8.88 and the value of C² table with df = 40 and a significant level ($\alpha = 0.05$) obtained C² value is 55, 76. Because the value of C² count is 8.88 < C² table which is 55.76, then this means that H_0 is accepted or the multiple regression equation model between Competency variables (X₁) and Motivation (X₂) Against Employee Performance (Y) is linear. So that it can be concluded that the multiple regression model is free from the problem of heteroscedasticity.

While the graphic proof of the heteroscedasticity of multiple linear regression models can be presented as follows:



Gambar 4. Grafik Heteroskedastisitas Data Regresi Berganda Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

Based on the results of the scatter plot in Figure 4, it can be noticed that the points do not clearly form patterns and the points scatter above and below 0 number on the Y axis, it can be concluded that there is no heteroscedasticity. This means that the variables of competence, motivation, and compensation have a scattering of data which from time to time is always consistent and can be said that the data has similarities in variance or commonly called as homoskedasticity.

3. Multiple Linear Regression Test

Table 7 Multiple Linear Regression test

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-28.079	4.474		-6.276	.000
Kompetensi	.216	.095	.163	2.277	.029
Motivasi	.420	.114	.343	3.701	.001
Kompensasi	.549	.079	.605	6.910	.000

a. Dependent Variable: Kinerja Pegawai

Source: Output SPSS 22

In Table 7 can be seen that the regression coefficient obtained is:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \epsilon$$

$$Y = -28,079 + 0,216X_1 + 0,420X_2 + 0,549X_3 + \epsilon$$

In table 7, it can be explained that when the Competency variable (X₁), Motivation (X₂), and Compensation (X₃) are constant, then the value of Employee Performance (Y) is -28,079. The amount of influence contained in the Competency variable (X₁) on Employee Performance (Y) is 0.216 and has a positive effect, where the addition of Competency (X₁) of one unit will affect the increase in Employee Performance (Y) of 0.216. The dimension of the effect contained in the Motivation variable (X₂) on Employee Performance (Y) is equal to 0.420 and has a positive effect. With the increase of Motivation (X₂) of one unit will affect the increase in Employee Performance (Y) of 0.420 on the Compensation variable (X₃) on Employee Performance (Y) is 0.549 and has a positive

effect, where the Compensation Increase (X₃) of one unit will affect the increase in Employee Performance (Y) of 0.549.

It can be concluded that Compensation (X₃) is the most dominant variable affecting the employee performance variable (Y) which is equal to 0.549, then the Motivation variable (X₂) on Employee Performance (Y) with the dimension of influence is 0.420 and then the Competency variable (X₁) against Employee Performance (Y) with the dimension of the influence is equal to 0.210.

a. Coefficient of Determination Test (R²)

Tabel 10. Uji Koefisien Korelasi antara Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.916 ^a	.839	.826	2.66773	1.723

a. Predictors: (Constant), Kompensasi, Kompetensi, Motivasi

b. Dependent Variable: Kinerja Pegawai

Sumber Output : SPSS 22

Based on the Model Summary table, obtained the strength correlation value (R) between Competency variables (X₁), Motivation (X₂), and Compensation (X₃) on Employee Performance (Y) is equal to 0.916 (91.6%). This shows that the correlation between Competency variables (X₁), Motivation (X₂), Compensation (X₃) to Employee Performance (Y) is very strong due to the range of 0.80 - 1.00 and with the direction of correlation between Competence (X₁), Motivation (X₂), and Compensation (X₃) on Employee Performance (Y) is positive, simplifies that if the Competency variable (X₁) and Motivation (X₂) is improved up, then Employee Performance (Y) will increase as well.

b. F Test

Tabel 11. Uji Simultan (Uji F) antara Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1339.697	3	446.566	62.748	.000 ^b
	Residual	256.203	36	7.117		
	Total	1595.900	39			

a. Dependent Variable: Kinerja Pegawai

b. Predictors: (Constant), Kompensasi, Kompetensi, Motivasi

Sumber Output : SPSS 22

The jointly test of the effect of independent variable on the dependent variable is done by using the F test. The result of statistical calculation shows the value of F count is equal to

62.748. Using a significance limit of 0.05, the significance value is smaller than 0.05. This means that the hypothesis which states that simultaneously the Competency, Motivation, Compensation variables have an influence on employee performance.

So it can be concluded that Competency, Motivation and Compensation have a simultaneously positive and significant effect on employee performance.

c. Hypothesis Test (T Test)

Tabel 12. Uji Parsial (Uji T) antara Variabel Kompetensi (X₁), Motivasi (X₂), dan Kompensasi (X₃) terhadap Kinerja Pegawai (Y)

Model	Coefficients ^a			T	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
1 (Constant)	-28.079	4.474		-6.276	.000
Kompetensi	.216	.095	.163	2.277	.029
Motivasi	.420	.114	.343	3.701	.001
Kompensasi	.549	.079	.605	6.910	.000

a. Dependent Variable: Kinerja Pegawai

Sumber Output : SPSS 22

Based on the Coefficients table above shows that:

1. The value of t-count Competency variable (X₁) is 2,277> the t-table value is 1.68 (n-k = 40-3 = 37) and the significant value is 0.029 <α = 0.05. Due to the value of the Competency t-score (X₁) is 2,277> t-table value = 1.68 and a significant value of 0.029 <α = 0.05, then Ho is rejected and H₁ is accepted. This means that the Competency variable (X₁) has a significant and positive effect on the Employee Performance variable (Y).
2. The value of t-count Motivation variable (X₂) is equal to 3.701> t-table value 1.68 (n-k = 40-3 = 37) and a significant value is 0.001 <α = 0.05. Due to the value of Motivation t-count (X₂) is 3.701> t-table value = 1.68 and a significant value of 0.001 <α = 0.05, then Ho is rejected and H₁ is accepted. This means that the Motivation variable (X₂) has a significant and positive effect on the Employee Performance variable (Y).
3. The value of t-count on Compensation variable(X₃) is equal to 6.910> t-table value 1.68 (n-k = 40-3 = 37) and the significant value is 0,000 <α = 0.05. Due to the value of Compensation t-count (X₃) is 6.910> t-table value = 1.68 and a significant value of 0,000 <α = 0.05, then Ho is rejected and H₁ is accepted. This means that the variable Compensation (X₃) has a significant and positive effect on the Employee Performance variable (Y).

4. Matrix Interdimensional Correlation Test

Tabel 13. Hasil Korelasi antar Dimensi Masing-Masing Variabel

	Kinerja Pegawai		
	Dimensi Target	Dimensi Kuantitas	Dimensi Ketepatan Waktu
Kompetensi (X₁)			
Dimensi Knowledge	0,322*	0,313*	0,203
Dimensi Skill	0,252	0,309	0,179
Dimensi Attitude	0,388*	0,429**	0,273
Motivasi (X₂)			
Dimensi Kebutuhan Psikologi	0,415**	0,522**	0,486**
Dimensi Kebutuhan Rasa Aman	0,535**	0,522**	0,599**
Dimensi Kebutuhan Untuk Disukai	0,697**	0,690**	0,722**
Dimensi Kebutuhan Untuk Harga Diri	0,526**	0,604**	0,481**
Dimensi Kebutuhan Untuk Pengembangan Diri	0,479**	0,914**	0,891**
Kompensasi (X₃)			
Dimensi Normatif	0,772**	0,802**	0,771**
Dimensi Kebijakan	0,801**	0,803**	0,801**

Sumber Output : SPSS 22

Based on table 13 above, it is noticed that the correlation value of each dimension between variables are as follows.

1. In the Competency variable; the strongest correlation dimension is *attitude* toward the quantity of the Employee Performance dimension variable with a correlation coefficient value of 0.429 ** (the correlation is quite strong because it is in the range of 0.400 - 0.599).
2. In the Motivation variable; the most powerful correlation of the dimension is need for self dimension toward the quantity dimension of the employee performance variable with a correlation coefficient of 0.914 ** (the relationship is very strong because it is in the range of 0.80 - 0.1000).
3. In the Compensation variable; the most powerful correlation of the dimension is the policy dimension towards the quantity dimension of the employee performance variable with a correlation coefficient value of 0.803 ** (the relationship is very strong because it is in the range 0.80 - 0.1000).

Conclusion & Suggestion

Conclusion

Based on the result of the research and discussion on the of competency, motivation, and compensation on the performance of employees of PT. Ciputat East XYZ, some conclusions can be drawn, which are:

1. Competency has a positive and significant effect on Employee Performance. The better of the Competency, it will improve the Employee Performance at PT. Ciputat East XYZ as well. The inter-dimensional correlation that has the strongest correlation between competency and employee performance is the dimension of *attitude*.
2. Motivation has a positive and significant effect on Employee Performance. The better of the Motivation, it will improve the Performance of PT. Ciputat East

XYZ as well. Based on the interdimensional correlation on the motivation variable with employee performance, the one has the strongest influence is the dimension of self-development needs.

3. Compensation has a positive and significant effect on Employee Performance. The better of the Motivation, the more Employee Performance of PT. Ciputat East XYZ will increase as well. Based on the intrdimensional correlation on the compensation variable with employee performance, the one which has the strongest influence is the policy dimension.
4. Competency, Motivation, Compensation together affect the Performance of Employees of PT. XYZ or can be interpreted that the regression coefficients of Competency, Motivation and Compensation together have a significant effect on employee performance.

Suggestion

The results of the research which have been conducted on the variables of Competence, Motivation and Compensation on the employee performance of PT. XYZ, the researcher gives the following suggestions:

1. Competency plays a very important role in PT. Ciputat East XYZ, in accordance with the main tasks of PT. XYZ in implementing its duties, which is responsible to the Mayor through the City Secretary. Leaders domiciled as an implementer of Regional Governments at the District level has the role of carrying out the authority of the government delegated by the Mayor and other government duties, these tasks require competency for implementing their work. Technical competency requires the ability of individuals to do a job correctly and have excellence based on matters relating to *knowledge*, *skills* and *attitude*. Competent employees usually have a character of attitude and behavior or willingness and ability to work which relatively stable when facing a workplace situation which is also formed from the synergy between character, self-concept, internal motivation and capacity of contextual knowledge. So that it can quickly overcome the problem faced in work, do work calmly and full of self-confidence, seeing work as an obligation that must be done sincerely, and openly improving the quality of self through the learning process. Therefore, it is expected that the government further will improve the attitude quality of human resources so that is becoming a good category. Based on the interdimensional correlation which has the strongest relationship between competence and employee performance is the dimension of *attitude* towards the quantity dimension of the Employee Performance variable (the correlation is quite strong).
2. Motivation is needed by the employees to improve their performance, because employees in an organization are the main role of all activities to achieve organizational goals. In motivating employees, it is necessary to have a motivator or also someone who is able to become a leader for the labor. Leader must have the ability to influence and motivate employees to do the thing which is needed

to achieve the goal. To improve employee performance, leader must be able to motivate employees well. This motivation is largely determined by the attitude and action of leader in implementing it. However, if the motivation is not as desired by the employee it will cause a decrease in employee performance. Giving motivation by leader is very important to encourage employees to be more accomplished in work. Therefore, the support and facilities of the leadership for employee self-development are very necessary. The availability of adequate work facilities for employees can foster employee performance. Facility is an infrastructure to facilitate and supporting all works.

On the Interdimensional Correlation, the strongest influence is the need for self-development dimension towards the quantity dimension of the employee performance variable (the correlation is very strong).

3. Compensation is very important for employees as individuals, because the amount of compensation is a gauge of the employee's work value. Otherwise, the compensation gauge can affect the performance of an organization. Compensation is not only important for employees, but important for an organization as well, because compensation policy is the reflection, so that the organization can improve its performance. Religious Holiday Allowance (THR), is a non-wage income that must be paid by the owner to Workers / Laborers or their families before the Religious feast. The strongest influence interdimensional correlation on the compensation variable with performance is the policy dimension towards the quantity dimensions of employee performance variables. Therefore, it is recommended that the organization in providing compensation must be fair and balanced by making an objective assessment of each employee and truly based on the resulting performance, also be carried out family gatherings in a year, both for employees themselves and with families. This compensation is not compulsory, but is very useful in building the togetherness and the employees will increasingly feel the part of the organization, so it can improve the Performance of Employees of PT. Ciputat East XYZ. Therefore, the leader must put the concern to the compensation received by the employee, so that the performance will increase. Among other things: Providing a holiday / religious allowance in accordance with statutory provisions. Providing food allowance at each entry to work. Giving the Transportation allowance every time in work, awarding an initiative allowance, annual day-off, having an annual vacation for all the employees and family.
4. For the further researchers who want to conduct the research on matters that affects performance, it is recommended that they will use other variables

besides this study, such as organizational climate, organizational culture, leadership style.

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The Influence of Work Stress and Job Satisfaction Employee On the Organizational Commitment of Palembang a Rivai Branch of PT Bank Rakyat Indonesia TBK

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Abstract: *This study aims to determine the influence of work stress and job satisfaction on the organizational commitment of Palembang A Rivai Branch of PT Bank Rakyat Indonesia Tbk. In this study, data were collected by questionnaires. The number of samples in this study amounted to 100 respondent with purposive sampling. Hypothesis testing in this study was done with multiple linear regression analysis method. The result of the study show that work stress has a negative and significant influence on organizational commitment and job satisfaction has a positive and significant influence on organizational commitment. To optimize organizational commitment, we recommended to create a conducive and friendly working atmosphere so that employees do not feel stressed and bored with their work.*

Keywords: *Work Stress, Job Satisfaction, Organizational Commitment*

1. Introduction

The increasingly rapid development of the environment and increasingly fierce competition requires every organization to be able to face global challenges, especially competition and competent human resources (HR) in their fields. The success of an organization is shown by its ability to achieve organizational goals.

In organizations, humans are the most important element in an organization. Without the role of humans even though the various factors needed are available, the organization will not work. Human resources are important assets because humans are dynamic resources and are always needed in every process of producing goods and services (Simamora, 2006: 58). Organizations should provide positive direction for achieving organizational goals. Implementation of organizational functions needs to be supported by management functions such as planning, organizing, personnel, direction, and supervision (Robbins, 2001: 67).

The growing development of the political, economic, socio-cultural and technological environment has made the organization must always be alert and respond quickly and anticipate any changes and developments that occur. This has an effect not only on companies and workers, but also on the corporate environment.

Banking is a financial institution engaged in services that provide services and trust to customers to be able to save their funds in a bank. New private-owned banks make banking business competition even tighter, making state-owned banks always try to make improvements, both in terms of human resources, technology and services to be the best for customers.

PT Bank Rakyat Indonesia is one of the largest government-owned banks in Indonesia, and was originally established in Purwokerto, Central Java by Raden Bei Ariq Wirjaatmadja under the name "De Poerwo Kerto She Hulp En Spaarbank Der Inlandsche Hoofden" or "Bank Assistance and Deposits Owned by Kampriyayi serving Indonesian people.

In business activities human resource banking has a main role that basically provides customer service. PT Bank Rakyat Indonesia, especially in the A Rivai Palembang Branch, always evaluates every year in order to become the best company among other BRI Branches. Therefore, employees are required to always develop the potential to be able to face competing companies out there. Employees of PT Bank Rakyat Indonesia themselves have a large responsibility to improve the quality of the company in order to achieve a target determined by the head office of PT Bank Rakyat Indonesia.

Organizational commitment explains the relative strength of an individual's identification with involvement in an organization, commitment to bring something beyond mere loyalty to an organization. In addition, this includes an active relationship with organizations where individuals are available to provide something of themselves to help the success and prosperity of the organization (Steers, 2005: 70).

Khatibi et al. (2009) and Firth et al. (2004) state a negative relationship between work stress and organizational commitment, employees who have high stress levels have implications for their low organizational commitment.

Velnampy and Aravinthan (2013) state that work stress is an emotional pattern of cognitive behavior and psychological reactions to harmful and harmful aspects of each job, work organization and work environment. The work stress experienced by employees of PT Bank Rakyat Indonesia needs to be paid attention because the high work pressure received by employees, especially from jobs and targets must be achieved amid intense competition with other banking companies.

The existence of these demands is not many employees who experience stress in the work that causes a decrease in performance on the employees themselves. Usually this happens to permanent employees, namely the Funding Officer and the Accounting Officer in the business department and employees in the operational section.

The Funding Officer and Accounting Officer are required to meet the target in the form of an annual RKA (Work and Budget Plan) by finding deposit and loan customers where employees must compete with other companies due to interest rates which sometimes go up and down. While employees in the operational section are required to always provide the best service and always be consistent with customers under any circumstances.

Robbins (2008: 94) the characteristics of work stress experienced by employees are low job satisfaction, decreased performance, enthusiasm and energy are lost, communication is not smooth, poor decision making, creativity and innovation are lacking and employees often struggle with tasks unproductive.

In improving employee performance and fostering a sense of kinship towards employees, PT Bank Rakyat Indonesia conducts annual evaluations in the form of gatherings by giving motivation to every employee who has problems and who does not have problems, provides benefits or rewards if the employee has reached the target set by the company, guidance from superiors in a series of loan and deposit strategy development, held an FPK (Performance Improvement Forum) and FGD (Focus Group Discussion) which is one of the mandatory agendas carried out by each BRI work unit.

Job stress experienced by employees usually affects daily life. Job stress itself can arise because the responsibility given by the company is too burdensome to employees. Lately there have been a lot of emerging companies that have a target market that can increase profits from their companies, including banking. In the world of banking competition began to be felt because many emerging private banks whose performance is not inferior to BUMN or BUMD banks, because of high competitiveness, companies, especially banks, usually have high achievement targets every year, therefore it can spur stress levels on employees banking.

Organizational commitment is the feeling of an individual towards the organization as a whole or in total. Organizational commitment in this study means that employees feel towards BRI Bank as a whole. Employees with high organizational commitment, he is predicted to work with the maximum effort and have the motivation to continue working at BRI Bank. On the other hand, employees with low-food organizational commitment work with not optimal efforts and do not have the desire to survive in the long term at BRI Bank.

The application of resource strategies in accordance with the company's vision, mission and strategy is one of them, namely by establishing the right organizational culture in the company. The attitude formed by organizational culture is closely related to job satisfaction, namely the general attitude of individuals to their work. A high level of job satisfaction shows a positive attitude towards his work. Conversely dissatisfaction with work shows a negative attitude.

Organizational commitment is also influenced by job satisfaction, Fisher (1994) argues that perceived satisfaction with work is reflected by satisfaction needs and expectations for work to be interesting, challenging and personally satisfying. The theory that will be used in this study refers to the theory put forward by Jason A. Colquitt, Jeffrey A. Lepine and Michael J. Wesson who explained that organizational mechanisms, mechanism of the team, individual characteristics build individual mechanisms in an effort to foster organizational performance and commitment in theory This is also related to work stress and employee job satisfaction that influence organizational commitment.

Based on the description above, the author is interested in conducting research with the title "The Effect of Job Stress and Employee Job Satisfaction on Organizational Commitment of PT Bank Rakyat Indonesia, Tbk Palembang A Rivai Branch".

2. Literature Review

a. Work Stress

According to Pace & Faules (1998: 67) stress is physical, mental or emotional suffering resulting from the interpretation of an event as a threat to an individual's personal agenda. In a company, the greater a company, the more employees will work in it, so that there are likely problems in it, and human problems.

Many of these human problems depend on the plurality of societies in which employees originate, the more advanced a society is, the more problems. The higher the employee's awareness of his rights, the more problems that arise. The more diverse the values that are embraced by its employees, the more conflicts that develop. One of these problems is the emergence of work stress on employees.

According to Robbins (2008: 256) stress is a dynamic condition in which an individual is confronted with an opportunity, obstacle, or demand that is associated with what is highly desirable and the results are perceived as uncertain and important. While according to Hasibuan (2003: 34) stress is a condition of tension that affects emotions, thought processes, and a person's condition. People who experience stress become nervous and feel chronic worries. They often become angry, aggressive, unable to relax, or show an uncooperative attitude.

b. Job Satisfaction

Robbins and Judge (2011: 114) provide a definition of job satisfaction as a positive feeling about work as a result of evaluation of its characteristics. Work requires interaction with work colleagues and superiors, following organizational rules and policies, meeting performance standards, living with less ideal working conditions and the like.

While McShane and Von Glinow (2010: 108) regard job satisfaction as an evaluation of a person for his work and the work context. It is an assessment of the characteristics of work, work environment, and emotional experience in the work that is felt.

Another opinion suggests that job satisfaction is an affective or emotional response to various aspects of one's work (Kreitner and Kinicki, 2010: 170). This definition implies that job satisfaction is not a single concept. Rather, people can be relatively satisfied with one aspect of their work and not satisfied with one or more aspects.

From these various views, it can be concluded that in essence job satisfaction is the level of pleasure someone feels as a positive assessment of their work and the environment in which they work.

c. Organizational Commitment

Commitment is a term that is often the subject of studies both among scientists and lay people. This commitment arises when someone or a group of people agree to do something. The term commitment comes from English, namely commit means to do, commitment means doing promises and responsibilities. Thus it can be said that commitment is the basis of adhesive and / or fostering relations between one individual and another individual, between individuals and their groups, between groups with other groups. (Umar Nimran, 2011: 67)

The term commitment in organizations, has always been a study in an effort to develop employee activities so that organizational goals can be achieved effectively and efficiently, so that the concept of organizational commitment emerges. Organizational commitment describes a situation in which members of the organization express their impartiality to certain organizations and their desire to maintain membership in the organization. (Umar Nimran, 2011: 67)

Prayitno argues that commitment is stability, willingness, determination and sincerity, to do better, to no longer repeat wrongdoing or violate: will not do the same thing in the same place or elsewhere. This is related to the behavior of workers when in the office. This means that commitment concerns the willingness, ability and determination to act in accordance with the values or norms set by the group or organization. Thus it can be said that the commitment of the organization is related to the attitude of members of an organization that promises to itself and its organization to carry out all the rules and regulations that have been set together well and responsibly.

3. Research Methods

This research is based on the study of human resource management and in general this research is intended to reveal and examine variable information namely Job Stress (X1) and Job Satisfaction (X2) on Organizational Commitment (Y). The data source used in the study is primary data. In this study, the primary data used by the author was obtained through the respondent questionnaire that had been shared. The target population is affordable marketing and operational employees at the Branch Office of PT Bank Rakyat Indonesia (Persero) Tbk Palembang A Rivai Branch which was taken by purposive sampling. The number of samples in this study amounted to 100 respondents, namely marketing and operational employees of the existing population of 110 people who were included in the leadership ranks. This is because marketing and operational employees have an important role in achieving the company's targets and have a large stake in increasing the company's fee-based income.

Multiple Linear Regression Analysis

Hypothesis testing carried out in this study was conducted by linear regression method which is used to predict how far the value of the dependent variable changes. If the independent variable is manipulated / changed or up and down. (Sugiyono, 2010: 260). Multiple Linear Formulas:

$$Y = a + b_1X_1 + b_2X_2 + e$$

When Y is Organizational Commitment, a as Constant, $b_1 - b_2$ is Regression Coefficient, X_1 as Job Stress Variables, X_2 as Variable Job Satisfaction, and e is Error term

4. Research Results And Discussion

The first hypothesis states that work stress (X_1) has a negative and significant effect on organizational commitment (Y) at PT Bank Rakyat Indonesia Tbk Palembang A Rivai Branch. The results of the t test can be concluded that there is a negative and significant influence between work stress (X_1) on Organizational Commitment (Y) in PT Bank Rakyat Indonesia Tbk Palembang A Rivai Branch which means the first hypothesis is **accepted**. This is supported by the theory of Khatibi et al (2009) which states that stating stress experienced by members of the organization must also be considered to determine its influence on intensity of commitment. Job stress arises as a mismatch between individuals and their work environment, the higher the work stress experienced by a person, the lower the organizational commitment they have. This study is in accordance with the results of a study from Physics Bytyqi et al. 2010 which states that work stress should not be considered normal, and gives a negative influence on organizational commitment.

Based on the results of frequency description data above, it can be seen that the highest responses found in the questions often do repetitive and tedious work of 91% who agree and strongly agree. And on the question the target company and the task demands are too high by 90% agreeing and strongly agree. This proves that employees feel the workload they receive is too large so the company needs to rethink the workload that will be given to employees. Then if it is associated with the theory that Robbins (2013: 64) has revealed that one of the factors that causes stress is organizational factors which in this case is an excessive workload.

The second hypothesis states that job satisfaction (X_2) has a positive and significant effect on organizational commitment (Y) at PT Bank Rakyat Indonesia Tbk Palembang A Rivai branch. The results of the t test can be concluded that there is a positive and significant influence between job satisfaction (X_2) on Organizational Commitment (Y) at PT Bank Rakyat Indonesia Tbk Palembang A Rivai branch which means the second hypothesis is **accepted**. This is supported by the theory of McShane and Von Glinow (2010: 110) which states that job satisfaction has a positive and strong influence on organizational commitment. This research is in accordance with the results of research from Putu Agus Yoga Ariawan (2018) which states that job satisfaction has a positive and significant effect on employee organizational commitment.

Based on the results of frequency description data above, it can be seen that positive responses are found in the first statement, namely employees are satisfied in work because the wages received for work feel fair, and satisfied with the rewards obtained because the tasks are done well, almost more than 80% of employees agree. This proves that employees are satisfied what they have been able to do in the company even though they are burdened with many tasks and working hours that are always busy. Then it is also in accordance with the theory expressed by Colquitt, LePine and Wesson (2011: 112) that job satisfaction will occur if workers feel the value they want is fulfilled, but different people can appreciate different things and values can change during working life.

5. Conclusions And Recommendations

Based on the results of the analysis and discussion, conclusions can be drawn as follows:

1. Job stress has a negative and significant effect on Organizational Commitment of PT Bank Rakyat Indonesia Tbk Palembang A Rivai Branch.
2. Job satisfaction has a positive and significant effect on Organizational Commitment of PT Bank Rakyat Indonesia Tbk Palembang A Rivai Branch.

Based on the results of the analysis and discussion in this study, suggestions can be put forward as follows:

1. The company must always pay attention to the level of work stress of the employees of PT Bank Rakyat Indonesia Tbk Palembang A Rivai Branch. Things that can be suggested by the author to manage stress levels by:
 - a. Evaluate the tasks and functions of each part.
 - b. Conduct training - training to further increase the desire and ability of employees.
 - c. Hold counseling programs on an ongoing basis.
2. The level of job satisfaction that has been in a fairly high category must be maintained and must be continually improved. Things that can be suggested by authors to optimize job satisfaction by:
 - a. Increase employee attitudes to like the company and increase willingness to always strive to achieve company goals, through giving attention to every employee's needs both materially and non-materially.

- b. Assume employees as partners, so that there is a strong emotional bond between leaders, management and employees.
3. Increased organizational commitment from employees must always get important attention for the company. The writer can recommend optimizing organizational commitment by creating a conducive and friendly working atmosphere, one of which is to conduct activities to increase closeness and sense of kinship among employees so that employees do not feel stressed and bored with their work.
4. The next researcher should add independent variables to the study such as training, leadership, organizational culture and motivation. Besides that, it can also add more populations.

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Strength Behaviour of Pervious Concrete

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Abstract- One among the main reason for water not soaking into the soil is the construction of impervious surfaces. A simple solution to this problem is the construction of pervious surfaces. Pervious concrete are special type of concrete with high porosity. In this paper, we mainly tested the strength of conventional and pervious concrete with same volume, same water cement ratio and aggregate cement ratio

Index Terms- Porosity, compression strength, modulus of elasticity, Void ratio, splitting tensile strength

I. INTRODUCTION

Large amount of rainwater ends up falling on impervious surfaces like sidewalks, streets rather than soaking into the soil. This creates imbalance and causes erosion, floods. A simple solution to avoid these problems is to stop constructing impervious surfaces which blocks the movement of water. Hence the concept of pervious concrete or porous pavement, a material that offers inherent durability and low life cycle cost came into existence. Portland cement pervious concrete (PCPC) is very popular and design with high void content (15-25%). The pervious concrete have no fine aggregate content. It also has interconnected voids and because of that water will percolate and spread in all direction which is not possible if those joints are not interconnected

II. SCOPE OF THE STUDY

The use of the pervious concrete has increased significantly. But there are number of areas that need additional work to improve the properties of pervious concrete. To ensure this, we conducted various tests to study the strength with varying size range of coarse aggregate and checked the permeability of pervious concrete with increase in coarse aggregate size

II. MATERIALS USED

The materials are collected locally near our area

1) ORDINARY PORTLAND CEMENT: OPC of 53 grade with flyash was used. It is mixed with water and quarry dust and coarse aggregate to make conventional Concrete and mixed with coarse aggregate only to make pervious Concrete.

2) QUARRY DUST: It is the byproduct of the crushing processes in quarrying activities. Quarry dust passes through 4.75mm sieve was taken.

3) COARSE AGGREGATE: Fractions passing through 20mm sieve and retained on 10mm sieve was taken for conventional concrete and pervious concrete of one type of proportion and fraction passing through 31.5mm sieve and retained on 20mm sieve were also taken.

III. PROPERTIES OF MATERIALS

1) ORDINARY PORTLAND CEMENT :Standard Consistency , Initial Setting Time and Fineness Modulus were determined for OPC taken. The standard Consistency of Cement was obtained as 39% .Table 1 shows the variation of consistency obtained.

Table 1 : Variation of Consistency

Sl No	Percentage of water	Quantity of water added	Penetration of Plunger (mm)
1	28	112	17
2	30	120	15
3	33	132	12
4	35	140	10
5	39	156	7

The initial setting time of the cement was obtained as 50 minutes which is greater than nominal value of 30 minutes

Specific Gravity of cement was determined in Le-Chatelier Apparatus and the value obtained as 3.15.

Fineness of cement is measured by sieving it on standard sieve . The proportion of cement of which the grain sizes are larger than the specified mesh size is thus determined. The value obtained was 9 % . According to IS specification, the percentage weight of residue shall not exceed 10%.

2) QUARRY DUST : The tests Conducted for quarry dust includes Void Ratio test,Bulking of aggregate,Fineness modulus.

Void ratio is defined as the ratio of volume of voids to volume of solids . Void ratio obtained was 0.64 . The bulking of aggregate was measured experimentally and the value obtained as 55.56 % for maximum(Figure 1).

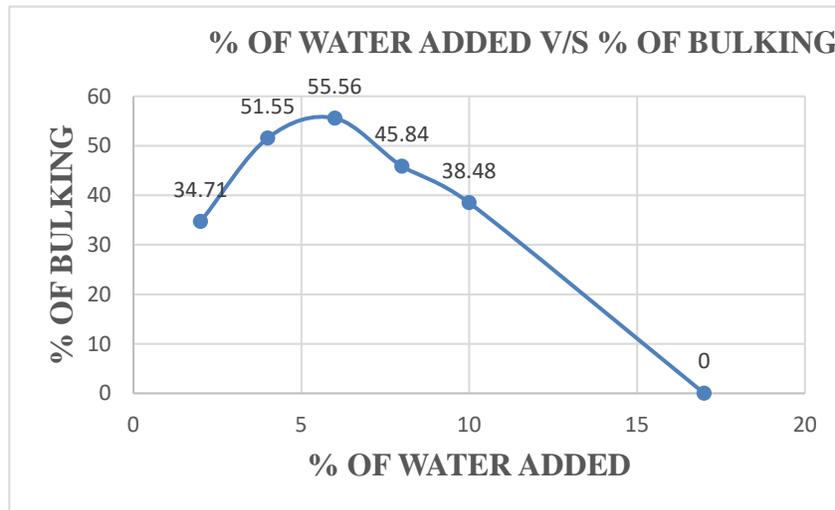


Figure 1: Bulking of Quarry Dust

Fineness Modulus as 4.33 was obtained from sieve analysis(Table 2)

Table 2: Sieve Analysis

Sieve size(mm)	Weight retained in each sieve(gm)	Percentage weight retained	Cumulative percentage weight retained (C)	Percentage weight passing = 100 – C
4.75	9	0.9	0.9	99.1
2.36	263	26.3	27.2	72.8
1.18	248	24.8	52	48
0.425	230	23	75	25
0.3	75	7.5	82.5	17.5
0.15	138	13.8	96.3	3.7
0.075	30	3	99.3	0.7
Pan	7	0.7	100	0

3) COARSE AGGREGATE: Fineness modulus was determined from sieve analysis . The table 3 and Figure 2 shows the findings for the fineness modulus of coarse aggregate.

Table 3: Sieve Analysis of Coarse Aggregate

Sieve size(mm)	Weight retained in each sieve(gm)	Percentage weight retained	Cumulative percentage weight retained (C)	Percentage weight passing = 100 – C
20	21	1.05	1.05	98.95
12.5	735	36.75	37.8	62.2
10	734	36.7	74.5	25.5
4.75	504	25.2	99.7	0.3
2.36	3	0.15	99.85	0.15
Pan	3	0.15	100	0

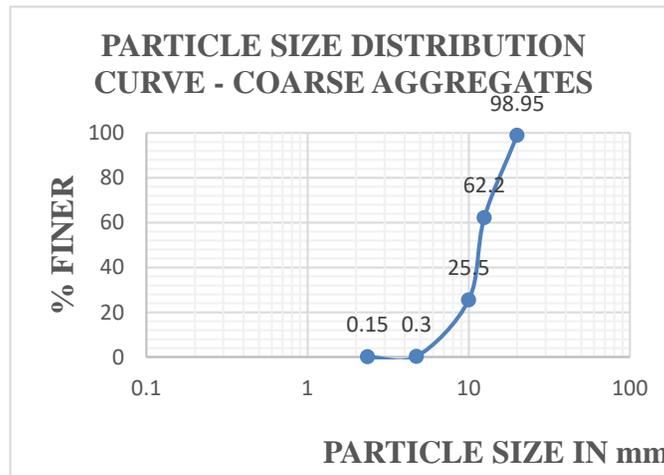


Figure 2: Particle Size Distribution Curve

The aggregate impact value was obtained from impact testing machine . It was obtained as 29.9 % . According to IS specification it should not be greater than 30 %

The specific gravity of aggregate is obtained by determinig the ratio of the weight of a given volume of aggrgate to the weight of equal volume of water .It was obtained as 2.72 . according to IS specification the specific garvity is in between 2.5 -3

V .METHODOLOGY AND MIX DESIGN

The methodology of the work is as follows:

- 1) Collection of materials : Suitable materials are collected by means of sieve Analysis
- 2) Selection of Mix Design
- 3) Selection of new proportions with selected materials

- 4) Preparation of Concrete mix and specimen
- 5) Curing
- 6) Laboratory Tests

Mix design is process of selecting proper material with their proper proportions to produce a concrete which will not only be economical but also fulfill its job requirements. Here we estimated the amount of materials required for casting pervious concrete and conventional concrete. The mix design we selected is M20 with mix proportion 1:2:4. Normal concrete is prepared in this ratio with aggregate size ranging from 10 to 20 mm. Pervious concrete casted with aggregate size ranging from 10 to 20 mm in the proportion 1:0:4 is compared with the convention concrete mix on the basis of same cement to coarse aggregate ratio as 1:4. Another mix of pervious concrete was prepared with coarse aggregate size ranging from 20 to 31.5 mm and is compared with first proportioned pervious concrete.

VI . LABORATORY TESTS

1) Slump Test:

Slump cone is used in this test. The mould is placed on a smooth, horizontal, rigid and non-absorbant surface. The mould is then filled in four layers, each approximately 1/4th of the height of the mould. Each layer is tamped 25 times by the tamping rod taking care to distribute the strokes evenly over the cross section. The tampings are provided vertically and freely. After the tamping of top layer, the top surface is struck off and level with a trowel and tamping rod. Then the mould is removed from the concrete immediately by raising it slowly and carefully in a vertical direction. This allows the concrete to subside. The difference in level between the height of the mould and that of the highest point of the subside concrete is measured. This difference in height in 'mm' is taken as SLUMP OF CONCRETE.

2) Compaction Test :

The compaction factor apparatus is cleaned and oiled. The weight of the empty cylinder is noted (W_1). The empty cylinder and mould is kept in position. The sample of concrete to be tested is placed in the upper hopper with a trowel. Fill the concrete upto the brim of the hopper and open the trap-door. So that concrete falls into the lower hopper. The trap-door of lower hopper is opened. So that the concrete falls into the cylinder at the bottom. The excess concrete above the top level of cylinder is wiped clean. The cylinder filled with partially compacted concrete is weighted (W_2). The partially compacted concrete is poured back and the cylinder is refilled with the same sample of concrete mix in 3 layers. Each layer is tamped 25 times using tamping rod to get fully compacted concrete. The top surface is levelled and the outside of the mould is wiped clean. The weight of cylinder with fully compacted concrete is taken (W_3). The compaction factor

$$= \frac{W_2 - W_1}{W_3 - W_1}$$

3) Compressive Strength Test

The compressive strength test is conducted on cubical specimen after 7 days, 14 days and 28 days of curing. Cubes are tested for calculating compressive stress on 7th day, 14th day and 28th day. Take cubical specimens of size 150*150*150mm from the curing tank. Place the specimen in the compression testing machine in such a way that, the casted portion should not face the loading surfaces. Apply load without shock in a specific rate of loading. Apply the load in the same rate until the specimen breaks. Note the maximum load taken by the specimen. Repeat the procedure for other cubical specimens. Calculate the compressive strength of each specimen. Final compressive strength of concrete cube is the mean value compressive strength of each cubical specimen.

4) Modulus of Elasticity Test :

Take the cylindrical specimen from the curing tank after 28 days of curing. Clean the surface of specimen using damp cloth. Attach the compressometer to the cylindrical specimen in such a way that the cylinder will project equally in both sides compressometer. Place the specimen with compressometer in the compression testing machine. Apply load continuously at uniform rate of loading. Apply the load until some readings are noted from the compressometer in approximately equal interval of loading in the compression testing machine. Deformation is calculated by multiplying the compressometer reading to its least count i.e, 0.002mm. The deformation divided by the gauge length of compressometer i.e, 150mm will give the strain value. The corresponding loads divided by the area of cylinder i.e, $\frac{\pi d^2}{4}$ where 'd' is the diameter of cylinder will give the stress value. Plot stress – strain graph which is in parabolic shape. The slope of the straight line portion of the graph will give modulus of elasticity value.



Figure 3: Modulus of Elasticity Test

5) Void Ratio Test

The void ratio of Pervious Concrete is measured on 28th day after casting and curing of Pervious Concrete in following steps:
Pervious Concrete cube is wrapped up with polythene covering all its vertical faces and bottom face and leaving only the top face open. To make sure that Pervious Concrete cube is watertight; it is further wrapped up with tape covering all its vertical faces and bottom face. Cube covered on its five faces and open at top face is placed on a flat horizontal surface and water is poured from the top. To make sure that covering polythene does not expand due to lateral pressure of water it is pressed by hands while water is being poured. Water is poured till all the voids are filled and water surface matches with the top face of Pervious Concrete.
Once pouring of water is stopped and all voids are filled, Pervious Concrete is turned upside down and all the water is allowed to drain out of Pervious Concrete cube and collected into a container. Volume of water collected in container is measured and it is equal to the volume of voids in cube, using it and volume of Pervious Concrete cube, void ratio is found out.

$$\text{Void ratio} = \text{volume of voids} / \text{volume of cube} \times 100.$$



Figure 4: Void Ratio Test

VI.RESULTS AND DISCUSSION

1) Variation Of Slump :

The slump test was conducted on conventional concrete mix and pervious concrete mix with both having coarse aggregate size ranging from 10 to 20 mm. pervious concrete prepared with this aggregate size (10 to 20mm) are represented as pervious concrete 1 and the other pervious concrete with coarse aggregate size 20 to 31.5 mm is represented as pervious concrete 2. Table 4 shows the variation of slump values.

Table 4: Variation of slump value

TYPE OF CONCRETE	SLUMP VALUE (mm)	TYPE OF WORKABILITY
Conventional	6	Stiff
Pervious concrete 1	0	Stiff

2)Variation of Compaction Factor

The compaction factor test was also conducted on conventional concrete mix and pervious concrete 1 mix. The obtained results are shown in Table 5. From that we can see that compaction factor for the CC is slightly higher than PC1 by a value of 0.03. So as per IS specification we can identify the type of workability of these concrete mixes.

Table 5: Variation of Compaction Factor

TYPE OF CONCRETE	COMPACTION FACTOR	TYPE OF WORKABILITY
Conventional concrete	0.83	Stiff Plastic
Pervious concrete 1	0.8	Stiff Plastic

3) Variation of Compressive Strength

The compressive strength test was conducted on cubical specimens. We conducted the test in the cubical concrete specimens after the 7th, 14th and 28th days of curing. Single cubes are used for finding out the compressive strength at 7th, 14th and 28th days. Figure 5 represent the variation of compressive Strength.

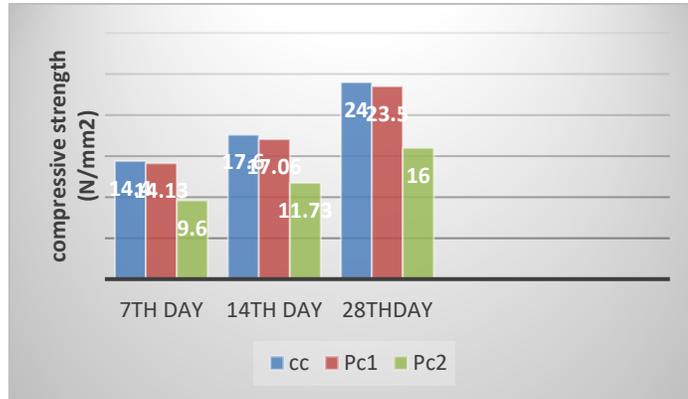


Figure 5: Variation of Compressive Strength

4) Variation of Modulus of Elasticity

The modulus of elasticity test was conducted on cylindrical concrete specimen of 300mm height and 150mm diameter. The stress – strain graph for each concrete mixes are drawn and the modulus of elasticity value is calculated by taking the slope of the straight portion of graphs. Figure 6 represent the stress strain curve of (a) normal concrete (b) Pervious Concrete

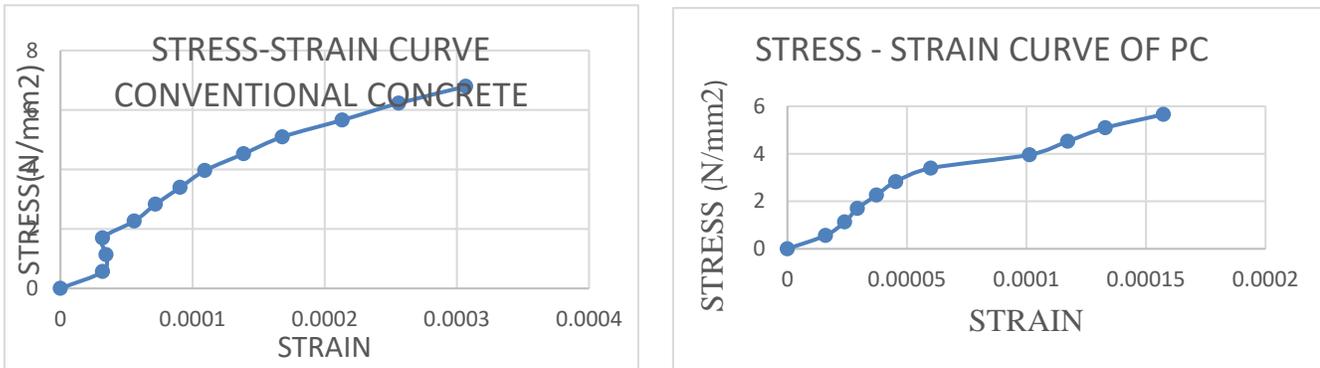


Figure 6: Stress Strain curve (a) normal Concrete (b) Pervious Concrete

5) Variation of Void Ratio

Void ratio test was conducted on pervious cubes of size 150*150*150 mm after 28 days of curing. Void ratio is the factor which determines the permeability of pervious concrete. Table 6 shows the variation of void Ratio

Table 6 : Variation of Void ratio

Type of concrete	Weight before addition of water. (Kg)	Weight after addition of water. (Kg)	Volume of voids (V _v). (m ³)	Void ratio = $\frac{V_v}{V_s} * 100$.

Pervious concrete 1.	7.267	8.165	8.98×10^{-4}	26.61%
Pervious concrete 2.	7.863	8.986	1.123×10^{-3}	33.27%

VII .CONCLUSION

The results shows that, both the conventional concrete and pervious concrete mix 1 has almost same rate of gain of strength. From the laboratory tests and analysis, following conclusion were arrived.

- Slump test is conducted on conventional concrete and pervious concrete mix having coarse aggregate size 10 to 20 mm and it shows there is no change in the type of workability of the concrete mixes from normal concrete mix.
- Compaction factor test is conducted on both the conventional concrete and pervious concrete 1 and the results shows the workability of concrete mixes are same.
- Compressive strength of both the conventional concrete and pervious concrete 1 are almost same. Because the strength offered by the quarry dust to the conventional concrete is less when compared to river sand.
- The characteristic compressive strength of CC is 24 N/mm² and that of PC1 is 23.4 N/mm².
- Modulus of elasticity value is also almost same for both CC and PC1 and it is little higher for CC. The obtained Modulus of elasticity of both cc and pc1 satisfies the condition $5000 * \sqrt{f_{ck}}$
- Void ratio of Pervious Concrete mix 2 is higher than that of pervious concrete mix 1. Hence the permeability of PC2 will be higher than PC1.

The compressive strength of PC1 is higher than that of PC2. The strength reduction of PC2 is due to the increase in the void ratio and porosity. Hence it can be concluded that, as the size of coarse aggregate increases, the void ratio increases and strength decreases.

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Empowering Rural Women for Gender Equality in Ashanti Region of Ghana Through Programmes and Projects.

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Abstract: Women empowerment has been an issue for discussion all over the world. One of the major means of empowering women throughout the world is by the use of programmes and projects. This study is designed to ascertain whether or not the available women empowerment programme in Ghana really empower women to challenge the gender inequality status quo and, to explore an alternative direction to improve on women empowerment programme. Thus, the study attempts to assess the efforts made by two of such programmes – Livelihood Empowerment against Poverty (LEAP), a Government intervention and, Care International project for women empowerment, an non-governmental intervention. Theories such as Marx’s class theory, functionalism theory as well as conflict theory were used to explain why gender inequality exist and the need to consider the basic causes of gender inequality in designing any women empowerment programme. The central theory used in explaining how these available interventions approach women empowerment is deficit thinking theory. The study used qualitative and descriptive statistics method. As the study explored an alternative direction for women empowerment programmes, it used exploratory research design. Interview and focus group discussions were used to elicit information from the women. The analysis were made based on the data collected from the selected programme and project such as CARE international and Livelihood Empowerment Against Poverty (LEAP). The main findings was that the available projects and programmes only provide mitigation measures to support women and do not address the root causes of what disempower women and therefore their effort do not challenge the status quo. What the study found to be the better practice for women empowerment programmes to improve the women status is to target a particular gender inequality and design an appropriate women empowerment programme that tackles the root cause of it.

Key words: Gender, programmes, empowerment, inadequacies, inequalities, deficit thinking,

1.0 INTRODUCTION

The problem of bridging the gender inequality gaps has been a major issue since 1995 after the Beijing Conference. The idea of creating an enabling environment for the women to achieve their outmost desire was derived from the fact that women are seen to be more vulnerable and at a disadvantage due to the role they play in the society and also as the weaker sex. Many authors have argued that ideas about gender difference were derived from classical thought, Christian ideology, and contemporary science and medicine (Gambetti, 2003; Blakemore, 1998). The question that needs critical attention in solving gender inequality problem through empowerment strategies is “*what do we empower to equate?*”

A great deal of work has been done on women empowerment, especially, since 1995. The concept of empowerment was adopted after the Beijing Conference in 1995. The Beijing Declaration (section 13), presents women’s empowerment as a key strategy for development: “*Women’s empowerment and their full participation on the basis of equality in all spheres of society, including participation in the decision-making process and access to power, are fundamental for the achievement of equality, development and peace.*” The empowerment of women is located within the discourse and agenda of gender equality; and is increasingly being taken in the agendas of international development organizations, perhaps more as a means to achieve gender equality than as an end in itself. At the Social Summit in Copenhagen in 1993 and the International Conference on Population and Development in Cairo in 1994, Governments committed themselves to the empowerment of women. This commitment was operationalized and formulated into a clear action plan at the Fourth World Conference on Women in Beijing 1995.

The purposes of treaties and conventions from which policies, programmes and projects were derived are that women are to be empowered. UNDP for instance in the year 2008 did integrate women’s empowerment into its three key thematic areas: sustainable development; inclusive and effective democratic governance; and risk prevention and resilience (UNDP, 2008). The organisation at the time believed that running programme and projects such as its Global Gender and Economic Policy Management Initiative (GEPMI) would give the women a comprehensive capacity development and policy advisory services that would accelerate

achievement of the Millennium Development Goals (MDGs) by making economic policies and poverty reduction strategies deliver results equitably to women and men. A new approach to women empowerment and Gender equality was adopted by UNDP in 2008 through to 2011. Another Gender Equality Strategy was put in place again in 2014. With this new strategy, UNDP is now ensuring that gender equality and the empowerment of women are integrated into every aspect of its work to support countries to eradicate poverty and reduce inequalities and exclusion (UNDP, 2014).

Differences in understanding of women empowerment to different empowerment agents creates various forms of definitions and means of empowering the women throughout the world. To some people, empowerment is *obscurity* – “it has been said that empowerment is like obscurity, you don’t know how to define it but you know it when you see it” (Stranberg, 2001 cited in Ridgeway 1997). An NGO Activist has been quoted by Batliwala (1994) to have said that no one has been able to define empowerment clearly therefore it gives a breathing space to work it out till its logical meaning. Rappaport (1987) points out that to *empower* is to enhance the possibilities for people to control their own lives.

UN Human Development Report (1995) also stresses that empowerment is about Participation. For Oxfam, empowerment is about challenging oppression and inequality for equity (Oxfam, 1995). Feminist activists has been quoted to have stressed that women’s empowerment should lead to the liberation of women from false value systems and ideologies of oppression. It should lead to a situation where each one can become a whole being regardless of gender, and realization of one’s fullest potential to construct a more humane society (Batliwala, 1994: 131).

It appears the most frequent approach to women empowerment problem is by the use of either a programme or a project. A *programme* is defined here to mean a group of related *projects* managed in a coordinated way to obtain benefits not available from managing the *projects* individually. The programmes and projects are not used interchangeably in this paper. There are number of measures being taken by the existing women empowerment programmes in Ghana such as REP (Rural Enterprises Programme) NGOs, (such as CARE International) and LEAP (Livelihood Empowerment Against Poverty) and many others found in the study area, as well as many other empowerment programmes in Ghana (Handa et al, 2013). Some of these measures are women advocacy and skill training in nature. Also, there have been income generating-activities at the various levels both individually and collectively (Awumbila, 2001; Tsikata, 2001). Other measures include promoting women decision making and participation in local, regional and national politics. All these measures have one way or the other pushed some women to make some marginal gains. From the question asked earlier, “ what do we empower to equate” if our empowerment programme is to solve gender inequality problem, then the main problem to address in this study is that, *were women in Ashanti Region of Ghana empowered to challenge the status quo as they received the programmes or projects interventions?*

The study is therefore designed to:

1. Assess the extent to which the available women empowerment programmes and projects such as Leap and Care international’s women empowerment programmes empower the poor rural women in the informal sectors of Ashanti Region of Ghana to challenge the gender inequality status quo.
2. Establish an alternative direction for women empowerment programmes and projects that would ensure the development of the potentials of rural women to bridge the inequality gaps for socio-economic development.

2.0 Literature Review

It is believed that gender comes about as the society defines the role of men and women (Risman, 2004). Role definitions among females and males have created inequalities and social classes between men and women in the society and that it has led to women subordinations to men (Lorber, 1994). Awumbila, (2001) stated that there is power inequality in gender relations to the disadvantages of the woman. To be able to understand why women need to be empowered, the concept of inequality needs to be understood. The main basic issue that needs to be examined in dealing with societal settings (as they create inequalities) is the question of why inequality exists in our societies. Thus, various social theories were employed to provide different perspectives of gender inequality and its solution, women empowerment. Marx’s class theory; functionalist; Conflict theory, and cognitive theory were employed to explain gender inequality as social construct and point out how women become less empowered. On the other hand, it appears that available programmes and projects in Ghana consider rural women’s deficiencies as a basis in designing the interventions needed to empower women hence, the review of deficit thinking theory.

2.1. The concept of gender inequality

Marx’s class theory rests on the premise of class struggles. According to the theory as explained by Edward (1983) Marx meant that in every known human society there has been a fundamental division between two broad social groups, the exploited and the exploiter.

Theorizing power struggling in gender from Marx's class theory point of view, men represent the control class as the women occupy the controlled class. As many scholars and gender activists have stated, we are living in a *patriarchal society*. Viewing society as fairly balanced system that has parts which interrelate, the functionalist or order theorist asserted that society is a system of interconnected parts that work together in harmony to maintain a state of balance and social equilibrium for the whole. According to Anderson and Taylor (2009), functionalism interprets each part of society in terms of how each contributes to the societal stability as part organized to fill different needs and has consequences for the form and shape of society. Functional arguments are summarized as follows:

- Society has system of interconnected parts that come together in harmony to maintain the state of balance and social equilibrium
- Certain positions are more important to the society and require special skills
- Only few people in the society such as men have these special skills
- Those with these skills need to be compensated with the additional reward
- The result is the social inequality (Dye, 1996).

In effect, inequality is essential in getting people to work harder in a more difficult jobs that require special skills (Dye, 1996). The inevitability of inequality in the society is best explained by Conflict theorists. This sociological approach does not look at how social structures help society to operate as in functionalism, but instead looks at how social patterns can cause some people in the society to be dominant, and others to be oppressed. These theorists argued that those who are given the most reward and influential position are able to apply the greatest power resources they possess. Conflict theorists argue that there are no assurances that the most qualified individuals will actually occupy key societal roles. This interpretation of conflict theory also leads to the idea that men cannot be trusted to give power to women because this gift would conflict with their inherent nature (Bruegal, 1979). Another example is seen in Althusser's (1971) Concept of Repressive State Apparatus which suggests that as police and armed forces are used as factors to maintain law and order in a state, by extension, as stated by Liversey and Lawson (2008) suggests that if the society is fundamentally unequal and the work of police and armed forces is to uphold the law and order, their behaviour simply seek to maintain the existing unequal social order. Conflict theory has been used by feminists to explain the position of women in the society. Feminist conflict theorists such as Bruegal (1979) argued that women have traditionally been oppressed so that men could benefit from positions of power, wealth, and status.

2.2. Deficit Thinking as a Model for Women Empowerment programmes

Deficit thinking, according to Valencia (1997) is an endogenous theory suggesting that some group of people (such as women) lack power due to deficiencies or deficits. Valencia (1997) was with the view that genetics, culture, class and familial socialization have all been postulated as the sources of the alleged deficits. Deficit thinking theory as applied to social class classification, refers to the notion that the programme and project implementers as women empowerment agents automatically make assumption that their beneficiaries – women, are less powerful such as earning low income, attaining low education or not at all; are more vulnerable than men, and inferior to men, and therefore needs to be empowered (Gorski, 2008; Valencia, 1997; Ryan, 1971). By extension, what renders these women into such status is not the major concern of the empowerment programme agents but they are only interested in measures to help the situation. The implication of such posture of these women empowerment agents – programme or project implementers, is top-down development approach, a developmental model that force the programme on the beneficiaries.

2.3 The Root Causes of Women Disempowerment

Fundamentally, women are disempowered by processes and social interactions. The central point explained by many authors is discriminations that occur from childhood, organisational settings and hierarchical gender inequality (Acker, 2006; Figart, Mutari, and Power 2002; Pierce, 1995; Adkins 1995). Women also get disempowered through status expectation, cognitive biases and resources control (Haselton, Nettle, and Andrews, 2005). Solutions to what disempower women can be summarised by the statement made by Ridgeway, (1997). Ridgeway, (1997) who asserted that if women are disempowered through processes and social interactions, then our approach to empowering women must deal with both organisational and socialization processes to compensate the women in such a way that women will not be *worst off* due to the disadvantages these processes put them into.

From the literature reviewed, it was established that society fuels inequalities. And, as the available programmes and project adopt deficit thinking model approach in addressing inequality through empowerment, one would accept the criticism made by Swadener and Lubeck (1995) that the deficit thinking approach is unreasonably simplistic, grounded in classism and therefore can establish that there exist a gap between what the programmes offer in relation to clients' needs. The missing link in literature is therefore the fact that there is no enough literature to show how these programmes or projects could empower women to challenge the status quo of gender inequalities.

3.0 Procedure and Data Collection Method

This study uses exploratory research design and, qualitative and descriptive statistics methods in data collection and analyses. The qualitative data derived from the respondents as I visit them, through the use of interview and focus group discussion (for women respondents) and questionnaire (for institutions and programme implementers) were expressed and analysed in words (Twumasi, 2001; Brown, 1996). However, there were few descriptive statistics presented in basic tables, diagrams and percentages. Both secondary and primary sources of data were used. The secondary materials include national reports and policies on gender issues, and documentation on women empowerment related projects and programmes. Livelihood Empowerment against Poverty (LEAP) and CARE International empowerment project were respectively consulted for both primary and secondary data.

3.1 Population and Sample of the Study

The population for this study comprises rural women who were beneficiaries of LEAP in Amansie West District and Asokore Mampong Municipal, and Care International clients in Amansie West all in Ashanti Region of Ghana. Specifically, Care clients covered include those in informal sector such as farmers, traders, and seamstresses. In all, a total of 83 women were randomly selected from about 805 women representing 10% of the population. Two groups were identified from the 83 respondents to engage in focus group discussion. Each group was made up of maximum of 10 members from each district. Interview was used in soliciting information from the 83 programme beneficiaries. A large number of 83 women respondents were interviewed in order to ascertain the impact the programmes or projects selected have on different group beneficiaries. The number is also huge (for qualitative study) because the study was involved with two interventions and each involved sizable number of respondents. The focus group discussion was also used to have fair assessment on how the groups were formed and how each group member was either benefiting or not from the intervention they been receiving. Non-probability sampling (purposive) was adopted to select the empowerment agents which include

3.2 Data Analysis

The analysis was connected to data collection as a field note book was used to capture any important issue that was necessary for the study and meanings were given to each issue raised. The analysis was done manually. The key issues were presented in tables, chart, diagrams and others.

4.0 LEAP and CARE International women's Empowerment Efforts

Livelihood Empowerment against Poverty (LEAP) as a National programme and, CARE International, as an NGO which also has 'Cocolife empowerment project' are the two woman empowerment programme and project assessed.

4.1 Care International's Projects for Women Empowerment

In 2015, Care International – Non-Governmental Organisation, reviewed its strategy of development and added women empowerment as an integral part in order to make development a whole. The NGO's (CARE) strategic plan for empowering women is based on how it defines women empowerment. CARE's operational definition for women empowerment is through the concept of *Agency*. This agency was explained to mean improvement of individual and collective well-beings. It entails increase in knowledge, wealth, change in attitude and, provisions of good structures and conducive environment for the betterment of women's lives. This definition links itself to the word 'agency'. CARE activities and strategies reviewed are more of 'power to' than the 'power from within' (Rowland, 1997). Their interventions help the women to create wealth, and have knowledge about the existing institution that can help women to resist women oppression and control. However, the other aspect of agency which UNDP (2014) placed emphasis on such as agency to use rights, capabilities, resources and opportunities to make strategic choices is not seen in CARE's definition of women empowerment which guides CARE for its intervention.

The office of CARE did indicate that CARE links up with BAC and Ministry of Food and Agriculture (MOFA) to help women to acquire skills to create wealth and have access to financial resources. The effective use of resources which these rural women need to acquire such that they can make strategic choices and decisions is however missing from CARE's interventions. This is evident in the presentation below.

CARE International as an NGO, has a project called CocoaLife which has five pillars. These pillars include; livelihood programmes that have projects such as Women Extension Volunteer (WEV) and, Village Savings and Loans Association (VSLA). Other pillars include farming; community and, youth and environment. These pillars are intended to empower women economically, socially and politically. For the purpose of this study, only VSLA and WEV were considered.

4.1.1 CARE International's Economic Empowerment Strategy

There are two key projects in the Care’s programme that seek to drive women economic empowerment in the study area. These pillars are Village Savings and Loans Association (VSLA) and, Women Extension Volunteers (WEV). Under village Savings and Loans Associations, CARE is able to form at least a 25-woman member group in each of the 10 communities and assist them to contribute to a ‘susu’ scheme. Each person’s contribution is used as a share. Through this scheme, members can contract a ‘soft loan’ for their economic activities.

A total of 40 women who are CARE’s VSLA and WEV project beneficiaries (22 from VSLA and 18 from WEV project), representing a total of 10% of the total beneficiaries in the study area were interviewed on how the scheme is effecting economic improvement in their lives. It must be noted that 18 out of 20 (90%) WEV direct beneficiaries were interviewed. The VLSA scheme as a source of major income for their economic activities, is said to be helping the members in number of ways. Table 1 below gives figures on the impacts of VSLA and WEV projects components on the beneficiaries.

Table 1. WEV and VSLA as a Means to Improve Income Earning

a. WEV Impact on Cocoa Farmers (2014/15 and 2015/16)

Rate of increase	Frequency	
	Number	%
2 bags	8	44
3 bags	1	6
4 bags	3	17
5 bags and above	6	33
Total	18	100

b. VSLA impact on the Traders and Farmers

Activity	Real Impact	Frequency	
		Number	%
Susu Loans Scheme	As Source of capital and means to hire farm labour	14	64
	As Source of financial security against business bankruptcy	8	36
	Total	22	100

The tables show how the respondents from VSLA and WEV project of CARE reacted to the question of “What benefits have you received...” “What change has the benefits received from CARE projects brought in your life?” Table 1a above shows the number of WEV respondents and how WEV as project benefits the respondents. The project covers 20 women found in 10 communities in Amansie West District. Through Ministry of Food and Agriculture (MOFA) expertise, it trains the women on best practices in cocoa farming through the use of cocoa demonstration farms found in each of the 10 communities. These Women, Extension Volunteers (WEV), are to retrain other women on modern techniques in cocoa farming. The rate at which the project intervention is helping these women has been quantified into the number of cocoa bags each of them earned between the year 2014/2015 and 2015/2016 cocoa seasons. About 44% (8) of the WEV respondents had their cocoa yield increased by 2 extra bags between the 2014/2015 and 2015/2016 cocoa seasons. In the same period, 33% (6), of them had an increase of 5 bags or more.

Table 1 also indicates the rate at which the intervention helped to increase the income levels of women cocoa farmers. However, further check from focus group discussion show that the least cocoa beans harvested by the WEV respondents in the year 2015/2016 cocoa season was 6 bags (increases from 4 bags in the previous year to 6 bags in the following year) and the highest was 20 bags (increased from 15 to 20 bags). Thus, using GhC 450 (price per bag of cocoa), it can be said that the income of these women’s income, if they solely rely on the cocoa, is between GhC 2,700 and GhC 9,000 per year or, between GhC 225 and GhC750 per month. The difference in the number of yield increase was due to two reasons. It was learnt from the MOFA officer I talked to that in a situation where the size of the farms are the same, the yield can be different. Also, differences in the adoption of the techniques taught by the individual farmers also led to differences in yield. This confirms the assertion made by Caplan (1985) that different women have different ability levels to convert any empowerment intervention to different levels of empowerment. What it means is that inequality, needs to be tackled from individualistic and not in heterogeneous. If not mass education will still widen the already existing gap. It can be inferred from the promotion of cocoa yield production among women groups in Amansie West District of Ghana that even though they all receive the same empowerment intervention, other factors such land fertility, farm sides and ability to absorb the intervention led to difference in yields.

From Table 1 a, a total of 64% of VSLA respondents said they rely on the scheme to hire the services of the farm labours to carry out their farming activities. Thus, these women do not depend on men or family members for such supposedly ‘men’s work’ in the farm. Close to 30% of the VSLA respondents did indicate that the scheme gave them assurance and a source of security against bankruptcy in their trading business. “With VSLA, I am now not afraid of bankruptcy, I do have reliable capital source” (A 40-year old woman beneficiary). The question is, do these women have control over their cocoa business? In table 2, a probe question was asked to ascertain the role of husbands in these women’s cocoa businesses

Table 2 VSLA and WEV beneficiaries’ Business Management Status

Who manages	WEV clients (Cocoa Farms)		VSLA clients (Farming/Trading Activities)		Total	
	Number(A)	%	Number(B)	%	Number (A + B)	%
Husband	14	78	9	41	23	58
Self	4	22	13	59	17	42
Total	18	100	22	100	40	100

From Table 2, a close to 78% of the WEV respondents have their cocoa business controlled and managed by their husbands. They did indicate that their husbands are the managers. It is interesting to note that those who control their own cocoa business (about 22%) do not have husbands. This is attributed to the accepted perception that cocoa business is difficult to be handled by women alone. On the other hand, majority of VSLA respondents seem to have control over their business. About 59% of them manage their own businesses and the loan they take whilst 41% have their loans and businesses controlled by their husbands. In total, only 42% of the CARE clients who responded have control over their businesses whilst the majority, 58% of them have their businesses controlled by the husbands. What it means is that women in the study area find it difficult to control and manage cocoa business as compared to those who are engaged in trading activities in VSLA project. Thus, even if the project helps to increase the income levels of women in the WEV project, it cannot be guaranteed that women in WEV have financial independence.

This findings partially confirms the work of Rahman (2013). Rahman found out that “the economic dependency of woman is built into the structure of property relations which are dominated by man” (p. 12). However, figures from women in VSLA, show that majority of the traders do control their businesses. Figures from VLSA shows that without the help of men, women can better manage

jobs which they have absolute control over them. Putting the figures of VLSA and WEV together, it indicates that women can be independent economically if they have the skills and control over the work they do. Thus, it is clear here that when women's confidence levels in jobs perceived to be men's jobs are boosted through well designed programme, women can go into such jobs and perform. Therefore, what programmes and projects should be seen doing is to prepare women to have skills and confidence over the so called men dominated jobs. Figures and interpretations from WEV also mean that the planners and world women empowerment bodies always plan how to support women and not how to develop power within women because they take structuralist perception that sees the existing programmes and projects to women empowerment as an attempt to regard one part of social structure as perpetually weak which needs to be supported. It also confirm my central theme that the available programmes are coming from deficit thinking point of view. As women in WEV only work for the men to control the resource at the end of it all, the effect is that these women only increase their work load but cannot control the cocoa resource.

4.1.2 CARE International's Political Empowerment Strategy

In the political empowerment, CARE seems to have few strategies to handle it. The NGO rely on the existing structures and institutions to create awareness on women's political rights. According to the Project Director of CARE in Kumasi area, CARE believes in the sensitization and building of women's confidence as a key tool to get women involved in politics. However, from women focus group discussion held in the various communities, those CARE women respondents who are into politics developed interest in politics not from the programmes and interventions they received from CARE or any other organisational body, but from their various homes. In Amansie West District, the NGO does form women groups and give them skills in public speech. It organises political fora and sensitisation programmes for them to uplift their political confidence. CARE has strengthened Gender and Child Protection Committees in every community it operates. There are 11 members in each group. Apart from their social functions, these groups are also sensitised politically to take part in both local and national politics. In the last 24 months, (since 2015) CARE through these groups has been organising District Assembly Engagement Fora. In these fora, the District Assembly sittings are moved from the District capital, Manso-Nkwanta to the remote communities where CARE operates. All the Assembly members, Heads of Departments, District Chief Executives, Coordinating Directors and all other District Assembly Machineries are brought to the door steps of these women.

The impacts of these moves from the CARE International are supposed to boost the confidence levels of the rural women in involving themselves in politics, both locally and national. It is also intended to educate them on their political rights. A check from these women political rights and confidence revealed that majority (63% of them) do not want to go into politics.

The major reason given by those who said they are not into party politics is that politics in Ghana is men's business and not a woman's one. They explain this to mean that it needs a lot of muscles and money. "Whom am I to vie for MP position in this constituency, it is for men not women" (A 46-year old political party's woman organiser). From focus group discussion, it came to light that the two main factors that discourage women in these rural communities to enter into politics are the women's low educational levels and huge money involvement in Ghana politics. From the literature what other study has established is that women political rights are hindered by the low education among girls (UN women, 2014). In the year 2010, Capaity.org published in its Issue 40 editorial that women are afraid of hot contest and high political tensions and that put them off from politics. Ghana women's political empowerment is hindered by monetisation and low educational levels among women

4.2 How LEAP as a Ghana Government's Programme Empowers its Beneficiaries in Ghana

Unlike CARE which has social, economic and political means of empowering women, LEAP is a programme for livelihood empowerment against poverty. The programme offers the physical money to its beneficiaries to give economic empowerment. There are four categories of women who can qualify to be given LEAP. These are: persons with severe disability; orphan children in the community; persons above 55 years without regular income and the indigents. The money is given to them direct, 'cash in hand'. According to the officials, the money ranges from 64 Ghana cedis (for one beneficiary), 76 Ghana Cedis (for two persons in a household), and 88 Ghana Cedis, (for three persons in a household) to 106 Ghana Cedis (for four persons in a household) per every two months.

A total of 43 beneficiaries from two districts were interviewed on how LEAP helps them in their economic lives and what they expect from the LEAP. Table 4 below shows the number of LEAP respondents and the total amount of cash each receives per month.

Table 3 LEAP Benefits

Amount Per Two Month (GhC)	Amount Per Month		Actual Amount per Head per month		Frequency	
	GhC	\$	GhC	\$	Number	%
64	32	8	32	8	7	16
76	38	9.5	19	4.75	18	42
88	44	11	14.7	3.7	6	14
106	53	13.23	13.25	3.31	12	28

Table 3 gives indication of amount of money a household takes per every two months as means to empower women against poverty. The highest amount of money a household can receive is 106 per two months (53 Ghana Cedis per month). To qualify for such amount, a household must contain 4 members who fall under any of the four categories that qualifies a person to be served under LEAP. In reality, each person receives GhC13.25 per month or \$3.31 per month (GhC4 is equal to \$1). It must be noted that this amount paid to LEAP beneficiaries is not regularly received in each month. This is the highest nominal amount of money one can receive under LEAP programme, whose aim is to support the poor to earn a living. Looking at the amount each person is supposed to receive each month, it is clear that if the household contains only one member of LEAP beneficiary, the person is entitled to GhC32 per month. This amount decreases as the number of beneficiaries increase in a household. From the table, only 16% of the beneficiaries do receive GhC 32 per month. About 84% of them receive between GhC19 and GhC13.25 per month. It can be argued that the amount given per month, if it is to be spent on food alone, can last an individual for one meal for children under 18 years and a snack for the adult. When the beneficiaries of the LEAP were asked if the intervention has brought any change in their lives, the responses were that the money is either used on food or save to support businesses as presented in the Table 4 below.

Table 4 What the LEAP Clients Use the Money for

USES	Number	%
Save to support business	10	23
For food	33	77
Total	43	100

From the Table 4, 77% of the LEAP respondents do spend the money on food. It is only 23% of them who are able to save and use it as a working capital to expand their porridge businesses. It is significant to note that 80% of these individuals – those who can save (8 out of these 10 women) did indicate that they have husbands who contribute to their up keeping. As the women confirmed that they have supports from husbands and children, they did confirm that the mode of selection is highly under political influence. Various offices of social welfare which manage the programme lamented that most beneficiaries do not deserve it. However, due to their affiliation to the ruling government, they were enrolled in the scheme whilst most of those who were supposed to enjoy were left out. During focus group discussion, the women groups from all the three districts covered did indicate that the capitation policy in the NHIS renders the card useless in accessing healthcare delivery.

It is significant to note that the amount given per month, as some of them indicated that the money is spent on food alone, can last an individual for one meal for children under 18 years and a snack for the adult. This confirms the findings of a study which suggested that the impact of LEAP on household consumption is essentially zero, likely due to the irregular payment, meagre nature of the

payment when made, and low level of the benefits (Honda, et al 2013). One would not be wrong to conclude from the LEAP figures that LEAP does not empower anybody in any form. First, the impact of LEAP on poverty eradication is almost nil. This is because an amount per month per head can only offer an individual a snack or a meal. To narrow it down to amount per head per day (between \$0.30 to \$0.11 per day), confirms the findings of a study which suggested that the impact of LEAP on household consumption is essentially zero, likely due to the irregular payment, lumpy nature of the payment when made, and low level of the benefits (Honda, et al 2013). It can therefore be concluded that, LEAP benefits as it stands now, cannot help its beneficiaries to fight poverty from any angle. LEAP fails to serve as a livelihood empowerment against any form of poverty among these women.

LEAP as a programme to empower the poor in this direction, seems to have failed to consider any of the principles needed to be considered in developing an empowerment programme as outlined by Oxaal and Baden (1997) as follows:

- The process of empowerment should not be confined to one area of development activity due to multifaceted character of empowerment. Hence, different aspects of empowerment (e.g. political, economic, social, legal) should not be addressed in isolation but rather there should be linkages between different aspects of empowerment in programme planning and implementation.

LEAP seems to focus on livelihood '*empowerment*'. From the above Oxaal and Baden's (1997) principle, LEAP seems not to agree with it. Oxaal and Baden's (1997) also asserted that:

- The participation of women in planning at all stages is essential if development programmes are to be empowering. Steps need to be taken to involve women right from planning stage. Participation fora may provide an opportunity for facilitating a process of a group or community's own analysis of need and means for transformation. This will be most useful if the indicators should be generated through a participatory process.

The implementers of LEAP admitted that the programme was designed through a top-down approach. It did not offer any room for the beneficiaries to make input in addressing their needs during programme designing stage. When the client respondents were asked what they would have wished to be included in the programme, about 71% said they would have wished that at least one of their children is sponsored to the university level. Others said they wish the programme will be able to offer them capital to trade. Thus, LEAP does not address the core need of the beneficiaries.

Conclusions

The actual needs of women in the study area which this study identified include *social protection* which was found to be depending on the women's ability to have regular and effective income earning activities; have good education for their wards; and have financial muscles and confidence to compete with their male counterpart in local and national politics was not well addressed by any of the two intervention. This is because all that each provide are just mitigation measures. They also need *change in socio-cultural expectation* of women which put males ahead of females as both look for a level playing field to have equal opportunities and equality of resources. As the available programmes limit their efforts to the mitigation measures to assist the poor women and not to tackle the root causes of women disempowerment, it leaves a gap between what to be done to achieve the needs of these women and what the available programmes can offer.

- LEAP as a programme to fight poverty has completely failed the poor rural women. The programme's need assessment is poor. It does not apply any poverty eradication principle available. It has no positive effect on the poor rural women's income generation. It cannot also offer the poor rural women the basic needs such as food and shelter.
- CARE international seems to have better project to improve women income as compared to that of LEAP. However, it only gives supportive measures and not development of economic powers that has capability to lead women to controlling of available economic resources within the rural community thereby cannot empower to challenge the gender inequality status quo

From the forgone discussions, this study fundamentally argues that LEAP and CARE international effort in empowering women as a programme approach to empower women does not fundamentally change the status of women to operate as the status as men. Whilst it contributes to creating of awareness and supporting women, its contributions to changing social role stratifications and culturally dimorphic presentations is marginal. In terms of gendered approaches to communal life and social power relations, the approach has fundamental deficit because it does not aim to deal with the societal norms and other socio-cultural factors that fuel women disempowerment – the ground from which I see the root cause of women disempowerment. Even on the surface of what these programme and projects set out to provide to the beneficiaries, each of them does not effectively change lives of the beneficiaries to challenge the status quo. LEAP as empowerment programme that seeks to provide livelihood against poverty does not improve the incomes of the people, but rather it serves as an act of tokenism. Hence, the programme's interventions to effect economic empowerment do not challenge the status quo. CARE International which is also set out to provide sensitisation and creation of awareness on women's political and legal empowerment, as well as creating of wealth among the beneficiaries seems to offer the rural

women some level of economic relief yet the efforts are also mitigation measures which cannot give women power as they need to be as same status as men.

Recommendation

Women empowerment Programmes and Projects approach must address the root causes of what disempower women. A purposive women empowerment Programmes and must focus on addressing the root causes of what disempower women. For example, low education among women needs to be tackled from girl-child education Programme. A comprehensive Programme which shall deal with the causes of girl-child school dropout; and dealing with all forms of cultural practices that militate against girls' education among others as situational analysis may indicate. Low income among rural women working in the informal sector needs another comprehensive Programme that seeks to identify the basic causes of low income among these women. The ideal Programme should be a comprehensive and should be able to create the opportunity, provide skills, give capability to utilize the opportunity created and ensure controlling of the available resources generated.

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An Appraisal of the Trend and Pattern of Birth Registration in Shiroro Local Government of Niger State Nigeria

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Abstract- Vital registration or registration of vital events is one of the three major sources of demographic data in Nigeria. The other two are the population census and sample survey. The former is judged to be an indispensable source of demographic data because, it provide information on vital statistics and population trends between two census periods. The study adopted a cross sectional survey design and applied multi stage sampling techniques to sample 230 respondents from the general public in the study area. The first stage involved the splitting of the local government into wards. The second stage involves selecting streets, while the third stage was the households. In all, 6 wards were sampled for the study. The study utilized both primary and secondary sources of data. The quantitative data were analyzed using Statistical Package for Social Sciences (SPSS). Descriptive statistics like tables, frequencies and percentages were employed in presenting and interpreting the data. Information from the qualitative data was transcribed and ordered in themes to ensure that outstanding points of the responses are noted. The following conclusions were drawn from the study: the available vital registration facilities are grossly inadequate and were unevenly distributed in the study area; lack of awareness and knowledge of the existence and the importance of vital registration by majority of the people in the local government; long distance to vital registration centres from their residents; majority of births in the area were not registered, and even among the few births that were registered, majority of them were registered after the limited period for registration. And the study reveals that socio-economic index, educational level and distance of facilities to residents are determinants of access to vital registration facility. The study made the following recommendations; government and it development partners should embarks on aggressive door-to-door campaign on the need to register children at birth and importance of birth registration, more vital registration centres should establish especially in rural areas, birth registration should be made compulsory and stiff punishment should apply to violators, deployment of qualified personnel to manage vital registration centres.

Index Terms- Registration, Birth, Vital, Centre, Campaign, Awareness and Pattern

I. INTRODUCTION

A functional vital registration system in any country, by supplying the most reliable data on deaths and births and population dynamics, provides indicators for health and development; and pre-requisite data for the effective planning of health and other services, resource allocation, legal, administrative and health policy formulation, program planning, and evaluation (Jewkes & wood, 1998; WHO, 2007; & Pais, 2009 cited in Tobin, Obi & Isah 2013). Birth registration data are needed to formulate programs relating to maternal and child health including nutrition, immunization and universal education; and data from death registration provide information on the economic burden of disease, and an understanding of disease etiology (Immigration and refugees Board of Canada, 2010 & NPC, 2006 cited in Tobin, Obi & Isah 2013).

The right to be registered at birth is founded in article 7 of the United Nations Convention of the rights of the child, now well over a decade old (NPC, 1998). Unfortunately, the accuracy of birth and death records, particularly in developing countries, has come under question in several studies with the increasing realization that each year, despite a growing awareness of the importance of vital registration, and the commitment of states under international law to ensure this right, several births and deaths go uncounted (Mba,2007 cited in Tobin, Obi & Isah 2013). Globally, each year, about two-thirds of 57 million annual deaths (representing 38 million deaths) go unregistered, and as much as 40% (48 million) of 128 million births go unregistered, representing one out of three children(WHO,2007 cited in Tobin, Obi & Isah 2013). Although it can be argued that census and other large sample surveys may be useful in supplementing demographic data in countries where vital registration system is still at infancy, they are expensive to perform on a routine basis, being frequently marred by politics, disputes about figures, underfunding and topographical challenges; and should rather serve as complements in a comprehensive health information system (Hill, lopez & shibuya, 2007; Akande & Sekoni 2005 cited in Tobin, Obi & Isah 2013).

Nigeria, a signatory to the convention, established the compulsory registration of births and deaths since 1979, with the National Population Commission (NPC) established and charged with the statutory responsibility of production of vital and demographic data in 1992 (Akande & Sekoni, 2005; NPC,2006).

However, several decades after, only a small proportion of these events are actually registered, with the national average for birth registration put at 30%, with 49% in urban areas and 22% rural areas in the 2008 census (Akande & Sekoni, 2005; NPC,2006 cited in Tobin, Obi & Isah 2013). Thus, about 70% of the over 5 million births annually go unregistered (McCan-Benns, Fox, Foster-Williams Ashley & Iron, 1996 cited in Tobin, Obi & Isah 2013). Interestingly, there is no national average for death registration. The few published studies carried out in the country to explore the reason for these small proportions show that a large percentage of the populace are aware of vital registration, particularly birth registration, but practice remains poor (Ndong, Gloyd & Gale, 1994 cited in Tobin, Obi & Isah 2013). It therefore remains to be investigated whether gaps in awareness, lack of clarity about the registration process, and individual perceptions may be contributory to this observed pattern. This study, therefore, was undertaken to assess the awareness, perception, and practice of birth registration in Shiroro Local Government Area of Niger State Nigeria.

II. LITERATURE REVIEW THEORETICAL FRAMEWORK

The dearth of demographic data in Nigeria has been a source of concern to government, scholars and policy analysts. Efforts at obtaining accurate population figures on which to base development plans have not yielded much results. Population census which has been the major source of data on population has been plagued by over-politicization. Hence, Okunsanya(1999) as cited in Okereka (2015) observes that “head counts” in Nigeria have been greatly flawed with corruption by power thirsty ones who maintain great duplication of published figures in order to acquire seats in legislatures. This has necessitated the exploration of complimentary sources of population data. Another reason for the manipulation or falsification of census figures in Nigeria is that population is one of the criteria or principle for the allocation of federal collected revenue among the states and local government of the federation (Okereka, 2015).

Traditionally, the statistics for demographic analysis and population studies are derived from vital registration system. Periodic census or enumeration, sample surveys or inquiries and non-conventional sources of population data (Kpedekpe 1979; Lucas 1994; Onokerhoraye 1995; Umoh 2001 cited in Okereka, 2015). These various sources have been explored by different countries, but in Nigeria, attention has been focused more on the conduct of censuses.

Adekunle (1998) cited in Okereka (2015), states that census exercise is a decennial affair, very costly and Nigeria experience has been faced with the problem of inflated figures over the years. This cankerworm has eaten deep had to be culture of census to the extent that other sources of generating reliable current demographic data had to be explored. Woods (1982) maintained that we have within the broad spectrum of demographic sources, two very distinctive sets of data, each of which is derived in a specific manner. Firstly, much elementary demographic information comes from population counts or more recently census. Secondly, vital statistics are provided by system of continuous registration. On his Part, Onokerhoraye (1985) cited in Oereka (2016) states that the census method of collecting population data described the states of population in particular

area at a given in time. Consequently, population census is less useful for analyzing population dynamics. To him “vital registration” which is not only continuous, but also backed by law should use to complement population census as registration data relates for various analytical purpose.

Grebenik (1968:340) cited in Okereka (2015) defines vital statistics as statistics on principal event in the life of an individual. He opines that these events are usually gathered at the time of event such as birth, marriage, the dissolution of marriage and death. He contends that vital registration in developing countries should be made compulsory so that it will be complete and in Nigeria has not been amenable to legal compulsory. In some part of Nigeria, disclosure of the number of children one has is seen as a culture taboo and because of the people’s belief in reincarnation (life after death), reporting the death of someone to stranger may be perceived to be counterproductive, that is, the smooth process of reincarnation may be interrupted or completely thwarted Idahosa and Otoghile (1999). In order to disabuse the minds of the people regarding these tendencies, they need to be persuaded and not compelled without first giving intensive re-orientation. Through a systematic process of enlightenment, the people should be made to understand that if birth and deaths, for example, are registered there will be no visitation of adverse consequences on them the foregoing analysis is in tandem with the argument by Lucas (1994) cited in Okereka 2015 that if registration is effective and compulsory, as it in Australia, Demark, Britain and America, the number of birth and deaths used together with most recent census and migration statistics will facilitate the calculation of births and deaths rates and up-to-date estimates of population. To Lucas, prevention of diseases and reduction of mortality can be achieved through the analysis of date in respect of a registered cause of a person’s death, his age and occupation. From the point of view of administration Lucas (1994) conclusion that the difficulties and cost of effective and reliable registration system are so enormous that registration is likely to provide demographic data for more developing countries within the next decades seems very expedient. In most cases, the economies of these countries, particularly Nigeria have been mismanaged by the leaders with the result that their ability to embark on masses-oriented policies and programmes are hamstrung by debilitating degree of corruption. As mentioned earlier, migration is one of the aspects of vital registration system. Migration is defined by Ogunlade (1995) cited in Okereka (2015) as the movement of people across a specific boundary for the purpose of establishing a new permanent residence. There is international migration (migration between countries) as well internal migration (migration within a country). Ogunlade (1886), states that with specific reference to contemporary civic registration system in Nigeria, there seems to be greater emphasis on the registration of births and deaths with less attention on migration. Under migration, it is just the international category that is given some attention.

The issue of the registration of internal migration is yet to come into the mainstream in the civic registration system. Scholars have advanced various reasons for this. For example Emereuwana (1995) and Oluwayemisi (2008) cited in Okeraka (2015) have observed generally that the greatest interest in vital statistics in Nigeria is directed to data on births and deaths because, these two event are needed for development planning, evaluation of public facilities, life insurance, medical services research and population

analysis; for the comparison of trends and changes in fertility and mortality and morbidity rates in the society on a continuous basis. In order to have effective vital registration system Linder (1981) suggests that for developing countries, start must be made with capital cities; (Urban Centres)... After the registration system in the urban centres is deemed operational, effort must be then transferred to semi-urban and rural areas. This is because; Linder in work above suggested that the rural people are highly illiterate and lack sufficient education on the usefulness of vital registration. He concluded by also recommending that these creation of local centres will ensure easy access to registration centres by the people in rural areas. In Nigeria, the national vital registration policy is being implemented throughout the county. But the coverage and intensity is very low. Therefore, the work is to identify some of the socio-economic factor militating against the effective implementation of the policy with a view to proffering solution to them and ultimately achieving enhancing vital civic registration system.

Understanding of human social actions is based on some existing theories and models. The theory of Urban Bias is adopted for explanations of issues under study. Michael Lipton (1980) argued that poverty persists mainly because development was designed by and for people living in urban areas. Most poor people in developing nations live in rural areas, but the towns and cities get a far larger share of national resources. This, he argued, was not only unjust but also inefficient. Furthermore, he argued that the development of urban areas and industrialization in poor countries has been at the expense of rural areas. He said public spending in poor countries have been concentrated on the development of urban areas and on industrial growth. Governments tend to favour allocating resources to towns and cities as opposed to villages. This is mainly because people in urban areas have more political power to convince governments to make taxation and spending choices that favour their interests. This theory explains the uneven distribution of vital registration centres in Shiroro local government of Niger State. Most vital registration centres in Shiroro Local Government are located in urban centres at detriment of rural areas where majority of the population reside. The study is aim at appraisal the trend and pattern of birth registration in the study area.

III. METHODOLOGY

The study adopted a cross-sectional survey design. The study was conducted in Shiroro Local Government area of Niger State, The study population comprised heads of households (or their spouses) that have been resident in the community for at least 6 months prior to the survey. Two hundred and fifty (250) questionnaires were administered on the heads of households (or their spouses) that have been resident in the community for at least 6 months prior to the survey.

Multi-stage sampling technique was employed for the study, which entailed the use of cluster, systematic and simple random sampling techniques to sample households and individuals at different stages were employed. The quantitative data collected were subjected to appropriate statistical analysis. Specifically, charts, frequency counts and simple percentages were used.

IV. RESULTS AND DISCUSSION

Socio-demographic Characteristics of Respondents

Table 1: Percentage Distribution of Respondents by Age

Age	Frequency	Percentage %
15-19 years	3	1.2
20-24 years	11	4.4
25-29 years	24	9.6
30-34 years	44	17.6
35-39 years	123	49.2
40-44 years	38	15.2
45-49 years	6	2.4
Total	250	100%

Source: field survey, 2018

Table 1 shows that 1.2% of the respondents are within age bracket 15-19 years, 4.4% of the respondents are within 20-24 years while age 25 – 29years constitute 9.6% of the respondents and 2.4% of the respondents are within 45-49 years. Similarly, 15.2% of the respondents are within the age 40-44 years while 17.6% of the respondents are age 30-34 years and 49.2% of the respondents are age 35-39 years. The above statistics shows that Majority of the respondents are within the age bracket 15-39 years which is typical of population composition of African countries.

Table 2: Percentage Distribution of Respondents by Occupation

Occupation	Frequency	Percentage %
Unemployed	9	3.6
Farming	117	46.8
Petty trading	13	5.2
Civil servant	40	16.0
Full time house wife	70	28.0
Total	250	100%

Source: field survey, 2018

Table 2 shows the percentage distribution of respondents by occupation. 3.6% of the respondents are unemployed, 5.2% of the respondents are petty traders, 16% of the respondents are civil servant, while 28% of the respondents are full house wife and 46.8% of the respondents are farmers. The implication of this result is that majority of the respondents are predominantly farmers. It explain that majority of the people of Africa reside in rural area where most of them practice agriculture.

Table 3: Percentage Distribution of Respondents by Annual Income

Annual Income	Frequency	Percentage %
No income	85	34.0
Less than #6,000	19	7.6
#6,000- #20,000	44	17.6
#21,000-#25,000	36	14.4
#36,000-#50,000	42	16.8
#51,000-#65,000	19	7.6
#66,000 and above	3	1.2
Total	250	100%

Source: field survey, 2018

In the above table 3 which reveals the percentage distribution of respondents annual income. The result shows that 1.2% of the respondents annual income is in between #66,000 and above, 7.6% of the respondents annual income falls in between #51,000-#65,000 and less than #6,000, 14.4% of the respondents annual income falls between #21,000-#25,000, 16.8% of the respondents annual income constitute #36,000-#50,000 while 17.6% of the respondents annual income is in between #6,000-#20,000 and 34% of the respondents had no annual income. The statistics shows that majority of the respondents are living below poverty level.

Table 4: Percentage Distribution of Respondents by Religion

Religion	Frequency	Percentage %
Muslim	173	69.2
Christian	75	30.0
Traditional	2	.8
Total	250	100%

Source: field survey, 2018

Table 4 shows the percentage distribution of respondents by religious affiliation. Majority of the respondents are Muslim with 69.2% while 0.8% of the respondents are traditional worshipers and 30% of the respondents are Christians. It is not surprising that the statistics indicated Muslims as majority, just like most local government areas in Northern Nigeria.

Table 5: Percentage Distribution of Respondents by Level of Education

Level of Educational	Frequency	Percentage %
No formal education	90	36.0
Primary	40	16.0
Secondary	87	34.8
Tertiary	33	13.2
Total	250	100

Source: field survey, 2018

In the above table 5, 13.2% of the respondents had tertiary education, 16% of the respondents had primary education while 34.8% of the respondents had secondary education and 36% of the respondents had no formal education. The implication of this result is that majority of the respondents had low level of education.

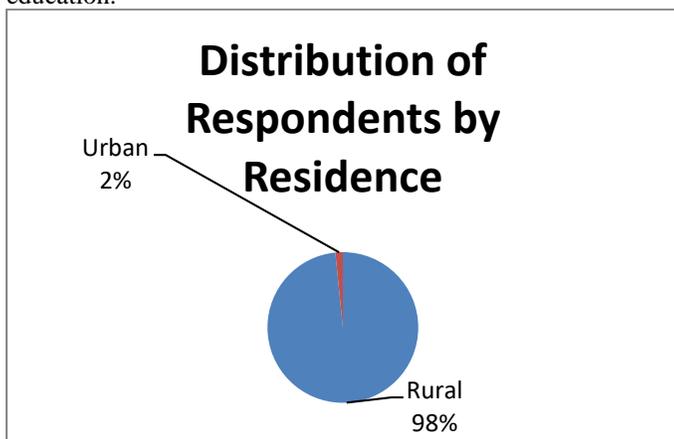


Figure 1: Distribution of Respondents by Residence

Figures 1 above reveals that 98% of the respondents' dweller in the rural area while 2% of the respondents' are urban dwellers. By implication the result shows that Shiroro local Government Area is still a rural local government area, typical of most the local government areas in Nigeria.

Table 6: Percentage Distribution of Respondents by Awareness of Vital Registration

Response	Frequency	Percentage %
Yes	78	31.2
No	172	68.8
Total	250	100%

Source: field survey, 2018

Table 6 reveals the percentage distribution of respondents on awareness of vital registration. 31.2% of the respondents said they are aware of vital registration while 68.8% of the respondents said they are not aware of the existence vital registration in Shiroro Local Government Area. The result indicated that majority of the respondents are not aware of vital registration in Shiroro Local Government Area.

In the FGD sessions, study participants maintained that they are not aware of the existence of birth registration in their community. In most of the FGD sessions conducted the participants commented, as follows:

A rural study participant had this to say:

'We are not aware of birth registration in this community. When children are born in this village we don't registered them.'

Table 7: Percentage Distribution of Respondents on Availability of Vital Registration Centre in their community

Response	Frequency	Percentage %
Yes	54	21.6
No	196	78.2
Total	250	100%

Source: field survey, 2016

Table 7 shows that 21.6% of the respondents said they have vital registration centre in their community and 78.2% of the respondents said no vital registration centre sited in their community. This is an implication that majority of the respondents said they didn't have vital registration centre in their community which could be responsible for low awareness in the study area.

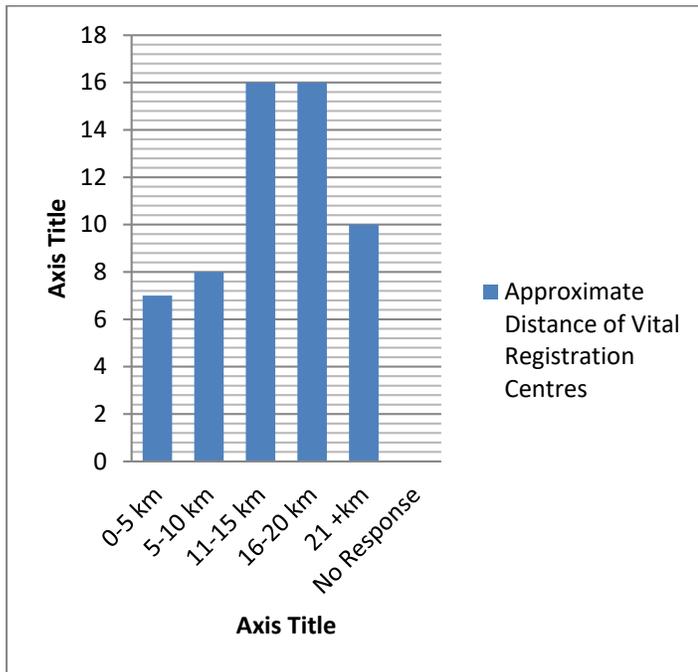


Figure 2: Distribution of Respondents on Distance of Vital Registration Centre to resident

Figure 2 shows that 2.8% of the respondents said vital registration centres is 0-5 km from their place of abode, 3.2% of the respondents said it is 5-10 km from them, 6.4% of the respondents said it is 11-15 km and 16-20 km from them, while 4.0% of the respondents said vital registration centres is 21 +km from them and 77.2% of the respondents did not respond to this question. This is an indication that most of the vital registration centres are located far away from the residents of majority of the respondents.

Table 8: Percentage Distribution of Respondents by children registration at birth

Response	Frequency	Percentage %
Yes	80	32
No	177	68
Total	250	100%

Source: field survey, 2018

Table 8 shows the percentage distribution of respondents whether they registered their child at birth, 32% of the respondents did registered their child at birth while 68% of the respondents said they did not registered their child. The result shows that majority of the respondents didn't registered their child at birth, since most

of them are not aware of vital registration or do not have vital registration centres sited in their community.

Table 11: Percentage Distribution of Respondents on Number of Children registered

Response	Frequency	Percentage %
1-4	50	20.0
5-8	29	11.6
9-13	6	2.4
14-18	2	.8
Others	1	.4
No Response	162	64.8
Total	250	100%

Source: field survey, 2018

From the above table, the percentage distribution of respondents responses on the number of children which they have registered, some of the respondents said they have registered 14-18 children with 0.8%, some of the respondents said they have registered 9-13 with 2.4%, others said 0.4%, and some of the respondents said they have registered 5-8 with 11.6% while 20% of the respondents said they have registered 1-4 number of children but majority of the respondents no responses with 64.8%. This is an implication that majority of the respondents have no idea of vital registration and most of them don't register their children.

Table 9: Percentage Distribution of Respondents on when they registered their Children

Response	Frequency	Percentage %
At birth	69	27.6
1 Month after birth	13	5.2
6 month after birth	1	.4
1 year after birth	1	.4
Do not register at all	166	66.4
Total	250	100%

Source: field survey, 018

In the above table 9, it shows that 0.8% of the respondents registered their children at 6 months after birth and 1 year after birth, 5.2% of the respondents said they registered their children 1 month after birth while 27.6% of the respondents registered their children at birth and 66.4% of the respondents don't registered their children at all. By implication the result shows that majority of the respondents don't registered their children in the area under study.

Table 9: Percentage Distribution of Respondents by reasons for not registering their children at birth

Reason	Frequency	Percentage %
Lack knowledge of vital registration	172	68.8
Culturally unacceptable	18	7.2
Do not consider it necessary	15	6
Poverty	35	14
Distance	10	4
Total	250	100

Source: field survey, 2018

In the above table 9, majority of the respondents lack knowledge of vital registration with 68.8% while 6% of the respondents do not consider it necessary and 7.2% said it is culturally unacceptable. Similarly, 14% of the respondents said poverty was the reason for not registering their children at birth while 4% claimed that distance from their resident hinders them. The result indicates that awareness of vital registration is very poor to the people of Shiroro and most of them don't know if vital registration centre exist in their local community.

In the FGD sessions, majority of the study participants said that lack of knowledge of vital registration was responsible for not registering their children at birth while the second reason is associated with prevailing poverty in the country. In most of the FGD sessions conducted the participants commented, as follows:

A rural study participant had this to say:

We don't know that we are to register our children at birth. Even I wasn't register by my parent at birth likewise majority of the people in this village.

Another urban participant comment further;

I don't have money to pay in order to register my child at the centre. The official often request for money before registering birth.

Table 10: Percentage Distribution of Respondents on the problems encountered at Vital Registration Centre

Response	Frequency	Percentage %
Personnel not friendly	35	14
Personnel not available	11	4.4
Request for money at the centre	39	15.6
No Response	165	66.0
Total	250	100%

Source: field survey, 2018

Going by the above table, 14% of the respondents said they encountered problems from the personnel because they are not friendly, 4.4% of the respondents said the personnel are not available whenever they visit the centre to register their children, 15.6% of the respondents said they requested for money at the centre while 66% of the respondents didn't respond to the question asked. The statistics shows by implication that majority of the respondents don't patronize vital registration centres; so they have no idea on the problems and challenges being faced by those who visit the centre. The FGD participants lamented bitterly on the attitude of vital registration personnel requesting money from parent who want register their children at birth.

Table 11: Percentage Distribution of Respondents on ways to improve Vital Registration

Response	Frequency	Percentage %
To educate and enlighten the public about vital registration	204	80.4
Compelled public to do it	14	5.6
More centres should be created	23	9.2
Employment of more personnel	12	4.8

Total	250	100%
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Source: Field survey, 2018

Nearly all the respondents advocated for aggressive enlightenment programme of the general public on the importance of vital registration centre with 80.4% of the respondents, 5.6% of the respondents state that the general public should be compelled by law in registering their children at vital registration centres, while 9.2% of the respondents said more centres should be created while 4.4% of the respondents said there is serious need for employment of additional personnel at vital registration centres. The result show that majority of the respondents recommended aggressive enlightenment campaign and education on the importance's of vital registration to the general public.

V. DISCUSSION

The study revealed that most of the respondents are not aware of vital registration in the study area which conforms to the submission of most study conducted in Nigeria. Under coverage and uneven distribution of vital registration was also discovered by the study as one of the factor of non-registration of birth by most parents especially by those who reside in rural area which also conform to Lipton theory of urban bias. This theory explained the concentration essential facilities at urban centre at the detriment of majority of the people who reside in rural area.

The attitude of vital registration personnel by requesting money in form of 'bribe' constituted a major barrier in the study area. Parent lamented on this attitude of money collection before birth registration at centre as their major challenge with conforms the findings of recent study conducted by UNICEF in Nigeria. The study observed that there is low registration of birth in the registration which was attributed to lack of awareness of the importance and existence of birth registration in the local government area. In response majority of the respondents recommends aggressive campaign especially in rural areas to create awareness by government at all levels and it development partners.

VI. CONCLUSIONS AND RECOMMENDATIONS

Although industrialized nations register virtually all their births and deaths, vital registration continues to remain suboptimal in developing countries. In this study awareness of vital registration is still very low in Shiroro Local Government of Niger State. Majority of the respondents especially those residing in rural areas have little or no knowledge of the existence vital registration center. It was also discovered that few available vital registration centers in Shiroro Local Government were unevenly distributed, majority of the centers located in the urban centers while rural areas are completely neglected. People who reside in rural area and area aware of vital registration had to traveled long distances to register their new born.

The study also revealed that only few parents registered their children at birth. The reasons given by parents for not registering their children at birth range from lack of knowledge of vital registration, culturally unacceptable to register their children,

do not consider registering children at birth necessary, lack of money to pay for birth registration (poverty) and spatial location of the registration centers from residents. Similarly, parents enumerated problems encountered at vital registration centers in Shiroro to include; personnel not friendly, most times the vital registration office lacked, the personnel requesting money from parent before registration.

The study made the following recommendations:

Nigeria, a signatory to the convention, established the compulsory registration of births and deaths since 1979, with the National Population Commission (NPC) established and charged with the statutory responsibility of production of vital and demographic data in 1992. The convention should be fully implemented and made compulsory for parent to register their children at birth. Also evidence of birth registration (birth certificate) should be a pre requisite for children enrollment into primarily school in Shiroro Local Government.

There is need for construction of more vital registration centers to bring the services closer to the people especially those living in the remote villages. This is because the available facilities are grossly inadequate to meet the increasing needs of the people of Shiroro local Government. There should be at least two well-equipped vital registration centres located in each ward in the Local Government.

It is necessary to strengthen and upgrade the existing vital registration centers by ensuring un-interrupted power supply and qualified personnel

Government and its partners should embark on massive and aggressive campaign to create awareness on the need for parent to register their children at birth. There should be regular house-to-house campaign by National Population Commission personnel, sponsor radio and television programmes to sensitising parent to register their new born. They should also enlighten the public on the consequences of noncompliance. The study recommends that an effective poverty alleviation strategy should be put in place by government and their partners at all levels.

Identify the constructs of a Journal – Essentially a journal consists of five major sections. The number of pages may vary depending upon the topic of research work but generally comprises up to 5 to 7 pages. These are:

- 1) Abstract
- 2) Introduction
- 3) Research Elaborations
- 4) Results or Finding
- 5) Conclusions

In Introduction you can mention the introduction about your research.

VII. IDENTIFY, RESEARCH AND COLLECT IDEA

It's the foremost preliminary step for proceeding with any research work writing. While doing this go through a complete thought process of your Journal subject and research for it's viability by following means:

- 1) Read already published work in the same field.
- 2) Goggling on the topic of your research work.

- 3) Attend conferences, workshops and symposiums on the same fields or on related counterparts.
- 4) Understand the scientific terms and jargon related to your research work.

VIII. WRITE DOWN YOUR STUDIES AND FINDINGS

Now it is the time to articulate the research work with ideas gathered in above steps by adopting any of below suitable approaches:

A. Bits and Pieces together

In this approach combine all your researched information in form of a journal or research paper. In this researcher can take the reference of already accomplished work as a starting building block of its paper.

Jump Start

This approach works the best in guidance of fellow researchers. In this the authors continuously receives or asks inputs from their fellows. It enriches the information pool of your paper with expert comments or up gradations. And the researcher feels confident about their work and takes a jump to start the paper writing.

B. Use of Simulation software

There are numbers of software available which can mimic the process involved in your research work and can produce the possible result. One of such type of software is Matlab. You can readily find Mfiles related to your research work on internet or in some cases these can require few modifications. Once these Mfiles are uploaded in software, you can get the simulated results of your paper and it eases the process of paper writing.

As by adopting the above practices all major constructs of a research paper can be written and together compiled to form a complete research ready for Peer review.

IX. GET PEER REVIEWED

Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

X. GET PEER REVIEWED

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XII. CONCLUSION

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in

American English is without an "e" after the "g." Use the singular heading even if you have many acknowledgments.

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Basic Amenities in Higher Institutions; Implication On Students Attitudes, Performances and Educational Development

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Abstract

The study looks at the availability of basic amenities in Nigeria higher institutions of learning and the implication on students' attitudes and academic performances. Primary data were collected and the data collected from the respondents was analyzed using chi-square test, exploratory data analysis and Pearson's chi-squared test. The result of the findings revealed that electricity, transportation, water supply, Information and Communication Technology, and lecture theatres have significant influence on the performance of students in Universities in Nigeria

Keywords; Learning, Basic Amenities

1.0 INTRODUCTION

Learning is an individual action which confronts the learners with the risk of going to an unknown place in the end. For most teachers, a good student is the one who is eager to learn and has positive attitudes towards learning. A low learning expectation level will reduce motivation and consequently the success. Students who are much better motivated for learning both get more successful and tend towards the thinking skills. Learning is basically an individual performance. For this reason, positive or negative attitudes towards learning are valuable for the success of learning.

Learning satisfaction has been described as a superior emotional complex that can be defined as the level of joy a person experiences when learning, being placed as the first of the two goals that students are trying to achieve by joining learning activities, the second pertaining to the learning outcomes, identifies learning satisfaction with the level of coherence between the individual's expectations and his actual experience. In a situation where the individual's real experience is equal or succeeds his expectations, the individual feels satisfied, as opposed to an experience that is under his expectations thus, making him feel unsatisfied, such an individual talks about student's satisfaction as related to student involvement, student-student interaction, student-faculty interaction, and sees satisfaction as a "spontaneous experience" associated with intrinsically motivated behaviors, emerging from learning activities designed with consideration for the learner's needs and likings regarding his own development.

Some of basic amenities that can motivate students towards learning are discussed below:

ELECTRICITY: Electricity is one of the most important things that science has given to mankind. It has also become a part of modern life and one cannot think of a world without it. Electricity has many uses in our day to day lives, especially in the educational aspect. It is used for lighting the room of students, either for studying or for other activities. All these provide comfort to students. In Nigeria, there are over 100 Universities and several Polytechnics, Colleges of Education and thousands of Secondary Schools that receive their funds from the Federal government and have resident staff quarters and students' hostels. Because of their peculiar nature as knowledge transfer- based institutions, the energy source predominantly in use in the Universities and these other institutions for educational aids is electricity. Therefore, the issues of electric energy availability, consumption and costs in universities with resident students and staff quarters can present a formidable challenge to any responsible administration. This is because its availability or otherwise can have profound effects not only on academic activities but also on the social and economic activities in the system. This is why university authorities in Nigeria make great efforts to compliment the generally unsteady electricity supply from the national grid with diesel generators albeit at a very high financial and environmental cost to fill the supply gap at the most critical moments. Electricity plays an important role in student life, in terms of reading, saving cost access to internet etc.

WATER SUPPLY: Water is a resource that has been used since the existence of mankind. Water resources are sources of water that are useful or have a potential use. Water is mainly used for agricultural, industrial, household, recreational and environmental activities. Most of the uses of water require fresh water but 97% of the earth's water is salty. The remaining 3% of fresh water is mainly found as groundwater, with only a small percentage available above ground or in the air. Safe drinking water and basic sanitation are crucial to the preservation of human health, especially children. Water-related diseases are the most common cause of illness and death among the poor in developing countries].

The World Bank while commenting on the world water challenge stated that access to water supply services and sanitation is a major factor in reducing child mortality. It revealed that of about 1.7 million deaths that occur every year worldwide (90 per cent of which are children) are attributed to unsafe water, poor sanitation and hygiene, mainly through infectious diarrhea. According to the WHO/UNICEF Joint Monitoring Programme, meeting the Millennium Development Goal (MDG) 7; Target 10 (halving the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015) would avert 470,000 deaths per year. In spite of the importance of adequate water supply to humans, access to potable water supply in Nigerian cities lag behind demand.

For instance, the joint report on water and sanitation by the WHO/UNICEF reveals that Nigeria and many other Sub-sahara African countries are lagging behind in achieving the millennium development goals and targets set for water and sanitation, Such shortages can lead to serious economic disruptions and human suffering. Although Nigeria is blessed with abundant water resources, governments at all levels (federal, state and local) have not been able to successfully harness these resources to ensure a sustainable and equitable access to safe, adequate, improved and affordable water supply and sanitation to the population.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT); ICT permeates the business environment, it underpins the success of modern corporations, and it provides governments with an efficient infrastructure. At the same time, ICT adds value to the processes of learning, and in the organization and management of learning institutions. The Internet is a driving force for much development and innovation in both developed and developing countries. Countries must be able to benefit from technological developments. In order to do these, a cadre of professionals have to be educated with sound ICT backgrounds, independent of specific

computer platforms or software environments? They are playing salient roles in work places, business, education, and entertainment. Moreover, many people recognize ICT as catalysts for change; change in working conditions, handling and exchanging information, teaching methods, learning approaches, scientific research, and in accessing information

ICTs are making dynamic changes in the society, it influences all aspects of life. The influences are felt more and more at schools. Because ICT provides both students and teachers with more opportunities in adapting learning and teaching to individual needs, forcing schools aptly respond to this technical innovation. Tinio further states the potentials of ICT as follows: ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational system. ICT has become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy.

STATEMENT OF THE PROBLEM

For growth and development to take place in a developing economy like Nigeria, the role of infrastructure is very important, because it is often the bedrock upon which growth and development relies on. Again, a lot of Nigerian students migrate abroad annually in search of better and quality education, despite the fact that it cost more to educate students abroad than in the country because of the infrastructural deficit in schools in the country. This infrastructural deficit in Higher institutions of learning in Nigeria is a spillover of the infrastructural deficit in the country. The situation is so worst in public schools unlike private schools, which make the amenities available but students has to pay more. Only a few schools have good water facilities that can enhance learning and performance of students. This has been a great problem in universities as it has caused a lot of problems to students, health wise, and even reducing their morale of learning. The lack of access to safe drinking water and sanitation is probably directly related to poverty and in many cases to ailments among university students and the inability of governments to provide water and sanitation systems for students in school environment. This situation has compelled many students, often those with low allowances, to end up getting water from poor sources, hence, thousands of Nigerian students die of water related diseases and lack of adequate health facilities in their schools. Also, epileptic power supply and unreliable ICT system has often promote students failure, a lot of cult activities are often related to inadequate lightning system of schools and Lecturers often stay away from schools because of the poor working condition of their offices, as ICT and power are important in promoting their efficiency. This situation has been confirmed by students of Ekiti State University, Nigeria.

The availability of these infrastructures in schools abroad and private schools in the country has created a gap and studies has shown that students mode of learning and performances are enhanced when these amenities are available. Earthman and Lemasters, (1996) have pointed out that students surrounded by a safe, modern and environmentally controlled environment experience a positive effect on their learning. However, studies are needed to draw a clear comparison between the quality of our school basic amenities and academic outcomes. Educators have point out the limited depth of research in this area O'Neill, (2000). In order for educational leaders to support reform that will boost student performance, they will need to understand the relationship existing between the school facilities and learning.

Also, teaching and research, which is the bedrock of Universities, are better enhanced with the provision of these amenities. But since most public schools suffers seriously from these, it limits students level of exposure, staff teaching and research work, limits students learning and performances ability. The 21st century University lacks the basic amenities necessary for learning, the research is clear that a strong link exists between the school basic amenities and the learning process Blair, (1998), hence the need for this kind of research, to look into the problem of infrastructural deficit in schools in Nigeria.

The aim of the study is to determine the impact of basic amenities on students attitudes towards learning and the specific objectives are to:

- i. determine the impact of information and communication technology on student attitudes towards learning.
- ii. investigate the impact of electricity on student attitudes towards learning.
- iii. examine the impact of transportation on student attitudes towards learning.
- iv. identify the impact of water supply on student attitudes towards learning.
- v. investigate the impact of conducive lecture theatre on student attitudes towards learning.
- vi. determine the impact of basic amenities on student readiness and ability to learn.

The purpose of this study is to examine the possible impact of school basic amenities on student attitude towards learning in Ekiti state university. Subsequently, the researcher will attempt to identify the aspects of school basic amenities that have the greatest potential to impact learning. Exploratory data analysis will shows the impact of the amenities on students attitude towards learning and its will be used to test the independent variables in the study.

2.0 LITERATURE REVIEW

Robert and Sampson (2011), found that the member of educational board will be educated and their impact on school is positive, for professional development, it is essential for student learning. The students who are actively engage in the learning process are observed to have a positive correlation with the CGP. A Study effort from student and the proper use of the facilities provided by the institution to the student, a good match between students' learning style and are positively affect the student's performance. Norhidayah Ali, (2009). Young (1999), held the view that student performances are linked with use of library and level of their parental education. Many studies have analyzed the factors behind the performance of students. Earlier studies have been carried out which focused on cognitive factors as predictors of academic success. Recently, there has been a growing interest on the non-cognitive factors. A number of researchers have examined the role of non-cognitive variables such as study skills Fazal, S. et.al, (2012); Awang, and Sinnadurai (2011), Demir (2012), Hassanbeigi (2011), study motivation Tella, (2007); Nonis and Hudson,(2008), study behavior Yang, (2011), Otto, (1978), study habits Crede and Kuncel, (2008), Nuthana and Yenagi, (2009), Nouhi (2008) Bashir (2012), Boehler, (2001), Kurshid, (2012), Mutsotso, (2010), and attitudes Sarwar (2010) and Yu, (2011) on academic achievement. Some argued that these factors have strong relationship with academic performance of students, while others concluded that it was the combination of the different factors that could explain students' academic performance.

According to Menzel, (2011), many students fail not because they lack ability but because they do not have adequate study skills. Students who have difficulty in college frequently do not have adequate study habits that affect their academic achievement. A central problem noted was that many of these students had not learned how to take effective notes and manage time for studying cited by Mutsotso and Abenga (2010). Moreover, a study by Nagaraju (2004) found that students usually do not devote sufficient time to their studies and seldom have proper study habits.

Efficient study habits are associated with a favorable attitude toward learning in general. In the study of Sarwar (2010), it was discovered that a significant relationship between student attitudes and academic performance exists. Another research found discrepancy between the study attitudes of high and low-achieving students. High-achieving students had a more positive attitude toward study in that they detected and reacted positively to the favorable aspects of the situation they found themselves in, while the

low-achieving students tended to be fault-finders, reacting to the negative aspects of study such as distractions and minor annoyances. The high-achieving students found tertiary work an interesting challenge, accepted the restrictions and conformed to the demands made upon them more readily, while the low achievers appeared to lack high-level motivation. The more successful group was also found to be more realistic and discriminating in their assessment of those situations which were highly relevant to scholastic achievement, such as discipline and work priorities, and they were better organized in both their work and leisure activities. In terms of attitude towards teachers, the high achievers generally have a positive attitude towards teachers.

For instance, as compared to low achievers, the high achievers more often say that their teachers are competent, impartial, and interested in their duties Sarwar, Bashir, Khan and Khan, (2009). Yu (2011) in his study revealed that among the SHSA factors examined, student perception of teacher effectiveness influence accounting performance. A substantial amount of research has examined the role of students' study habits and their attitudes to study on academic performance. The study of Osa-Edoh and Alutu (2012) which examined the usefulness of imbibing in the students study habit, as a means of enhancing their academic performance, revealed a high correlation between study habits and students' academic performance. This suggests that it is only when students imbibe or cultivate proper study habits that their academic performance can be improved upon. Similarly, Nuthana and Yenagi (2009) found significant correlation between study habits and academic achievement. It further revealed that reading and note-taking habits, habits of concentration, and preparation for examination had significant correlation with academic achievement. The authors pointed out that students who are better in reading and note-taking, well prepared for the board examination and have concentration may have better academic achievement. An association between study skills and academic performance also has been found to prevail among undergraduate students. The study of Fazal (2012) identified various study skills used by learners and ascertain which study skills is more related to academic achievement. Results of the study indicate significant relationship of time-management skills, reading and note-taking skills with academic achievement. Students with higher academic achievement used a wide range of study skills as compared to students with lower academic achievement.

Nonis and Hudson (2010) also conducted a study on performance of college students-impact of study time and study habits in which they found that some study habits had a positive direct relationship on student performance but others had a negative direct relationship. Hassanbeigi et al. (2011), in their study of the relationship between various study skills and academic performance of university students, noted that the study skills scores of students with GPA of 15 and above (out of 20) were statistically higher than those students with GPA of less than 15 in all of the seven skills (time management and procrastination, concentration and memory, study aids and note-taking, test strategies and test anxiety, organizing and processing information, motivation and attitude, and reading and selecting the main idea). Because of the importance of study habits and attitudes on academic performance, some researchers have proposed strategies that will help students develop effective study habits and attitudes. For example, the study of Demir et al. (2012), which examined the effect of development of efficient studying skills curriculum on academic achievements and studying skills of learners, found that students can acquire efficient studying skills by means of curriculum for developing efficient studying skills. The students were able to organize the study environment and use specific methods effectively, such as efficient reading, listening lectures, note-taking, efficient writing and doing homework. It further revealed that those students where the curriculum was implemented have increased academic achievement as compared to the group of students on which the curriculum was not implemented.

Mutsotso and Abenga (2010) also propose a paradigm shift in study methods and suggest strategies for both lecturers and the students in universities towards improved learning and performance. It is based on the "distributed learning approach" that adequately

cater for individual differences that exist among the students. This situation doubtless, cannot promote students learning ability and subsequently better performance in their class work including examinations. He therefore recommended that there was need for all hands to be on deck to make sure that hindrances were removed so that a good solid foundation could be laid for future generation. This kind of situation as stated by Nwachukwu (1994) in which the physical comfort of the students cannot be guaranteed is not ideal for learning and does not enhance academic achievement. Still on the possible influence of school plant,

3.0 RESEARCH METHODOLOGY

This section deals with the method used in carrying out the research work; the data for this study is a primary data, using a questionnaire. The Questionnaire will be administered by the researcher personally to the respondents individually using direct means.

4.0 ANALYSIS AND INTERPRETATION OF DATA

The analysis was carried out using Chi-square and exploratory data analysis, the statistical package used is SPSS. This presentation will be based on the responses from the completed questionnaires.

Respondent Demographic Profile; shows the age distribution of the respondents, the table reveals that 39.0% of the respondents are born below 20 years, 50.0% of the respondents are between 21-25 years of age, and 10% of the respondents are between 26-30 years of age while 1.0% is between 36-40 years of age. In conclusion the table above reveals that the highest percentage of the students in the university who respond to the questionnaire are between 21-25 years of age, which is a significant age range for students in the university.

Table 1; Age Of The Students

	Frequency	Percent	Valid Percent	Cumulative Percent
below 20	39	39.0	39.0	39.0
21-25	50	50.0	50.0	89.0
Valid 26-30	10	10.0	10.0	99.0
31-35	1	1.0	1.0	100.0
Total	100	100.0	100.0	

Table 2; Level of the students

	Frequency	Percent	Valid Percent	Cumulative Percent
100L	21	21.0	21.0	21.0
200L	34	34.0	34.0	55.0
300L	17	17.0	17.0	72.0
Valid 400L	23	23.0	23.0	95.0
500L	5	5.0	5.0	100.0
Total	100	100.0	100.0	

Table 2 shows that 21 of the students are in 100L which represent 21.0% , 34 of them are in 200L which represent 34.0% , 17 of them are in 300L which represent 17.0%, 23 of them are in 400L which represents 23.0% while 5 of the respondents are in 500L which represents 5.0% of the respondents. In conclusion the table shows that highest percentages of the students are in 200 level.

Table 3; Gender of the students

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	38	38.0	38.0	38.0
Valid Female	62	62.0	62.0	100.0
Total	100	100.0	100.0	

Table 3 shows that the genders of each respondent of which 38.0% of the respondents are male while 62.0% are female. In conclusion the table shows that the highest percentages of the respondents are female.

Table 4; Testing of Research Questions

Electricity supply is a source of motivation towards learning.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid strongly disagree	5	5.0	5.0	5.0
Valid Disagree	1	1.0	1.0	6.0
Valid Undecided	2	2.0	2.0	8.0
Valid Agree	32	32.0	32.0	40.0
Valid strongly agree	60	60.0	60.0	100.0
Total	100	100.0	100.0	

Table 4 shows that 60% of the respondents strongly agree that electricity supply is a source of motivation towards learning, 32% of the respondents agreed, 2% of the respondents are undecided while 1% of the respondent disagreed and 5% of the respondents totally disagreed that electricity supply is a source of motivation towards learning.

Table 5; I get distracted whenever there electricity supply.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid strongly disagree	11	11.0	11.0	11.0
Valid Disagree	29	29.0	29.0	40.0
Valid Undecided	11	11.0	11.0	51.0
Valid Agree	26	26.0	26.0	77.0
Valid strongly agree	23	23.0	23.0	100.0
Total	100	100.0	100.0	

Table 5 shows that 23% of the respondents strongly agree that they get distracted whenever there is electricity supply 26% of the respondents agreed, 11% of the respondents are undecided while 29% of the respondent disagreed and 11% of the respondents totally disagreed that they get distracted whenever there is electricity supply

Table 6; Whenever there is electricity supply, i can study for at least seven hours in a day

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid strongly disagree	6	6.0	6.0	6.0
Valid Disagree	21	21.0	21.0	27.0
Valid Undecided	18	18.0	18.0	45.0
Valid Agree	35	35.0	35.0	80.0
Valid strongly agree	20	20.0	20.0	100.0
Total	100	100.0	100.0	

Table 6; shows that 20% of the respondents strongly agree that whenever there is electricity supply, they can study for at least seven hours in a day, 35% of the respondents agreed, 18% of the respondents are undecided while 21% of the respondent disagreed and 6% of the respondents disagreed that whenever there electricity supply, they can study for at least seven hours.

Table 7; The poor availability of water supply discourages me from reading.

	Frequency	Percent	Valid Percent	Cumulative Percent
strongly disagree	20	20.0	20.0	20.0
Disagree	22	22.0	22.0	42.0
Undecided	12	12.0	12.0	54.0
Agree	28	28.0	28.0	82.0
strongly agree	18	18.0	18.0	100.0
Total	100	100.0	100.0	

Table 7 shows that 18% of the respondents strongly agree that poor availability of water supply discourages them from reading, 28% of the respondents agreed, 12% of the respondents are undecided while 22% of the respondent disagreed and 20% of the respondents disagreed that poor availability of water supply discourage them from reading.

Table 8

Lack of befitting lecture theatres discouraged some students from learning.

	Frequency	Percent	Valid Percent	Cumulative Percent
strongly disagree	3	3.0	3.0	3.0
Disagree	9	9.0	9.0	12.0
Undecided	17	17.0	17.0	29.0
Agree	43	43.0	43.0	72.0
strongly agree	28	28.0	28.0	100.0
Total	100	100.0	100.0	

Table 8 shows that 28% of the respondents strongly agree that Lack of befitting lecture theatres discouraged some students from learning, 43% of the respondents agreed, 17% of the respondents are undecided while 9% of the respondent disagreed and 3% of the respondents disagreed.

Table 9

Some of the white boards in the lectures theatres are not good.

	Frequency	Percent	Valid Percent	Cumulative Percent
strongly disagree	2	2.0	2.0	2.0
Disagree	13	13.0	13.0	15.0
Undecided	19	19.0	19.0	34.0
Agree	37	37.0	37.0	71.0
strongly agree	29	29.0	29.0	100.0
Total	100	100.0	100.0	

Table 9 shows that 29% of the respondents strongly agree that most lecture theaters re not in good condition, 37% of the respondents agreed, 19% of the respondents are undecided while 8% of the respondent disagreed and 5% of the respondents disagreed that most lecture theaters re not in good condition.

Table10; Good ICT makes study easier.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	3.0	3.0
	Disagree	6	6.0	9.0
	Undecided	12	12.0	21.0
	Agree	30	30.0	51.0
	strongly agree	49	49.0	100.0
	Total	100	100.0	100.0

Table 10 shows that 49% of the respondents strongly agree good ICT makes study easier, 30% of the respondents agreed, 12% of the respondents are undecided while 6% of the respondent disagreed and 3% of the respondents disagreed.

4.9: TESTING OF HYPOTHESIS

HYPOTHESIS 1:

H₀: There is no significant association between the impact of Information and communication technology and student attitude towards learning.

H₁: There is significant association between the impact of Information and communication technology and student attitude towards learning.

Table 11; Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	56.012	16	.000
Likelihood Ratio	32.964	16	.007
Linear-by-Linear Association	7.183	1	.007
N of Valid Cases	100		

From the above Chi square $\chi^2 (16) = 56.012, p < 0.05$. Since the significant value (0.000) is less than the p-value (0.05), we therefore reject the null hypothesis (H₀) and conclude that information and communication technology is a determining factor in student attitude towards learning. This shows that more provision of ICT facilities in the school environment will increase the attitude of the students toward learning.

HYPOTHESIS 2

H₀: There is no significant association between the impact of electricity and student attitude towards learning.

H₁: There is significant association between the impact of electricity and student attitude towards learning.

Table 12; Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.203	16	.000
Likelihood Ratio	30.740	16	.015
Linear-by-Linear Association	5.044	1	.025
N of Valid Cases	100		

From the above Chi square $\chi^2 (16) = 45.203, p < 0.05$. Since the significant value (0.000) is less than the p-value(0.05), we therefore reject the null hypothesis (H_0) and conclude that electricity is a determining factor in student attitude towards learning. This shows that more provision electricity in the school environment will increase the attitude of the students toward learning.

4.4.3: HYPOTHESIS 3

H_0 : There is no significant association between the impact of water supply and students’ attitude towards learning.

H_1 : There is significant association between the impact of water supply and students’ attitude towards learning.

Table 13; Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	62.529	16	.000
Likelihood Ratio	69.305	16	.000
Linear-by-Linear Association	14.206	1	.000
N of Valid Cases	100		

From the above Chi square $\chi^2 (16) = 62.529, p < 0.05$. Since the significant value (0.000) is less than the p-value(0.05), we therefore reject the null hypothesis (H_0) and conclude that water supply has an impact on student attitude towards learning. This shows that more provision of water supply facilities in the school environment will increase the attitude of the students toward learning.

HYPOTHESIS 4

H_0 : There is no significant association between the impact of transportation and students’ attitude towards learning.

H_1 : There is significant association between the impact of transportation and students’ attitude towards learning

Table 14; Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.297	16	.017
Likelihood Ratio	25.433	16	.063
Linear-by-Linear Association	6.422	1	.011
N of Valid Cases	100		

From the above Chi square $\chi^2 (16) = 30.297, p < 0.05$. Since the significant value (0.017) is less than the p-value(0.05), we therefore reject the null hypothesis (H_0) and conclude that transportation has an impact on student attitude towards learning. This shows that more provision of transportation facilities in the school environment will increase the attitude of the students toward learning.

HYPOTHESIS 5

H_0 : There is no significant association between the impact of conductive lecture theatres and students’ attitude towards learning.

H_1 There is significant association between the impact of conductive lecture theatres and students’ attitude towards learning.

Table 14; Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.502	12	.003
Likelihood Ratio	32.605	12	.001
Linear-by-Linear Association	3.109	1	.078

N of Valid Cases	100		
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From the above Chi square $\chi^2 (12) = 29.502, p < 0.05$. Since the significant value (0.003) is less than the p-value(0.05), we therefore reject the null hypothesis (H_0) and conclude that conducive lecture theatres has an impact on student attitude towards learning. This shows that more provision of conducive lecture theatre in the school environment will increase the attitude of the students toward learning.

HYPOTHESIS 6

H_0 : There is no significant association between the impact of basic amenities and students’ readiness and ability to learn.

H_1 : There is significant association between the impact of basic amenities and students’ readiness and ability to learn.

Table 15;Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.155	16	.004
Likelihood Ratio	38.334	16	.001
Linear-by-Linear Association	6.120	1	.013
N of Valid Cases	100		

From the above Chi square $\chi^2 (16) = 35.155, p < 0.05$. Since the significant value (0.000) is less than the p-value(0.05), we therefore reject the null hypothesis (H_0) and conclude that basic amenities is a determining factor in student readiness and ability to learn. This shows that more provision of basic amenities in the school environment will increase the attitude of the students towards learning.

5.0 CONCLUSIONS

This research work critically appraised the impact of basic amenities on student’s attitude towards learning, a case study of Ekiti State University. The result of the study revealed that electricity, transportation, water supply, Information and Communication Technology, and lecture theatres have significant influence on the performance of students in Ekiti State University. This research work, being an expository study has tested some tentative statements, in order to arrive at its conclusions. The research work evaluated the impact of basic amenities on student’s attitude towards learning. The results showed that basic amenities have an influence on students’ performance. Based on the findings gathered from the test of the hypotheses that directed the study, the following conclusions were made, basic amenities significantly influences student’s attitude towards learning. There exists a significant influence of basic amenities on students’ attitude towards learning. That is, students from schools with good basic amenities will perform better academically than students from schools with poor basic amenities. Basic amenities significantly influence students’ academic performance.

Based on the findings of this study, it is recommended that the Government of Nigeria should make available more basic amenities that are of high quality to students in universities in order to motivate students towards learning. More priority should be given to the allocation of funds to universities to make them a better place for conducive teaching and learning to take place. This will improve the school/learning environment and the academic standard of schools. Availability of basic amenities such as electricity, transportation, water supply, ICT etc. should be provided by the Government, in all universities in Nigeria especially in Ekiti State

University as it will help to engage the students in meaningful activities. The Ministry of Education and indeed all stakeholders in the education sector should work towards the provision of adequate basic amenities in universities to motivate students' attitude towards learning.

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Nutrient Quality Assessment of Phosphocompost Under Two Fortification Methods

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Abstract

Phosphocompost was prepared with the mixture of different organic materials to give four compost types: RB+PM+BM+GL, SD+PM+BM+GL, RB+PM+GL and SD+PM+GL. Where RB = Rice bran, SD = Sawdust, BM = Bone meal (Fortifying agent) and GL = Glyricidia sepium. The nitrogen and carbon sources were combined in the ratio 3:1 and moisture content is maintained. On a daily basis, the ambient and pile temperature was taken, fortnightly; samples were picked from each pile and were taken to the laboratory to check pH and electrical conductivity. After maturation of compost, post composting fortification was done to give additional two compost types: RB+PM+GL (post) and SD+PM+GL (post) making 6 compost types altogether. These were used for germination test which involved the usage of the compost extract as a growth media for maize seed.

The composting process lasted for 84 days, RB+PM+BM+GL and RB+PM+GL entered the curing stage around 60 days while SD+PM+BM+GL AND SD+PM+GL attained the curing stage around 75 days of composting. This showed that rice bran based compost cured faster than sawdust based compost. The compost types showed that bone meal improved compost quality with RB based compost being better than sawdust based compost. SD+PM+BM+GL, RB+PM+BM+GL, SD+PM+GL (post), RB+ PM+GL (post), SD+PM+GL, RB+PM+GL compost types had N:P:K values of 0.68:1.19:1.47, 0.55:1.38:1.42, 0.54:3.90:1.28, 0.52:2.56:1.08, 0.68:1.22:1.42, 0.51:1.07:1.38 respectively. Composting bone meal with composting feedstock helped to reduce C/N of the resultant compost, it also enhances N and K content while addition of bone meal after composting tend to increase P content.

Keywords; Phosphocompost, Fortification

INTRODUCTION

Food scraps and yard waste currently make up 20 to 30 percent of what we throw away, and should be composted instead. Making compost keeps these materials out of landfills where they take up space and release methane, a potent greenhouse gas (Bernal *et al.*, 2007). Compost is dark in color and filled with nutrients, it's more than just an important addition, it is absolutely crucial. It is a material created by nature (San Mateo County magazine, 2007).

Healthy compost adds nitrogen, phosphorus, potassium and sulfur to soils. It can also help the soil retain moisture and give structure and support for its inhabitants (Ogunbanjo, 2007). Not only can compost stimulate plant growth, it can carry the necessary bacteria to resist dangerous pathogens and toxins in the soil. Compost can help create soil out of every kind of soil, silt, clay, or sandy dirt. The two things sick soils lack are microorganisms and organic matter. By adding nutrients to soil, vegetation becomes healthier and micro and macro organisms are attracted to the ecosystem. The most beneficial organism is the earthworm, but there are many others. Once this ecosystem becomes balanced in the natural intended, every aspect of the system works to create a good environment for vegetation (Tyler, 2004).

Composting of organic wastes is a bio-oxidative process involving the mineralization and partial humification of the organic matter, leading to a stabilized final product, free of

phytotoxicity and pathogens and with certain humic properties (Zuconni and de Bertoldi, 1987). It is the spontaneous biological decomposition process of organic materials in a predominantly aerobic and anaerobic environment (Yvette, 2000). The composting process has received much attention in recent years because of pollution concerns and the search for environmentally sound methods for treating waste. Composting has been used as a means of recycling organic matter back into the soil to improve soil structure and fertility (Ojeniyi, 2012).

Phosphocompost is a form of compost that has been fortified with a phosphorus source. Phosphorus source that could be used includes phosphate rock, pyrite and bio solids such as bone meal. Advanced preparation of phosphocompost can be done by making use of phosphate solubilizing microorganisms such as *Aspergillus awamori*, *Pseudomonas straita*, *Bacillus megateriu* (Pazhanivelan *et al.*, 2006). Phosphate is the key ingredient that helps in high yield, it is also called building block as it is the major constituent of RNA and DNA found in cells. Availability of phosphate energizes the plant and influences fruit size of the plant.

In agricultural systems, P is needed for the accumulation and the release of energy associated with cellular metabolism, seed and root formation, maturation of crops (especially cereals), quality and strength of straw in cereals. In the natural (i.e. non-agricultural) systems, P is recycled back into the soil via litter, plant residues and animal remains (Brogan *et al.*, 2001). Although, a high level of phosphorus in the soil is an environmental concern because it may be washed into streams and lakes by run-off or soil erosion and cause eutrophication (Sharpley *et al.*, 1997). Phosphocompost will not only reduce P deficiencies, improve P uptake and grain yield of crops but also enhance recycling of agro-waste into useful soil amendment (Oyeyiola *et al.* 2016). To increase the soil fertility in a sustainable manner and enhance plant growth and safety, the use of phosphocompost as fertilizer is appropriate. Usage of phosphocompost on

acidic nutrient degraded soils will go a long way to reduce high application rates of chemical fertilizers on these fragile soils (Oyeyiola *et al* 2016). Therefore the work aimed to prepare phosphocompost from different organic material and assess its nutrient quality.

MATERIALS AND METHODS

EXPERIMENTAL SITE DESCRIPTION

The work was carried out at the compost shed of the Faculty of Agricultural Sciences Ladoke Akintola University of Technology Ogbomoso, Oyo State South Western Nigeria between May and September, 2015. The shed was roofed with Aluminum roofing sheet coated with green color.

EXPERIMENTAL SITE PREPARATION

The compost shed used was cleared of stones and other debris and was well swept. The door leading into the shed and the windows were measured and covered up with sac-like material in order to enable uniform ambient temperature in the room, and to prevent rain droplets from gaining access into the room.

COMPOST PREPARATION AND FORTIFICATION

Four piles of compost were prepared. The carbon sources: Rice bran (RB) and Sawdust (SD) were mixed with the nitrogen source: Poultry Manure (PM) in ratio 1:3, The carbon source Rice bran (RB) was collected from rice mill at Arada area Ogbomosho and sawdust (SD) from saw mill at Pakiotan area Ogbomosho, Nitrogen source which is poultry manure (PM) was collected from onigbinde farms Ogbomosho, Oyo state, *Gliricidia sepium* leaves and flexible stem was collected fresh from Teaching and Research Farm Ladoke Akintola University of

Technology Ogbomosho, Oyo State, and bone meal was collected and grinded before use. Turning was done every three days during the first two weeks of composting and subsequently every five days till compost maturity after 84 days of composting.

Fortification was done to make the compost readily available. Bone meal was used as the phosphorus fortifier. Two methods were used for the fortification which is the co-composting and post composting method.

Co-Composting Method: This method involves the mixing of Sawdust (SD) , Poultry Manure (PM), Bone Meal (BM) and *glyricidia sepium* (GL), all to give a mix tagged SD+PM+BM+GL. These forms a pile of about 255 g (SD 60 g + PM 180 g + BM 7.5 g + GL 7.5 g). The above process was repeated again substituting RB as the carbon source to give a mix tagged RB +PM +BM +GL.

POST COMPOSTING METHOD

Phosphorus fortifier (BM) in this method would be added when the compost is matured. Therefore we have a mix tagged SD+PM+GL and RB +PM +GL. Throughout the mixing, there was subsequent addition of ordinary water to the upcoming pile and we ensured uniform mixing. A thick nylon material was at the base of each pile in order to avoid any form of reaction with the ground. Each pile was covered with nylon in order to boost the heat buildup and to also avoid any form of unwanted reaction. While turning the compost, water was sprinkled on any pile noticed to be dry.

GERMINATION TEST

After 84 days of composting, the compost is assumed to be stabilized and samples from the cured compost were taken for seed germination test. The aim of this test is to get the germination percentage, root elongation percentage and the germination index. Two compost types; SD+PM+GL (Post compost) and RB+PM+GL (Post compost) were prepared by adding 1g of BM to 4g of already cured compost types; SD+PM+GL and RB+PM+GL. The addition of compost types SD+PM+GL (pc) and RB+PM+GL (pc) makes the number of compost types increase to 6 compost types altogether.

Five (5) g of the 6 compost types were poured in a 120ml bottle and 50ml of water was added. The mixture was shaken at a uniform rate for 1 hour and the germination media was prepared using cotton wool and petri dish, 0.8g of cotton wool was placed in each of the petri dish to be used. After an hour of shaking, the mixture was filtered into a clean 120ml bottle to get a filtrate of the compost types.

The seeds to be used (maize seed) were carefully picked and disinfected using 70% ethanol. Ten (10) ml of distilled water was sprinkled on the cotton wool and the seeds were carefully placed (distilled water was used as control experiment). For the 6 compost types, the above process was carried out for 100% concentration of the compost filtrate and also 50% (5 ml compost filtrate + 5 ml distilled water). Each petri dish was sealed with foil paper to regulate the effects of exogenous factors and also to prevent water loss thereby retaining oxygen. Each sample was replicated once and all measurement in terms of weight and volume were carried out using the sensitive weighing scale and measuring cylinder respectively.

DATA COLLECTION

Ambient and compost temperature were taken daily throughout the 84 days of composting. Samples were taken from each pile every two weeks, air dry and then take to the laboratory to get the pH value and electrical conductivity value. This is done using 1:4 and 1:2 i.e. compost: distilled water. Five (5) g of each sample was measured (using sensitive weighing balance) and poured inside a 120ml bottle then 20mls of distilled water was added to the 1:4 samples and 10 mls was added to the 1:2 samples. Bottles were labeled accurately to avoid any mistake. There were replicates for each sample. The samples were placed in the mechanical shaker and shook for 40 minutes. After achieving a uniform mix, the samples were poured inside pH cups and the pH meter and Electrical conductivity meter were inserted one at a time to get the values.

All petri dishes were kept in a cool dry place and after 4 days, data in terms of number of germinated seeds (%), root elongation (cm) and weight (g) gained by the root. Germination index was calculated to assess compost phytotoxicity.

$$\text{Germination index} = \frac{\text{Relative germination \%} \times \text{Relative root length \%}}{100}$$

$$\text{Relative germination\%} = \frac{\text{no of seeds germinated in compost extract}}{\text{No of seeds germinated in control}} \times 100$$

$$\text{Relative root length\%} = \frac{\text{mean root length in compost extract}}{\text{mean root length in control}} \times 100$$

RESULTS

Table 1 reveals the different stages involved in composting. Day 1 to 5 indicated the mesophilic stage where we have excessive increase of temperature. Day 6 to 22 indicated the thermophilic stage where microbial activities of decomposition were active. Day 23 to 64 indicated the cooling stage and day 65 to 84 marks the maturation stage. Temperature evolution is an indicator of microbial activity during the composting process.

Figure 1 showed the amount of N, P, K and Ca present in matured compost. SD+PM+GL+BM and SD+PM+GL had the highest amount of N (0.68), while RB+PM+GL (post) had the least amount (0.52). SD+PM+GL (post) had the highest amount of phosphorus (3.90) followed by RB+PM+GL (post) 2.56. The other treatments showed no significant difference while RB+PM+GL had the least amount (1.07). SD+PM+GL+BM had the highest amount of potassium (1.47) followed by RB+PM+GL+BM (1.42) while SD+PM+GL (post) and RB+PM+GL (post) had the least amount of 1.28, giving null significant difference between the two treatments. SD+PM+GL (post) and RB+PM+GL (post) had relatively higher amount of

calcium of values 14.49 and 13.17 respectively, while RB+PM+GL+BM gave the least amount of value 5.52.

From table 2, SD+PM+GL (post) had the highest amount of C and Zn while SD+PM+GL had the least. SD+PM+GL+BM had the highest amount of Na and Fe while RB+PM+GL (post) had the least. RB+PM+GL (post) had the highest amount of Mg followed by SD+PM+GL (post) while SD+PM+GL+BM gave the least amount. RB+PM+GL+BM had the highest amount of Mn while SD+PM+GL (post) had the least amount. SD+PM+GL+BM had the highest amount of Cu while SD+PM+GL and RB+PM+GL had no significant difference and both gave the least amount,

TABLE 1: Comparison between ambient and compost combination temperatures.

Days	Ambient	Compost A	Compost B	Compost C	Compost D
°C.....				
1	25	32	32	32	32
8	31	47	56	54	57
15	30	45	47	44	48
22	27	45	46	46	47
29	28	43	46	40	43
36	27.5	47	38	38	44
43	30	40	43	34	45
50	30	37	42	33	45
57	30	35	43	35	43
64	27	30	38	30	35

71	28	33	37	30	35
78	25	32	34	30	34
84	27	32	32	30	31

Where Compost A = RB+PM+GL+BM, Compost B = SD+PM+GL+BM, Compost C = RB+PM+GL, Compost D = SD+PM+GL, SD = Sawdust, RB = Rice bran, GL= *Glyricidia sepium* and BM = Bone meal.

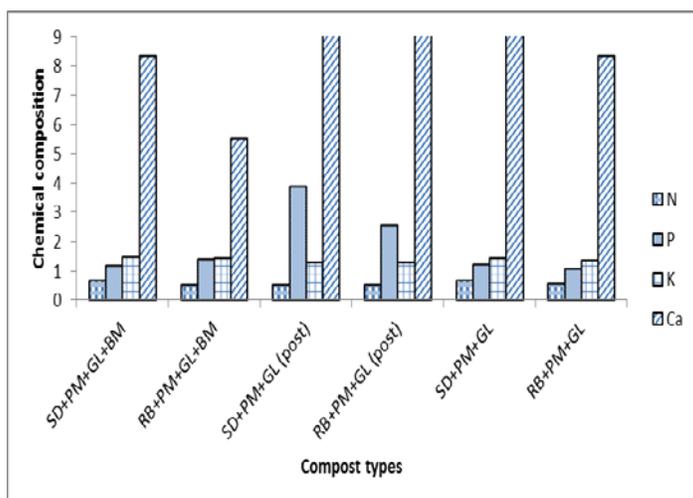


fig 1: SELECTED CHEMICAL COMPOSITION OF EACH COMPOST PILE. Where SD = Sawdust, RB = Rice bran, GL= *Glyricidia sepium* and BM = Bone meal.

TABLE 2: CHEMICAL COMPOSITION OF EACH PILE

	C	Mg	Na	Mn	Fe	Cu	Zn
%%ppmppmppmppmppm
SD+PM+GL+BM	24.71	0.33	79.39	310.49	277.33	8.10	88.00

RB+PM+GL+BM	24.62	0.36	76.09	331.78	233.70	7.79	89.03
SD+PM+GL (post)	25.74	0.38	11.54	239.01	131.43	6.98	96.03
RB+PM+GL (post)	22.52	0.40	9.47	265.10	73.78	7.23	93.48
SD+PM+GL	24.32	0.36	77.73	269.92	210.66	6.39	90.24
RB+PM+GL	25.18	0.37	78.27	297.63	102.33	6.39	93.46

Where SD = Sawdust, RB = Rice bran, GL= *Glyricidia sepium*, and BM = Bone meal.

DISCUSSION

The difference in the curing days is as a result of the sawdust being far more lignified than rice bran; therefore it will take the microorganism longer time to decompose sawdust based compost. Tom Richard (1996) confirmed this in his report that plant cell material is composed of 3 important components: cellulose, lignin and hemicellulose, and lignin being the most difficult to biodegrade.

Looking at the curing trend, rice bran based compost that was fortified with bone meal after maturation cured first and this can be explained in comparison to previous researches that has been done on compost that the microorganisms inside the rice bran based pile doesn't really require the extra energy given (the BM), the extra energy slowed down the decomposing rate (Carreiro, 2000). Hence the Rice bran-based unfortified cured faster than the fortified one. On the other hand, the microbes in the SD based compost requires extra energy to breakdown the sawdust faster, therefore the Sawdust-based fortified cured faster than non-fortified one. Cornwell (2008) reported this also when he conducted a research on litter decomposition rate within biomass.

It was observed when the actual concentration of the compost extract was used for germination test that where bone meal was used to fortify the compost had better germination than where bone meal was not added and where bone meal was added after composting. This may be due to the fact that addition of bone meal supplied enough phosphorus during composting, this made it cure better and promote good germination process, while addition of bone meal at the point of use did not have significant difference compared to when bone meal was not supplied at all. (Andreas baumgarten., 2004).

CONCLUSION

From the experiments carried out, results obtained showed that activities of microorganisms in compost have a great influence on temperature which is an important factor in composting. It is eminent from the experiment that composting can take place within 84 days when the average ambient temperature is around 28°C in this region. The time of the year to compost should be put into consideration before composting.

Conclusively, in compost production, where rice bran is the carbon source, fortification is not necessarily needed for speedy maturation but it is needed to increase growth factors. Where sawdust is the carbon source, fortification is highly recommended; it promotes plant growth and ensures speedy maturation. Considering the availability of the two carbon sources, sawdust is recommended to be used because it is easy to acquire. To promote plant growth with the use of compost, it is recommended that the compost should be fortified at the onset of composting.

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Inflation and Unemployment Dynamics in Nigeria: A Re-examination of the Philip's Curve Theory

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Abstract

This work had its main thrust as unraveling the existing relationship between unemployment and inflation rates in Nigeria. This was premised on the fact that inflation and unemployment are among the macroeconomic challenges faced by every economy, and as such is the case, it becomes sacrosanct that every country must strive to manage the dynamics between the two variables to ensure stability in the macroeconomy. Based on the postulate of Philip's curve, it is expected that a trade-off exists between inflation rate and unemployment rate as countries should choose either low rate of inflation with high unemployment rate or high rate of inflation with low unemployment rate. This research made its empirical investigation based on Nigeria's annualized time-series data obtained from the CBN and NBS which was modeled on Fully Modified Least Square Regression (FMOLS). From the evidence emanating from the findings, it became obvious that Philip's curve doctrine is applicable in Nigeria as our study proved that an inverse relationship exist between unemployment and inflation rates in Nigeria within the study period of 1981 to 2017. We found that for Nigeria to achieve a one-percent reduction in unemployment rate, she must be ready to tolerate a forty-nine percent increase in the rate of inflation vice-versa. Consequently, we recommend that a proper threshold should be established to ensure stability in Nigeria's macro-economy; also the government should focus more on output targeting through economic deepening rather-than relying wholly on monetary targeting as the only means of moderating inflation and unemployment rate.

Keywords: Inflation, Unemployment, Philips Curve, Fully-Modified-Least-Square, Output-targeting

1. Introduction

In every economy the world over, there is the need to maintain a relative stability in prices, low rate of unemployment, achievement of rising economic growth and a competitive exchange rate for the currency. The above stated are the major macroeconomic goals as enumerated in economic literature. Maintenance of price stability and low rate of unemployment took another dimension and thus became a burning issue after the inroad made by J. W. Philips in 1958 on the relationship between inflation and unemployment as observed by Philips (1958) which was simply illustrated by the popular Philips curve. The doctrine of the Philip's curve states that an inverse relationship exists between inflation and unemployment; that is, there is a trade-off between the two macroeconomic variables. Consequently, nations need to choose the level of inflation and unemployment rate they could tolerate as they cannot have a very low rate of inflation at the same time with a very low rate of unemployment.

Nwaobi (2009) as cited by Orije *et al.* (2015) maintains that people (households or individuals) know when the relative value of the money in their possession loses value due to inflation. They will show their dissatisfaction when their money and their take-home can no longer take them home, which was occasioned by rising inflation rate.

Unemployment or rising level of unemployment is a problem and a disturbing one that is facing the developing economies. Achieving a low rate of unemployment is a critical macro-economic objective/goal of every action irrespective of the level of development. As aptly put by Okafor *et al.* (2016), unemployment is a global problem that possesses serious challenge to the developed and developing

countries. In most developing countries, unemployment has continued to surge upwards as the proportion of the able-bodied youths who are qualified and willing to work but cannot find any has risen to an alarming rate.

The coexistence of high-rate of unemployment and rising rate of inflation as been observed in most developing countries these days (Nigeria inclusive) seen to defeat the notion of the Philip's theory. Most researchers discovered that instead of the trade-off, a positive relationship rather exists and this is a clear evidence of stagflation and an overwhelming contradiction to Philips Curve postulation.

Currently in Nigeria, there is visible increase in the rate of unemployment and rising rate of inflation which is a clear contradiction to the assumed trade-off between the two variables. The rising unemployment level and surging rate of inflation as witnessed in Nigeria had brought untold hardship in the nation. Year in year out, millions of able-bodied youths graduated from the tertiary institution and they are thrown into the labour market that has no capacity of absorbing them.

Again, this worrisome situation seems to be one of the major causes of mass movement of Nigerian youths to other countries through any means that can be possible. The youths are unsatisfied with such situation as they cannot get any meaningful job to engage themselves profitably, still with this, the chunk of money available with them cannot command any meaningful value. It is pertinent to highlight here that for there to be any meaningful progress in the quest for development in Nigeria, the government must pay adequate attention to the problems of unemployment and rising inflation. Consequently, the current research becomes highly necessary as it promises to bring to bear the current situation relating to inflation and unemployment rate in the country, exposing some areas of strengths/weaknesses and finally suggests ways of escape.

As Orji, *et al* (2015) noted, the stability of inflation and unemployment rate is of great advantage for any economy to achieve sustainable growth and development. It is equally critical for the achievement of other macroeconomic goals. In the same direction, Jelilov *et al* (2016) confirmed that inflation and unemployment are among the critical factors of economic growth and development. They maintained that both variables are used in ascertaining the level of poverty and hunger in developing countries. Mori *et al* (2016) citing Tella *et al*; Dausa *et al* affirmed that inflation and unemployment rates are universal phenomena and such they are important indicators of economic well-being of any country.

1.1 Unemployment and Inflation Trend in Nigeria.

Currently, the unemployment rate in Nigeria is double digit, likewise the rate of inflation. In 2001, the unemployment rate in Nigeria stood at 13.6%, 14.8% in 2003, it hovers within that range till 2009 when it rose to 19.7%. It has continued on the rise from 21.4 in 2010, 27.4% in 2012 and decline slightly to 23.1% in 2017. Inflation rate in Nigeria stood at 16.49% in 2001, it rose to 23.84% in 2003, it dropped to 6.56% in 2007, it then rose again to 15.05% in 2008, then from 2009 to 2013, it hovers around 12.14%, 12.10%, 10.80%, 12.90% and 8.84% respectively. In 2014 it stood at 8%, it moved to 9% in 2015, it surged to 15.7% and 16.3% in 2016 and 2017 respectively (NBS, 2017).

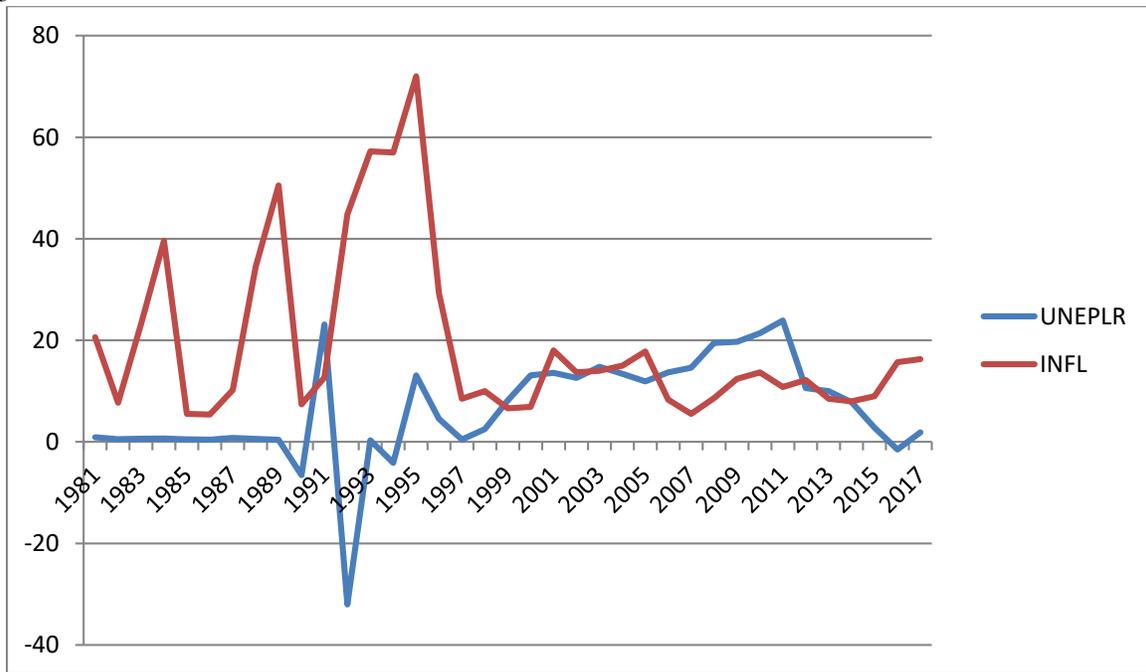


Fig. 1: Inflation – Unemployment Trend in Nigeria.

Source: Authors computation

The table above shows that unemployment has witnessed cyclical movements within these years with years of increases and decreases. Equally, inflation equally witnessed fluctuations within the very high rates and very moderate rates. On a closer observation of the table, it demonstrates an existence of rising inflation rate and declining rate of unemployment and this point towards the establishment of the Philips curve doctrine within the Nigerian economy.

Based on these multiple-insight scenarios and the effects of inflation and unemployment in the country, it is therefore a great motivation of this research work to empirically unravel the relationship between these two macroeconomic variables in Nigeria. The main focus of the sturdy is to ascertain the nature of trade-off if any between inflation and unemployment in Nigeria between 1986 – 2016. The research is of paramount importance as it will provide policy directions for policy makers in ensuring stability in the Nigerian macroeconomy. The rest of the paper is organized as follows: section 2 focused on review of literature, section 3 is concerned with the methodology adopted, section four (4) demonstrates the data analysis and discussion of empirical findings. Section 5 being the last offers conclusion and some policy recommendations.

2 Literature

2.1 Theoretical Literature

2.1.1 The Philips Curve Theory

It was A. W. Philips, a British Economist who in 1958 gave a graphical illustration of the existence of an inverse relationship (trade-off) between unemployment rate and inflation rate, As Ezeaku and Ugwuebe (2016) narrated it, the Philips curve identifies that decrease in unemployment rate (increased in employment rate) moves in reverse order with increases in the rate of inflation. That is to say that a lower rate of inflation will bring about an increase in the level of unemployment. The above scenario which is a likely outcome will most likely operate only in the short-run, but at the long run other policies targeted at inflation may not guarantee such outcome. In similar scenario, a study on the relationship between unemployment and inflation in the US economy by Samuelson and

Solow (1960) as cited in Ezeaku and Ugwuebe (2016), who empirically demonstrated that there exists an inverse relationship between the variables of unemployment and inflation. That is when unemployment rate increases, inflation will take a downward trend, but when unemployment rate decreases, inflation will invariably increase. Such scenario entails a trade-off between the two variables and this becomes an issue of great concern to policy makers as either to accept higher rate of inflation will lower rate of unemployment or vice-versa. Invariably, this situation entails that government cannot achieve the objectives of full employment and at the same time maintain price stability, rather such calls for the establishment of an appropriate threshold that could prevail as it becomes almost practically impossible to simultaneously maintain low inflation rate and low rate of unemployment.

The Philips Curve

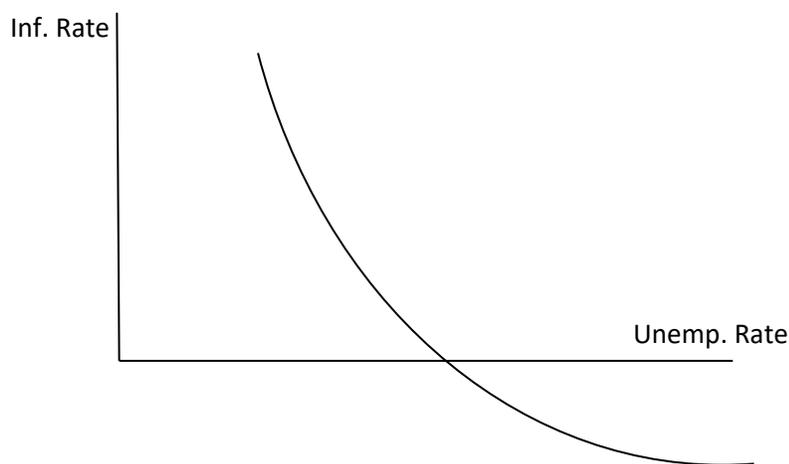


Fig. 2: The relationship between unemployment and inflation

The above curve demonstrates the typical Philips curve and it shows that as unemployment rate decreases, inflation rate increases and vice versa.

2.1.2 The Modified Philips Curve

Orji *et al.* (2015) noted that the Philips curve hypothesis enjoyed some successes in its early stage as it became a popular macroeconomic yardstick that enjoyed greater acceptability and greater influence on government policies of the 1960s. In the words of Blanchard and Illing (2009), the Philips curve influence and great regard for it as an instrument for policy making, the governments believe that they can either achieve low rate of unemployment amidst higher rate of inflation or alternatively tolerate higher unemployment rate amidst lower rate of inflation (price stability).

In 1970s, the existence of the inverse relationship between unemployment and inflation as Philips curve suggests became questionable as nations began to notice the existence of both high rate of unemployment and high rate of inflation. Such scenario which was regarded as stagflation persists in the OECD countries. The Philips curve could not account for such situation where both factors were increasing at the same time (stagflation). This new discovery – stagflation led to the more discoveries between unemployment and inflation, such as inverse relation of unemployment and inflation. According to Orji *et al.* (2015), the discovery of the new relationship gave credence to the concept of modified Philips curve and such is still valid, visible and applicable in many developed and developing economies the world over. Accordingly, the concept has witnessed modest pressure from the turn of events and economic theorizing which had eventually led to incorporation of more and new concepts such as the NAIRU (Non-Accelerating Inflation Rate of Unemployment), the adaptive expectation theory and the rational expectation hypothesis.

2.1.3 Empirical Literature

So many scholars have conducted intensive study on the dynamic relationship existing between unemployment and inflation rate. Such empirical studies had been conducted in both developed and developing countries but there are still more rooms to cover as the controversies still remain.

Todorova (2012) studies the economic dynamics of inflation and unemployment under the Blanchard treatment of taken monetary policy into account. His analysis which was modeled both in continuous and discrete time series reveals that inflation and unemployment fluctuate around their intertemporal equilibria. Inflation fluctuates around the growth rate of nominal money supply while unemployment fluctuates around the natural rate of unemployment. They conclude that while the continuous-time case shows uniform and smooth fluctuation for both variables, in discrete time, they show an explosive and nonoscillatory time path.

Umoru and Anyiwe (2013) in their study of the dynamics of inflation and unemployment in Nigeria using a Vector Error Correlation Model over a period of 27 years discovered the existence of stagflation in Nigeria over the studied period. They discovered that Nigerian economy is battling with a shocking rate of inflation alongside a severe recession as the unemployment rate had risen astronomically. They conclude that the Nigerian economy is at the cross-road.

Kogid *et al.* (2013) while studying inflation-unemployment trade-off relationship in Malaysia using three robust econometrics methods of ARDL bonds testing technique, ECM based ARDL and Toda-Yamamoto techniques for the period 1975 – 2007. Their empirical result demonstrates that a longrun cointegration relationship exist between inflation and unemployment and a unidirectional causal relationship running from inflation to unemployment. They conclude that there is an evidence of inflation-unemployment trade-off relationship in Malaysia.

Orji *et al.* (2015) while conducting their research on inflation and unemployment nexus in Nigeria; another tests of Philips curve, made use of ARDL in studying the data covering the period 1970 – 2011 in Nigeria. Their results indicate that unemployment is a significant determinant of inflation as a positive relationship exists between inflation and unemployment rate in Nigeria. They conclude that the Philips curve proposition is not applicable to the situation in Nigeria.

Ezeaku and Ugwuebe (2016) in a related study, the responsiveness of unemployment to inflation in Nigeria made use of data between 1989 to 2014. They adopted the Error Correlation Model (ECM) and the Johansen technique in their study. Their findings reveal that inflation has negative impact on unemployment while money supply and exchange rate were found to positively influenced unemployment in Nigeria. They conclude that despite the existence of long-run association between unemployment and inflation, there exists a divergence along the equilibrium part but such divergence is corrected anomaly at 65% speed of adjustment.

Jelilov, Obasa and Isik (2016) studied the impact of inflation on unemployment in Nigeria between 2001– 2013. They adopted the OLS method in their empirical analysis and their results indicate that monetary and fiscal policies were effective in controlling inflation and unemployment. They recommend that to curb the surging rate of unemployment as been witnessed in the country, efforts must be made to achieve a labour intensive system of production as labour is cheaply and readily available than concentrating on capital intensive method as the economy is faced with limited availability of capital.

Odo *et al.* (2017) conducted a similar study titled understanding the relationship between unemployment and inflation in Nigeria between 1980 – 2015. They modeled unemployment as a function of inflation and adopted causality test, VECM and Johansen cointegration tests in their analysis. Their findings indicate that inflation had a significant impact on unemployment in Nigeria both in

the short and long-run. They maintain that increases in government expenditure reduce unemployment and such government spending creates employment to the extent that inflation remains within the single digit ambit.

Iyeh and Edame (2017) in a similar investigation on price expectations and the Philips curve hypothesis in the Nigerian economy made use of Persimonous Error Correction Model and Johansen method of cointegration. Their result revealed the prevalence of a direct (positive) relationship between inflation and unemployment in Nigeria and thus invalidates the Philips curve hypothesis of an inverse (negative) relationship.

Saed and Salim (2017) undertook a study on inflation and unemployment in Nigeria using an ARDL model approach. They made use of annual time series data of 1977 to 2011 in their analysis. The result of the cointegration result indicates that a long-run relationship exists between the variables of inflation and unemployment in Nigeria. Their finding supports the applicability of Philips curve hypothesis in Nigeria and as such contradicts the popular idea of the co-existence of unemployment and inflation in the country.

Edeme (2018) in his study, providing an empirical insight into Nigeria’s Non-Accelerating Inflation Rate of Unemployment (NAIRU) made use of annual time series data between 1972 – 2015 obtained from the statistical bulletin of CBN. The Ordinary Least Square (OLS) method was adopted to ascertain if Philips curve postulate exists in Nigeria both in the short-run and long-run. He equally estimated the non-accelerating inflation rate of unemployment in Nigeria. The emanating evidence from the empirical analysis established the existence of a negative but insignificant relationship between inflation and unemployment both in the short-run and long-run in Nigeria.

Gap in the Literature

Having reviewed several empirical works done in the dynamics of inflation and unemployment both in Nigeria and some other economies, we identified that most of these authors made use of data that do not consider the current realities in the case of Nigeria. The most current of the data as reviewed was 2015 and adopted OLS technique in its analysis. To extend the frontiers of knowledge in this direction, this study made use of data between 1981 and 2017 so as to give a clear identification of current realities in Nigeria. Equally, we deviated in the choice of analytical technique by adopting the robust econometrics tool of Fully Modified Least Square (FMOL) regression technique as developed by Philips and Hansen (1990). We incorporated the Gross Domestic Product (GDP) growth rate to serve as a check variable in the model.

3 Methodology:

3.1 Data and Model Specification

The data for this research was sourced from the annual data from the statistical bulletin of the Central Bank of Nigeria (CBN) and annual data set of the National Bureau of Statistic (NBS) 2018 edition. The timeframe covers the period of 1981 – 2017, covering annual data of the variables of inflation, unemployment rate and data for Gross Domestic Product (GDP) growth which serves as a check variable.

Our model specification is therefore given as:

Unemp = f(Infl, GDP) 1

Unemp = a₀ - a₁infl + a₂GDPGR 2

Unemp = a₀ + a₁infl + a₂GDPGR_t + e_t 3

Where a₀, a₁ and a₂ are coefficients of the constant, inflation and GDP respectively.

Unemp = unemployment rate

Infl = inflation rate

GDPGR = Growth rate of GDP

et = Error term or stochastic term

3.2 Estimation Procedure

The analysis of data in this research started by test of stationarity of the data in order to avoid working and interpreting a spurious result as time series data are mostly unstable in their natural form. We adopted the Philip-Perron (PP) and Elliot-Rothenberg-Stock DF-GLS test of stationarity. After determining the unit-root properties of the variables and ascertaining their levels of properties, we proceed to determining the long-run and short-run dynamics and elasticities of the coefficients.

4 Empirical Analysis

4.1 Unit Root Test

In order to have a very robust stationarity check result, we employed the Philips-Perron (PP) and the Elliot-Rothenberg-Stock DF-GLS unit tests in our analysis.

Table 1: Result of Philip-Perron (PP) stationarity test

Variable	PP Test Statistic	5% critical	10% critical	Prob.	Order of Integration
UNEMP	-4.690739	-2.945842*	-2.611531**	0.0006	I(0)
INFL	-2.952425	-2.945842*	-2.611531**	0.0493	I(0)
GDPGR	-3.168633	-2.945842*	-2.611531**	0.0303	I(0)

Source: Authors' computation, 2019. Eviews 9

Table 2: Result of Elliot-Rothenberg-Stock DF-GLS stationarity test

Variable	DF-GLS Test Statistic	5% critical	10% critical	Order of Integration
UNEMP	-1.959875	-1.950687*	-1.611059**	I(0)
INFL	-3.020464	-1.950394*	-1.611202**	I(0)
GDPGR	-2.924336	-1.950394*	-1.611202**	I(0)

Source: Authors' computation, 2019. Eviews 9

*, ** represents significant at 5% and 10% level respectively.

The results emanating from the unit root test in table 1 and 2 above show that all the variables are stationary at levels, and having determined that all our variables are stationary at levels I(0), therefore we have the justification to apply the Ordinary Least Square model to determine the longrun elasticities of the coefficients. Bearing in mind the endogeneity problem which the static OLS may not take care of, we adopted the Fully Modified Least Square (FMOL) regression model is superior to the OLS and it provides a more consistent and robust result. The FMOL of econometrics analysis is preferred to OLS because it provides more superior, reliable and consistent results and it takes into account the endogeneity problem that might rise in such analysis which the OLS cannot take care of (Philips and Hansen, 1990).

Table 2: Result of the FMOL

Variable	Coefficient	t-value	P-value
Infl	-0.492102	-3.402040	0.0018*
GDP	0.312950	1.721586	0.09***
Constant	9.703822	2.957208	0.0057*

Source: Authors' computation, 2019. Eviews 9

*, *** represents significant at 5% and 10% level respectively.

Table 2 above presents the result of the FMOL model of our analysis. The result provides a reliable and empirical evidence that an inverse relationship exists between unemployment and inflation in Nigeria over the study period. The coefficient of inflation is -0.492 (0.0018) probability value in bracket. This shows that inflation and unemployment share a negative and significant relationship in Nigeria within the period under investigation. Or findings are in line with the findings of Okafor *et al.* (2016), Edeme (2018) and Buba *et al.* (2017). On the other hand, it contradicts the findings of Iyeli and Edeme (2017) and that of Orji *et al.* (2015) whose empirical findings show that a rather than inverse, a direct relationship exist between inflation and unemployment in Nigeria.

Having ascertained that an inverse relationship exists between the two variables, we therefore support that Philips curve theory is applicable in the Nigeria context as it can serve as a policy guide to policy makers. The empirical evidence emanating from this research is that for Nigeria to achieve a one-percent reduction in unemployment rate, she must allow inflation rate of increase at about forty-nine percent. This shows that a trade-off exist between the two variables. Our findings conform to the postulates of Philips curve theory.

Diagnostic Tests

The Breusch-Godfrey Serial Correlation LM Test and Harvey heteroskedascity Test show that there is no presence of serial correlation or heteroskelasticity in the model; therefore our empirical findings are consistent and reliable for policy making.

5.1 Conclusion and Policy Recommendations

The study relied on available data in Nigeria to empirically prove and contribute the ever unending debate of the existing relationship between the twin problems of unemployment and inflation in Nigeria. Every country both the developed and emerging economies contend with the challenges presented by the evils of unemployment and inflation rates. The idea of a trade-off between the two variables as Philips curve theory suggested had opened up more interesting aspect of the debate as Economists and other researchers are trying to prove the applicability of such trade-off in their various economies.

Every nation wants to achieve the macro-economic goals of reduction in unemployment rate and stability in general price level. Making use of annualized time-series data of Nigeria between 1981 to 2017 which was obtained from the statistical bulletin of the CBN and that of the NBS, we discovered that such trade-off as postulated by Philips curve do actually exist in the Nigerian economy. Our findings indicate that inflation significantly impacted negatively on unemployment in Nigeria, while GDP has a positive and significant effect on unemployment within the period under review. Based on the aforementioned scenario, we suggest that Nigeria should strive to establish a proper balance between the two variables as the study had proved that actually such trade-off exists. Secondly, the research had brought to bear that the government should not rely only on monetary target alone as a means of controlling inflation in Nigeria rather they should employ other avenues that can increase output and invariably increase the rate of employment in Nigeria (Economic deepening). They should adopt economic deepening as such would guarantee increases in output and invariably leads to a reduction on unemployment rate.

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A Comparative Analysis Between Private Sector Employees and MBA Aspirants on Performance Appraisal System

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Abstract- Performance Appraisal is a systematic, general and periodic process that assesses an individual's performance and productivity in relation to certain pre-established criteria and organizational objectives. Performance Appraisal indicates the level of desired performance, level of actual performance and the gap between two. This system can be implemented through personal attention, feedback, career path, employee accountability, person's level of achieving goals and reaching the targets. This paper looks at the comparative analysis between private sector employees and MBA aspirants on performance appraisal system. The data given by the students and employees is separated using Microsoft excel and then through SPSS analysis, relation between independent variables like gender, occupation and dependent variables like motivation, need of appraisal and role of appraiser is analysed. The study concludes that there is a need for performance appraisal system in the organization from both student and employee perspectives. Performance Appraisal system is helpful for improving skills of both students and employees.

Index Terms- Feedback, Employee accountability, Personal attention, Career path

I. INTRODUCTION

A major concern of every organization should be to contribute positively towards the achievement. A manager can ensure organizational effectiveness only by guaranteeing the full utilization of human resource available through individual employees under his guidance. Hence, it is always required for a manager to monitor and measure the performance of employees. A merit rating or performance appraisal or performance review is a method by which the performance of individual can be evaluated. Performance Appraisal process is incomplete without the feedback given to the individual about his/her appraisal and performance. But the way of giving as well as receiving the feedback differs from person to person and their way of handling and the outlook towards the issue.

Student evaluation is done to assess performance (skill attainment) and knowledge learned in the educational program. It helps in monitoring student progress, providing structure for students, aid them in career guidance. Employee appraisal is a

formal and at times informal and documented process of the performance of workers, professionals and other staff members of an organisation to measure the intrinsic worth and work performance of employees and encourage, motivate and reward them based on their performance.

II. OBJECTIVES

- To determine the need of performance appraisal system.
- To know how satisfied are the employees and the MBA students with the existing appraisal system.
- To know the requirement of changes in the existing appraisal system.

III. REVIEW OF LITERATURE

1. **Narayana (1997)** further believes that performance appraisal is based on the principle of management by agreement or contract rather than management by command. It can in fact play a major role of providing for an integrated and coherent range of human resource management processes which are mutually supportive and contribute as a whole for improving organisational effectiveness.
2. **Shri. Narendra Ahuja (1997)** felt that most of the Appraisal systems had become merely a routine exercise and hardly served the purpose that organization wished to achieve. In light of the same, Narendra Ahuja brought out the publication covering each aspect of the appraisal system that would have been a useful reference source for human resource professionals, organizations, appraisers and appraisees.
3. **T.R. Manoharan (2002)** has written in his article that he has noticed in many organizations that the appraisal systems are not relevant to organizational objectives, subject to personal bias and are often influenced more heavily by personality than by performance.
4. **T.V. Rao (2003)** talks about the movement or shift in performance appraisal systems in the Indian Organisations over the years in the latter half of 20th century. These organizations have enumerated some

points, which are indicators for further development in the Performance Appraisal System.

system. It is carried out through the analysis of data collected through a questionnaire. Microsoft Excel and Statistical Package for Social Sciences (SPSS) software is used for Data analysis. Sample size is 50 and the technique is random sampling technique.

IV. METHOD

This study is about the comparative analysis of private sector employees and MBA aspirants on performance appraisal

V. HYPOTHESIS

S.No.	Null Hypothesis	Alternate Hypothesis
1.	Occupation has no significant effect on Motivation	Occupation has a significant effect on Motivation
2.	Gender has no significant effect on Need of appraisal	Gender has a significant effect on Need of appraisal
3.	Gender has no significant effect on Role of the appraiser	Gender has a significant effect on Role of the appraiser

Table-1: Hypothesis table

Data presentation

	Occupation									
	MBA Student (%)					Employee (%)				
	SA	A	N	D	SD	SA	A	N	D	SD
Need of Performance appraisal in the organisation	28	18	2	0	0	30	16	2	0	6
Satisfied with the existing performance appraisal system	10	14	24	0	0	4	26	16	2	4
Need any changes in the existing appraisal system	16		12	20		18		8	26	

Table-2: Responses table

Occupation Vs Motivation:

		Motivation					Total
		Agree	Disagree	Neutral	Strongly agree	Strongly disagree	
Occupation	Student	10	0	8	1	5	24
Total		10	0	8	1	5	24

Table-3: Crosstabulation of responses of MBA Students

		Motivation					Total
		Agree	Disagree	Neutral	Strongly agree	Strongly disagree	
Occupation	Analyst	1	0	0	0	0	1
	Employee	2	0	0	0	0	2
	Engineer	1	1	0	2	2	6
	Programmer	1	0	0	0	0	1
	Software	2	1	0	2	1	6
	Manager	2	0	0	0	0	2
	Marketing assistant	1	0	0	2	0	3
	Software developer	0	2	0	0	0	2
	Hardware	0	1	0	0	0	1
	Trainee	0	0	2	0	0	2
Total		9	5	2	5	3	26

Table-4: Crosstabulation of Responses of employees

Gender Vs Need of appraisal:

		Need of appraisal			Total
		Agree	Neutral	Strongly Agree	
Gender	FEMALE	5	0	5	10
	MALE	4	1	9	14
Total		9	1	14	24

Table-5: Crosstabulation of Responses of MBA Students

		Need of appraisal				Total
		Agree	Neutral	Strongly Agree	Strongly Disagree	
Gender	FEMALE	5	0	5	3	13
	MALE	3	1	9	0	13
Total		8	1	14	3	26

Table-6: Crosstabulation of Responses of employees

Gender Vs Role of appraiser:

Crosstabulation

		Role of the appraiser			Total
		Both	Helper	Judge	
Gender	FEMALE	8	0	2	10
	MALE	10	3	1	14
Total		18	3	3	24

Table-7: Crosstabulation of Responses of MBA Students

Crosstabulation

Count

		Role of the appraiser			Total
		Both	Helper	Judge	
Gender	FEMALE	7	5	1	13
	MALE	8	4	1	13
Total		15	9	2	26

Table-8: Crosstabulation of Responses of employees

	Pearson's Value	Chi-square	Accepted(>0.05) or Rejected(<0.05)	
			MBA Student	Employee
Occupation Vs Motivation	0.829	0.293	Null hypothesis is Accepted	Null hypothesis is Accepted
Gender Vs Need of appraisal	0.442	0.130	Null hypothesis is Accepted	Null hypothesis is Accepted
Gender Vs Role of appraiser	0.226	0.915	Null hypothesis is Accepted	Null hypothesis is Accepted

Table-9: Hypothesis summary table

VI. FINDINGS

- It is observed that 46% of all the employees and 46% of all the MBA Students need performance appraisal.
- 30% of all the employees and 24% of all the MBA Students are satisfied with the existing appraisal.
- 16% of the MBA Students want changes in the existing appraisal system in their organisation. 18% of the employees want changes in the existing appraisal system in their organisation.
- Occupation has no significant effect on motivation in case of employee. Occupation has no significant effect on motivation in case of MBA student also.
- Gender has no significant effect on need for appraisal in case of MBA student. Gender has no significant effect on need for appraisal in case of employee also.
- Gender has no significant effect on role of appraiser in case of MBA student. Gender has no significant effect on role of appraiser in case of employee also.

VII. LIMITATIONS

- There might be an ambiguity in the data given by the respondents because the data was collected through online survey and also might be because of confidentiality of the data.
- Time limitation.

VIII. SUGGESTIONS

- Both the students and employees should identify a variety of appraisal methods.
- From students and employees' perspective, communication should be improved in the organization to prevent failure of appraisal system.

IX. SCOPE

Performance Management system has undergone a lot of changes in the late 20th century for changing effort to performance. In this changing scenario, few practices like periodical ratings, genuine appraisals etc., have become more important and can be redesigned for successful implementation of the new approach.

X. CONCLUSION

There is a need for performance appraisal system in the organization from both student and employee perspectives. The organization should make attempts to conduct periodical ratings and rectify the gaps that have crept into the appraisal system so that it can become a powerful tool to improve performance.

Performance Appraisal program would be designed in such a way that the appraiser would be able to analyze the contribution of the employee to the organization periodically and all the employees who have been performing well would be rewarded suitably either by an increase in the salary or a promotion.

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Fecundity Correlations; Critical Allometric Determinant for Spawning of *Clarias Gariepinus* from River Uke, Nasarawa State, Nigeria

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Abstract- For fecundity assessment, the Morphometric measurement of fish samples were determined and recorded, fish were dissected to determine the sexes while eggs were collected, weighed and preserved in specimen bottles using 5% formalin prior to estimation. Biologically Viable parameters were equally examined such as; Gonadosomatic Index (GSI), condition factor (K), fecundity and water parameters. A total of 67 samples were collected with total length ranging from 13.5cm – 46.9cm and weight ranged between 70g -1800g. Overall sex ratio for male and female was 2:1 and chi square showed no significant difference in the ratio of males to females. ($p < 0.05$) Positive correlation exists between the following; fecundity and length ($r = 0.97$). Fecundity and weight ($r = 0.98$), fecundity and condition factor ($r = 0.95$), fecundity and GSI ($r = 0.98$). Fecundity ranged from 864eggs - 16,625eggs. Generally,, results portray positive correlation between fecundity and other body parameters of the fish species. it is important to state that, the size suitable for fish culture(spawning range) falls between 1kg - 2.5kg for species of *Clarias gariepinus* which can be used as source of brood stock for production in hatchery to boost aquaculture enterprise and meet nutritional demands of the immediate community, State and Nigeria at large .

Index Terms- Condition factor (K), Fecundity Correlation, Gonadosomatic index (GSI), Sex Ratio, Spawning size range,.

I. INTRODUCTION

The study was design to cover fish species of *Clarias gariepinus* in River Uke located at Karu Local Government area in Nasarawa State, which is in the North Central Part of Nigeria. Karu Local Government is located between latitude 8°-37° North and 8°-2° east. The Local Government is bordered by Abuja in the east, Kaduna in the North, Keffi-Kokona at the west and in the South by Nasarawa Local Government.

The description of reproductive strategies and the assessment of fecundity are fundamental topics in the study of the biology and population dynamics of fish species and also for evaluation of the reproductive potential of individual fish species. Moreover, the availability of data based on reproductive parameters and environmental variation leads to a better

understanding of observed fluctuations in reproductive output and enhances our ability to estimate recruitment (Yem, 2007).

The fecundity of fish is defined as the number of ripening eggs in the female prior to the next spawning period, (Bagenal, 1973). Irrespective of its various applicability and number of purposes, it's still the same; for example, either as part of systematics in racial studies, in connection with total population estimation or in studies of population dynamics or productivity. For all this fecundity determinants, the methods are similar and rail conveniently into three processes namely; catching an unbiased sample, estimating the number of eggs and analyzing the result in relation to other population statistics, (Dickel, *et al*, 2004).

Fecundity data are instrumental in the calculation of reproductive potential of a population, which aids estimation of the minimum adult population needed to maintain and or increase recruitment for commercial purposes, more so, used (along with the adult sex ratio) to estimate stock size (Bagenal. 1968).

Egg preservation usually facilitates counting, though it is still possible to count eggs from unpreserved ovaries even though, difficult and perhaps not too accurate. Most fecundity studies utilize hardened preserved eggs that are easier to count (Offem. 2007).

Olatunde, (2008) reported that, environmental factors were found to cause location – related differences in the fecundity of certain species like catfish. Gonad Maturity Stages in *Clarias gariepinus*, *Chrysichthys nigrodigitanus* and salmon.

For most accurate estimate of fecundity, we embark on total count of eggs in a fish, even though a more tedious and time consuming exercise. Fecundity estimates are based on sub-sampling (Khan, *et al.*, 2002). Other methods include volumetric and gravimetric methods.

Over the years, many African countries have a considerable population growth that has taken place, accompanied by a steep increase in urbanization, industrial and agricultural land use, this has entailed a tremendous increase in discharge of wide diversity of pollutants to receiving water bodies and has caused undesirable effects on different components of the aquatic environment of fisheries (FAO. 1992 and Authman, 1998). The damage done by pollution to the environment is irreversible (Miles, 1999 and Omoregie, 2000). The awareness of harm caused by several pollutants to the natural environment has led to political and

legislative authorities of the industrially developed countries to introduce or renew regulations to protect the environment as reported by Biney *et al.*, (1987).

The main problem of culture fisheries in Nigeria is due to insufficient supply of fry and fingerlings, environmental degradation and drought. This could be attributed to the breeding and culturing of various fish which appears more dependent on the environment that is; marine, brackish or freshwater (FAO, 2007). Fishes in the tropics and some of the tropical water bodies usually experience growth fluctuation due to many factors, some of which are; environmental changes, availability of food, spawning rate, amongst others.

Length-weight relationships of fish play an important role in fishery management (Haimovici and Velasco, 2000). It gives an estimate of average fish weight at a given body length (Haimovici and Velasco, 2000) and also assesses the relative well being of the fish produced. Several studies on length-weight relationship were carried out by Ochkiya (2000) on snake-head fish also known as *Channa obscura* Niger Delta freshwater swamps, Lawrence (2000). Knowledge about fecundity (egg production capacity) of fishes is important for comprehension of their life history. Fecundity assessment of fishes has been useful in racial distinction, progeny survival studies, stock evaluation and aquaculture-based induced spawning and egg incubation. (Fafioye *et al.* 2005)

The absolute fecundity, which is the total number of ripe eggs in the ovaries prior to spawning of an individual female fish (Bagenal and Braum, 1978) is a function of its body length. This length-fecundity relationship is a critical allometric function in fisheries biology due to the relevance of the parameters in various pragmatic applications including: assessments of population fecundity (Bagenal, 1978).

Fecundity and spawning habitats are the important aspects of the biology of fishes which must be understood to explain the variation of the level of population as well as to make efforts to increase the amount of fish harvest. To evaluate the commercial potentialities of fish stocks, information on the fecundity of the fish (*C. gariepinus*) composing the stock is essential. In bio-ecological studies. In practical fish culture, it is very desirable to know the number of eggs, fry and young produced. The knowledge of fecundity estimation may also be used to assess the abundance and reproduction potential of the spawning stock (Khan, *et al.*, 2002). Bagenal (1978) define fecundity as the number of vitellogenic oocytes in mature female prior to the next spawning season. This work considered only the ripe spawnable eggs in the ovary of the fish. However, some other works (Holl, 1966; Bowmaker, 1973; Clay 1979; Eyo and Mgbenka, 1992 considered fecundity to include all available eggs in the ovary of the fish (total fecundity).

Studies on fecundity is important to evaluate the reproductive potentials of the species (Duarte and Araujo 2002) and it gives prerequisite information needed to plan a bridging program so as to determine how many eggs would be spawned or stripped, the amount of rearing facilities required and the extent to which various culture equipments would be put to use (Eyo and Mgbenka 1992). Reproductive biology of the clariids and other culturable species have been studied by many researchers across the globe particularly in Africa and there have been specific research on fecundity (Yalcin, 2001).

Mshella *et al.*, (2009) and Bagenal (1978), stated that enormous fecundity in fisheries is related to enormous mortality. They also reported that an increase in fecundity of an individual within the population represents an adaptive response of the population to environmental changes where an increase in fecundity ensures preservation and notation of the species, it ensures its relative stability both in space and time, in the event of fairly wide fluctuation in the environmental conditions and it means that fecundity showed increase with increasing environmental harshness.

Condition factors of different populations of the same species gave some information about food supply and the timing and duration of breeding. It is also used in assessing the well-being of a fish (Ekanem, 2000). This value (K) is used in assessing the health condition of fish of different sex and in different seasons.

II. LITERATURE REVIEW

Ecology and Culture of *Clarias gariepinus*

The African catfish (*Clarias gariepinus*) is widely distributed throughout Africa. It has a Pan-African distribution ranging from the Nile Basin to West Africa and from Algeria to Southern Africa. It also occurs in Asia Minor (Israel, Syria and South of Turkey). They are termed "Potamodromous" which means they migrate within streams and rivers (Teugels, 1986). It inhabits tropical swamps, lakes, rivers, lagoons, basins and some of which are subject to seasonal drying thereby forming creeks and holes to hibernate and wait for due season (rainy season rainfall) Viveen *et al.*, 1986.

Aquaculture is simply the farming of aquatic organisms in enclosed water bodies such as ponds, dams, pens, raceways, aquaria etc. One can hardly talk about aquaculture today without the mentioning of artificial propagation of fish seed of a cultivable species (e.g. *Clarias gariepinus*) for commercial purposes. This fish species is most often chosen for its fast growing nature and its acceptability to consumers especially in Africa with Nigeria included. Huisman (1976) stated that *Clarias gariepinus* have proved to be a very suitable species.

Clarias gariepinus is one of the most cultured fish as to *carps* and salmonids and tilapias. Over few decades, the production of farmed *Clarias* (cat fish) has shown a tremendous increase, jumping from 383, 654 metric tons in 1990 to 1,505, 804 metric tons in 2002 (FAO, 2007). The value of farmed cat fish (*Clarias*) has also witnessed a great increase during the past two decades, going from \$154 million in 1984 to 1800.7 million in 2002 (El-Hafway, *et al.*, 2007).

In Nigeria, the national demand for fish is established to be 1.18 million metric tons annually and the potential yield is estimated at 1.83 million metric tons (Holl, 1993). However, the actual fish supply in 1993 report was 619, 211 metric tons with a decline of 515, 135 metric tons in 1994 (FAO, 1995). This short decline in the fish supply have been attributed to the inefficiency in fisheries management, development and poor post harvest technology in terms of handling, processing, preservation and storage. Distribution and sales aid sustainable aquaculture. Aquaculture which promises the most renewable option only supplies 2% of national demand now (Fafioye, 2006).

The big *Clarias* (*anguillaris*; Linnaeus and. *Gariepinus*; Burchell) occupy unique and prominent position in commercial

fisheries and as such, fishermen seek the *Clarias Species* because it could attain biggest size (7kg) and it's very tasty (Holden and Reed, 1972). Thus commands greater commercial value and fetches a higher price. Aquaculturist seek out the wild fry and fingerlings of *C. gariepinus* to stock their ponds because in fish culture trials, it grows fast and has an efficient feed conversion in especially the males (Henken *et al.*, 1987); It is tough and can tolerate poor water quality conditions (Hogendoorn *et al.*, 1983). It can **also** mature and reproduce in captivity (Hogendoorn, 1980; Viveen *et al.*, 1985). *Clarias gariepinus* is in the family *clariidae*, it is a highly sophisticated cat fish with a massive skeletal system, used in its mastery of defense and offence, they are found in a variety of ecosystem particularly at the Niles and fresh water(s). They feed on phytoplankton, periphytons, aquatic plants, small invertebrate, debris and con-specifics and are also known to be carnivorous. Nile *Clarias* can filter feed by entrapping suspended particles including phytoplanktons and bacteria on mucous in the buccal cavity, although its main source of nutrition is obtained at the bottom and therefore are termed bottom feeders.

Members of the family *clariidae* among the commercial fishes found in Uke river of Nasarawa State, ranks second in terms of number and weight when total fishery of the area is considered. Both small-scale and commercial production of *Clarias* is rapidly expanding in many countries, while remarkable progress has been made in improving the productivity of crops and livestock in the last three to four decades through breeding and selection. It is only in the last few decades that efforts has been made to harness the benefits of genetic improvement in fish (Ofitem, *et al.*, 2007).

Biological Backgrounds, of *Clarias gariepinus*.

Morphology

The African catfish are elongated with fairly long dorsal and anal fins. The dorsal fins have 46-65 soft rays. They have strong pectoral fins with spines that are serrated in the outer side (Tuegels, 1986). These species can attain a sizeable length of 1.7 meter from tip of the snout to the end tip of the anal fin (tail) and can weigh up to 60kg (Eyo *et al.*, 1992) when fully grown. They possess anal and maxillary barbells, somewhat smallish eyes, they are dark or grey in coloration dorsally and creamy coloured ventrally. Adults possess dark longitudinal lines on either side of the head. However, this is absent in young fish, adult heads are coarsely granulated, while the head is smooth in the young. Their heads are large, depressed and heavily boned. The mouth is quite large and sub-terminal (Omeregie *et al.*, 2000). They are also obligate breathers which mean they spend some time on the surface. These species can live in very poor oxygenated water and is one of the last species to live in such an inhabitable place (Ekanem, 2000). They also secrete mucus to prevent drying and are able to burrow- in muddy substrate of a drying body of water (Kariman, 2008).

The classification of *clarias gariepinus* is thus;

Kingdom	Animalia
Phylum	Chordate
Subphylum	Vrtebrata
Class	<i>Actinopterygii</i> (Rayfined fishes)
Order	<i>Suluriformes</i> (Cat fish)
Family	<i>Claridaea</i>
Genus	<i>Clarias</i>
Species	<i>gariepinus</i>

Hence, Binomial name: *Clarias gariepinus* (Teugels, 1986).

III. METHODOLOGY

Sample Collection

Clarias gariepinus were randomly collected (purchased) from Artisanal fishermen in Uke Rivers, Nasarawa State, Nigeria. The collection of the samples look place between February and April which is a twelve weeks period encompassing the spawning season of most species. Fish species were caught using gill net, and cast net during the period at sample collection. Fresh (live) samples were transported to the Zoology Laboratory, Department of Biological Sciences, and Nasarawa State University. Keffi.

IV. SAMPLE ANALYSIS

Determination of Weight

Weight of each fish was determined using a weighing balance (Camry Emperors 44lb x 2oz or 20kg x 50g) and measured to the nearest 0.1g. The ovaries were weighed using sensitive metla-balance (pm 2000), (Nikolsky, 1963).

Determination of Total and Standard Length

Total length of each fish sample was obtained by placing the fish laterally on the dissecting board, using a meter rule, from the mouth (tip of the snout] to the end (tail) which is the total length, while from the tip of the snout (mouth) to the end of the caudal penduncle is the standard length. The total length was measured to the nearest 0.1 cm and recorded for statistical analysis (Kariman, 2008).

Dissection of Fish

Each fish sample was placed dorsally on the dissecting board, using the dissecting tools to eviscerate the fish and the ovaries isolated. The gonad was recorded and as well gonad weight was taken and recorded to the nearest 0.1g (Kariman, 2008).

Estimation of Fecundity of Fish Samples

The fecundity of collected *Clarias gariepinus* was estimated using gravimetric method. The following parameters were kept for each individual fish separately: The fish length, body weight and gonad weight. The fish was cut open to determine the sex and mature gonads were removed and preserved in 5% formalin, (Kariman. *et al.*; 2008).

Preparation of 5% Formalin

The chemical used in preparation of the preservative are; formaldehyde and water. For every 100ml of formalin it will contain 5ml of formaldehyde and 95ml of water. This preservative was prepared in the laboratory of the Department of Biological Sciences Zoology Unit). Ovaries were preserved in labeled sample bottles.

Counting of Preserved Eggs

To clean the eggs, the formalin was decanted and replaced by water followed by a periodic vigorous shaking which liberated

most of the eggs but the remainder were removed manually. The ovarian tissues free of eggs were removed using forceps. The sample bottle now containing the free eggs in 5% formaldehyde made cloudy by minute fragments of tissue. By repeated filling with water and decanting the supernatant, the eggs became sufficiently washed.

Egg Count

The preserved and washed eggs were poured into a filter paper in a funnel. When the liquid has drained away the paper and eggs were spread to remove excess moisture. After 3 minutes the eggs were spread until they can be moved without raising the surface of the paper. When they were thoroughly dried, they were counted. Eggs in 1 gram subsample were counted. Fecundity estimate for each fish sample was obtained by multiplying the total weight of eggs by the number of eggs per gram weight (Nikolsky, 1963), (Kariman, 2008).

V. RESULTS

Table 1. Gonad Maturity Stages in *Clarias gariepinus*

S/N	GONAD CONDITION	FEMALE/MALE
I	Immature	Young individual which have not yet engage in reproduction: gonads of very small size.
II	Resting stage	Sexual products have not yet began to develop; gonad of very small size; eggs not distinguishable to the naked eye.
III	Mature stage	Eggs distinguishable to the naked eyes: a very-rapid increase in weight of the gonad is in progress; testes changes from transparent to a pale rose color.
IV	Maturity stage	Sexual products ripe: gonads have achieved their maximum weight, but the sexual products are still not extruded when light pressure is applied.
V	Reproductive stage	Sexual products are extruded in response to very light pressure on the belly; weight of the spawning to its completion.
VI	Spent condition	The sexual products have been discharged, genital aperture inflamed; gonads have the appearance of deflated sacs, the ovaries usually containing a few left-over eggs and the testes some residual sperm.
VII	Resting stage	Sexual products have been discharged; inflammation around the genital aperture has subsided; gonads of very small size, eggs not distinguishable to the naked eye. According to

Table 2. Relationship between fecundity and body parameters of female *Clarias gariepinus* from River Uke, Nasarawa. Length (cm)

Total length (cm)	Standard length (cm)	Total weight (g)	Gonad weight (E)	GSI	Condition Factor	Fecundity (f)	Log _{T_L}	Log Wt	Log f
25.6	23.20	400	1.00	0.25	2.40	1,680	1.24	2.69	2.00
17.60	13.20	500	1.00	0.22	7.17	980	1.13	2.60	2.95
13.50	37.00	400	1.00	0.25	6.00	901	1.62	2.90	3.51
42.00	38.00	800	2.00	0.25	1.10	3,250	1.60	2.95	3.17
40.00	29.00	900	1.00	0.11	1.40	1,480	1.57	3.14	4.22
38.00	27.00	1,400	4.00	0.28	2.60	16,625	1.50	3.00	3.92
32.00	38.00	1000	3.00	0.30	3.10	8,350	1.47	3.00	4.01
30.00	34.50	1000	3.00	0.16	3.70	10,250	1.61	3.14	3.35
41.00	15.30	400	4.00	0.28	2.00	2,250	1.60	3.00	2.98
40.00	17.10	200	3.00	0.30	1.50	960	1.30	2.60	2.93
20.00	13.10	100	1.60	0.40	4.90	864	1.34	2.30	-
22.00	11.60	500	1.00	0.50	1.90	-	1.25	2.00	-
18.00	12.80	310	1.00	1.00	1.70	-	1.21	2.69	3.04
16.50	15.20	280	3.00	0.60	6.00	1,106	1.24	2.49	-
17.40	16.40	400	2.00	0.65	1.70	-	1.29	2.44	3.00
19.50	15.10	200	1.50	0.54	5.90	1,008	1.34	2.60	3.23
22.20	38.00	1,400	2.00	0.50	3.70	1,732	1.28	2.30	3.21

19.40	37.00	1,400	1.50	0.75	3.70	1,630	1.61	3.14	4.08
41.00	25.10	1,400	4.00	0.28	2.00	12,080	1.63	3.14	-
42.80	37.50	600	1.00	0.07	1.80	-	1.46	3.14	3.92
29.30			3.00	0.23	5.60	8,320	1.63	2.77	3.79
43.00			3.00	0.50	0.70	6,302			
511						79,768			

r(Length -Weight)=0.998,
r(Fecundity -length)=0.972,
r(Fecundity-Weight)=0.981,
r(Fecundity -Gonad)=0.980

VI. RESULT INTERPRETATION

Statistical Analysis

Correlation and Regression analysis were used to calculate length-weight relationship and also -body parameters relationship.

VII. DISCUSSION

LENGTH-WEIGHT

There were more males than females of *Clarias gariepinus* and they can probably be attributed to the relative few spawnable females susceptible to catch. The low population of this fish species in the river might be responsible for the production of large sizes of fish, there is however an assurance that every mature female will get a male to mate it.

The variations recorded among the Morphometric characteristics assess are due to the seasonality associated with spawning, which is an indication of a cyclic pattern of maturation. A similar cyclic pattern of maturation has been demonstrated for *Clarias gariepinus* in lake Kabira. McIlwaine and Kyle and in Zimbabwe as reported by (Holl,1968). Thus the variation could be associated with the onset of rains as an indicator of spawning and development of a fish interplay with other factors. This also agrees with the observation of Green wood, (1955), Holl(1968) and Clay. (1979) who also reported that the onset of spawning of *Clarias spp* was short after heavy rain.

Many tropical fishes are reported to breed at the beginning of the rainy season(Greenwood, 1958; and VanderWal,1978).*Clarias gariepinus* bred throughout the year, reason for this patter may be due to the large varieties of food items in the river which is an advantage for gonad material production to meet the all year round egg or milt production. The availability

of suitable environment may also be responsible for extended breeding in the river.

VIII. SEX RATIO

Observation made on 67 *Clarias gariepinus* caught showed that 44 were males and 23 were females giving a male/female ratio of 2:1. The smallest mature male had a total length of 20.2cm while the female was 16.5cm. The length frequency of all *Clariasgariepinus* on spawning runs in fig. 2.

The fecundity (F) was expressed in relation to the log of total length (T,) and the relationship was linear.

The fecundity was also linearly related to the fish body weight (BW) and condition factor .

The sex ratio for *Clarias gariepinus* in River Uke is approximately two males to one, Eyo. J.E and Mgbenka, (1992) observed a ratio of one male and one female in Anambra River Basin. Fafioye (1996) observed a sex ratio of approximately one male to one female in *S. galilaeus*(a cichlid) of Oba reservoir.

IX. CONDITION FACTOR

The condition factor values varied between males and females specimen of the same size group showcase high k-values in the small size fishes and decreased in the larger fish. Nikolsky, suggests that the condition factor is not stable but rather fluctuate depending on the health statue which is ecologically determined. The k-values obtained in this study indicate that the relatively smaller sized fishes are better adapted to the ecological statues of the river. This may be in terms of their predatory or feeding activities. Mgbcnka and Eyoalso attributed the decline in condition factor to the deposition of materials for gonad formation which lead to increase in weight and actual spawning which lead to reduction b weight respectively.

$$\text{Condition factor (k)} = \frac{100W}{L^3}$$

Where W= Weight of fish in grams
L = length in cm

X. GONADSOMATIC INDEX (GSI)

The very low GSI values obtained, showed that the fish species uses a good percentage of its body for egg production. Imevbore (1970) remarked that an increase in the frequency of ling of African fishes is usually accompanied by a fall in GSI of females fishes. This probably explains the very low GSI values of *Clarias gariepinus* in river Uke.

Gonado-Somatic Index (GSI) =

$$\frac{\text{Gonad weight} \times 100}{\text{Weight of fish}}$$

XI. FECUNDITY

In the fecundity studies, the average number of eggs per females was 4431. The result obtained in this work is lower than that observed by other workers. Fecundity in *C. gariepinus* was reported to be up to 25000 eggs by Eyo and Mgbenka (1992), while Adikwu, I.A and Zaki, G.M. (2001) reported a fecundity of 38000 in Nguru wetland of Northern Nigeria.

A relatively lower fecundity obtained in this study might be attributed to degree of parental care in the fish species. As a rule, the fecundity of a fish is inversely related to feed degree of parental care it exhibits (Lagler *et al*, 1977; Nikoisky, 1963). The relative low fecundity in this study as compared to other works could be as a result of low water level due to dry season.

In this study, fish species of the same length or weight had variable fecundities. Bagenal, 1957) asserted that fish species exhibit wide fluctuation in fecundity among fish of the same species, size and age. Bagenal (1966, 1969) suggested that variation in fecundity may be due to differential abundance of differential feeding success within the members of the population. Fecundity =

$$\frac{\text{Total weight of ovary} \times \text{number of eggs in sub sample}}{\text{Weight of sub sample}}$$

XII. CONCLUSION

In conclusion, the positive allometric growth and condition factor exhibited by *Clarias gariepinus*, indicated that River Uke had suitable water environment for its survival and growth in relation to physio-chemical parameters of the water, thereby showing a very strong and positive correlation between fecundity and other body parameters of the fish. Hence, succinctly recommended that, to ensure the continuous survival and growth of this species in the river, a management in place is required for proper and constant monitoring, as well as control of the physiochemical parameters, such as temperature, Dissolved Oxygen (DO), Total Suspended Solid (TSS). Biological Oxygen Demand and Electrical conductivity, etc of the River, while brook stocks which falls within sizes suitable for fish spawning between

1kg - 2.5kg are better induced in hatchery for aquaculture enterprise, given a good mimicking of physiochemical parameters are made to maintain the existing suitable conditions in pond for ensured survival and or good productivity for the wellness of the *Clarias gariepinus* species.

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The Role of Small Enterprises in The Development of Libyan Society and Economics

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Abstract- Libya lived a considerable period of recession, the economy nearly the last forty years has this period old Libya was suffering from poverty and hunger and were dependent entirely on agriculture and animal husbandry, and this was before the discovery of oil a year before 1951, and then oil was discovered in Libya and began to export almost 1958 and Libya began in drawing three development plans, short-term and medium-term and long-term work on the development of individuals and their development and the provision of building good infrastructure, but this did not continue because of the power struggle has changed the system of government from a monarchy to a revolutionary system of military ruled the country for forty years and the direction of this military system to the application of the economic system Communist rule if the state is of finance fundamentals living members of the community worked to provide all dues basic life only from clothing, and housing, but this policy does not tend never to markets and encourage investment and did not even work on the teaching of students in universities, the state is in the eyes of this provision is a merchant and is an investor, a market, and here occurred error where neglected education, training and development of individuals was most Libyan society almost dependent adopt a holistic are being provided by the State of consumer goods were State supports this item and sells the cheapest did not think people in the self-development or research on development and development because originally this thing does not exist only by the state and the country was closed to the world and the development of the Renaissance and contemporary life it was the Libyans to rely on the post and was get a monthly salary and then turn to consumer associations and buy the commodity from Eater, clothing, and other durable goods and non-durable for use in the home and there were not small projects and not a medium for they were all owned by the state and no businessmen because Law Revolution does not allow it was difficult to the success of any small project was or the average of the lack of possibilities and the inability to obtain the required permits and also the competitive advantage of the already non-existent because the state is the biggest competitor owner of the project could not compete with state support goods and sell them at discounted prices so if there was a clear difference in the quality Individuals in Libya were dependent on salaries only and have no other source of income or other income were those salaries last them to the end of the month only and can not even save them. From here came the idea in writing on the program of small projects In the last period of the life of Libyan society after resolving most of the outstanding issues with the bone in the world has opened up Libya outside world and moved precipitated free economy and looked people in Libya think actually in the creation and establishment small businesses and medium and became an

individual in Libya, more than one source of income, but individuals wishing to establish small businesses lack the expertise and skill, and how to create ideas and get good opportunities to establish projects wishing them because most of the small projects have been successful only lacked how to manage financially and administratively, and from here to write a review of this study and work on them to deliver the idea and encourage the success of small enterprises.

New innovation actually can and creativity in creating the idea and finding new and innovative cutting-edge ideas in which they can work on the establishment of a small project and utilize it to the fullest.

Index Terms- small enterprises, microprojects, revolution, small business, credits, Libya

I. INTRODUCTION

The small projects of the most important projects of economic, social and political that have contributed and continue to contribute to the progress and growth in many countries of the world, in addition to being a source of income for members of the community, which led to an interest in the study and draw appropriate strategies to her, and adopted as projects feasible for their ability to the achievement of economic and social welfare of the communities as one of the tools actors in supporting the local economy and the international extension.

The availability of core funding for small projects and bring about changes parallel the economic and social environment, fiscal and legislative important factor and tributary financially supportive in exchange operations, maintenance and development, training and other in order to achieve the objectives of small enterprise development on the one hand, and profitability on the other hand, the continuing growth and development of human resources on the other hand. To achieve this, it requires a reconsideration of the financial conditions in small projects with more care and attention in their financial structures and the search for new sources ensure the safety and profitability.

On the other hand, faced small projects in Libya, many of the problems and the most prominent of which funding problems of various types of ownership or financing or borrowing to participate or Islamic Murabaha or lease that had a clear impact in the failure of many small projects.

So here we will focus on a number of topics related to and including:

1. Definition of some of the concepts of small businesses and standards, and their properties both domestically and

internationally, the most important definition: the European Union, the World Bank, the United Nations Industrial Development Organization, the United Kingdom, the United States, Egypt, Libya.

2. Highlight the importance and the role of small projects economically and socially through a series of economic measures and legislative branches to ensure the achievement of many of the economic and social objectives, including, for example: the development of new human resources and here we mean graduates of universities and higher vocational institutes and medium enterprises, the reduction of unemployment and grant opportunities Operating and investment and employment optimized for human resources, and the elimination of underdevelopment, and increase the standard of living, and others.

3. Showing some surveys backed data and information through Fin for small projects at both the global and local levels.

4. Shed light on the reality of small projects and funding mechanisms in Libya in the earlier stages and so far and witnessed economic and social activity in Libya changes from positive and negative, and formed of the importance of the Libyan economy.

5. Sources of funding for small projects and which are formed: forming sources of funding for small projects funding ownership represented in the self-financing of external financing through trade credit, bank credit, loans bodies and supporting institutions and specialized in micro-finance, loans, Islamic finance program of Islamic banking Libya, loans, parents and relatives and friends.

6. Study and analysis of the mechanisms and sources of funding for small projects in Libya and the possibility of development. So exposure to sources of funding which commercial banks Development Bank and the Rural Bank and the Agricultural Bank of the main sources of funding to finance small projects in Libya.

7. Obstacles and challenges facing the financing of small projects: The many difficulties and risks, both internal and external, including technical, administrative or financial or other.

8. Recommendations, including a proposal to build a balanced financing structures for small enterprises in Libya.

II. THE CONCEPTS OF SMALL PROJECTS

Known as the European Union small projects that each entity or organization neighborhood practiced economic activity, and the least number of employees by about 100 workers. The World Bank projects that which ranges where the number of workers between (1-25) factor. The United Nations Industrial Development Organization UNIDO defined in the standard for small number of workers see that the project is small, which employs the (15-19) factor. In the United Kingdom are considered small businesses if employed less than 200 workers in manufacturing, but in the field of mining and construction, the projects are small if the number of workers is less than (25) factor, and uses standard annual sales as a criterion for the division of facilities that operate in the field of transportation wholesale and retail. In the United States knew the small enterprises (SBA) small projects as "an enterprise owned and managed independently, and it is targeting a profit, does not dominate in the field of work or activity of any non-monopoly, but competition, where the standards are based on the size to two indicators: the number of

employees and annual sales (average the last three years). Authority has identified activities in which it operates small projects with the application of a criteria mentioned.

SIZE	STANDARD	SECTOR
500 up	Number of employees	Manufacturing
Less than 5 million	Annual sales value	Retail business
Less than 5 million	Annual sales value	Services
100 up	Number of employees	Trade clause
Less than 5 million	The value of annual revenues	Building Contracting
Less than 5 million	Annual sales value	Commercial activities especially
Less than 5 million	Annual sales value	Agriculture

In Libya : know small projects such as economic units which employs less than 100 workers and with a limited share in the market.

Some argue that no more than the number of workers (20) factor, while in Libya is viewed her as a civil institutions productivity, service and a tool for economic and social development to accommodate the forces of young available where technical specifications, administrative and technical measures to run efficiently, and standard working projects in Libya is (25) element does not exceed the value of the lending institution, which gives this magnitude million Libyan dinars

Second, the specific criteria for the concept of sall projects

There are several definitions for small projects, both at the international level or individual countries according to the standards of many and varied, which can be summarized as follows: -

1. Standard employment (number of employees)

The standard of the most important labor standards and the most common at all in determining the size of the project and in the distinction between small and large, as a result of the availability of data on employment in most countries.

2. Standard invested capital:

Adopts this standard in determining the size of small projects, according to a maximum of capital invested in the project varies depending on countries where there are these projects.

3. Standard labor and capital:

Or what is called the standard binary or double by placing a maximum of labor beside a certain amount of fixed capital investments in small projects.

4. Standard annual sales value:

Sales is the most important engine for project operations and are affected by the assets, liabilities and property rights and the costs of all kinds, and because the number of sales volatile inflation, it is preferable to account for an average of two or three years to reach the minimum specifically to the small size of the project.

5. Standard small share of the project in the market:

This requires measuring the size of the market and then measuring the share of small-scale project in the market, which is also linked to the standard value of your annual sales.

6. Standard level of technology used:

Small facility tend to use technology with a low level of complexity and progress, or the use of outdated machinery and equipment for the purpose of reducing costs, they also are part of the production process or marketing, which does not require the physical facilities are integrated.

Economic and social importance of small enterprises:

- contribute to the reduction of unemployment and poverty, and the granting of employment opportunities, investment, and expand the base of business
- Work on the development of exports through their finished products for export directly, or capable of entering into the production of other products.
 - attract small savings and directed towards investment and simplified methods.
 - meet local needs for goods and services locally due to diversify what they offer a variety of outputs and high flexibility, whether consumer products or raw materials or semi-processed
 - To contribute to the enrichment of entrepreneurial culture among entrepreneurs and encourage initiative and creativity and innovation which enhances the chances of success of small enterprises.
 - The possibility of achieving the integration of production in a number of facilities like a small industrial complex in the larger facility.
 - broaden the base of the self-financing of projects.
 - Support for large projects, either through feeding industries to industries or large supply of skilled labor, which trained and formed in the small and sometimes rival to the large number.
 - bring about economic and social development, which affects positively in the redistribution of national income in favor of the employers of small incomes, and thus improve their levels, particularly in the less developed regions, the poorest and most rural and remote within the same country, and thus is a way to reduce the areas of poverty and the number of individuals who fall below the poverty line.

Characteristics of small projects

Can summarize the most important characteristics that distinguish from other projects in the following:

1. Decline in the absolute size of the capital needed for the establishment and operation of small projects.
2. Different patterns of ownership.
3. Reduced capacity for self-development and expansion talk.
4. Reduced economies of scale and the importance of benefiting from economies of assembly.

III. THE REALITY OF SMALL ENTERPRISES IN LIBYA – DEVELOPMENT AND CAPABILITIES

Occupies the subject of small projects important place in economic activity in Libya, and deliver a special attention by researchers and interested people and local institutions, in addition to the participation and contribution clear by many of the international organizations in supporting and developing those projects where:

1) began to finance small projects in Libya before the specialized banks and trading since the eighteenth century has shown the Ottoman era through the departments of the British military, French and Italian referee in the ninth century by ten founding of the Agricultural Bank and the Fund for Libya to provide and which have been re-organized at 03/24/1981 with the beginning of the Development Bank.

2) saw the Libyan economy since the seventies shifts in various developmental activities, whether agricultural or industrial, service, or other intent to cause sound infrastructure served as the institutional support of the economic activity of the Libyan public and private sectors.

3) suffered small projects during the period 1980-1999 a case of negligence and shortcomings of the administrative and finance and marketing and legal due to the absence of a clear vision, comprehensive and specific to the nature of the work and goals of small projects, as well as to double the efforts of their development, as well as the absence of the body responsible for the conduct of follow-up and support these projects, which affected on productivity and competitiveness, so they are small projects in that period a secondary role.

4) emerged in 2000 and interest and a clear will by economists and those interested in the advancement of small businesses in all activities and draw its strategic plans, restructuring and put it in a legal framework.

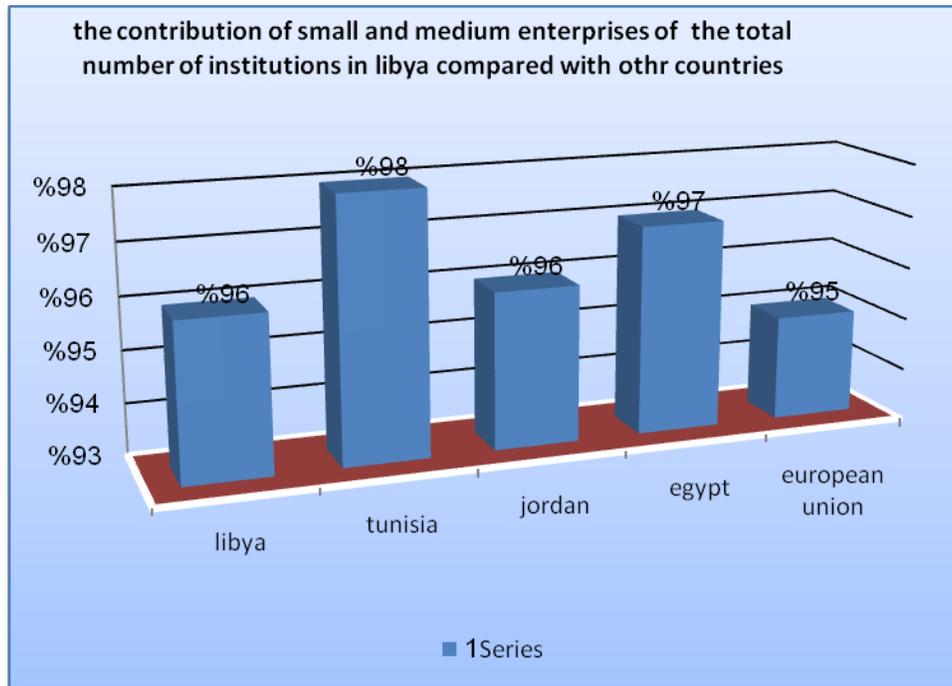
5) form small projects of great importance in the Libyan economy, accounting for nearly 88% of the total number of projects.

6) Some studies in 2007 that 96% of civil institutions in Libya are small and medium enterprises mostly work in the service sector, and works out to about 1.6 million people, and that the majority of employees are of Arab labor and African expatriate and suggest some report Banking that the number is increasing very significantly during the years of the Arab Spring which made increased in per capita income increased by four times during the last five years which performance to a significant rise in prices for most consumer goods.

7) constitute the only Libyan national employment (20%) of the total workforce, at a time that does not exceed the contribution of small and medium enterprises accounted for 4% of GDP.

As will be seen in the following table:

Table No (1) The proportion of small and medium enterprises of the total number of institutions



Showed a statistical survey of the most important results in 2016 for some economic activities on the level of Libya and were as follows:

A.

Number of projects in Libya (168 317) on the distributor project areas as shown in the following table:

A table No (2) showing the number of small projects, broken down by regions in Libya as a sample only

Percent %	Number of Projects	Zone	N
3.4	5754	Batnan	1
2.3	3865	Darena	2
3.8	6343	Algabal alaadar	3
2.8	4550	Almarej	4
11.0	18588	Bangaze	5
3.2	5467	Oases	6
1.1	1863	Alkofra	7
1.8	3045	Searet	8
1.1	1854	Algefra	9
2.8	5032	Alzentan	10
10.5	17699	Mosrata	11
5.6	9366	Almergeb	12
22.0	37032	Trabuls	13
6.6	11136	Algfara	14
7.1	11920	Alzaoya	15
5.3	8842	Zuwarah	16
3.9	6611	Algabal algarbi	17
1.2	1978	Nalut	18
2.9	4937	Sabha	19
1.4	2331	Wadi alshati	20
1.3	2255	Murzuq	21
1.2	2100	Wadi alhayat	22
0.5	790	gat	23
100 %	173349	total	

Source: General Information Authority 2016

Seen from the above table that the largest number of projects located in the region of Tripoli, where numbered (37032) Draft accounting (22%) of the facilities or projects operating in Libya, come Benghazi area ranked second in terms of number, reaching projects by (18588) Draft by (11%), while occupies area of Misrata ranked third with projects reached (17699) project, representing (10.5%) and finally zone languages projects amounted to (790) projects, and what constitutes a rate of (0.5%) of the total projects operating in Libya.

B.

Number of small projects (148 831) project spread over four main activities as shown in the following table:

Table No (3) A statement of the number of economic activities by classification and the extent to which projects

percent	The Number of large projects	percent	Number of medium enterprises	percent	Number of small projects	Economic activity	n
0.7	126	3.5	674	95.8	18313	Industry funding	1
9.4	156	20.1	334	70.5	1170	construction	2
2.5	2504	-	-	97.5	100129	Internal trade	3
67.5	14040	-	-	32.5	29219	services	4
	16826	-	1008	-	148831	total	5

Shown in Table No. (4) that the number of small projects amounted to (148 831) project represents the activities of the manufacturing number (18313) project by (12.3%), and in the activities of construction, bringing the number (1170) project by (0078%), while The number of projects operating in the internal trade activities (100129) project by (67.28%), and the service activities were numbered (29219) project by (19.63%). It is clear from the focus of small projects in the majority of the services activity, which reflects the interest of small business owners and financiers of this type of activity, while the decline in construction activity, reflecting the weakness of interest in him because of the lack of experience and skills in this activity, which requires decision-makers to work on the preparation and training of cadres specialized for the advancement of this sector, as well as payment towards the financing of these projects for their importance and their role in supporting development programs in general.

Sources of funding for projects in Libya:

Considered as commercial banks and Development Bank and the Rural Bank and the Agricultural Bank of major sources of funding to finance small projects in Libya, and can be summarized as follows:

Table No 4: The commercial banks: the total capital of commercial banks in Libya amount of (660) million and described according to the following table:

Capital	Inception Date	Bank	
200Million	1969	Aljamhorua	1
252 Million	1970	Alsahare	2
108 Million	1970	Alohada	3
100 Million	1970	Altegare Alyatne	4
660 Million		Total	5

The volume of loans granted by commercial banks to the economic activities during the period of 2012-2016 the sum of (24774.1) million and set forth in the table below as follows:

Table (5) A statement of loans and credit facilities granted by commercial banks to the Libyan various economic sectors and activities during the period from 2012 to 2016 million dinars

The proportion of economic productivity and service loans to total loans	total	Social advances	Manmade river loans	Real estate loans	Economic production and service activities loans	year
44%	6166.6	1665.7	373.0	1426.3	2701.6	2012

51%	7067.2	1709.9	373.0	1394.4	3589.9	2013
55%	8191.3	1899.9	328.0	1419.4	4544.0	2014
62.5%	10544.9	2473.3	174.0	1300.8	6596.8	2015
62%	11812.7	3192.1	206.5	1278.8	7341.8	2016
56.6%	43782.7				24774.1	TOTAL

Source: prepared by the researcher based on the report of the Central Bank of Libya

2. Development Bank:

Development Bank, a joint stock company established a Libyan based on Law No. (8) for the year 1981 and headquarters in the city of Tripoli, and keep track of the Treasury, and with a capital of (100) one hundred million Libyan dinars. The total amount of funding granted by the Development Bank (801,577.4) million during the period 2012-2016, which appears in the following table:

Table (6) A statement of the loans granted by the Development Bank during the period from 2012 to 2016

total	new	Industrial services	Furniture industry	Textile industry	Minerals industry	Chemical and plastics industries	Building materials	Food industry	year
254408.0	7978.5	196685.7	8377.6	173.9	3240.9	8569.0	18604.1	10778.3	2012
177476.3	52645.5	12976.3	2493.4	2480.0	6837.2	14823.4	59518.9	25701.6	2013
221939.9	41650.9	6858.3	0.0	490.0	5969.9	7843.4	129949.2	29178.2	2014
60968.5	12016.4	1356.4	808.6	607.1	290.9	358.2	40820.3	4710.6	2015
86784.7	5788.1	5260.7	1402.2	0.0	1289.4	1218.3	65793.0	6033.0	2016
801577.4									

Source: prepared by the researcher based on the report of the Development Bank

It was for small and medium-sized share of the total loans granted by the Development Bank, with total lending to the number (3298) of small projects amount (238 614 464), but the number (20) of the projects medium amount (47,544,355) According to the following table :

Table (7) A statement of SMEs funded by the Development Bank from 2012 to 2016

statement	Small projects		Medium projects	
	number	value	number	value
plastic	51	2015568	2	5500000
construction	290	96769115	7	12212003
Tourist services	37	3843008	2	4275000
Health services	26	3867587	-	-
Service	248	13211989	4	8300000
Wooden stamps	233	11380596	-	-
Food and feed	92	10619468	4	14257352
Metal and engineering	85	7372681	1	3000000
Textile and leather	4	950000	-	-
Transportation	2232	88584452	-	-
total	3298	238614464	20	47544355

Source: Table prepared by the researcher based on the reports of the Development Bank.

Notes from the table above, that about most of the projects that obtained funding from the Development Bank, is a project of transportation and an increase (68%), while the building and construction activity comes in the second place of the size of projects and accounting (9%) almost , reflects this increase in transport projects and the fact that the reality of the market shows that about 95% of transportation imported.

1.Agricultural Bank: The number of loans granted during the period 2012-2016 the number (1014) loan, as the volume of financing granted by the Agricultural Bank (6172.5) million during the period 2012-2016, which appears in the following table:

Table (8) A statement of the loans granted by the Agricultural Bank during the period from 2012 to 2016

The proportion of short-term loans to total loans %	total	Long-term loans	Medium-term loans	Short-term loans	year
8.4	717.0	360.4	296.5	60.1	2012
5.5	1163.0	685.0	414.0	64.0	2013
5.3	1370.0	915.0	382.0	73.0	2014
5.6	1475.5	829.0	564.0	82.2	2015
6	1447.5	813.5	549.0	85.0	2016
	6172.5	3602.9	2205.5	364.1	total

Source: prepared by the researcher based on the report of the Central Bank of Libya

Notes from the table above, that the volume of financing from the bank-oriented agricultural short-term loans amounted to (364.1) million, accounting for 6%, while the value of funding in the short-term loans amounted to (2205.5) million and accounting (36%) almost, but the value of the funding in the long-term loans amounted to (3602.9) million and accounting (58%) and almost reflects the interest the bank financing small and medium enterprises and large, taking into account the nature of each of them.

4. Rural Bank was established in 2002 with a capital of 100 million Libyan dinars, and began his work effectively in the second quarter of 2005, with the aim of lending to low-income loans, short-or medium-term, and amounts ranging between (500-10000 LD), The rate of service charge on the value of the borrowed amount up to 2% in the areas of agricultural and marine wealth, animal and industrial and service and literal in order to improve their economic and social development, and to provide technical consultancy for entrepreneurs, where the total number of projects that have been financed by this bank (2339) small projects worth funding (9.211.300 LD and the average value of a loan up to (4000) Libyan dinars per project.

Table No(9): Facilities and loans from the Rural Bank.

Number of projects	number	project	number
0.09	2	Press and publicity	1
0.1	3	Informatics	2
0.3	7	Lathing	3
0.5	11	Hunting and fishing	4
0.6	15	Clinics	5
0.9	21	Tourist	6
1.1	26	Electric	7
1.5	34	Makeup	8
2.0	46	Food	9
3.3	78	Contracting	10
3.7	86	Transfer	11
4.8	112	Agricultural and animal	12
4.9	115	Chemical	13
36.9	862	Home and sweets	14
39.4	921	Fabric and sew	15
100	2339	total	

Source: Master Thesis on small projects in Libya - researcher Ben Halim Abdul Razak, the Academy of Graduate Studies.

As shown in Table (9) that more than three-quarters of the loans granted by the Rural Bank addressed to the projects, domestic and sweets and fabric and sewing, and the usual that the

majority of these projects are managed and implemented through businesswomen, this principle explains the extent of the contribution of women in the economy, and the desire at work and

contribute to the production process, but most suffer from Libyan banks is the low collection rate and which does not exceed (40%)

IV. THE RESULTS

From the data obtained and analyzed after and get quantitative results for a sample of small projects in Libya show us the following:

1. that small projects in Libya, mostly based on the individual itself, which depends on the establishment of a legitimate financial savings on their existing or borrow from a relative or post one of the persons in the establishment of a small project and returned the latter end in failure.
2. Most of the founders of small projects in Libya depends on some of the ideas and innovations of the idea or tradition, and most of these projects are very similar.
3. that rely on small projects for the members are not experienced and is trained and is qualified for the establishment of small businesses, especially in the administrative process, financial and resource exploitation.
4. legislation and applicable laws and that have been developed to simplify the procedures and the creation of small projects are in fact not serve wishing to create small businesses and are not in their favor versa in are in favor of the mourning institutions such as banks, which of course is due subordination to the state, we find here that the exemption allowance tax founders of small businesses than on his shoulders debt and financial obligations.
5. blurry these regulations and instructions, which in some cases are almost impossible implementation, especially for those interested in the establishment of a small project.
6. scarcity of information and data relating to the establishment of small projects and ideas and innovations, and the moral and material support to him.
7. Comparison of small projects in Libya and other countries are almost non-existent for the lack of a good regulatory regime in Libya.
8. laws and regulations and international instructions used in the creation of small and work out projects exist, but no one works out or followed. Facing industries or small projects in Libya, like the rest of the number of problems that they may still be summed up as follows:
9. Reliance kidney in the establishment of small enterprises on loans money saver or relatives or partnership.
10. A high proportion of small projects in Libya depends on trade buying and selling or importing and selling without relying on production and industry.
11. Initial availability of resources for some industries and not them optimally.
12. Significant shortfall in trained human resources and Libyan classes them specifically.
13. The list of small projects by foreign workers rather than labor Jamahiriya.
14. Lack of clarity of the state or its institutions in support of the program of small projects in Libya.
15. Explain tough conditions for borrowing, making it difficult to do a small project.
16. the small size of the market, in addition to the difficulty of pre-planning, or forecasting effectively and accurately the size of the demand, and this also applies to export to foreign markets for different prices from time to time.
17. Non-availability of skilled labor with high skills or expertise, and thus reduced productivity and quality of what ought to be.
18. the lack of sufficient information, and not knowing how to or how to get them, making some small projects like isolated islands in the world, where such information includes aspects of marketing, technical and competitive, as well as for the prices of raw materials or products etc.
19. the difficulties of funding, where to find the owners of small factories difficulty in obtaining loans from banks because of the high risk element in such small projects, as well as not being able to take advantage of investment incentives such existing appropriations customs, as well as subsidized energy costs, or access to land prices symbolism.
20. opening of the market, making it difficult to import with the possibility of competition, with the lack of tariff protection, as well as consumer preference for some foreign products.
21. Lack of research and development has led to an inability to flexibility in production, or whether to change the product developed or improved, or when you need to introduce alternatives and new products, the lack of correlation with effective specialized centers and institutes.
22. banks that offer financing facilities are commercial banks and therefore the goal of profit regardless of the return on the borrower.
23. The implementation of the requirement to 50% by getting a loan funding and is considered difficult to implement many of the facilities of small industries.
24. There are problems associated with the geographical location, there are many of these factories were created outside the industrial cities and that at least the availability of the basic components of the industry.

V. CONCLUSIONS

This study is based on some samples of small projects of the National Program for medium and small projects in Libya. And make some correspondence via the Internet with a number of directors of the credit banks, specialized and small business owners to find out the extent of the need for a clear and financing structures and activities suitable for small projects. We have obtained in this study, the following findings:

First, at the global level:

1. Has been shown worldwide to micro and small and medium enterprises accounted for about 90% of the volume of projects in the world, including: (35%) handicraft encourage innovation and invention, and contributes about 85% of the total GDP, and

provides (about 80%) of the total employment in most economies of the world.

In developing countries, the small enterprises provide employment opportunities between (60%) - (80%).

2. Explained that some of the studies (30%) of these projects fail in the first year due to lack of adequate funding, and that about 50% fail during the year and the first half of the composition.

Second, at the local level:

1. Were available on the number of files SMEs projects and business incubators in some Libyan cities, especially the western region samples, turned out that most of them do not include structures financing variety for the project, and what is available in many small enterprises and institutions, sponsors and donors for loans just data and financial information prepared by student funding and codified by the consulting offices of these institutions.

2. Presence of more than one authorized direct supervision on the project management and the subsequent collection of data and information related to the components of the financing structures for small projects in Libya.

3. Has been the introduction of a new device in Libya under the name of the national program for small and medium enterprises in 2007 assigned his duties overseeing the establishment of projects of both types and care and follow-up, in addition to the care and embrace the training of entrepreneurs and innovators through a program of modern ensures and supports the implementation of small projects with a variety of activities covering all areas to contribute to the creation of a comprehensive renaissance in support of the national economy and through the approach of a training program a distinct and sophisticated works to train and develop the skills and capabilities of workers to these projects in support of the national economy through the provision of human resources trained and ready to establish industrial projects free economic raise the level of income of the members of the community.

4. Spite of the establishment of a guarantee fund lending for the purposes of operating the year 2009 to ensure lending to entrepreneurs targeted funding and by ensuring (70%) of the total value of loans granted, but the fund has not based to ensure any project because of the lack of clarity funding mechanism specific for the remaining (30%). Thus the absence of his role as an institution to ensure risks.

5. That there are reasons for the difficulties faced by financing small projects in Libya, including:

A. lack of adequate safeguards for employers against the funding of the project.

B. high cost of funding and the potential risk.

C. weak administrative capacity and accounting, regulatory and technical for those in charge.

D. twice the preparation of feasibility studies and technical projects.

E. palaces Libyan banks in providing funding for projects in a timely and appropriate size.

F. stumbled repayment of loans granted to finance small projects.

G. Do not update or diversify financial sources and rely on traditional sources when grant funding.

H. low culture of creativity and innovation and leadership among entrepreneurs.

Microfinance:

This means the transfer of the financing capacity of the units fiscal surplus units to the fiscal deficit, this may be the situation directly from one project to another or overlap each other intermediary institutions as institutions of funding, which means that financing small supply of these projects with funds needed to carry out its activity Economic either internal resources or external resources.

Financing structure in small projects:

And refers to the components of the money which is funded assets, and some believe the exclusion of current liabilities at the study of the components of the funding on the grounds that they finance a temporary, while others feel the need to calculate the current liabilities of the components of the funding, particularly in small projects so as it relies heavily on opponents short-term.

Commercial Credit: refers trade credit to Payment Facility obtained by small-scale project of suppliers, and the credit business has many advantages including: lower cost of funding, the ease and simplicity of procedures to obtain trade credit, and risks: to encourage the owners of the project on the extravagance and obtain the kits are unnecessary, which The project follows on the repayment obligations outweigh the potential in the future, and focus on the need to obtain the trade credit reduces the chances of choosing the appropriate resource, where it is a trade-off between suppliers who accept the granting of trade credit project in spite of the presence of other suppliers better and more committed to them. B. Credit: the owner can project the small to obtain the bank credit short-term or long-term from the bank, and it depends on the nature of the need for the project to finance the purchases of the project from the production requirements of commodity or to finance a temporary shortfall of cash or to cover obligations payable short-term, such as: pay the wages of workers in that case bank credit required short-term credit, in the case of project finance purchases of equipment, machinery and buildings, construction etc. ..., the credit required is long-term credit, in which case the bank provides the required funding.

C. Loans bodies and institutions specialized in financing small projects: are loans granted by entities other governmental and non-governmental organizations and some might be specialized in providing loans to small businesses such as the management of small projects in the United States and in India, Indonesia, Japan, and the Social Fund, and a craftsmen in Egypt.

D. Islamic finance loans: and take many different forms, such as Murabaha financing for small projects purchases of equipment, machinery and production requirements and pay the price at intervals to be agreed upon by the bank, and participation of the bank where they can access with the owner of the project as a partner.

E. Loans, parents, relatives and friends: include loans obtained by the owners of the project from parents, relatives and friends as their primary source of funding, and typically range between (4-15%) of the amount of funding granted to small enterprises, In the United States the proportion is (9-11%), In Egypt, the proportion (15.4%). There are a lot of factors and considerations that should be subject to careful consideration when deciding on the structure of funding, and most important: the structure of investments in the project, the cost, the degree of risk, flexibility, control and tighten controls.

Obstacles and challenges and risks facing the financing of small enterprises

Fear and reluctance of banks to lend to small enterprises to the high degree of risk.

High interest rates on loans to compensate for the higher risk.

Lenders are working to program small projects on lending interest and this is a hindrance when the Libyans because the Libyan society and the Muslim community of interest (usury) is forbidden in their religion.

Lack of banking experience for small projects which weakens the decision of borrowing and lack of understanding of monetary policy and its instruments.

Demand guarantees small projects (in kind) are not available I have the owners of these projects.

Often the size of loans available from commercial banks and investment banks and businesses are limited and not sufficient for the development of small enterprises.

Lack of technical expertise, and organizational skills, experience and market mechanisms.

Lack of knowledge of competitors and suppliers, and the labor market and human resources available and regulations.

Impaired ability to deal with administrative bodies, and to deal with the funding agencies.

Lack of planning or outlook and plans to cope with crises.

Deficit own resources for support of the project, if necessary.

Lack of attention to the development and training and developing the skills and capabilities of workers.

Inability to cope with the changes and market fluctuations, and the inexperience of ways of marketing and advertising and advertising and promotion.

VI. RECOMMENDATIONS

1. Based on the above results in the practical side during the analysis of the questionnaire and the interpretation of the results obtained and the charts and explanations of each results or we can put some of the recommendations for the study and are as follows:
2. the study recommends the need to work on educating young graduates from colleges and universities and who want to work or are looking for jobs or who want to start a new awareness of scientific and providing them with adequate information and culture change have to search a job to the possibility of establishing a small project.
3. Work on training in recent years before graduating from the study on how to establish a small business individual can live his income and meet its daily needs.
4. planting a love of innovation and creativity among young people so that they can take out all of the ideas in them to establish a small project.
5. moral support from the state facilitated things and bring forward new ideas for small businesses and encourage them.
6. personnel training and scientific development of their development process developed up to date in the industry and construction and architecture, construction, construction and other fields of small projects.
7. The adoption of ideas and successful premium as an incentive for each.
8. to assist individuals who want to establish a small project to know the resources available to them in their activities.

9. The study recommends the need to adopt a strategy of funding and clear and specific guarantees to provide the necessary funding for small projects at the lowest cost and more flexible in the capital increase.

10. the necessity of activating the role of the Guarantee Fund lending for the purposes of operating in by guaranteeing loans (70%) with the issuance of the document to ensure it.

11. study the possibility of centering insurance companies to recommend the trust between the bank and the customer by issuing insurance policies to cover the overall value of the facilities granted.

12. Work on creating a stimulus policy to ensure repayment of the facilities granted such as cash discount compared to accelerate the Order, or exemption from the cost of borrowing once the immediate payment of the outstanding payments, regardless of the period of maturity.

13. the establishment of a specialized collection of information on small projects and made available to users of the decision-makers in enterprises when needed. Activating the role of the specialized banks and investment for the development of small enterprises by raising the volume of loans, while reducing the cost of funding.

14. the need to establish a national bank to finance small enterprises and micro financially and in terms of information and serves to provide future plans for small businesses so that they can achieve their goals guarantee security institutions.

15. activating the role of the specialized banks and investment for the development of small enterprises by raising the volume of loans granted, while reducing the cost of funding.

16. emphasis on the analysis of the financial operations of banking and financial indicators according to precise criteria and process to help evaluate the performance of the study provided the credit.

17. to reconsider the construction of financing structures for small projects so as to achieve the objectives of the current project owners and investors in profitability and continue, and in order to achieve the objectives of the borrowers to collect their debts and benefits, and that the security institutions play an active role in it, as follows: -

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Human Resource Trends and Perspectives: An International HEI Experience

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Abstract- Cognizant of the crucial reality on employee turnover, this research paper delved into the trends and perspectives of the 31 participants who underwent the exit interview. Primarily, it looked into the proportion of the participants in terms of personal profile and information about resignation; the things they considered as “greatest satisfaction” and “greatest problem” they encountered in the organization, and their recommendations on how to lessen employee turnover and how to improve university best practices. The results showed that the turnover rate was high on the Basic Education Unit. It occurred during the first three (3) years of service, and among the school’s own graduates. Regardless of profile variables, the attrition causes included the following: professional growth, better job opportunity, primarily in the government, and practical reasons that embrace the family, and as to future plans, working in a government unit and going abroad. In terms of level of satisfaction, it revealed that regardless of profile variables, the participants were generally satisfied. The participants’ greatest satisfaction included 19 factors, foremost of these are acquisition of skills that are job-related and personal. On the other hand, there were 23 greatest problems evolved; the mutual problems regardless of profile variables were on office procedures, salary, and workload/load assignment. To help employee retention, at least 24 measures were recommended. These include strengthening SPUP’s best practices. It is concluded that employee turnover is happening during the first three (3) years of employment due to varied reasons and aspirations in life. However, employee retention may be reinforced.

Index Terms- employee retention, employee turnover, human resources, satisfaction

I. INTRODUCTION

In an organization, there are two (2) realities that the human resource practitioners must look into: employee retention and employee turnover. Of these two, the crucial one is employee turnover. This is a scenario where employees would say goodbye to the organization voluntarily due to some reasons. According to Goldstein et.al (2017), the organization’s culture and climate has an effect on employee turnover. An employee will find satisfaction if the culture of the organization fits his/her expectations and values and this kind of satisfaction will be reinforced if the organizational climate is supportive of the expectations, values and other aspects of his/her life. If otherwise, employee turnover happens.

Employee resignations are unavoidable, but too much can ruin a company (Reh, 2014). There are instances wherein an organization cannot grasp the impact because, seemingly, one or two resignees are not significant. However, as some researchers would say, whether one or two resigned, important information from them may affect employee retention.

According to Kokemuller (2018), there are negative effects of turnover. He said that high turnover rates typically mean companies are doing a poor job selecting the right employees, failing to provide a motivating work environment or losing out to employers that offer better pay and benefits. He added that it will lead to decreased performance in the workplace, unfulfilled daily functions, high cost, and lower knowledge base. He further imparts that the Business Link website indicates that the more valuable the positions being turned over are to the company, the more impact the turnover will have on current and future performance.

One of the measures in knowing why an employee leaves the organization is through exit interviews. Accordingly, the conduct of an exit interview can identify areas that can improve the organization, at the same time, to help retain other employees (hrinz.org.nz, 2018). Through this method (exit interviews) one can discover both positive and negative motives for leaving such as employee-employer relationship, their sensitivity about pay, training, career opportunities and performance appraisal schemes. Likewise, exit interviews will obtain from the resignees views on the working conditions offered by the organization, and this is an opportunity to ask for some suggestions for organizational improvement.

On the other hand, employee retention and turnover may be influenced by the person’s motivation in life. According to motivation theories which were based on Abraham Maslow’s human needs, there are factors that affect employees in the organization. Employees’ needs were categorized in progressive categories starting with basic physical needs then will evolve to personal growth and career development (Ingram, D., 2018). Based on the theory of Herzberg, there are two factors that affect people’s attitude toward work (Gawel, 2018). These are hygiene factors and motivators/satisfiers. The hygiene factors would include company policy, supervision, interpersonal relations, working conditions, and salary. The motivators/satisfiers are achievement, recognition, the work itself, responsibility and

advancement. According to the theory, the absence of hygiene factors can create job dissatisfaction, but their presence does not motivate or create satisfaction, thus, the need for the satisfiers.

According to the Need Theory of McClelland as cited by Lewis (2015) there are three (3) needs that are important in and to the workplace: achievement, power, and affiliation. On the other hand, Adams's Theory (Lewis, 2015) explores how human resources consider "forms of exchange like salaries and recognition" while Vroom's Expectancy Theory (Lewis, 2015) explains that employees' performance is influenced by what he or she hopes to receive.

Maslow emphasized that failing to meet employees needs can result to dissatisfaction in employees' personal lives and will eventually fulfill these needs on their own, or possibly find a new employer who can provide better opportunities (Gawel,2018).

At St. Paul University Philippines, it had been observed that for the past years, there were employees leaving, even those who served the University for a long time. With this premise, the researcher was motivated to look into the trends of turnover, the factors that led to employee turnover, and the resignees' perspectives that may help address employee retention in the future.

Purpose and Statement of the Problem:

This study aimed to look into some variables that may have contributed to employee turnover. Specifically, it sought to answer following:

1. What is the proportion of the participants in terms of the following?
 - 1.1. Personal profile:
 - 1.1.1. School/Office of Assignment;
 - 1.1.2. Years of Service; and
 - 1.1.3. School Graduated From
 - 1.2. Information about resignation:
 - 1.2.1. Reasons for resigning;
 - 1.2.2. Future plans; and
 - 1.2.3. Level of satisfaction
2. What are the things considered as:
 - 2.1. "greatest satisfaction" and
 - 2.2. "greatest problem" in the organization?
3. What recommendations can be proposed to lessen employee turnover and to improve University best practices?

II. METHODOLOGY

Research Design

This study made use of a mixed method employing purposive sampling to illustrate some factors that may have contributed to employee turnover.

Participants of the Study

The participants of the study were the thirty-one (31) resigned employees of St. Paul University Philippines from 2015 to the first quarter of 2018.

Research Instrument

The study primarily utilized the Exit Interview Form available at the Human Resource Management Office.

Data Analysis

Thematic analysis was employed, together with simple statistical tools –frequency and mean distribution. Likert scale of five (5) was employed for the level of satisfaction.

III. RESULTS AND DISCUSSION

There were six (6) groups of participants, namely administrators (3 or 9.68%), Basic Education Unit (BEU) faculty (13 or 41.93%), college faculty (5 or 16.13%), guidance counselors (3 or 9.68%), Knowledge Information Resource Network (KIRN) staff (2 or 6.45%), and support staff (5 or 16.13%). These participants rendered years of service as follows: less than a year to 3 years (16 or 51.61%), 4 to 6 years (7 or 22.58%), 7 to 9 years (3 or 9.68%), and 10 years and above (5 or 16.13%). Majority of these are Paulinian graduates (25 or 80.65%) and the rest were graduates from other others (6 or 19.35%).

There are 12 reasons why the participants resigned. The common reason for resigning is professional growth (4/6 on work assignment, 2/4 under years of service, and 2/2 on school graduated from). These were literally expressed by the participants who wrote the following: "*more professional growth; for professional growth; professional career growth*"; *to widen my horizon in my chosen field of expertise.*" As to work assignment, the second shared reasons by three (3) groups include better job opportunity in the locality (BEU Faculty, guidance counselors and KIRN); family (faculty and staff); and government job (administrators, BEU faculty and KIRN). In terms of years of service and school graduated from, the common reasons are related to attitude, family, government job, and practical reasons. Professional growth as top most reason is similar to the point of view of the article of Doyle (2018) from the Balance Career where she claims that career growth is the common reason for resigning from a job. This career growth may be fulfilled in other job opportunities available in the local or international market. Likewise, this finding is likened to the point of view of Goh (2014) when she mentioned in her article that some of the most rational and easy to understand and accepted reasons for quitting a job are the following: "*you are looking for better career prospects, professional growth and work opportunities; you want a change in career direction; you are looking for new challenges at work ; you need to be able to take better care of your family; and you want to study or go travelling for a prolonged period of time.*" In addition, attitude as a reason is a silent reason when one leaves an organization. According to Doyle (2018), there are things that one should not mention when quitting a job. These include: "the boss is a jerk; the manager is not good and team member's performance or bad attitude." However, for the improvement of the university, this reason on attitude can be viewed as a positive aspect for cultivating a culture of professionalism.

There are 12 elicited future plans of the participants. Regardless of profile variables, the common plans included *working in a government unit* and *working abroad*. This finding shows that they look forward to greener pasture. It is a public knowledge that the compensation abroad and in the government is higher compared to private educational institutions much more outside the National Capital Region. On the other hand, some of the participants have varying plans which were closely related to their reasons in resigning. This means that while they were conceptualizing to resign they do have clear plans after their respective resignation is approved.

The participants are generally satisfied in all the given sources of job satisfaction. The administrator group is very satisfied along the following: “#1. *Close match between performance goals and actual performance*, #4. *Knowing that I have “reached” students and they have learned/profited from our encounter*, #5. *Enjoyment of teaching / work experience and use of skills*, #6. *Development of personal skills*, #20. *Quality of supervision*, #23. *Working conditions*, #24. *Freedom to be innovative and creative*.” This means that the administrators believed that they were able to perform well in the attainment of institutional goals and in their performance as a teacher, and as a supervisor. Likewise, they believed that they were able to develop their personal skills. In addition, they were happy to have good working conditions and exercise their freedom to be innovative and creative as administrators. However, they were dissatisfied on the following: “#11. *Time for travel and holidays (especially in summer)*, #15. *Load assignment*, and #25. *Time to pursue own interest after office/class hours*.” This connotes that the administrators are so much preoccupied that they were not able to find time to relax during summer time and after office time. On the other hand, they were neutral along the following: “#3. *Dean/Principal/Head regard us, their staff, as competent independent professionals*, #10. *Respect from others*, and #16. *Inspiring and challenging students/work*.” This denotes that the administrators did not feel being seen as competent professionals who can do challenging work and they felt that they were not given due respect. The level of satisfaction of the BEU and Guidance group in all the items is from satisfactory to very satisfactory. This means that they were satisfied and happy during their stay in the University. As to the College and KIRN groups, their level of satisfaction is from satisfactory to very satisfactory except on some items. For the College group, they were neutral on the following: “#13. *Salary and #14. The number of subject preparation*.” This means that they find neither satisfaction nor dissatisfaction on how much they are receiving, and on their load assignments. For the KIRN, they are neutral on the following: “#14. *The number of subject preparation*, #15. *Load assignment*, and #25. *Time to pursue own interest after office/class hours*.” This means that they had some adjustment problems along teaching and workloads as well as on time management. On the other hand, the staff group is generally satisfied. However, they have some areas of dissatisfaction. These include the following: #11. *Time for travel and holidays (especially in summer)*, and #25. *Time to pursue own interest after office/class hours*.” This denotes that they need time for themselves to relax and enjoy. In addition, they were neutral on the following: “#12. *Security of income or position*, #17. *Time*

schedule, #18. *Administrative support*, and #20. *Quality of supervision*.” This implies that they have expectations about their take home pay but understand that they are compensated as staff who is expected to report for duty on a definite time schedule, and as staff they were not directly involve with administrative matters and have not directly felt the impact of top administrative supervision. On the other hand, the neutral feeling on the quality of supervision means that they have some issues with their immediate head. As to years of service, it is good to note that those below 4 years of service were relatively satisfied; nevertheless, the lowest means of 3.7 are on “#12. *Security of income or position*, #13. *Salary and #15. Load assignment*.” Looking further, as the years of services increases, there are some areas of neutrality such as “#11. *Time for travel and holidays (specially in summer)*[4-6 & 10 years and above; #13. *Salary* [7-9 years]; #15. *Load assignment* & #25. *Time to pursue own interest after office/class hours* [10 years and above]. This means that the tenured employees have some realizations about how their summer vacation and after office time are being spent, about their compensation, and about their workloads. In addition, the finding shows that regardless of school graduated from, the participants are generally satisfied. However, for the Paulinians, the two lowest means of 3.5 and 3.6 are on “#15. *Load assignment and #13. Salary*”, respectively. On the other hand, the non-Paulinians have areas of neutrality such as on “#11. *Time for travel and holidays (especially in summer)*, #12. *Security of income or position*, #13. *Salary* & #15. *Load assignment*.” This denotes that these are the immediate areas of concern for review in order to increase the level of satisfaction among the employees. This finding is related to the theory of Herzberg which states that the absence of hygiene factors such as company policy, supervision, interpersonal relations, working conditions, and salary can lead to job dissatisfaction Gawel (2018), hence the need for satisfiers such as looking into the work itself, giving of recognition and other forms of motivation.

There are 19 factors that are considered as the “greatest satisfaction” among the participants. It is revealing that regardless of work assignment, the top 2 factors are on acquisition of skills / capabilities (job-related and personal) and professional development. It further shows that the participants have varied factors that were contributory to their “greatest satisfaction” in the university. The factors range from personal to professional development; from physical, material, financial to human resources; from colleagues to students; and from school policies, activities to goals and objectives. This finding is related to motivation theories cited by Ingram (2018) wherein he mentioned that employees’ needs were categorized in progressive categories starting with basic physical needs then will evolve to personal growth and career development. Based on the theory of Herzberg, there are two factors that affect people’s attitude toward work (Gawel, 2018). One of these is the hygiene factors. The hygiene factors would include company policy, supervision, interpersonal relations, working conditions, and salary. As regard years of service, the common factors expressed by the participants regardless of years of service include the following: *acquisition of skills / capabilities (job-related and personal)*, *personal development*, *professional development*, & *work environment*. For those who rendered less

than 4 years, they have a longer list of other factors compared to the tenured ones. The unique factors revealed by the tenured participants include *culture & social activities* (4-8 years), *students & family atmosphere* (7-9 years), and *supportive / trusting head* (10 years and above). This denotes that they find more satisfaction in community activities that involved students and are carried out in a spirit of 'Paulinian family' and of course, when the head is supportive. The Paulinian graduates have longer list of factors that contributed to their greatest satisfaction in the university than the non-Paulinians. On the positive note, the common factors that made them happy include the following: *acquisition of skills / capabilities (job-related and personal), friendly environment, personal development, professional development, relationship with co-employees, salary, students, work environment*. This finding shows that regardless of school graduated from, the participants were satisfied with their personal and professional growth, with their social relationship, with their work atmosphere, and to some extent, with their compensation. These findings are related to the article of Suzono (2018) when she mentioned that in the study of Josh Bersin, he considered "growth opportunity" (including training and support on the job and self-directed, dynamic learning) to be one of the five factors of a "simply irresistible organization." In addition, she included that employees themselves are likely to assert this research finding: '87% of millennials (and 69% of non-millennials) rate "professional or career growth and development opportunities" as important to them in a job.'

On the other hand, there are 23 factors considered as "greatest problem" of the participants. Varied factors were elicited. Regardless of profile variables, some of these factors are common to three or two groups; e.g. *office procedures, salary, and workload*. This means that there are issues on the policies of the organization particularly on loading and compensation. On work assignment, the *office procedures* as a factor is common to the administrators, college faculty, and guidance group; *salary and subject preparation* are common to faculty and KIRN group; and *workload/load assignment* is true to the administrators and faculty members. The *hours of work (on call)* is a problem for the college faculty and the staff group; *less support (faculty and administration)* for the BEU faculty and guidance group; and *Time Management* for the BEU faculty and KIRN. The administrators have problems with *communication* that is associated with *grapevine*, with *inter-office politics*, and with *outsource personnel*. The BEU faculty members have problems with their *administrators, classrooms/class size, fellow teachers who irresponsible, parents, students*, and with their own *adjustment*. On the other hand, the college faculty members have problems on *benefits* and *paper works*. These findings show that the participants have diverse negative experiences that reinforced their reasons for quitting their jobs in the university. These experiences are also reasons for dissatisfaction. According to Gawel (2018), Maslow had emphasized that failing to meet employees needs can result to dissatisfaction in employees' personal lives and will eventually fulfill these needs on their own or possibly find a new employer who can provide better opportunities. As to the years of service, there are issues common to three or two groups such as the following: *Less support from faculty and administration and Workload/Load assignment* (less

than 3 years, 4-6, & 10 years and above), *Salary* (less than 3 years, 4-6 & 7-9 years), and *Office Procedures* (4 years and above). This means that they have issue on the people whom they work with and with the policies of the organization particularly on loading and compensation. On the other hand, two groups have some issues along the following: *Administrators, Subject Preparation & Student Schedule* (<1-3 & 10 and above years), *Communication: grapevine* (4-6 & 10 up), and *Students' Attitude /behavior & Student-teacher ratio / Class size* (<1 to 6 years). This denotes that there are issues with the middle managers, with the loading, with interactions among faculty and administrators and among students. Further, the younger group has other concerns such as the following: *classrooms (some not conducive), irresponsible teachers, parents, self-adjustment, teacher attitude, and time management*. This means that their issues are ranging from personal to physical facilities. They need more understanding on the values of education that learning should take place in any venue regardless of the physical structure. They still need to develop more confidence to become more proactive in dealing with the teachers and parents. And they have to learn more how to discipline themselves so that they can adjust and manage their time productively. The tenured ones have these concerns: *benefits, hours of work (on-call), inter-office politics, and line of communication* (4-6 years group) -this denotes that they have some questions about the policies and the manner of transacting business in the organization; *paper works* (7-9 years group) -this means that they resent having too much work that is routine in nature – report writing, keeping records and the like; and the most tenured group has problem about the *outsource personnel and security of income* -this connotes that they have predicament about the presence of the non-employees working in the organization and they do not feel secured about the benefits and compensation packages of the university. Further, the results show that regardless of school graduated from the common problems raised by the participants are: *administrators, communication: grapevine, hours of work (on-call), less support (faculty and administration), office procedures (protocols), salary, subject preparation, students' attitude/behavior, Tme/time management, workload/load assignment*. This means that both groups have difficulties about the middle managers/their management styles, gossiping employees, policies and personal organization. The other concerns of the Paulinian group include the following: *benefits, irresponsible teachers, line of communication, outsource personnel, paper works, parents, security of income*. This denotes that they have some concerns about policies, work attitude of employees, and indirect clients of the university. Similarly, the other concerns of the non-Paulinian group includes *classrooms (some not conducive), inter-office politics, and self-adjustment*. This means that they may have some expectations about SPUP as an educational institution where all facilities are of the-state-of art and where employees live harmoniously. As such, they were not able to adjust.

Finally, there are 24 suggestions or recommendations of the participants to improve the university. The mutual recommendation from three groups (college faculty, guidance and staff) is "strengthening of SPUP best practices." The unique recommendations from each group are as follows: for the

administrators, they listed the following: *consultative management style; help address outsource personnel concerns; professionalism; and respect for human dignity*; for the BEU faculty, they are suggesting to *improve information dissemination as well as parent interaction; to have more classrooms; to review administrators' qualifications and the student-teacher ratio or class size* particularly the preschool; to *have more trainings and seminars* especially on handling students' with special needs; and *support from the tenured faculty*; for the college faculty, they are recommending to *include more employee benefits one of which is a birthday leave and salary increase (improved compensation package); to give equal opportunity for trainings; to lessen workload; to have responsive office procedures; and to streamline clearance procedure*; the KIRN group is suggesting to *have more time for travel and holidays*; and the staff group is recommending the following: *continue gatherings/team building/assemblies, improve customer service by administrators, and thorough evaluation of teachers*. When grouped according to years of service, some of these are collective thoughts from two groups such as the following: *Review of teacher-student ratio and class size particularly pre-school, salary increase or improved compensation package, trainings and seminars, one of which is on handling students' with special needs, and to strengthen SPUP best practices*. The younger group (<1-3) and the tenured participants (4 years up) have included some other recommendations. As to school graduated from the Paulinians have their own recommendations just like the non-Paulinians.

The above recommendations from the participants show that they still wish the university to improve along its processes, procedures, policies, human relationships, employee development and benefits. The participants are also trying to impart their opinions as to how the organization may improve its processes in order to uplift job satisfaction among the employees. As opined by Vroom in his Expectancy Theory (Lewis, 2015), he explains that employees' performance is influenced by what he or she hopes to receive. These may be in the form of what Herzberg presented in his hygiene factors - company policy, supervision, interpersonal relations, working conditions, and salary (Gawel, 2018).

IV. CONCLUSION

Based on the findings, it is concluded that an educational organization suffers from fast turnover during the first three (3) years of service. It is predictable among its own graduates and it happens due to various reasons. On the positive note, employees leaving the organization still impart their views on how to improve the organization for employee retention. Hence, it is recommended that the University may consider reviewing some of its policies that have direct impact on the quality of life of the employees.

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A Case Study on *Tundikeri* w.s.r to Tonsillitis

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Abstract

Tundikeri is one of the common prevalent diseases in paediatric age group. It is defined as a swelling at the base of *Hanusandhi* (temporo-mandibular joint) resembling one *Vanakarpasa phala* (cotton fruit). *Tundikeri* can be correlated with tonsillitis as both the terminologies have similar features like Pain and Burning sensation in throat (*Ruk, Daha*), suppurative inflammation (*Prapaka*), Enlarged tonsils (*Shopha*) etc. We are discussing here a case report of a 7 year old male child having history of *Tundikeri* (tonsillitis) for last 1 year. He came to us with complaint of *Kasa* (Cough), *Jwara* (Fever), *Kanthavedana* (Pain in throat) *Kanthadaha* (Burning sensation in throat) *Aruchi* (Loss of appetite) since last 3 days. Generally he got relief from modern medicines, but this time symptoms reoccur after one month. He was treated with *Ayurvedic* medicines which gave effective results from the third day of treatment.

Key words: *Tundikeri*, Tonsillitis, case report, *Ayurveda*

Introduction

In our classical texts *Tundikeri* has been described under the *mukharogas* (diseases of oral cavity). *Acharya Charaka* has classified the disease of *mukha* (oral cavity) on the basis of predominance of *doshas*.¹ *Acharya Sushruta* has described it under *Talugataroga*² and *Acharya Vagbhatta* has kept it under *kanthagatropa*.³ *Tundikeri* can be correlated with tonsillitis as both the terminologies have similar features like Pain and Burning sensation in throat (*Ruk, Daha*), *Prapaka* (suppurative inflammation), *Shopha* (Enlarged tonsils) etc^{4,5,6}.

Tonsillitis is commonly encountered now a day due to dietary habits of taking spicy food, cold beverages and cold climate. Children are particularly prone as the immunity status is low in them. Tonsillitis not only cripples children from majority of their enjoyable and learning moment but also makes them to feel uneasy, restless and even bed ridden, if complication occurs. Antibiotics are the main stay in the treatment of tonsillitis as far as the allopathic system of medicine concerned. They can give temporary relief to the patient but can't check the reoccurrence of disease. Repeated administration of antibiotics may lead to many unwanted effects in the patients. In our classical texts there are so many preparations advised to treat the patients of tonsillitis.

Case report

A 7 year male child came to us with chief complaints of - *Kasa* (Cough), *Jwara* (Fever), *Kanthavedana* (Pain in throat), *Kanthadaha* (Burning sensation in throat), *Aruchi* (Loss of appetite). Patient had above complaints since 3 days. On examination *Shofa* (Bi-lateral enlarged tonsils due to inflammation) was present. He had a history of recurrent tonsillitis since last 1 year.

H/O Present Illness

According to child's mother, her child had a history of recurrent tonsillitis for last 1 year. He was taking medicine for that, but did not get permanent cure. The child was normal 3 days back. Then he had been suffering from *Kasa* (Cough), *Jwara* (Fever), *Kanthavedana* (Pain in throat), *Kanthadaha* (Burning sensation in throat) *Aruchi* (Loss of appetite). He was taking paracetamol for fever. His mother took him to this hospital for treatment.

Ashtavidha pariksha

- Nadi* (Pulse rate)-100/min
- Mala* (Stool)-*Prakrit*
- Mutra* (Urine)- *Prakrit*
- Jihwa* (Tongue)-*Saam*
- Shabda* (Speech)-Hoarseness (*Swarbheda*)
- Sparsha* (Skin)-*Ushna*

- g) *Drika*(Eyes)-*Ashrupurnata*
- h) *Akruti-Krishna*

Material and methods

Method

Centre of Study: R.G.G.P.G. Ayu. College and Hospital, Paprola, Kangra, H.P.

Table 1: Showing assessment criteria

Disease	Severity	Grade
<i>Jwara</i> (fever)	Normal body temperature	-
	Up to 100 ⁰ F	+
	Up to 100-103 ⁰ F	++
	>105 ⁰ F	+++
<i>Kasa</i> (cough)	Nil	-
	Less frequently	+
	Occasionally	++
	Present all time	+++
<i>Kantha Shopha</i> (enlarged tonsils)	Located within tonsilar fossa	-
	Tonsilar hypertrophy till the brim of tonsilar fossa	+
	Tonsilar hypertrophy extend beyond the pillars but do not touching each other	++
	Tonsils in contact with each other	+++
<i>Kanthavedna</i> (pain in throat)	No pain	-
	Mild pain	+
	Moderate pain	++
	Severe pain	+++
<i>Kanthadaha</i> (burning sensation in throat)	Nil	-
	Mild	+
	Moderate	++
	Severe	+++
<i>Aruchi</i> (loss of appetite)	Normal desire for food	-
	Eating timely without much desire	+
	Desire for food only after long intervals	++
	No desire for food at all	+++

Material

Table 2: Showing Internal Medicines used in Case Study along with dose, duration and *anupana* (vehicle)

Sr.No.	Name of Drug	Dose	Duration	<i>Anupana</i> (vehicle)
1	<i>Sitopaladi churna</i> <i>Godanti bhasm</i> <i>Tankan bhasm</i> <i>Shankh bhasm</i>	1 gm 250 mg 250 mg 125 mg	thrice a day for 1 week	<i>Madhu</i> (Honey)
2	<i>Sanjeevani vati</i>	250 mg	twice a day for 3 days	<i>Koshnajala</i> (Luke warm water)
3	Syrup Imudab#	5 ml	thrice a day for 1 week then twice a day for next 2 weeks	-
4	Syrup Jufex forte##	5 ml	thrice a day for 1 week	<i>Koshnajala</i>
5	Syrup Adliv###	5 ml	twice a day for 3 weeks	
6	<i>Agastyaharitaki avleha</i>	5 gm	twice a day for last 2 weeks	<i>Koshnajala</i>

#Syrup Imudab
Manufacturer : Dabur
##Syrup Jufex forte
Manufacturer : Aimil Pharmaceuticals India Ltd.
###Syrup Adliv (200 ml)
Manufacturer : Albert David

Pathya

- a) Luke warm water.
- b) *Khichadi*(kedgerree)
- c) *Daliya* (porridge)
- d) Soup etc.

Table 3: Showing Mode of Action of the Formulations

Name of Drug	Mode of Action
<i>Sitopaladi churna</i>	Mucolytic, Expectorant
<i>Godanti bhasm</i>	Analgesic, Antipyretic
<i>Tankan bhasm</i>	Expectorant
<i>Shankh bhasm</i>	Carminative
<i>Sanjeevani vati</i>	Analgesic, Anti inflammatory
Syrup Imudab	Immunity enhancer
Syrup Jufex forte	Expectorant, Mucolytic
<i>Agastyaharitaki avleha</i>	Anti-allergic, Immunomodulator
Syrup Adliv	Hepato protective, Appetizer

Observation and results

Regression of Patient symptoms was observed from the third day of treatment and complete remission of the condition was observed by 15th day of treatment. During the treatment no minor or major complications was observed in the patient.

Table 4: Showing regression of symptoms during treatment.

Sr.No.	Symptoms	0 th day	3 rd day	7 th day	10 th day	15 th day	21 st day
1	<i>Kasa</i> (cough)	++	++	+	-	-	-
2	<i>Jwara</i> (fever)	++	+	-	-	-	-
3	<i>Kanthavedna</i> (pain in throat)	+++	++	+	-	-	-
4	<i>Kanthadaha</i> (burning sensation in throat)	+++	++	+	-	-	-
5	<i>Aruchi</i> (loss of appetite)	++	++	++	+	-	-
6	<i>Kantha Shopha</i> (enlarged tonsils)	++	++	+	+	+	-

Discussion

There is natural dominancy of *kapha dosha* in childhood⁷ and *tundikeri* which is a *kapha pradhan* disease is more prone in children. Low immunity in children is also a factor for higher incidence of *tundikeri* in this age group. The *nidana* (aetiological factors) for this disease is not clearly mentioned in our classics, but items like chocolate, chips, icecreams, cold drinks, fast and junk foods may vitiate the *dosha* in current scenario. Poor oral hygiene is also a factor for secondary infection in this context. Due to *nidana sevana* (*sheeta, abhishyandi, ruksha, teekshna* food items) there is vitiation of *dosha*, which in turn causes impairment of digestive power (*agni vikriti & aama utpatti*) and *srotorodha* (obstruction of channels) in *kantha* and *talv* and thus swelling of the tonsils occur.

Figure 1. Samprapti

(Pathogenesis) of *tundikeri*



Table 5: Sampraptighataks of Tundikeri

<i>Dosha</i>	<i>Kapha</i> (according to <i>Acharya Vagbhata</i>) <i>Kapha Rakta</i> (according to <i>Acharya Sushruta</i>)
<i>Dushya</i>	<i>Rasa, rakta, mamsa</i>
<i>Srotas</i>	<i>Rasabaha. Raktabaha, Mamsabaha</i>
<i>Agni</i>	<i>Jatharagni mandya</i>
<i>Srotodushti</i>	<i>Sanga</i>
<i>Roga marga</i>	<i>Abhayntara</i>
<i>Udbhavasthana</i>	<i>Amashaya</i>
<i>Adhithana</i>	<i>Talu & Kantha</i>

Conclusion

The cardinal features of *Tundikeri* described in our classical texts are similar to that of tonsillitis in contemporary science. It is a clinical condition which is very common in today's paediatric practice. The timely treatment is most essential to avoid surgery. The medicines used in this case study have shown significant results (complete remission of the symptoms occurred after 15 days of treatment i.e. the patient obtained 100% relief in symptoms). The effectiveness of *Ayurvedic* treatment has proved that, satisfactory result may be found in these cases.

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CONFLICT OF INTEREST None declared

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Influence of Socio-Cultural Related Factors on Utilization of Primary Health Care Facilities among Pregnant Women in Iwo Local Government Area, Osun State, Nigeria

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Abstract

Introduction: Improvement of maternal healthcare of pregnant women at the grassroots level has necessitated the need to access and utilize primary health care (PHC) facilities. In spite of the benefits that are accrued to accessibility and utilization of such facilities, exploratory survey has revealed persistent underutilization of the facilities. Previous studies mainly focused on demographic, economic and some social factors, with little concentration on illiteracy, societal inspiration and cultural belief, particularly among pregnant women. This study therefore, examined influence of socio-cultural related factors on utilization of PHC facilities among pregnant women in Iwo Local Government Area (LGA), Osun State, Nigeria.

Methodology: A descriptive survey design of correlational type was used in the study. Purposive and simple random sampling techniques were used to select a total of 100 respondents from five wards in Iwo LGA of Osun State. A self-developed questionnaire with reliability value of 0.73 was used as the instrument for data collection. Data were analysed with the use of inferential statistics of Pearson product moment correlation and multiple linear regression.

Results: The outcome of the study showed that socio-cultural factors of illiteracy, societal inspiration and cultural belief had positive relationship with utilization of PHC facilities among pregnant women in Iwo LGA. Socio-cultural factors jointly had significant influence on utilization of PHC facilities among the respondents ($F_{(3,96)}=80.546$; $p<0.05$). Illiteracy ($\beta=0.255$, $p<0.05$) and societal inspiration ($\beta=0.685$, $p<0.05$) had relative influence on utilization of PHC facilities among the respondents, while cultural belief ($\beta=0.049$, $p>0.05$) did not.

Conclusion and Recommendation: Socio-cultural factors had a joint influence on utilization of primary health care facilities among pregnant women in Iwo Local Government Area of Osun State. Illiteracy and societal inspiration had relative influence on utilization of primary health care facilities. It was recommended that an effective health education on proper utilization of primary health care facilities should be organised for the pregnant women.

Index Terms- Socio-cultural factors, Utilization and Pregnant women.

I. INTRODUCTION

The current trend of event across the globe, particularly in public health has ascertained and emphasised the need for every country to provide efficient services and ensure effective utilization of primary health care (PHC) facilities. A typical aspect of such services is maternal health care service which is aimed at reducing maternal mortality. According to World Health Organization [WHO] (2005), pregnancy related complications contribute to more than half of the global deaths among women annually; with about 90-95% of these emanating from developing countries. Consequently, Focused Antenatal Care was introduced as a new model of antenatal clinic attendance for the purpose of reducing the number of required antenatal visits to four; and to provide focused services that could bring about improved maternal outcomes (WHO, 2005; Chorongo, Okinda, Kariuki, Mulewa, Ibinda, Muhula, Kimathi and Muga, 2016).

Prenatal care is more likely to be effective if women begin to receive care in the first trimester of pregnancy and continue to receive care throughout pregnancy. Effective antenatal interventions include serologic screening for syphilis, provision of malaria prevention, anti-tetanus immunization and prevention of mother-to-child transmission of HIV among others. In order to reduce life-threatening risks and reduce mortality, good-quality maternal health services by trained health workers must be available and must be used (WHO, 2005; Heaman, Newburn-Cook, Green, Elliot and Helewa, 2008; WHO, 2014).

Health care is rendered through the full participation of community members. It is also carried out at a cost that the community and the involved country could be able to maintain at every stage of their development with the aim of self-reliance and self-determination (Starfield, 2011; White, 2015). Primary healthcare services are usually rendered at the grassroots in Nigeria, particularly at the local government level. Nurses, midwives, community health officers, health technicians and other paramedical officers are mostly used, while few doctors are engaged. As, such, the staff provide prevention and treatment of communicable diseases, immunization, maternal and child health services, family planning, public health education, environmental

health and the collection of statistical data on events that are related to health (Federal Ministry of Health, 2004; Adeyemo, 2005).

The goal of PHC is to provide accessible health for all. However, this is yet to be achieved in Nigeria and appears to be unlikely in the next ten years. The care is primarily aimed at providing individual across the globe with the essential health services. In spite of the intention of equity and easy access of establishing PHC centres, the rural populations in Nigeria are seriously underserved when compared with their urban counterparts. Also, PHC which is supposed to be the foundation of the country's health care policy, is presently providing for less than 20% of the potential patients (Gupta, Gauri and Khemani, 2004; Federal Ministry of Health, 2004).

Ikuforiji (2018) revealed that several pregnant women are still giving birth in unregistered health facilities, which are mostly managed by both quacks and unskilled birth attendants. It was further established that most of such pregnant women who utilize the unregistered health facilities were usually at the critical stage before they are usually referred on emergency to registered health facilities. Ikuforiji (2018) further revealed that, Nigeria is currently one of the leading countries in maternal mortality. This means that there is a need to improve maternal healthcare in Nigeria. Consequently, empirical studies have identified various barriers that hinder the choice of utilizing PHC facilities. Cost of services, socio-demographic and educational level of the client, women's level of autonomy in making health care decisions, physical accessibility to health care services, the type of health services being rendered, disease pattern and attitude of the healthcare workers are some of the recognized factors (Jumbo, 2000; Wakama, 2000; Rasha and Mansoura, 2007; Al-Nahedh, 2009; Adekoya, 2012; Akute, 2013; Odetola, 2015).

In its usual characteristics, health care at the local government level is aimed at making the management of PHC services more effective and nearer to the grassroots. However, the level at which healthcare has been rendered to the rural populace is questionable in Nigeria, considering the level of health awareness. Typically, insufficient number of medical personnel as well as their uneven distribution is part of the hindrances to the development of health especially in Nigeria (Federal Ministry of Health, 2004; Adeyemo, 2005). In spite of the benefits that are accrued to accessibility and utilization of PHC facilities, an explorative survey has revealed persistent underutilization of such facilities in the study area.

Essentially, numerous women of childbearing age experience serious barriers to accessing services. Similarly, most of such services are often of insufficient quality when they are access by the women (Adeyemo, 2005). Consequently, the rate of maternal mortality could be prevented provided the pregnant women utilize good quality services, particularly when complications arise. Thus, this study examined influence of socio-cultural related factors on utilization of PHC facilities among pregnant women in Iwo Local Government Area, Osun State, Nigeria.

II. STATEMENT OF THE PROBLEM

Maternal and child health services are essential services that should be provided in an ideal primary health care facility, specifically at the grassroots level in Nigeria. This is necessary so as to improve maternal healthcare of women, particularly the pregnant women at such level. As such, the pregnant women will be well informed about certain aspects of pregnancy such as danger signs that are associated with pregnancy and labour, necessary dietary requirements, the need for adequate daily rest and exercise, timing of the antenatal visits, the importance of not smoking during pregnancy and the proper spacing of babies. In the same vein, it is necessary for the monitoring of fetal growth so as to have a safe pregnancy and delivery; as well as to detect maternal and fetal complications. Also, maternal mortality could be guided against provided the women of childbearing age utilize PHC appropriately when the need arises.

In spite of the benefits that are accrued to utilization of PHC facilities, an explorative survey has revealed persistent underutilization of PHC facilities among pregnant women in the study area. In order to address the challenges associated with the phenomenon, previous studies mainly focused on demographic, economic and some social factors influencing the choice of utilizing PHC facilities; with little concentration on socio-cultural related factors of illiteracy, societal inspiration and cultural belief, particularly among pregnant women. This study therefore, examined influence of socio-cultural related factors on utilization of PHC facilities among pregnant women in Iwo Local Government Area, Osun State, Nigeria.

Main Objective:

The study focused mainly on the influence that social and cultural related factors had on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Specific Objectives:

The focuses of the study were specifically to:

1. Examine the level of relationship between illiteracy, societal inspiration, cultural belief and utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.
2. Examine the joint influence of socio-cultural related factors (illiteracy, societal inspiration and cultural belief) on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.
3. Determine the relative influence of socio-cultural related factors of illiteracy, societal inspiration and cultural belief on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Research Question

The below research question was answered:

1. What is the relationship between illiteracy, societal inspiration, cultural belief and utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There will be no joint influence of socio-cultural related factors (illiteracy, societal inspiration and cultural belief) on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.
2. There will be no significant relative influence of illiteracy on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.
3. There will be no significant relative influence of societal inspiration on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.
4. There will be no significant relative influence of cultural belief on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

III. METHODOLOGY

The descriptive survey research design of correlational type was used in the study. The population comprised the pregnant women in study area. Purposive and simple random sampling techniques were used to select 100 pregnant women for the study. The respondents were selected from five wards in Iwo Local Government Area of Osun State. The pregnant women were selected from wards 1, 3, 4, 6 and 8 respectively.

The purposive sampling technique was employed to select pregnant women from Iwo Local Government Area as the population for the study. Simple random sampling technique of fish bowl (without replacement) was used to select five wards from the Local Government Area. The simple random sampling technique was further used to select twenty (20) respondents each from the chosen wards respectively. This was done in order to ensure that each of the respondents in the Local Government Area was equally given chance to be selected in the study.

A self-developed and validated questionnaire named as Socio-Cultural Related Factors and Utilization of Primary Health Care Facilities Questionnaire (SRFUPFQ) was used for data collection. The questionnaire was divided into three sections, namely, A, B and C. Section A entailed socio-demographic characteristics of the respondents, section B involved Socio-Cultural Related Factors Scale (SCRFS), while section C entailed Utilization of Primary Health Care Facilities Scale (UPHCFS). The socio-demographic features of the pregnant women covered in section A include age and level of education. Section B was used to elicit information on independent variables of socio-cultural related factors (illiteracy, societal inspiration and cultural belief); while section C was used to elicit information on utilization of PHC facilities. The responses in sections B and C were developed in a 4-point modified Likert format of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

Experts in the field of Health Education were used for the validation of the questionnaire. This really helped to improve the construct and content validity of the instrument. The data generated through pre-testing of the instrument were later subjected to factor analysis. A cronbach alpha method was used to test the internal consistency of Socio-Cultural Related Factors and Utilization of Primary Health Care Facilities scales, which yielded reliability values of 0.72 and 0.74 respectively; while the entire questionnaire yielded a reliability of 0.73.

The filled copies of questionnaire were collated, coded and analysed with the use of both descriptive and inferential statistics. The generated data were analyzed using the Statistical Package for Social Sciences program (SPSS), version 21. Frequency count and percentages were used to analyse demographic data, while Pearson product moment correlation (PPMC), mean as well as standard deviation were used to answer the research question. Inferential statistics of multiple linear regression was used to test hypotheses 1-4; while a *p*-value equal to or less than 0.05 alpha value was set as significant for each statistical test.

IV. RESULTS

Table 1: Socio-Demographic Characteristic of the Respondents

Variable	Frequency	Percent (%)
Age:		
18-28 years	21	21.0
29-39 years	56	56.0
40 years and above	23	23.0
Total	100	100
Level of Education:		
No formal Education	23	23.0
Primary Education	42	42.0
WASC/SSCE	23	23.0
Tertiary Education	12	12.0
Total	100	100.0

As revealed in table 1, 21 (21.0%) respondents were between 18-28 years, 56 (56.0%) were between 29-39 years, while 23 (23.0%) respondents were above 40 years. This means that most of the respondents were between 29-39 years. In addition, 23 (23.0%) respondents had no Formal Education, 42 (42.0%) obtained Primary Education, 23 (23.0%) possessed WASC/SSCE, while 12 (12.0%) had Tertiary Education. It means that most of the respondents had Primary Education.

Research Question 1: What is the relationship between illiteracy, societal inspiration, cultural belief and utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State?

Table 2: Correlation matrix showing the relationship between socio-cultural related factors and utilization of PHC facilities

Variables (sub-scales)	Utilization of PHC Facilities	Illiteracy	Societal inspiration	Cultural belief
Utilization of PHC facilities	1			
Illiteracy	.715**	1		
Societal inspiration	.828**	.720**	1	
Cultural belief	.689**	.663**	.831**	1
Mean	7.46	6.82	7.01	7.66
Standard Dev	3.60	2.70	3.29	3.34

** Correlation is significant at 0.05 (2-tailed)

Table 2 showed the inter-correlational matrix of the relationship between the socio-cultural related factors and utilization of primary health care facilities. The table revealed that illiteracy ($r=0.715$, $p<0.05$); societal inspiration ($r=0.828$, $p<0.05$) and cultural belief ($r=0.689$, $p<0.05$) were positively correlated with utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. This implied that, illiteracy, societal inspiration and cultural belief independently had positive relationship with utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Test of Hypotheses

The following hypotheses were tested in this study;

Hypothesis 1: There will be no joint influence of socio-cultural related factors (illiteracy, societal inspiration and cultural belief) on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Table 3: Regression analysis about influence of socio-cultural factors on utilization of PHC facilities

R=.846 R ² =.716 Adj. R ² =.707					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	916.660	3	305.553	80.546	.000
Residual	364.180	96	3.794		
Total	1280.840	99			

Table 3 revealed that there was a significant joint influence of illiteracy, societal inspiration and cultural belief on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State ($F_{(3,96)}=80.546$; $R=.846$, $R^2=.716$, $Adj.R^2=.707$, $p<0.05$); with about 70.7% of the variation accounted for by the independent variables. The null hypothesis was therefore rejected. The implication was that socio-cultural factors of illiteracy, societal inspiration and cultural belief jointly had influence on utilization of PHC facilities among pregnant women in the Local Government Area.

Hypothesis 2: There will be no significant influence of illiteracy on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Table 4: Regression analysis about influence of illiteracy on utilization of PHC facilities

Variable	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta (β)		
(Constant)	.295	.556		.530	.597
Illiteracy	.340	.106	.255	3.204	.002

Table 4 showed that illiteracy ($\beta=0.255$, $p<0.05$) had relative influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. The null hypothesis was therefore rejected. This implied that illiteracy had strong influence on utilization of PHC facilities among the respondents.

Hypothesis 3: There will be no significant influence of societal inspiration on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Table 5: Regression analysis about influence of societal inspiration on utilization of PHC facilities

Variable	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta (β)		
(Constant)	.295	.556		.530	.597
Societal inspiration	.749	.117	.685	6.412	.000

Table 5 showed that societal inspiration ($\beta=0.685$, $p<.05$) had relative influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. The null hypothesis was therefore rejected. It implied that societal inspiration had strong influence on utilization of PHC facilities among the respondents.

Hypothesis 4: There will be no significant influence of cultural belief on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State.

Table 6: Regression analysis about influence of cultural belief on utilization of PHC facilities

Variable	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta (β)		
(Constant)	.295	.556		.530	.597
Cultural belief	.053	.107	.049	.494	.623

Table 6 revealed that cultural belief ($\beta=0.049$, $p>.05$) had no relative influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. The null hypothesis was therefore accepted. This implied that cultural belief did not have strong influence on utilization of PHC facilities among the respondents.

area. It means that illiteracy of some respondents, societal influence on the respondents as well as their cultural belief jointly had strong impact on underutilization of PHC facilities in the study area. The outcome of this study on socio-cultural factors was in contrast to the finding of Odetola (2015) that, there was an association between affordability of service provided and the choice of health institution by women of child bearing age.

V. DISCUSSION OF FINDINGS

The findings on the relationship between the socio-cultural factors and utilization of PHC facilities revealed that illiteracy, societal inspiration and cultural belief were positively correlated with utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. This implied that, illiteracy, societal inspiration and cultural belief independently had positive relationship with utilization of PHC facilities among pregnant women in the study area. This means that an increased level of illiteracy, societal inspiration and cultural belief among the respondents could lead to an increase in underutilization of PHC facilities among pregnant women in the Local Government Area. The outcome of the present study on relationship between illiteracy and utilization of PHC facilities was in agreement with the finding of Odetola (2015) that, there was a significant relationship between level of education and child bearing women's choice of health care service.

In the same vein, it was revealed in the study that illiteracy had significant relative influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. This implied that illiteracy independently had significant influence on utilization of PHC facilities among the respondents. It means that the low level of literacy of the pregnant women in the study area had strong impact on underutilization of PHC facilities by the respondents in the Local Government Area. This outcome may be connected with the fact that, a reasonable number of respondents had no formal education, while majority of the respondents had primary education. The outcome of this study on illiteracy was in line with the finding of Odetola (2015) that, there was a significant relationship between level of education and child bearing women's choice of health care service.

The finding about joint influence of socio-cultural factors on utilization of PHC facilities revealed that the linear combination of illiteracy, societal inspiration and cultural belief had significant influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. This implied that socio-cultural factors of illiteracy, societal inspiration and cultural belief jointly had strong influence on utilization of PHC facilities among pregnant women in the study

The finding of the study further revealed that societal inspiration had significant relative influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. This implied that societal inspiration independently had significant influence on utilization of primary health care facilities among the respondents. It means that the influence or pressure from the society on the pregnant women in the study area had strong impact on underutilization of primary health care facilities by the respondents in the area. This outcome may be as a result of the fact that some respondents in the area allowed the societal opinion to prevail on their personal decisions. The outcome of this study on societal inspiration was

in line with the finding of Jumbo (2000) that, the level of women's autonomy in making health care decisions was a significant factor that influence the choice of utilizing PHC facilities. It was further established in the same study that mothers-in-law, husbands or other family members usually make decision for women of childbearing age in Port Harcourt.

The outcome of the study further revealed that, cultural belief had no significant relative influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area of Osun State. It implied that cultural belief independently had no significant influence on utilization of PHC facilities among the respondents. This means that the cultural belief of the pregnant women in the study area did not have strong impact on underutilization of PHC facilities by the respondents in the study area. This outcome may be connected to the fact that, the respondents did not have strong conviction on existing cultural belief in relation to utilization of primary health care facilities. The outcome of this study on cultural belief was in contrast to the findings of Wakama (2000) and Akute (2013) that healthcare workers' attitude was a significant factor that influence the choice of utilizing PHC facilities.

VI. CONCLUSION

It was concluded that socio-cultural factors of illiteracy, societal inspiration and cultural belief had positive relationship with utilization of PHC facilities among pregnant women in Iwo LGA of Osun State. It was also concluded that socio-cultural factors jointly had significant influence on utilization of PHC facilities among pregnant women in Iwo Local Government Area. It was further concluded that illiteracy and societal inspiration had relative influence on utilization of PHC facilities, while cultural belief did not.

VII. RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. An effective sensitization programme on proper utilization of PHC facilities should be carried out intermittently by the authority of Iwo Local Government Area of Osun State. This is necessary so as to ensure that pregnant women in the area are aware of the proper utilization of PHC facilities.
2. An effective health education on proper utilization of PHC facilities should also be organised for the pregnant women. This will help the pregnant women to have better understanding on the need to utilize PHC facilities in their study area.

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Behavior of small states from the perspective of International Relations theory: An analysis of South China Sea

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Abstract

Territorial disputes in the South China Sea have long been one of the most critical and complex issues of security between south-east Asian states and China. The competition for maritime rights has emerged as the most important security issue in the east Asia.

The powerful states have a tendency for domination. The smaller states may not show their dominating behavior over other states, but they have tendency to maximize their relative power by making alliance with great power or by other means. Since the smaller states are not capable enough individually to ensure their own security or to use military force against threatening power, they have tendencies to join in alliances or in other words to create balance of power to ensure their own security. This study attempts to analyze the behavior of small states and to find out which theory matches with the behavior.

The behavior of small states like Vietnam and the Philippines cannot be well-explained by the realist approach. They behave to make their existent clear and safeguard themselves only. Making allies with great powers as well as economic ties simultaneously with other economic powers render their behavior of having peaceful coexistent with everyone.

Key Words: dispute, small states, maritime borders, security.

1. INTRODUCTION

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Territorial disputes in the South China Sea have long been one of the most critical and complex issues of security between southeast Asian states and China. The competition for maritime rights has emerged as the most important security issue in the East Asia. Even more broadly, the entire Asia-Pacific region is involved in the dispute.

The powerful states usually have a tendency for domination. The smaller states may not show their dominating behavior over other states, but they have tendency to maximize their relative power by making alliance with great power or by other means. Since the smaller states are not capable enough individually to ensure their own security or to use military force against threatening power, the smaller states have tendencies to join in alliances or in other words to create balance of power to ensure their own security. This study aims to explore the tendency or behavior with relations to the theory of International Relations.

II. OBJECTIVE

The objective of the study is to analyze the behavior of small states and to find out whether the theory of realism matches with the behavior of small states.

III. THEORETICAL FRAMEWORK

Realism is regarded as the most dominating theory in international relation. From realist point of view, states are motivated by the desire for military and economic power for security. Neo-realism describes anarchic structure of world politics rather than human nature. In anarchical structure

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states remain wary of each other and compete with each other. In this system cooperation among states always aim at maximizing their relative power.

Liberalists focused on economic interdependence and good relations among the states rather than confrontation, while in constructivist theory international institutions have impact on state's behavior. Interaction and socialization brings collective identity to a state.

These theories of International Relations make scope to study the behavior of small states in the activities of cooperation with each other especially with powerful states.

Medeiros (2005) has found that many scholars supported the realist tradition to describe security in Asia. Asian states hedging or balancing against rising China. The US is also continuing as a dominant power (Sutter, 2008). Mearsheimer (2001) has applied realism theory to explain Asia. He argued that China will seek hegemonic authority and asymmetry between rising power and existing leading power will characterize Asian order and cause great power.

This study has been done within this framework of realist theory of International Relations since the Asia is experiencing having China as a future great power along with some small states who are gaining economic strength.

IV. METHODS OF STUDY

This study approaches qualitative analysis. The secondary data such as journals, books, news, articles have been analyzed to find out the objective.

V. SOUTH CHINA SEA DISPUTE AND STAKEHOLDERS

The South China Sea dispute is mainly the dispute in demarcation of maritime border. It is believed to be rich in natural gas, oil and fish. The number of claimants is at least six - China, Taiwan, Vietnam, the Philippines, Malaysia and Brunei (Ruland, 2004). All have occupied atolls and islets in the Spratly Archipelago and erected military installations. China occupied Mischief Reef in 1995 which was claimed

by the Philippines as part of their Kalayan islands (Ruland, 2004).

Sharkov (2016) showed that the United States Energy Information Agency has estimated 11 billion barrels of oil and 5.38 trillion cubic meters of natural gas in deposits under the sea—more than what exists in the reserves of some of the world's biggest energy exporters.

The waters also contain lucrative fisheries that account for, according to some estimates, 10 percent of the global total. A lot of fishing boats are cruising around in waters contested by several different navies, increasing the risk of conflict.

The area's greatest value is as a trade route. According to a 2015 US Department of Defense report, \$5.3 trillion worth of goods moves through this sea every year, which is about 30 percent of global maritime trade. That includes huge amounts of oil and \$1.2 trillion worth of annual trade with the United States.

This gets to a core contradiction in the South China Sea dispute: It is driven by territorial competition, yet all countries involved want open sea routes. Everyone benefits from the free flow of goods between Asia and the rest of the world, and everyone suffers if that is disrupted.

This is part of why the United States stresses freedom of movement in international waters. While it is very unlikely that China would ever want to close off trade, the United States would still rather not allow Beijing even the ability to hold the global economy hostage.

From China's perspective, the United States itself has that ability, because of American naval dominance; the Chinese also suspect that the global status quo is engineered to serve Western interests first. So it is hardly surprising that China is seeking greater control over waterways it relies on for economic survival.

This is a dynamic that has permeated Sino-American relations throughout China's rise over the past two decades. In theory, both nations understand they are better off cooperating. But in practice, they often treat each other as

competitors or potential threats—a cycle that is difficult to break.

China, for the past few years, has been asserting ever greater control over faraway water that was previously considered international or was claimed by other countries. Chinese state media outlets responded recently by publishing a map. It showed the South China Sea with most of the waters encircled with the "nine-dash line" that has long represented China's claims in the strategic waterway (Sharkov, 2016).

This little line has shown up on official Chinese maps since the 1940s (it began with 11 dashes). It demarcates a vast but vague stretch of ocean from China's southern coast most of the South China Sea.

China has never clarified the line's exact coordinates. But it sweeps across waters — and some small islands — that are claimed by five other nations. It seems to go many beyond what is allowed under the United Nations Convention on the Law of the Sea (Unclos), which China signed.

For China, the line represents long-lost historical claims that the country, after two centuries of weakness, is finally strong enough to recover. For the other nations, the line is a symbol of what they characterize as a naked power grab by China. China claiming this has seized small land formations or reefs, sometimes dredging up underwater to make the islands large enough to the stakeholders of the South China support small military installations.

China's naval forces have also grown more aggressive in patrolling these claims and chasing off non-Chinese ships. That is part of why its neighbors see this as an effort by China to dominate the region. This is also about whether China will comply with international laws and norms, while Beijing sometimes views as a plot to constrain the country's rise.

The United States has gotten involved, sending the Navy to patrol waters it insists are Emotional and backing international mediation efforts. Washington says it wants to free movement and rule by international law. The risk of outright conflict is extremely low, but the militarization of

these heavily trafficked and heavily fished waters is still dangerous.

The international tribunal in July this year ruled that Philippines fishermen should be given access alongside Chinese fishermen in the contested waters dismissed China's that land elevations in the regions can be considered islands (Sharkov, 2016). The tribunal rejected the nine-dash line that China has used to indicate its South China Sea claims. This could open the way for other Asian states to challenge China's claims. So the letter of international law seems to say that China could be compelled to abandon many of its South China Sea claims.

But while the ruling is considered binding, there is no enforcement mechanism. China the proceedings, saying that the tribunal had no jurisdiction and that it would ignore decision—a position it reiterated after the ruling came out (Sharkov, 2016).

VI. BEHAVIOUR OF SMALL STATES IN THE SOUTH CHINA SEA DISPUTE

Being the stakeholders of the South China Sea the countries except US and China are among the small states. In this study cases of Vietnam and the Philippines have been studied these two countries are the most prominent claimants of the parts of the sea. The behaviors have been analyzed in terms of their relations with US and China.

A. Relation of Philippines with US and China

Both the security and economic relations have been studied to understand the actual dimension of growing relations between countries.

i) Security Cooperation

The United States has begun to provide \$40 million in technical expertise, training and equipment through the Global Security Contingency Fund to strengthen the Philippines security operations and maritime domain awareness capabilities, the United States is supporting the Armed Forces of the Philippines (AFP) as it transits from internal security to external defense (as outlined in the

Philippines government's 2011 "Internal Peace and Security Plan"). This funding also assists the Philippines National Police as they assume a leading role in providing internal security and combating terrorism (white house website, 2016).

The Enhanced Defense Cooperation Agreement (EDCA) between US and Philippines will help US-Philippines alliance continue to promote the peace and stability. The agreement will facilitate the enhanced rotational presence of U.S. forces; facilitate humanitarian and disaster relief in the Philippines and the region; improve opportunities for training and support the long-term modernization of the Armed Forces of the Philippines (AFP) as it works to establish a minimum credible defense (white house website, 2016).

The United States, through the Defense Threat Reduction Agency, is also helping to construct a Philippines National Coast Watch Center in Manila that will assist the Philippines Coast Guard in assuming increased responsibility for enhancing information sharing and interagency coordination in maritime security operations.

ii) Economic Cooperation

Philippines's main import partners are: China (25 percent), the United States (9 Percent), Japan (10 percent) and South Korea (8 percent) (tradingeconomics.com, 2016), while Philippines's main export partners are: China (21 percent), the United States (14 Percent), Japan (15 percent) and South Korea (4 percent) (tradingeconomics.com, 2016). This study reveals that China is the most prominent partner in both import and export context.

iii) Recent development in ties with China

Philippines President Rodrigo Duterte recently has announced his "separation" from the United States, declaring he had realigned with China as the two agreed to resolve their South China Sea dispute through talks. Duterte made his comments in Beijing, where he was visiting with at least 200 business people to pave the way for what he has called a new commercial alliance as relations with longtime

ally Washington deteriorate (Reuters, 2016). He rendered that there will be no relation with America except social relation.

Duterte's efforts to engage China, months after a tribunal in the Hague ruled that Beijing did not have historic rights to the South China Sea in a case brought by the previous administration in Manila, marks a reversal in foreign policy of the Philippines. According to the trade secretary, Ramon Lopez, a total of \$13.5 billion in deals has been signed during a recent China trip (Reuters, 2016). China has welcomed the Philippines approaches, even as Duterte has vowed not to surrender any sovereignty to Beijing, which views the South China Sea Hague ruling as null and void. China has also expressed support for his drug war, which has raised concern in Western capitals about extrajudicial killing.

B. Relation of Viet Nam with US and China

Similarly with Philippines, both the security and economic relations have been studied to understand the dimension of growing relations between countries.

i) Security Cooperation

Restrictions on the sales of military equipment and arms were one of the few US trade restrictions with Vietnam that remains in place since the end of the Vietnam War in 1975 (Martin, 2016). In 2010, then U.S. Ambassador to Vietnam Michael Michalak informed about likeliness to expand military to military relationship to include the sale of arms. Rising U.S. concerned about China's increased assertiveness over disputed islands and waters in the South Sea have led the Obama Administration to see Vietnam as a partner on maritime security issues (Martin, 2016). As a result, on October 2, 2014, announcement comes about the United States allowing the future transfer of maritime security-related defense article to Vietnam. In November 2015, another announcement comes from White House about providing \$19.6 million in maritime assistance to Vietnam in FY2015 and \$20.5 million in FY2016 (Martin, 2016).

USA has also elevated its security priority which is visible through talks with Vietnam about the use of former Soviet base Cam Ranh Bay (Manicom, 2013).

ii) Economic Cooperation

Main import partners of Vietnam are China (98 percent of the total imports), Korea (14 percent), Japan (9 percent) and US (4 percent) while main export partners are: the United States (20 percent of the total exports), China (13 percent), Japan (10 percent), South Korea (5 percent), Hong Kong (4 percent) and Germany (4 percent) (white house website, 2016). This study reveals that China is the most prominent partner in the context of import. In case of export, United States shares the major part, But the shares of China is increasing gradually (tradingeconomics.com).

VII. ANALYSIS OF BEHAVIOR OF VIETNAM AND PHILIPPINES IN TERMS OF IR THEORIES

The continued rise of China's economic and maritime power is the leading influence on the future maritime security environment of Asia. The United States is declining in strategic and political influence, while China looms as a major power with global interests.

After the cold war US became the only super power. But currently US unipolar domination in Asia is seen to be loosened. The decline of US and the rise of Asian countries seem to be the main causes behind this. The present role of USA in Asia has therefore begun to transform into a balancer from a leader (Honggang, 2014). Despite uncertainty about US capacity to maintain regional presence in light of economic cooperation, the cuts to defense spending will not come at the expense of forces deployed in the Asia-Pacific. It has come out from the number of US officials speeches. The then US Secretary of Defense Mr. Panetta mentioned in the Shangri La Dialogue in 2012 that 60% of US navy will be deployed in the Pacific by 2020 (Manicom, 2013).

The Philippines and Vietnam increasingly worry that they are at a disadvantage in the competition with an increasingly powerful China. This feelings has made them act and

preemptively continuously strengthen the control over islands already they have occupied. They move closer to the United States to gain more support (Honggang, 2014). In line with it Vietnam has increased its number of submarines in the South China Sea along with other claimant countries (Manicom, 2013).

From this point of view it seems that both the countries are eager to make allies with US to get stronger against their rival China. But the economic cooperation with China largely reveals that they want economic cooperation rather than power politics. Recent remarks of Philippines President Rodrigo Duterte regarding economic tie with China, that has already mentioned earlier, make this view stronger.

The behavior of small states like Vietnam and the Philippines cannot be well-explained by the realist approach. In the case of China, the hegemonic nature can be found since it is aggrieved to conquer the most of the South China Sea and opted to tackle USA egoistically. But the small states like Vietnam and the Philippines behave to make their existent clear and safeguard themselves only. Due to this reason, they make allies with great powers. But economic ties with China render their behavior of having peaceful co-existence with everyone.

VIII. RECOMMENDATIONS & CONCLUSION

To establish a secured order in Asia for further economic development, United States should rebalance its presence in Asia to adjust with China and other growing economy. China as a rising economy should play positive role to accommodate other smaller economies and keep good balance with United States. The other small states should keep balanced relation with China and United States.

In the International system, there is an unequal distribution of power among states. The capacity to pursue and achieve objectives varies according to the relative power of states. There are many studies which focus the issues from great power's perspectives. But the number of studies focusing small weaker states is very little. This study shows their dominating behavior over other states. To keep the peaceful

existence in the region, China as a super economy of Asia should play the positive role that will be helpful for greater cooperation in the region.

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Analysis of Leadership Effect and Public Service Motivation on Work Satisfaction (ASN) In The District Bantaeng

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Abstract : This research was conducted to determine the effect of leadership and motivation of public service for job satisfaction ASN Bantaeng district. Basically, job satisfaction is an individual thing and depends on one's perception of what he feels about work. Further explained that the job satisfaction theory tries to reveal what makes some people more satisfied with their work than some others. If employees have high job satisfaction, employees will try to show the best service quality. Job satisfaction in this study as a central point that can not only affect the quality of public services directly, but can be a factor that mediates indirect effects of several factors that affect the quality of public services, including leadership factors and motivation for public services. Leadership has a positive direct effect, although not significantly on ASN job satisfaction, while the activation of public services has a significant positive direct effect on ASN job satisfaction in Bantaeng District .

Keywords : leadership, work motivation, public service,

1. INTRODUCTION

One of the aspects that affect the quality of public services provided is job satisfaction, that is to say with a high level of employment kepuasan usually employees will provide good service and vice versa, when the employee is not satisfied with the job the services provided will not be satisfactory. Thus, job satisfaction is a driving factor in increasing the quality of public services that contribute both directly and to the factors that mediate other external factors. This is in line with what was stated by Trivellas, Jacques, and Dargenidou (2009) who in his research findings argue that "employees not only provide and create services, but are actually part of service", thus, their satisfaction drives service quality. Furthermore, the results of the study of Sunaryo and Suyono (2013) indicate that motivation for public services has a significant and positive effect on job satisfaction. The significant impact of public service motivation on job satisfaction as found in this study shows that high public service motivation will result in high job satisfaction. These results are in line with Liu, Tang, and Zhu (2008) who have shown that motivation for community service has a strong impact on job satisfaction of public sector employees in China. Then the results of Taylor (2007) research, which found that there was a significant relationship between motivation for public services and individual performance, where job satisfaction is the main attitude of employees in the public sector.

In general, job satisfaction reflects the feelings of workers on their jobs. According to (Robbins, 2007) that job satisfaction is a general attitude of an individual to work where someone with a high level of job satisfaction shows a positive attitude towards work. (Hartatik, 2014) further explains that the job satisfaction theory tries to express what makes some people more satisfied with their work than some others. Basically, job satisfaction is an individual thing and depends on one's perception of what he feels about work. Further explained that the job satisfaction theory tries to reveal what makes some people more satisfied with their work than some others. If employees have high job satisfaction, employees will try to show the best service quality. This is in line with (Panggabean & Mutiara, 2004) , which states that basically job satisfaction depends on what someone wants from his job and what he gets. Several factors can increase employee job satisfaction as stated (As'ad, 2003) that are opportunities for advancement, namely: job security, salary, corporate environment and management, intrinsic factors and work, working conditions, social aspects of work, communication, and amenities. In line with these opinions, job satisfaction as a mediating variable in improving service quality in this study is directly influenced by transformational leadership, work discipline, work environment and appreciation.

Leadership is one of the important elements in increasing job satisfaction and quality of public services. Piccolo and Colquitt (2006) argued that transformational leadership has been two decades emerged as one approach to understanding keefekti fit asan lead. It is this transformational leadership that truly means true leadership because this leadership really works towards the goal that directs the organization to a goal that was never achieved before (Locke, 1997). Furthermore, transformational leadership is characterized by the behavior of leaders to raise subordinates to a higher level, (Bass, 1985 ; Burns, 1978).

A leader is said to be transformational in style if it can change the situation, change what is usually done, talk about a noble goal, have a reference to the values of freedom, justice and equality. Transformational leaders will make subordinates see that the goals to be achieved are more than just their personal interests. Transformational leadership has been the main research theme for the past two decades. Empirical findings from previous studies reported that transformational leadership improves employee attitudes and performance (Bass, 1997 ; Lowe, Kroeck, & Sivasubramaniam, 1996). In addition, some previous research

findings also show that leadership has a significant effect on job satisfaction (Plangiten, 2013 ; Widodo, 2014) and also has an impact on improving service quality (Hariri, 2011 ; Hati, 2013 ; Munwar Hussain Pahi & Kamal Ab Hamid, 2015). Furthermore, leader behavior is significantly related to the behavior and responses of followers, such as employee satisfaction, efforts to self-report, task performance, and role clarity (Podsakoff, Ahearne, & MacKenzie, 1997) . Furthermore, research (Judge & Bono, 2000) found that transformational leader behaviors influence job satisfaction and subordinate satisfaction with their leaders. Thus, if the leadership is more charismatic and understands subordinates it will be able to create employee job satisfaction so that it has an impact on the quality of public services.

Various studies in America and Europe found that public service motivation (*Public Service Motivation*) has a significant effect on service quality and job satisfaction as done by (HG Rainey & Steinbauer, 1999), who conducted a study by improving findings (Brewer & Selden, 1998) . Based on the results of the study (Clerkin & Cogburn, 2012) found that the increasing motivation of public services will cause an increase in job satisfaction which in turn improves the quality of service for employees in the public sector. The results of the study (Wright & Grant, 2010) found that people who have motivated public service tend to work in the public sector compared to the *pro fit* sector .

Research conducted by (Pandey, Wright, & Moynihan, 2008 ; Wright, Moynihan, & Pandey, 2012) strengthens research on people's interest in motivating public services to work in the public service sector but has not been able to answer why it is different. Finally, the results of the study (Syamsir, 2016) on all local government employees of West Sumatra Regency found things that were different from findings in America and Europe in general. His findings indicate there is influence but the effect is very small, which is only 2.6%. At this point this study will prove how the relationship between the motivation of public services and job satisfaction and the quality of public services in the Bantaeng District Government departs from the differences in the results of this study.

The description that has been stated previously has shown that the quality of public services can be improved through increasing employee job satisfaction. Job satisfaction in this study as a central point that can not only affect the quality of public services directly, but can be a factor that mediates indirect effects of several factors that affect the quality of public services, including leadership factors and motivation for public services. Based on the meta-analysis which included 6,746 people consisting of 28 separate studies revealed a positive and significant relationship between good organizational member behavior and satisfaction (Organ, 1995). Furthermore (Robbins, 2007) explains that it is logical to consider satisfaction as the main predictor of someone's extra role behavior, because satisfied employees tend to talk positively about the organization, help other individuals, and pass normal expectations in their work. In addition, satisfied employees may give more roles because they respond to their positive experiences so that they will improve the quality of their services.

2. RESEARCH METHODS

The method used in this study is inferential quantitative method (statistics with *Structural Equation Modeling* -SEM) which can analyze the relationship between variables to the indicators of each variable. This research was conducted in Bantaeng Regency where the object of research was all local government organizations (OPD) in Bantaeng District Government. Data collection methods used in this study consist of two, namely:

1. Observation, namely data collection carried out directly to the place of research through observation of the object under study or things that are needed specifically related to the variable under study .
2. Questionnaire, which is collecting data by distributing questionnaires (questionnaires) to respondents (research samples) to answer the problem in this study.
3. In-depth interviews (*in-depth interviews*) if required, the process of obtaining information for research purposes by way of question and answer face to face between the interviewer and respondent or person diwawancara, with or without the use of a guide (*guide*) interview in which the interviewer and the informant involved in relatively long social life (Sutopo, 2006) .

3. RESULTS AND DISCUSSION

The quality of public services in public organizations is in the spotlight and that is where the hope of society depends. With the quality of good public service, people will be calm because they believe that each of their affairs will be served with the maximum. The government is required to find solutions to every problem faced by the community with innovation and renewal of government management (Rachmat, 2018) where in it must think of ASN as the main element in service. The research provides an overview of the relationship between leadership and public service motivation, job satisfaction in ASN in Bantaeng District.

a. Direct influence of leadership on job satisfaction

Leadership is believed to have an influence on ASN job satisfaction as it has become the belief of experts with various research results in the *private sector* . Some of the results of research in the private sector show that leadership, both transformational leadership and transactional leadership have contributed to increasing ASN job satisfaction. The results showed that the leadership influence coefficient (KPM) on job satisfaction (KPK) was 0.006 with a t-count value of 0.028 at a significance level of 0.978. The coefficient shows that leadership (KPM) has a positive effect on job satisfaction (KPK) of 0.006. While t-count (CR) is only equal to 0.028 smaller than 2.0 as the *cut of point* (Ferdinand, 2014 ; Joseph F. Hair Jr et al., 2014) which means that the effect of leadership is not significant on job satisfaction. This means that increasing leadership (KPM), will

be followed by an increase in job satisfaction (KPK); on the contrary, a decrease in leadership (KPM), will be followed by a decrease in job satisfaction (KPK), assuming other factors that affect the size of job satisfaction (KPK) are considered constant even though this is not significant.

The results of the study also showed contributions from leadership-forming indicators consisting of transformational leadership and transactional leadership. The biggest contribution to leadership is transactional leadership, this can be seen from the estimated value (*loading factor on standardized regression weights*) as much as 0.769 is greater than transformational leadership that is equal to 0.751. The interesting thing is that if we look at the forming items of the two indicators, it will be seen that the biggest contribution is derived from transformational leadership, namely 1) encouraging employees to appear /advance (0.775), 2) increase employee motivation (0.765), and 3) encourage employees to think more creatively (0.686). While items forming transactional leadership are in the order of 4) making standards for doing work (0.683), 5) taking action before chronic problems (0.601), and 6) making clear expectations (0.557), and the most recent are items in Transformational leadership is listening to employee concerns (0.554). These results indicate that a transformational leader is expected to be a motivator and guide ASN to be creative in work, while transactional leaders are expected to be able to make clear standards, ability to make decisions, and as good listeners.

The results showed that ASN job satisfaction can be improved with good leadership even though this is not significant. This is because basically ASN job satisfaction is formed from the largest contribution forming indicators of ASN job satisfaction respectively 1) jobs in general (0.747), 2) coworkers (0.709), 3) supervision (0.694), and 4) salary currently (0.561). The entire indicator is a factor that comes from the environment in which the ASN is located and the direct contribution of the leader is minimal. Basically ASN in Bantaeng Regency is in the field where they already feel that they are compatible with the ASN which is supported by good relations between the ASN itself which contributes to their satisfaction with their work. Current supervision and salary is one of the direct contributions of the leader but salaries for ASN adjust to their rank and class so that even this cannot make satisfaction for ASN due to good leadership. While supervision is formed by 3 (three) items, namely the leader gives flexibility to ASN but assesses the work objectively, always around if needed, and knows the job well, also not maximally contributing to ASN job satisfaction. Based on the results of interviews with several informants, especially ASN who held positions (echelon 2-4) said that the current leadership they had very strict supervision in which each leader in each unit must *stand by* 24 hours, and anyone contacted by the highest leadership in the district Bantaeng and does not respond to 2 or 3 times the call must be prepared to be transferred. Even though they were satisfied with their work but they felt that there was a strong pressure from the leadership so the researchers considered that this was one of the factors that made leadership not significant to ASN job satisfaction in Bantaeng District.

The results of this study contradict the findings which state that good leadership significantly increases ASN job satisfaction and vice versa, as the results of research (Paripurna, 2013) show that leadership variables have a partially significant effect on employee job satisfaction. The leadership variable becomes the most dominant variable that influences employee job satisfaction because based on analysis calculations the *standardized beta coefficients* have the greatest value. Furthermore, research shows that transformational leadership has a greater contribution compared to transactional leadership on job satisfaction (Ahmad, Adi, Noor, Rahman, & Yushuang, 2013) in line with that (Aloysius, 2017 ; Seung-Ho, Meier, & Ladenburg, 2008).

Other studies that see direct influence of leadership on job satisfaction include, (Voon, Lo, Ngui, & Ayob, 2011 ; Wan Omar & Hussin, 2013 ; Yunus & Bachri, 2013) with a significant positive influence, furthermore the research conducted by (Long et al., 2014a) showed that only one of the four characteristics of transformational leadership was found to have a significant relationship with job satisfaction. Characteristics of individual considerations found most contribute to job satisfaction. Research (Judge & Bono, 2000) me nemukan that transformational leaders' behaviors influence job satisfaction and subordinate satisfaction with their leaders. While research is in line with the findings in this study , where there is a positive but not significant relationship (Budiyanto & Oetomo, 2011) the research was conducted in Magetan Indonesia . Furthermore, the more extreme is the finding that leadership has a negative and significant effect on employee job satisfaction, meaning that the results of executing managerial activities of leadership do not necessarily have an always positive or good impact for the organization, because the higher the leadership managerial activities are carried out. will have an impact on decreasing company performance from time to time. The implementation of more leadership activities in the direction of pressing employees can cause an employee to achieve satisfaction in work, but not necessarily able to bring a positive influence in the formation of subordinate personality to sincerely work towards achieving organizational goals (Brahmasari & Suprayetno, 2008) .

The style of a leader in managing an organization is said to have a large role in employee performance and transformational leadership is considered as one of the most effective styles applied in a work environment that is believed to have an impact on employee job satisfaction (Belias & Koustelios, 2014). Other research on a bank shows that transformational leadership has no significant effect on job satisfaction even though in general influential leadership then communication and interaction can be emphasized as the main pillar of a leader (Cetin, Karabay, & Efe, 2012).

Leadership in this study is defined as the ability possessed by a leader in influencing his subordinates based on transformational and transactional styles through intelligence, maturity, social relations and self-motivation in order to achieve organizational goals. This variable is measured by indicators based on (Bass, 1997 ; Yuki,2010) , namely transformational leadership, and transactional leadership. To be able to display charming leadership in Bantaeng District government organizations, the leadership dimension must be designed so that it can create a positive positive response to employees.

The initial idea of transformational leadership theory was developed by (Burns, 1978 ; G. Yuki, 1994) based on descriptive research on political leaders. Conceptually Burns introduces two types of leadership, namely transactional leadership and transformational leadership, where the two types of leadership are different but positively related rather than conflicting styles. (Bass, 1985) views transactional leadership and transformational leadership as different processes, and he recognizes that the same leader can use both types of leadership at different times and situations. This opinion is supported by (Waldman et al., 1987

) who argues that, although the concept is different, transactional leadership and transformational leadership can be adopted at a certain level by a manager, and that the most effective leaders are transactional and transformational leaders. If leadership is effective in showing leadership, the impact is on satisfaction of employees.

Leadership characterized by transformational and transactional dimensions has a positive but not significant effect on ASN job satisfaction, this is because the main driving factors for ASN job satisfaction are good relationships with colleagues, work in general, and the salary they receive. Thus the factors that come from their leaders are only salaries, but salaries for ASN have been stipulated in accordance with the applicable rules based on rank and class of the ASN. Furthermore, ASN in Bantaeng Regency does not receive additional income as received by ASN elsewhere.

The results of this study also prove that theoretical studies and empirical studies that state and prove the existence of a positive although not significant causality relationship (the effect is very small) between leadership and job satisfaction and the quality of public services. *The implication of this finding is that leadership is not a major driver of increasing ASN job satisfaction. By that, it should pay attention to leadership, especially 4 (four) transformational leadership drivers and 3 (three) transactional leadership drivers as explained before, although this does not have a significant effect.*

c. Direct influence of public service motivation on job satisfaction

The study of the motivation of public services in Europe and America is very large, but similar studies in ASEAN are still very rare, especially in Indonesia. From various research results, it shows that there is a positive relationship between motivation of public services and job satisfaction and quality of public services, both in Europe and America and in Indonesia. One of the studies in Indonesia is carried out in West Sumatra with very little results, which is only 2.6 % different from the results found in Europe and Amerika.

Public service motivation activation (PSM) on job satisfaction (KPK) is 0.683 with at value of 3.855 greater than 2.0 as a *cut of point* (Ferdinand, 2014 ; Joseph F. Hair Jr et al., 2014) at a significance level of 0,000. The coefficient shows that the public service motivation variable (PSM) has a positive effect on job satisfaction (KPK). This means that increasing public service motivation (PSM), will be followed by increased job satisfaction (KPK); on the contrary, a decrease in public service motivation (PSM), will be followed by a decrease in job satisfaction (KPK), assuming other factors that affect the size of job satisfaction (KPK) are considered constant.

The confirmatory test results also provide an interpretation that of the four indicators used to measure public service motivation, respondents respond to compassion, commitment to the public interest (*commitment to the public interest*) as the dominant indicator is considered by employees, this is evidenced by an estimated value of 0.959 and 0.814 which is greater than other indicators. So that as far as possible the Bantaeng District government pays more attention to aspects of compassion and commitment to the public interest (*commitment to the public interest*).

The results found in the study were that public service motivation driven by feelings of compassion, commitment to the public interest, and interest in policy making could increase ASN job satisfaction (Liu et al., 2008) . Furthermore, it is rather different from the results of research that see the relationship between motivation in general and job satisfaction (Ferawaty & Tamsah, 2016 ; Lambrou, Kontodimopoulos, & Niakas, 2010), although the effect is the same, which is positive and significant.

To maintain employee job satisfaction, it is necessary to have good public service motivation. Motivation of public services in this study are government employees who have the desire to serve the public or a public employee will be involved in behavior that is consistent with community-oriented motives and *altruistic* attitudes (selflessness). This variable is measured by indicators based on (Perry,1996) and developed (Coursey & Pandey, 2007 ; Coursey et al., 2008) as follows: interest in public policy making (*attraction to public policy making*) , a commitment to the public interest (*commitmen to the public interest*), mercy (*compassion*), and self-sacrifice (*self-sacrifice*).

The concept of motivation of public servants (Vandenabeele 2007) has been developed as a counterbalance to the motivation of self-interest (*self interst*) found in the theory of rational pilhan. Whereas according to (Willem et al., 2010) the concept of motivation for public services was introduced to show motivation based on values and attitudes beyond self-interest or organizational interests.

The motivation of ASN in the perspective of the PSM theory is formed by intrinsic and extrinsic *reward* factors . Intrinsic *reward* is the satisfaction of an ASN because it has done a work that means for example, feelings of satisfaction, pride and pride. While extrinsic *rewards* are *rewards* received by ASN from the government, such as salary increases, promotions, job security, status and pestise. PSM is not only driven by the compensation factor alone, but also factors of satisfaction (*satisfaction*).

PSM does not view *reward* factors as important instruments in increasing ASN motivation because motivation is formed by intrinsic and extrinsic factors. So far, the government has tended to only emphasize extrinsic factors, namely by increasing salaries, benefits, promotions without regard to ASN satisfaction factors towards their work. It is predictable that the results will not be effective because ASN is positioned as a human economy that only emphasizes material aspects. In fact, ASN also wants to be respected for its existence, wants to do something that is in accordance with its abilities and expertise, so that they are satisfied to serve the nation and the State. That is, ASN has *altruism* values , namely values do something for the benefit of many people.

Evidence from the results of previous studies confirms that job satisfaction is influenced by public service motivation, (Rainey & Steinbauer, 1999), who conducts studies by improving findings (Brewer & Selden, 1998) . Furthermore, the results of the study (Clerkin & Coggburn, 2012) found that the increasing motivation of public services will lead to an increase in job satisfaction which further increases the quality of service for employees in the public sector. Furthermore, research on people's interests has a motivation for public service to work in the public service sector but has not been able to answer why it is different (Moynihan & Pandey, 2007 ; Pandey et al., 2008) .

The results of this study also prove that theoretical studies and empirical studies state and prove the existence of a positive and significant causality relationship between motivation for public services and employee job satisfaction. *The implication of this finding is that increasing public service motivation, which consists of feelings of compassion, commitment to the public interest, and interest in policy making are the main drivers of increasing ASN job satisfaction in Bantaeng District. Therefore, the motivation of public service which consists of the spirit of self-sacrifice, commitment to the public interest, the spirit of compassion, and interest in making policy on the ASN are of concern.*

4. CONCLUSION

1. Leadership has a positive direct effect even though it is not significant for ASN job satisfaction in Bantaeng District. These results indicate that enhanced leadership is characterized by encouraging employees to perform/advance, increase employee motivation, encourage employees to think more creatively, and listen to employee concerns (transformational leaders) and better standards for doing work, taking action before chronic problems, and making clear expectations (transactional leadership) will increase the ASN job satisfaction in Bantaeng Regency.
2. Motivation of public services has a significant positive direct effect on ASN job satisfaction in Bantaeng District. These results indicate that the better the ASN public service motivation which is marked by improvement in compassion, commitment to the public interest, interest in policy making has implications for increasing ASN job satisfaction in Bantaeng District.

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Gauge for Corruption

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Abstract: Corruption Perceptions Index, Corruption Ratio, Corruption Age are focused in the research. The theory of Optimum Corruption Scale is also involved. There are three methods to calculate Corruption Ratio, (1) the ratio of corrupted officials against all public servants related, (2) the ratio between the economic loss and the total income, (3) the ratio between the time loss and the total time. From theoretical points, Corruption Ratio complies with truth more than Corruption Perceptions Index. The innovative points of the research are as following, (1) apply three methods to calculate Corruption Ratio; (2) make a systematic summarizing as well as analysis on important corruption ratio; (3) make a comparison between Corruption Ratio and Corruption Perceptions Index; (4) propose the concept of corruption age; (5) suggest that the hazard of a social system could be forecasted with important corruption indexes.

Methods, (1) literature method, (2) statistics method.

Key Words: Corruption Perceptions Index; Corruption Ratio; Corruption Age.

The impairing degree of corruption to a social system depends on two factors: the first is the amount of corruption in a social system, the second is the bearing capacity of the social system. With the same knife, a chop upon a 100 jin pig may kill it, while to a few tons of elephant may only get it slightly wounded. Therefore, quantitative research on corruption is very meaningful.

I. Corruption perceptions index

Corruption Perceptions Index, CPI, the most influential index in international community, it is a quantitative index to measure public corruption. Wikipedia.com data, the index, published worldwide in 1995, was from Transparency International founded by Peter Eigen in Germany in 1993, which commissioned Johann Graf Lambsdorff to create, Johann Graf Lambsdorff, a professor at Passau University in Germany. CPI of different countries was obtained by expert evaluation and questionnaire survey. From 1995 to 2011, the index was based on a rule with 10 as full marks. Since 2012, the index has adopted a percentile system, e.g., with 100 as full scores (fig.1 of this study has been uniformly adjusted to a percentile system). In 2012, CPI adopted 13 different questionnaire methods, involving evaluation by experts from 12 international authorities such as World Bank, African Development Bank, World Economic Forum. The higher CPI, the cleaner a country, the lower CPI, the more corrupt the country. Wikipedia.com, in 2016, European countries almost swept the top six of the whole world CPI: New Zealand 90, Denmark 90, Finland 89, Sweden 88, Switzerland 86, Norway 85, Netherlands 83. Singapore ranked seventh with 84, Canada 82 ranked 9th, Britain, Luxembourg and Germany 81, Australia 79, the United States 74, Hong Kong 77, Japan 72, Chinese Taiwan 61, South Korea 53. India 40, China 40 ranked 79th (fig.1), Russia 29 ranked 131th. The bottom countries were Afghanistan 15, Libya, Sudan 14, South Sudan 11, Somalia 10 ranked 175th, North Korea ranked 176th with 8. From the 2016 ranking situation, as a whole, integrity index is in line with the reality. Generally, developed countries are more clean than developing countries.

Fig.1 1995-2017 China CPI mark and rank

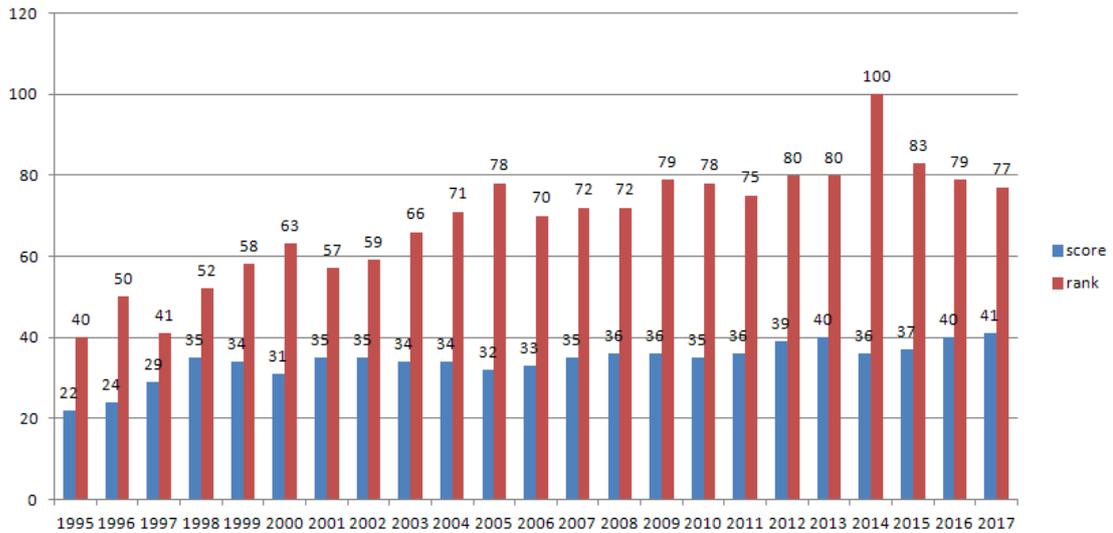


Fig.1 illustrates the score and ranking of China’s CPI from 1995 to 2016, 1995 the lowest year after Chinese reform and opening up, it then gradually climbed up, indicating that China attaches importance to corruption governance. It is worth noting that after the new generation of CPC with Xi Jinping as the core took power in 2013, Chinese CPI showed an overall upward trend in the international rankings, which is highly consistent with the improvement of Chinese political ecology year by year. This is the result from the new generation CPC’s efforts.

For CPI is attained by a qualitative method, it is still controversial in international community.

II. Three methods to measure corruption Ratio

Luo Guicheng, Tan Bin, Zheng Shiqiao (2009) [1,P8] proposed Corruption Ratio, to judge the quality of a social system. Zhou Li’an, Tao Jing (2009) [2, P57-69] used the total amount of corruption cases to quantify corruption. Chen Gang, Li Shu (2010) [3, P62] and Liu Baojian(2014) [4, P31] employed the ratio of corruption cases, malfeasance cases against total civil servants from Chinese Procuratorate every year to undergo quantitative research. The corruption ratio in a country can be measured in several ways:

(I) Methods of population ratio

For a specific social system, the ratio of the corrupt civil servants number against the total number of related civil servants at a given time. For example, there are more than 2050 officials above deputy ministry level serving in the party, government, and military systems in China. Dagong Information Network article (2016) "Anti-corruption storm sweeps official field, captured officials after the 18th National Congress of CPC outnumber the total in history," showed that about 160 senior provincial and ministerial officials were investigated and dealt with after the 18th National Congress of CPC (after 2012). Comparing the two figures, after the 18th CPC National Congress, the corruption ratio in China is about $160 / 2050 \approx 7.80$, that is, about 78 out of every 1,000 provincial and ministerial cadres are corrupt officials. The 160 corrupt officials investigated are the number emerging out of accounting, in fact, there are a lot of corrupt officials not emerging out of water, this number is a black hole. The impression on China public officials by Chinese civilian is that “no official is not corrupt”, that is, the party, government, and military systems in China do not have public officials with clean hands in real sense. Judging by this qualitative method, The corruption ratio among public officials in China is about 90%. Therefore, CPC Central Committee could not punish all the corrupt, drawing a red line, firmly capture civil servants “do not take hands back, do not withdraw after the 18th CPC National Congress”. The defect of population ratio method is that it may fail to objectively measure the harm extent to social system by corruption, for a big rat is usually far more destructive than ten flies.

(II) Method of Economic resource ratio

In a given social system, the ratio of the economic loss caused by corruption to the tax revenue or net income earned by the

social system in the related time. According to www.163.com news, in 2014, the investigated and handled cases involving corruption and malfeasance in Lingyun County, Guangxi, China, amounted to more than 4 million yuan, while the revenue reported on the county government's website during the same period was 178.9 million yuan, so, the county's corruption ratio in 2014 was about $0.04 / 1.789 \approx 2.2\%$. In 2009, Chinese national tax revenue was 6.31 trillion yuan. In the same period, the amount of corruption recorded in the China Procuratorial Yearbook was about 6.14 billion yuan. This does not include the amount of corruption cases in the military. According to this calculation, in 2009, the corruption ratio in China was about $61.4/63 \times 100 \approx 0.1\%$. Of course, the credibility of corruption rates calculated from official website statistics remains to be further verified. The above accounting methods have not yet calculated the actual economic losses, in Lingyun County, money in the corruption is more than 4 million yuan, and the actual economic efficiency loss may be 10 million yuan or more. There are also shortcomings in the method of accounting economic resources, which makes it difficult to collect real data, while the results obtained from official website statistics are not very reliable. Liu Baojian (2014) mentioned that since 1990s, the economic losses caused by corruption in China have accounted for an average of 14.5% (2014) [4, P3] of GDP per year. Regardless of the source of the data, the rate of corruption of 14.5-14.9% is close to the result obtained by the population ratio method, and it is also consistent with the public opinion, so it should be more reliable.

The method of calculating economic resources also has a good effect on measuring personal corruption. For example, cadre A at county level has a monthly income of about 10000 yuan, of which he spends an average of 2000 yuan a month on gambling money and 1000 yuan per month on buying porn services. Because his corruption indirectly resulted in 20000 yuan annual losses for family welfare, such as old people or children get disease, or lost business opportunities, the corruption ratio per year for A is $[(2000+1000) * 12+20000] / 10000 * 12=56000 / 120000 \approx 46.67\%$. Such high ratio of corruption in personal management system is quite dangerous, and a personal or family crisis could be expected if the situation is not improved or corrected. If A holds public power, when A's personal income cannot fill the financial deficit of personal corruption, A's greedy hands would likely extend to the unit vault, or take bribes, and personal corruption evolves and is disseminated into power corruption. Personal management failure evolves into a social disease.

(III) Method of time resource ratio

Time resource calculation method is more effective on gauging personal corruption. College pupil B, who has become an internet addict, has the habit of staying up late at internet cafes every weekend. He spends little time on studying at weekend. It is common for him to stay up all night long on Sunday and impact normal classes on Monday. B not only fails to utilize Saturday, Sunday time, but also ruins his Monday normal classes, his learning efficiency can be regarded as zero on Monday, then B's corruption rate can be calculated, $3 / 7 \approx 42.86\%$. If only working days are considered, five working days a week, Monday is knocked out by net addiction from Sunday night, B's corruption rate is calculated to be one-fifth, or 20 percent. For college students or young entrepreneurs, the rate of corruption computed by the time resources is more reasonable, for, under current reality of social competition, most young people spend their weekend time solving problems left or unresolved from five working days, such as unfinished, not understood professional problems, unconnected clients, etc. Except for health reasons of the middle-aged and the elderly, it is not in line with social reality to throw hands completely at weekend. B's personal management system has such a high rate of corruption, if the efficiency of personal management not improved, a qualitative forecasting according to his corruption rate could be undergone, if B is a university pupil, B is unlikely to graduate normally, if B is a young entrepreneur, B could hardly be a successful young man.

Three kinds of corruption rate, economic resources ratio method and time resource ratio method are more suitable to measure personal corruption. Theoretically speaking, three kinds of corruption rate are more accurate than Corruption Perceptions Index. In reality, the corruption rate is relatively difficult to obtain. The important reason, some corruptions has not been filed at all, which makes the official statistics distorted. Transparency International's Corruption Perceptions Index, its credibility has grown as a result of rigorous procedures. With the progress of human civilization, there is reason to believe that the application of corruption rate will become more and more widespread.

III. Corruption age

Smokers have smoking age, drunkards have alcohol age, and a corrupt social system has a corrupt age. Both (CPI) and <http://dx.doi.org/10.29322/IJSRP.9.01.2019.p85117>

(Corr), are cross-sectional data. A research combining CPI or Corr with the age of corruption and the changing trend of corruption index will make people have a clearer understanding of corruption in a social system. Taking China as example, if China's social system has been corrupt since 1985 and kept internationally recognized as corrupt by 2016, the age of corruption in New China will be 31 in 2016. China's CPI reached a minimum point in 1995 (fig.1) and then rose. In 1995, the country's Corr reached a high point and then declined. Before 1985, the social system of New China was not completely free of corruption, while not counted into the age of corruption, here, we regard a social system with CPI beyond 5 by decimal system or more than 50 by centesimal system, as a relatively clean social system.

For personal corruption, if citizen C has one or all habit of unconstrained alcoholism, whoring, gambling, drug abuse or uncontrolled online games, for more than five years, then C's age of corruption could be 5 years old.

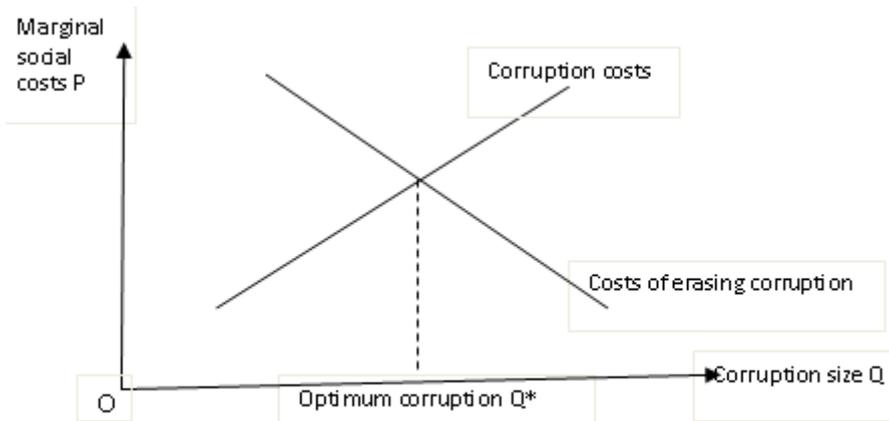


Fig. 2 The optimum corruption scale of a social system

Generally speaking, the longer the corruption age, the more difficult to govern it. For a citizen with a long age of corruption, his corruption has formed a fixed mental path or mental inertia, together with environmental allurements, it is quite difficult for him to escape from the psychological inertia of corruption. Just like the young drug addict relapses after drug control treatment, the sex ghost can not help pursuing love affair. For a country with a long age of corruption, the whole social system has formed a social mental identification with the latent rules of corruption, corruption has been solidified into social life customs, forming a strong psychological corrupt culture, the social system has reached a corruption equilibrium, it is very difficult to root out it. Xi Jinping (2015) pointed out, “change the convention of doing nothing without gifts or presents.” As a matter of fact, the Chinese have had the custom of “gifts” and “presents” for thousands of years. From this point, CPC’s “two learning, one doing” is the radical measures to change convention and mindset.

IV. Theory of optimum corruption

What is the relationship between corruption rate and economic growth in a social system? With regard to power corruption, the widespread view in Chinese theoretical circle is that corruption and economic growth are inversely U-shaped, that is, mild corruption and economic growth are positively correlated. Corruption deterioration in the social system exceeds a certain extent, it will be negatively correlated with economic growth. As to personal corruption, there is a general view in western psychology circles that appropriate catharsis should be given to the physiological and psychological requirements for young individuals, while the traditional Chinese culture tends to suppress it. Contemporary personal management theory generally advocates the combination of catharsis and constraint. In Chinese traditional philosophy, there is saying “absolute clean water could never accommodate fish”, meaning that the water in a river is too clean for a fish to survive. Therefore, similar to the optimum population theory, human society also has the optimum corruption theory or moderate corruption theory. Robert Klitgaard (1998) [5, P27] proposed that the social system has an optimal level of corruption (fig.2), and Robert Klitgaard employed it to illustrate that since the eradication of corruption also carries social costs, So the optimum anti-corruption efforts is not unlimited, and the corresponding best amount of corruption will not be zero. The idea of moderate corruption may be the theoretical basis for cultivating a clean government with a high salary.

Corruption, after all, is the vent of human evil nature, is not a good thing, no worthy of encouragement. The theory of <http://dx.doi.org/10.29322/IJSRP.9.01.2019.p85117> www.ijsrp.org

moderate corruption may be seen as a compromise to human evil nature. The Nordic countries, Singapore, Hong Kong, these social systems basically bear no power corruption, the utility of these social system is very high. Since Chinese reform and opening up in 1978, the natural environment has deteriorated, the moral environment has declined, food safety problems, engineering quality problems, and environmental pollution have been overrun. In the final analysis, it is an ugly human nature, making money without concern for means, to do things bettering oneself impairing others. In addition to human nature, there are institutional reasons and traditional cultural inertia, while, power corruption undoubtedly plays a key role in these social diseases. So, Mao Yushi (2013) thought that “politics good, everything will be all right.”

V. Relationship of several methods

In terms of the method obtained, corruption rate Corr is more scientific than the corruption perception index CPI. With the progress of human civilization, corruption rate Corr is likely to gradually replace the corruption perception index CPI. Combining them with the age of corruption can help people deepen their understanding of the corruption in a social system, and they can also be used as a quantitative index to predict the systemic risk of society. Three kinds of corruption rate are suitable for measuring corruption in the field of public power. The economic ratio and the time ratio are more persuasive in measuring personal corruption. The theory of moderate corruption has its scientific basis, while the reality is that corruption is not worthy of encouragement. The corruptive psychology of human beings is like bringing up a child, pampering could spoil a child, and indulging in corruption may bring unpredictable damage to social system.

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