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Factors influence trust and relationship commitment toward long-term orientation between manufacturer and distributor

Abdul Majid*, Sri Hartoyo**, Kirbrandoko**

* Post Graduate, School of Business, Bogor Agricultural University, Indonesia 16151
**) School of Business, Bogor Agricultural University, Indonesia 16151

Abstract- The research purposes to (a) evaluate the implementation of long-term orientation between PT XYZ and its distribution channels and (b) analyze the relationship among trust, relationship commitment and its effect on long-term orientation. This study is involving 33 non-authorized tire shops and have cooperated for more than 15 years. The data are obtained through a questionnaire designed with closed questions with 5-point Likert scale and to be analyzed by structural equation modeling with approach of partial least square (PLS-SEM).

Index Terms - long-term orientation, relationship commitment, trust.

I. INTRODUCTION

Competition in the four-wheeled vehicle tire or car tire industry is increasingly rising. One of indications of such competition is the decline in each company's sales, one of which is PT XYZ. The sales decline in PT XYZ's replacement market is higher than the decline in OEM and Export markets. Compared to 2014, in 2015 there was decline in sales for replacement segments in Jakarta, Sumatra, East Java, West Java and Central Java, meanwhile in Kalimantan, the sales tended to increase. The sales decline were contradictory to the increase in the number of authorized tire shops as company's authorized dealers in areas outside Jakarta. This showed the increase in their trust and commitment as retail shops in marketing PT XYZ products.

General tire shops that turn into authorized tire shops are required to comply with the terms and conditions set forth in the agreement between tire shop owner and manufacturer, as well as agreements between manufacturer and distributor. The terms and conditions require the general tire shops to have high loyalty to the Company's products, be willing to prioritize the customers' interests, have good attitudes or behaviors, integrity, high spirit and professional attitude.


PT XYZ as a qualified tire manufacturer has a commitment to ensure the product availability in the market for passenger car tires, off-the-road tires and commercial tires. To demonstrate that commitment, the company must be able to ensure the fulfillment of consumer needs through retailers such as product availability, speed and accuracy of delivery, product specifications and price relativity. In addition, as described earlier that the competition conditions in this industry is very strict, thus, this can affect the market environment. Therefore, to face such condition, the company must make various efforts to maintain the trust of its distribution channel members. Based on the aforementioned matters, this research aims to (a) evaluate the implementation of long-term orientation between PT XYZ and its distribution channels and (b) analyze the relationship among trust, relationship commitment and its effect on long-term orientation.

II. RESEARCH METHOD

The research was conducted between October - December 2016 at PT XYZ in Jakarta using secondary and primary data. The secondary data was collected from PT XYZ Company, while the primary data was collected from 33 retails that were independent on PT XYZ.
Structural Equation Model (SEM) was used to determine the relationship between the studied variables. The model was described in Figure 1.

![Figure 1 Structural equation model.](image)

The variables in this research were grouped into two parts: (a) exogenous latent variables, namely market environment and manufacturer performance and (b) endogenous latent variables, namely trust to manufacturer, relationship commitment and long-term orientation. The variable indicators are presented in Table 1.

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<tr>
<td>Market environment (Ganesan 1994)</td>
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<tr>
<td>Manufacturer performance (Doney and Cannon 1997)</td>
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<td></td>
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<tr>
<td>Relationship commitment (Morgan and Hunt 1994)</td>
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<td></td>
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<tr>
<td>Long-term orientation (Ganesan 1994)</td>
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III. RESULT AND DISCUSSION

The characteristics of the 33 tire shops as respondents are presented in Table 2. Most of respondents were male (91%), domiciled in Jakarta (64%), and mostly were retail owners and 30% of them have cooperated for more than 15 years (average 13.2 years). Demographic description was not significant different from the data obtained from the manufacturer for Jakarta and surrounding area, in which the shop owners and managers were mostly male (82%) and domiciled in Jakarta (60%).
Distribution of respondents' assessments on the indicators of each variable is shown in Table 3. From the initial assessment, it was known that in general, the respondent's trust perception to manufacturer was quite good (positive). This was shown in the assessment on the indicators of Company's reputation and size, in the other hand, there were 33% of respondents who were not sure that manufacturer would be willing to customize for distributors' demand. Similarly, perceptions of the market environment were indicated by the assessment on indicators of accuracy, certainty, and complexity with a high level of uncertainty, in which those indicators had value of 30%, 24% and 45% respectively and each of which disagree with each proposed statement by 6%, 3% and 6% respectively. Meanwhile, respondents' assessment on manufacturer’s performance was responded well enough. Indicator of delivery performance and product performance showed agree and strongly agree answer by 81% and 82% respectively, in contrast, price relativity obtained bad assessment from respondent that was disagree by 6% and not sure by 42%. Meanwhile, relationship commitment obtained poor assessment (tended to be negative) from respondents. It was indicated by 72% of respondents to agree and strongly agree to do a fairly high relationship termination cost. On the other hand, there were 85% of respondents assessing the Company that they occasionally conducted opportunistic behavior, while there were 70% respondents found that the Company did not communicate as expected. The last was, the entire indicator of long term orientation obtained good assessment from the respondents.

**Table 3 Respondent evaluation for each indicator**

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<th>Notation</th>
<th>Indicator</th>
<th>SNA</th>
<th>NA</th>
<th>N</th>
<th>A</th>
<th>SA</th>
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<td>Trust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X.01</td>
<td>Manufacture reputation</td>
<td>0%</td>
<td>0%</td>
<td>9%</td>
<td>48%</td>
<td>42%</td>
</tr>
<tr>
<td>X.02</td>
<td>Size of manufacture</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>61%</td>
<td>39%</td>
</tr>
<tr>
<td>X.03</td>
<td>Manufacture willingness to customize</td>
<td>0%</td>
<td>3%</td>
<td>33%</td>
<td>58%</td>
<td>6%</td>
</tr>
<tr>
<td>Market Environment</td>
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<tr>
<td>X.04</td>
<td>Accuracy</td>
<td>0%</td>
<td>6%</td>
<td>30%</td>
<td>58%</td>
<td>6%</td>
</tr>
<tr>
<td>X.05</td>
<td>Certainty</td>
<td>0%</td>
<td>3%</td>
<td>24%</td>
<td>33%</td>
<td>39%</td>
</tr>
<tr>
<td>X.06</td>
<td>Complexity</td>
<td>0%</td>
<td>6%</td>
<td>45%</td>
<td>30%</td>
<td>18%</td>
</tr>
<tr>
<td>Manufacture Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X.07</td>
<td>Delivery performance</td>
<td>0%</td>
<td>3%</td>
<td>15%</td>
<td>39%</td>
<td>42%</td>
</tr>
<tr>
<td>X.08</td>
<td>Relative Price/Cost</td>
<td>0%</td>
<td>6%</td>
<td>42%</td>
<td>27%</td>
<td>24%</td>
</tr>
<tr>
<td>X.09</td>
<td>Product/service performance</td>
<td>0%</td>
<td>0%</td>
<td>18%</td>
<td>58%</td>
<td>24%</td>
</tr>
<tr>
<td>Relationship Commitment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X.10</td>
<td>Termination cost</td>
<td>0%</td>
<td>0%</td>
<td>28%</td>
<td>53%</td>
<td>19%</td>
</tr>
<tr>
<td>X.11</td>
<td>Communication</td>
<td>0%</td>
<td>0%</td>
<td>70%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>X.12</td>
<td>Opportunistic behaviour</td>
<td>0%</td>
<td>0%</td>
<td>15%</td>
<td>55%</td>
<td>30%</td>
</tr>
<tr>
<td>Long-term relationship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.01</td>
<td>Long-term profitability</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>58%</td>
<td>39%</td>
</tr>
<tr>
<td>Y.02</td>
<td>Importance of LTR</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>73%</td>
<td>24%</td>
</tr>
<tr>
<td>Y.03</td>
<td>LTR goal</td>
<td>0%</td>
<td>0%</td>
<td>18%</td>
<td>52%</td>
<td>30%</td>
</tr>
</tbody>
</table>

SNA=strongly not agree, NA=not agree, N=neutral, A=agree, and SA=strongly agree
Analysis of relationship among trust, relationship commitment, and long term orientation

Partial Least Square (PLS) is an alternative to covariance based structural equation modeling (CB-SEM). The PLS method has its own advantages such as: the data should not have multivariate normal distribution (such as, indicator by scale of category, ordinal, interval until the ratio can be used on the same model) and the sample size should not be large, (Ghozali 2011; Sarwono and Narimawati 2015). The stages of data processing using partial least square (PLS) based SEM approach are (1) evaluation of outer model or measurement model and (2) evaluation of inner model (structural model) measurement described in the section below.

Evaluation of Outer Model

The measurement model with reflective indicator was evaluated with three criteria: convergent, discriminant validity and composite reliability with its block (Ghozali 2011). In addition to the construct validity test, construct reliability test was also performed; it was measured by two criteria, such as composite reliability and Cronbach alpha from the indicator block measuring the construct. The construct was considered reliable if the value of composite reliability and Cronbach alpha were above 0.70 and 0.60 respectively according to the output in Table 4.

<table>
<thead>
<tr>
<th>No.</th>
<th>Construct</th>
<th>Composite Reliability</th>
<th>Cronbachs Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trust (TR)</td>
<td>0.825251</td>
<td>0.682016</td>
</tr>
<tr>
<td>2</td>
<td>Manufacture performance (MP)</td>
<td>0.882116</td>
<td>0.737185</td>
</tr>
<tr>
<td>3</td>
<td>Relationship commitment (RC)</td>
<td>0.866983</td>
<td>0.771977</td>
</tr>
<tr>
<td>4</td>
<td>Market environment (ME)</td>
<td>0.844475</td>
<td>0.725968</td>
</tr>
<tr>
<td>5</td>
<td>Long-term orientation (LT)</td>
<td>0.841615</td>
<td>0.723248</td>
</tr>
</tbody>
</table>

From the initial graphic output results, it was found that there was a reflective indicator having a loading factor under 0.50, which was X.08, considered as relative price/cost so it was necessary to do re-estimation because it had not met the requirement. The re-estimation results are shown in Figure 2; it showed that all the loading factors were already above 0.50. According to Ghozali (2011), an indicator is considered valid if it has a correlation value above 0.70. However, for loading of 0.50 to 0.60 is still acceptable by looking at the correlation output between the indicator and its construct.

Evaluation of Inner Model

Inner model or structural model test was performed in order to find the relationship among variables, significance value, and R-square from research model such as: (a) R square of 0.423 meant that the effect of latent variable of market environment with its indicator on trust was equal to 0.423 while the rest of 0.577 was affected by other variables not included in this research; (b) the effect of latent variable of manufacturer performance with its indicator on relationship commitment was equal 0.708, while the rest of 0.292 was affected by other variable not included in this research; and (c) the effect of latent variables of trust on manufacturer and relationship commitment with its indicator on long term relationship variable was equal to 0.549 and the rest of 0.451 was caused by other variable not included in this research.

Chin (1998) grouped $R^2$ values of 0.67; 0.33 and 0.19 as substantial, moderate and weak respectively. Therefore, the relationship between construct of trust and market environment, as well as the long-term orientation and its affecting constructs were at a moderate level, while the relationship between manufacturing performance construct and relationship commitment was at a significant level. Path coefficient value for the last model can be seen in Figure 2, while the results of t-statistical calculations can be seen in Table 5. The calculation result showed that the prepared model had the ability to predict the endogenous constructs (predictive relevance) because all of $Q^2$ value that was obtained was higher than zero.

The last stage of the PLS SEM analysis in this research was the validation of the entire model. Based on the convergence validity test results for the final model, it was obtained the average value of communality = 0.67638. From the calculation, it was obtained $R^2$ average = 0.5597, so that goodness of fit could be found to be equal to $\sqrt{(0.67638 \times 0.5597)} = 0.6153$. In accordance with the limitation of evaluation criteria, this value showed, overall, model had proper goodness of fit, with high value.
The market environment has a positive (0.650) and significant (6.023) effect on retail store’s trust in establishing long-term orientation between retail stores and manufacturer. The dimensions of the market environment can describe the dimension of trust properly. The most influential indicator variable on trust was the indicator of the complexity of market conditions. Theoretically, the result was also not contradictory that the higher the respondents' perception to the level of accuracy, certainty and complexity, the higher the level of trust to business partners and business relations itself.

Another finding indicated that manufacturer performance had positive (0.716) and significant (6.513) effect on relationship commitment. The higher assessment on manufacturer performance led to the higher level of manufacturer commitment in establishing business relationships. The most influential indicator variable on relationship commitment was the indicator of delivery performance including the speed and accuracy in delivery of goods and the availability of the product. In addition, so far, assessment on product specifications or features, product quality and after sales has received a positive response from respondents. Therefore, the result of research has been in accordance with the results of previous research (Concha, 2005: 56).

The subsequent results tests showed that trust in producers had a relationship and positively (0.368) and significant (2.911) effect relationship commitment in conducting business relationships. This was in line with the theory and initial assumption that the level of trust will support the level of partner commitments to run and maintain the business relationships (Doney and Cannon 1997, Moore 1998). The most influential variable of trust indicator was the indicator of the company size, which was the manufacturers’ assessment as a company engaging in the industry and dominating the car tires market.
While trust in manufacturer had positive (0.664) significant (3.618) effect on long term orientation. The level of trust and commitment in a partnership created positive outcomes (outcomes or impacts) on business continuity. The most influential indicator variable was the size of the firm, in which manufacturer played important role as market ruler in this industry. This finding was consistent with the results of Ganesan's (1994: 12) research that the credibility of suppliers will increase buyers' willingness to engage in long-term orientation.

Then, relationship commitment had a positive (0.146) but not significant (0.721) effect on long term orientation. This was in accordance with the initial assumption that theoretically, the termination cost provided positive effect on increased commitment. The indicator variables that the most affected relationship commitment was opportunistic behaviors, which were broken promise often made by manufacturer and manufacturer’ behavior that could not deliver the service as expected.

IV. CONCLUSION

From the initial assessment before the data processing conducted using PLS-SEM analysis, it was found that in general, respondents' perception on trust to manufacturer was quite good (positive). Similarly, perceptions of the market environment and manufacturer’ performance were also quite good although there were some statements obtaining negative responses (disagree). Meanwhile, the perception of relationship commitment obtained a poor assessment (tended to be negative).

The result of the analysis using PLS-SEM showed that the good fit-established model illustrated the partnership between the tire shop and PT XYZ among factors affecting trust on manufacturer and relationship commitment. Trust on manufacturer constituted a good mediation as a bridge between the factors affecting the long-term orientation with outcomes generated. The trust on manufacturer was positively affected by the market environment but not positively correlated with relationship commitment. Relationship commitment was positively affected by the manufacturer performance but it did not significantly affect long-term orientation.

Based on the results of the analysis, it is proposed some suggestions as follows:
1. It is necessary for manufacturer to maintain the partners’ trust by always proving that manufacturer do not have opportunistic behavior.
2. It is necessary to maintain tire shop’s commitment by fostering partners’ trust in the manufacturer and ensuring that partners would feel that they have harmonized values, views and goals in order to have strong relationship with manufacturer.

REFERENCES


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The Effect of Risk on Cement Industry Stock Return in Indonesia Stock Exchange

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² Department of Management, Faculty of Economic and Management, Bogor Agricultural University

Abstract- This study aimed to find empirical evidence about the effect of risk on stock return in cement industry which listed in Indonesia Stock Exchange. In this study risk was divided into two categories, systemic risk and unsystemic risk. Samples used in this study are public firms in cement subsector listed in Indonesia Stock Exchange during 2011-2016, which selected by purposive sampling. The model was evaluated by Structural Equation Modeling (SEM) and linear regression. The result of this study from both analysis has shown that systemic risk has significant effect on stock return. On the other side, unsystemic risk didn't have significant effect on stock return. This was because the unsystemic risk can be diversified, neither did systemic risk.

Index Terms- systemic risk, unsystemic risk, stock return, cement industry

I. INTRODUCTION

The uncertainty of the emerging world in recent years, leaving an impact for developing countries in the world. Indonesia is one of the developing countries also feeling the effects, in the third quarter 2016 Indonesia's economic growth not as strong as expected. BPS recorded that Indonesia's economic growth in the fourth quarter of negative 1.67 percent in 2016 (QoQ) and 5.19 (YoY), so that the overall Indonesian economy in 2016 grew by 5.08 percent (BPS 2016). A country's economic growth needs to be supported by the development of the real sector as well as a good investment climate. The cement industry in Indonesia is one of the emerging industries today. Government work plan (RKP) NawaCita2016 also aims to boost the industrial sector to maximize the development of industrial estates and revitalisation structures and infrastructure. The need for cement as the main raw materials is expected to continue to increase along with a vigorous infrastructure development undertaken by the current government.

On the other hand, the economic slowdown experienced by Indonesia during 2015 due to the impact of the global crisis effect on the ability of the company in financing and influence the growth of the industry, one of which the cement industry. Stocks as one source of financing the company has run into difficulty due to the disruption of the real sector as well as the perception of the inherent uncertainty as risk. The condition causes the majority of companies listed on the stock exchange world experienced a decline in stock prices (Bartram and Bodnar, 2009) including stock price of cement industry in Indonesia. Economic conditions are unstable and unpredictable is one factor that causes a decrease in business activity that occurred in the Indonesian capital market. Investors as market participants will expect the rate of return or a maximum of investment activities undertaken. Each investor expect a maximum return of investment, but still need to consider the risks covered (Revelation & Fajri 2014). Investment risk is a deviation level of benefits with the expected profit rate (Paramitasari 2011). Absari (2013) states that in investing in the stock market investors in addition to the gain factor should also review the risk factors.

In general, the risk can be divided into two, namely the systemic risk and unsystemic risk (Kusbianto 2001). Bodieet. al (2014) explain that the systemic risk of so-called market risk, where risk and unsystemic risk arises from the influence of micro factors that have an influence on the particular company and therefore is unique that this risk can be offset by the positive things happening in the company of others. This risk can be diversified in the portfolio and is influenced by the quality of the internal control (Heidarpoor & Shahriar 2015).

Nowadays the Indonesian government tried to encourage the development of infrastructure to encourage economic growth in Indonesia. The cement industry is an industry that support infrastructure development in terms of raw materials. It can be pointed out as a good signal for investors to be able to invest their shares in the cement industry. However, on the other hand investors also need to consider the risks that may occur, in addition to the investor is often difficult to determine the level of risk that may occur. Risk is the primary factor that determines the amount of value return (Nugroho, 2013). Based on this, the goal of this research is:

1. Analyze the effects of systemic risk on stock returns of cement industry listed on the Stock Exchange
2. Analyze the effect of unsystemic risk on stock returns of cement industry listed on the Stock Exchange.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

This study was conducted to give a description of the systemic risk and unsystemic risk and analyze the impact on stock returns cement industry listed in Indonesia Stock Exchange in the period 2011-2016. The data will be used in this research is secondary data over a six year period, namely 2011-2016. Data will be collected from various main reference i.e. www.idx.co.id and www.yahoofinance.com to cement industry's stock price, www.bi.go.id for inflation, BI rate, exchange rate and economic growth (GDP). The population of this research is the cement industry sub-sectors listed in Indonesia Stock Exchange during the last 6 years (2011-2016). This study uses a purposive
sampling technique where sampling is done with certain considerations. Criteria used to determine the sample in this study are:
1) Listed as an issuer in the cement subsector in Indonesia Stock Exchange in 2011-2016,
2) Companies already doing Initial Public Offering (IPO) in the period 2011-2016,
3) never delisting and relisting during the years 2011-2016.

Based on these criteria, there are three companies that meet the criteria to be used as example in this study as presented in Table 1.

Table 1 Companies that serve as examples of research

<table>
<thead>
<tr>
<th>No</th>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PT Indocement Tunggal Prakarsa, Tbk</td>
</tr>
<tr>
<td>2</td>
<td>PT Semen Indonesia (Persero), Tbk</td>
</tr>
<tr>
<td>3</td>
<td>PT Holcim Indonesia, Tbk</td>
</tr>
</tbody>
</table>

Source: IDX, 2016

III. RESULTS AND DISCUSSION

Analysis of Structural Equation Modeling – Partial Least Square

The analysis is performed using the Partial Least Square (PLS) is processed using SmartPLS 3.0. PLS does not require the assumption of normality, based variances that do not require large amounts of samples, as well as PLS can also be used to confirm the theory and explain whether there is any relationship between the latent variables. Selection of PLS as a tool of analysis of this study seems right because the sample size is not large. PLS model evaluation is done by assessing the outer model or measurement model and inner model or structural model.

Measurement Model Evaluation (Outer Model)

All indicators in this study model essentially reflective so that should be a outer model analysis using five criteria namely Convergent Validity, Composite Reliability, Average Variance Extracted (AVE), AVE square root, and Cross Loading (Ghozali 2015). The initial model image of this study can be seen in Figure 1.

The analysis of the initial model (Figure 1) shows that the indicator X1.1 (-0156), X1.2 (-0600), X1.4 (0286), X1.5 (-0044), and X2.3 ( - 0.124) has a loading factor value below 0.7, these four indicators therefore should be excluded from the model. So in the end all that remains is an indicator with a loading factor value above 0.7. The end model study after the iteration can be seen in Figure 2.

The analytical tools used to help the processing of the data in this study are Microsoft Excel 2013 and SmartPLS 3.0.

Research Variable

The research variables and indicators used in this study can be seen in Table 2.

Table 2 Research variables and indicators

<table>
<thead>
<tr>
<th>No</th>
<th>Latent Variables</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Systemic risk (X1)</td>
<td>a. Inflation (X1.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Exchange Rate Against Dollar(X1.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. BI Rate (X1.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Economic Growth (X1.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e. Beta Industry (X1.5)</td>
</tr>
<tr>
<td>2</td>
<td>Unsystemic risk (X2)</td>
<td>a. Variance returns of INTP(X2.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Variance returnsof SMGR (X2.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Variance returns of SMCB (X2.3)</td>
</tr>
<tr>
<td>3</td>
<td>Stock returns (Y)</td>
<td>a. Stock returns of INTP (Y1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Stock returns of SMGR (Y2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Stock returns of SMCB (Y3)</td>
</tr>
</tbody>
</table>

The final step in evaluating the outer model is a unidimensional test validity. Test the validity unidimensional done using the composite indicator of reliability and Cronbach's alpha with a cut off value of 0.7 to 0.6 for the composite reliability and Cronbach's alpha. The results of the overall assessment criteria and standard values reflective model in this study can be seen in Table 3.

Table 3 Results of the research assessment and standard value of reflective model

<table>
<thead>
<tr>
<th>No</th>
<th>Criteria Standard</th>
<th>Research results</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

www.ijsrp.org
On the inner models, testing conducted on two criteria, named Structural Model Evaluation (Inner Model) reliability.

Source: Processed data results with SmartPLS (2017)

Table 4 Results of standard assessment and inner models value

<table>
<thead>
<tr>
<th>No</th>
<th>Criteria</th>
<th>Standard</th>
<th>Research result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loading factor</td>
<td>≥ 0.7</td>
<td>X1.3 = 1.000</td>
<td>Meet the standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X2.1 = 0.867</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X2.2 = 0.987</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Y1.2 = 0.981</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Y1.3 = 0.975</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average Variance Exicted (AVE)</td>
<td>≥ 0.5</td>
<td>Systemic risk = 1.000</td>
<td>Meet the standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unsystemic risk = 0.863</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stock return = 0.956</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Square root of AVE</td>
<td>Greater than</td>
<td>All of the AVE square root values of the construct are already greater than the correlation between each construct</td>
<td>Meet the standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the correlation value between constructs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cross Loading</td>
<td>Indicators must have a greater loading value for any latent variables compared with other indicators of latent variables</td>
<td>All values of the loading indicator of each latent variable are already greater than the other latent variables</td>
<td>Meet the standard</td>
</tr>
<tr>
<td>5</td>
<td>Cronbach’s Alpha</td>
<td>≥ 0.6</td>
<td>Systemic risk = 1.000</td>
<td>Meet the standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unsystemic risk = 0.874</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stock return = 0.954</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Composite Reliability</td>
<td>≥ 0.7</td>
<td>Systemic risk = 1.000</td>
<td>Meet the standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unsystemic risk = 0.926</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stock return = 0.977</td>
<td></td>
</tr>
</tbody>
</table>

Source: Processed data results with SmartPLS (2017)

Table 5 Results of testing the inner bootstrapping models

<table>
<thead>
<tr>
<th>Effect</th>
<th>Original Sample</th>
<th>T Statistics (</th>
<th>O / STDEV</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic risk to return</td>
<td>-0.547</td>
<td>3.977</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Unsystemic risk to return</td>
<td>0.0263</td>
<td>0.968</td>
<td>0.343</td>
<td></td>
</tr>
</tbody>
</table>

Source: data processed by SmartPLS (2017)

The results also show the influence of systemic risk on stock returns is negative, namely in terms of the value of its original sample at -0.547, so it can be stated that the systemic risk can lower stock returns. The real impact of systemic risk on stock returns according to research conducted by Machdar (2015). Systemic risk can be a negative influence over the invested asset which has a high degree of volatility. The uncertain economic conditions make investors shift their investment allocation on asset which has lower risk of such bonds. Thus, it can decrease the return on the stock market. Investors who do not like big risks will select asset such as bonds, because it has a greater interest rate and a lower risk and also generate a higher return.

Meanwhile, the results of this study also show the influence of unsystemic risk on stock returns is not real, it can be seen from the value t-t-table. The results are analogous with research conducted by Purba (2016), Rostami and Basirat (2016), and Pinayani (2002) where the unsystemic risk does not have a significant influence on stock returns. Unsystemic risk is the risk that can be minimized by the diversification of the portfolio, so better diversification done within the portfolio investment, it can reduce unsystemic risk.

IV. CONCLUSION

Based on the results and discussion of research that has been obtained, it can be concluded that:

1. Systematic risk of a significant negative effect on stock returns of cement industry. Changes in economic growth

Source: data processed by SmartPLS (2017)
(GDP) will impact on the return of their respective companies.

2. Unsystematic risk has no effect on stock returns, because this risk can be diversified by investors and companies to have a combination of a diverse portfolio and make good on the internal management of the company.

V. SUGGESTION

Based on the results and discussion of research described previously, there are several things that can be recommended, there are:

1. The Company is expected to be more sensitive to changes in the market is mainly related to the economic growth that occurred in Indonesia in order to minimize systemic risk.

2. Although unsystematic risk did not significantly affect the return, the company still needs to implement good corporate management, especially with regard to labor, because labor is the largest asset owned by the company.

3. For investors or prospective investors who will conduct stock transactions in Indonesia Stock Exchange in particular the cement company, has taken notice of the level of risk in accordance with the expected profit rate.

4. For further research, it can be extended by adding the effect of the company's performance and can also be done for other industries, as well as on indices listed on the Indonesia Stock Exchange for each industry or index is unique so that research results can differ from one another.

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PATH ANALYSIS OF TUBERCULOSIS CLIENTS ADAPTATION DURING TREATMENT IN JEMBER REGENCY, EAST JAVA, INDONESIA

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Abstract—Tuberculosis clients are experiencing various problems in terms of adaptation models such as physical problems, psychological problems, social problems and problems of dependence. This study is a correlational study. The method used is a cross-sectional. Respondents in this study were taken was 83 clients at the Lung Hospital in Jember. This research measurement is using a questionnaire. This study uses path analysis technique. Analysis of the data on the effect of the stimulus to coping with t-statistic = 2.370. Analysis the effect of the stimulus to adaptation with t-statistic = 2.115. Analysis the effect of the coping mechanisms to adaptation with t-statistic = 2.348. Stimulus contributes significantly to the coping mechanisms, stimulus significantly contributes to the adaptation, and coping mechanisms significantly contribute to the adaptation of Tuberculosis clients during treatment at the Lung Hospital in Jember.

Education and socialization about tuberculosis and peer group of tuberculosis clients in community are significantly needed to increased tuberculosis client adaptation. Suggestions for further research, collecting data by using prospective observation is better than retrospective observation.

Index Terms—stimulus, adaptation, coping, tuberculosis

I. INTRODUCTION

Diagnosis of chronic diseases such as Tuberculosis is one of the causes of excessive pressure and fear when the client realizes that his life and his activities may be limited by the condition of the disease. The physical changes that occur result in the loss of income associated with employment restrictions, or the reliance on help from family. Tuberculosis clients will experience considerable problems so that in addition to the necessary medical treatment and social support is good [1]. Tuberculosis clients will experience a variety of problems in terms of adaptation models such as physical problems, psychological problems, social problems and problems of dependence [2]. Tuberculosis clients will experience physical problems such as dyspnea, nausea, vomiting, allergies, lethargy, and others. Psychological problem that arises is despair, stress, denial, anger, anxiety, and irritability. Perceived social problem is the feeling of inferiority, not useful in society, feeling isolated or rejected. Dependency problems disclosed are feeling in need of help from others [3].

Tuberculosis cases are currently experiencing an increase in cases worldwide level. World Health Organization (WHO) reported that in 2015 Tuberculosis cases were 10.4 million new cases worldwide. The case consists of 5.9 million (56%) were male, 3.5 million (34%) of the women, and 1.0 million (10%) children. Six countries having highest number of Tuberculosis cases are India, Indonesia, China, Nigeria, Pakistan, and South Africa. WHO reported in the Global Tuberculosis Report, Indonesia has a high burden of Tuberculosis which is seen from a mortality rate of 40 per 100,000 population and new cases amounted to 395 per 100,000 population [4]. The spread of Tuberculosis cases in Indonesia spread in various provinces. Java Island, especially East Java, contributes to the number of deaths and new cases in Tuberculosis figures in Indonesia. East Java has a new case of 101.82 per 100,000 population and a mortality rate of 1.83 per 100,000 population. Jember Regency is a city in East Java which contributed the second highest Tuberculosis case after Surabaya City. Jember regency in 2014 has new cases of 2,070 clients and total cases of 3,139 clients [5].

Preliminary study, interviews showed 9 lung tuberculosis clients (90%) reported multiple complaints or physical disorders due to the disease. Physical disorders most often complained of lung tuberculosis clients are coughing. Other complaints include shortness of breath, chest pain, nausea, and sleep disorders. In addition to the physical impact, 6 clients (60%) also suffered mental and emotional disturbances, such as feeling gloomy, sad, fearful or anxious due to illness, fear of not getting cured, fear shunned by those around him that eventually also impacted in daily activities. A total of 7 clients (70%) also suffered from disruption to their social life so that clients who prefer to stay aloof at home and reduce interaction with others around it because of shame the disease. The reasons the client relates to the reduction of social activity are due to embarrassment to his illness and feelings of weakness / fatigue.

Nurses have an important role in providing nursing care to Tuberculosis clients. Given nursing actions is to increase the adaptation response in healthy and sick situation. Such actions are manipulating the focal stimulus, stimulus contextual and residual stimuli. Manipulation is expected to make individual adaptations in the zone. Nurses must anticipate that the client runs the risk of ineffectiveness in response to something by increasing cognator mechanism and regulatory mechanism on the individual client. This makes the role of nurses to support the creative efforts clients to use appropriate coping mechanisms [6][7].

II. METHODS

This type of research used in this study was correlational. The method used was cross-sectional. The research subject is not measured on the same day or time, but the exogenous and
endogenous variables were measured at the same time. This method is expected to explain the results of the effect of an exogenous with endogenous variables. This study has several variables, stimulus, coping, and adaptation to the client. Respondents in this study were taken was 83 clients intensive phase of treatment at the Lung Hospital in Jember. This research measurement using a questionnaire. This study uses path analysis technique.

III. RESULTS

Table 1. Distribution of Gender, age and education level Clients During treatment at the Lung Hospital Tuberculosis Jember (n: 83)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Male</td>
<td>49</td>
<td>49.0</td>
</tr>
<tr>
<td>2) Female</td>
<td>34</td>
<td>34.0</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
</tr>
<tr>
<td>b. Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) 21-25</td>
<td>4</td>
<td>4.8</td>
</tr>
<tr>
<td>2) 26-30</td>
<td>6</td>
<td>7.2</td>
</tr>
<tr>
<td>3) 31-35</td>
<td>29</td>
<td>34.9</td>
</tr>
<tr>
<td>4) 36-40</td>
<td>38</td>
<td>45.8</td>
</tr>
<tr>
<td>5) 41-45</td>
<td>6</td>
<td>7.2</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
</tr>
<tr>
<td>c. Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Elementary</td>
<td>43</td>
<td>51.8</td>
</tr>
<tr>
<td>2) Junior</td>
<td>28</td>
<td>33.7</td>
</tr>
<tr>
<td>3) High</td>
<td>10</td>
<td>12.0</td>
</tr>
<tr>
<td>4) College</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Based on Table 1 shows that out of 83 clients who were respondents in this study had respondents with male sex with 49 clients (49%) and female as much as 34 clients (34%). Age of the respondents in this study are located mainly in the age range 31-40 years to 31-35 years of age distribution of as many as 29 clients (34.9%) and 36-40 years of age were 38 clients (45.8%). The education level of respondents most elementary level of education as many as 43 clients (51.8%).

Figure 1. Adaptation Model Clients During Treatment at Lung Hospital in Jember

Table 2. Outer loading of Adaptation Model (n: 83)

<table>
<thead>
<tr>
<th>Original sample estimate</th>
<th>Mean of subsamples</th>
<th>Standard deviation</th>
<th>T-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1</td>
<td>0.716</td>
<td>0.685</td>
<td>0.216</td>
</tr>
<tr>
<td>x1.1</td>
<td>0.806</td>
<td>0.773</td>
<td>0.178</td>
</tr>
<tr>
<td>x1.2</td>
<td>0.825</td>
<td>0.799</td>
<td>0.156</td>
</tr>
<tr>
<td>x2</td>
<td>0.904</td>
<td>0.864</td>
<td>0.143</td>
</tr>
<tr>
<td>x2.1</td>
<td>0.747</td>
<td>0.734</td>
<td>0.143</td>
</tr>
<tr>
<td>x3</td>
<td>0.926</td>
<td>0.902</td>
<td>0.136</td>
</tr>
<tr>
<td>x3.1</td>
<td>0.871</td>
<td>0.846</td>
<td>0.147</td>
</tr>
</tbody>
</table>

Based on table 2 it can be seen that all indicators are valid because it has the original sample estimate value (> loading factor) > 0.7 and it can be seen that each indicator in each latent variable has a positive and significant effect on each latent variable. This
can be shown by the value of t-statistics greater than t-table that is equal to 1.96.

Table 3. Average variance extracted (AVE) of Adaptation Model (n: 83)

<table>
<thead>
<tr>
<th></th>
<th>Average variance extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1</td>
<td>0.581</td>
</tr>
<tr>
<td>x2</td>
<td>0.685</td>
</tr>
<tr>
<td>x3</td>
<td>0.808</td>
</tr>
</tbody>
</table>

Based on table 3, it can be seen that the Average Variance Extracted (AVE) root value is greater than 0.5. This means testing discriminant validity with AVE root indicates that all variables are said to be good / valid.

Table 4. Composite Reliability of Adaptation Model (n: 83)

<table>
<thead>
<tr>
<th></th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1</td>
<td>0.735</td>
</tr>
<tr>
<td>x2</td>
<td>0.867</td>
</tr>
<tr>
<td>x3</td>
<td>0.894</td>
</tr>
</tbody>
</table>

Based on table 4, it can be seen that the value of the composite reliability of each variable has a value > 0.7. It can be concluded that all variables have good reliability and show that all constructs in the model are estimated to meet the criteria of discriminant validity.

Table 5. Inner Model of Adaptation Model (n: 83)

<table>
<thead>
<tr>
<th></th>
<th>original sample estimate</th>
<th>mean of subsamples</th>
<th>Standard deviation</th>
<th>T-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1   -&gt; x2</td>
<td>0.226</td>
<td>0.286</td>
<td>0.112</td>
<td>2.370</td>
</tr>
<tr>
<td>x1   -&gt; x3</td>
<td>0.238</td>
<td>0.256</td>
<td>0.113</td>
<td>2.115</td>
</tr>
<tr>
<td>x2   -&gt; x3</td>
<td>0.297</td>
<td>0.289</td>
<td>0.121</td>
<td>2.348</td>
</tr>
</tbody>
</table>

Based on table 5, it can be seen that analysis of the data on the effect of the stimulus to coping with t-statistic = 2.370, analysis the effect of the stimulus to adaptation with t-statistic = 2.115, analysis the effect of the coping mechanisms to adaptation with t-statistic = 2.348. Stimulus contribute significantly to the coping mechanisms, stimulus significantly contribute to the adaptation, coping mechanisms significantly contribute to the adaptation of Tuberculosis clients during treatment at the Lung Hospital in Jember.

The client's treatment experience is affected by the distance of health care with the client's home. Most of the respondents who seek treatment at Lung Hospital are clients located far from Lung Hospital. Clients mostly come from outside Patrang Village which is the location of Lung Hospital and there are located outside of Jember regency. There is no significant influence between home distance to non-adherence treatment in pulmonary tuberculosis patients [8]. The results showed that the distance of the house to reach the health facility is not a determinant factor of non-compliance of patients in the treatment. Therefore, although the distance away from Lung Hospital client still do the treatment and does not affect the perception to not seek treatment at Lung Hospital.

Perceptions of health workers on Tuberculosis clients affecting coping of clients. Perceptions of good health personnel in terms of treatment and care will increase the motivation of medication and adherence in treatment [9]. The medical service is the most influential factor on the compliance of client treatment [10]. This is in contrast to the results found in the field that there are still many clients who have experience of good health workers but coping in problem solving is still bad. This poor copper is influenced by some things like most clients who are still low-educated. Effective / high coping is caused by the influence of a high level of education [11].

Perceptions of health, perceptions of treatment, and perceptions of health workers in men largely have a positive perception. There are differences between men and women in terms of infectious disease, disease progression, incidence and death from Tuberculosis [12]. In terms of disease progression have differences between men and women, ie women have more severe disease at the time of coming to treatment. Women are more often late in coming to health services than men. This may be related to shame and shame more felt in women than in men, so that the contextual stimulus to the physiological integrity and integrity of self-concepts does not show a significant effect as the client is mostly male-compliant males in treatment who make adaptations Physical and self-concept. The facts of male Tuberculosis male clients have better treatment motivation compared to female Tuberculosis patients [13]. It can be shown from the analysis in his research that male Tuberculosis clients have greater motivation for treatment compared to female clients. Therefore, the absence of significant relationships due to the majority of clients who become respondents of this research is male and the client's self concept remains good although there is a stimulus that causes obstacles in running the treatment.

Work for a while during illness. This does not affect the client in performing Tuberculosis treatment in Lung Hospital. Test analysis showed...
no significant relationship between the work with medication adherence [14]. Therefore, the perception in the treatment performed by the client does not affect the role function of the client who must work for his family and remain obedient in undergoing treatment performed at Lung Hospital. The client's experience in receiving Tuberculosis treatment will influence the adaptation of client role function. The experience of health workers affected this analysis. There is relation of attitude and motivation of officer in giving service to client with achievement of Tuberculosis treatment success [13]. Therefore, the support of health personnel to the client to be obedient in the treatment is very important, so that when the client does not feel saturation and laziness to seek clients will be easier to recover and work again to perform the role function.

Coping from male clients is better than women so the motivation in getting higher healing men. Clients assume that with healing can be activity and run daily activities again. Role function in the client Tuberculosis in the form of client alignment with the environment and live everyday life in accordance with its role (eg: as head of the family and work as a farmer, as a housewife and work selling food in the school cafeteria). Role functions other than as actors in society, role functions are closely related to the role of income generators in the family. There is a significant influence between family income on non-compliance treatment in patients with pulmonary Tuberculosis [8]. Very low family income can determine non-compliance of patients with treatment. The role function in the family must keep running to increase the family's income and keep the client obedient in the treatment.

V. CONCLUSION
1) Stimulus contribute significantly to the coping mechanisms of Tuberculosis clients during treatment at the Lung Hospital in Jember;
2) Stimulus contribute significantly to the adaptation of Tuberculosis clients during treatment at the Lung Hospital in Jember;
3) Coping mechanisms do not significantly contribute to the adaptation of Tuberculosis clients during treatment at the Lung Hospital in Jember.

VI. RECOMMENDATION
1) The results can be used as a foundation for health workers who deal with Tuberculosis clients will experience a variety of issues such as adaptation to physical problems, psychological problems, social problems and problems of dependence. Adaptation can be enhanced as Tuberculosis clients consider factors that affect each patient adaptation.

Good adaptation will improve the recovery of patients;
2) Nurses provide health education on Tuberculosis treatment to prevent change adaptation that led to drop out of treatment;
3) The establishment of a peer group treatment group at each location of patients in the community, this requires good cooperation between the clinic nurses and community nurses.

VII. REFERENCE


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An Investigation Of Determinants Influencing The Usage Of Mobile Banking In Pakistan

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Abstract- In the last few decades the rapid technological change has been observed in the banking industry of both developing and developed countries. The utilization of internet banking increased the level of competition in banking sector. The objective of the study is to determine the factors that impact on the attitude of customers towards the usage of mobile banking. The study collected the data by 150 respondents of five selected banks. The study used perceived usefulness and risk as independent variables and attitude of customers as the dependent variable. Findings of the study revealed that both perceived usefulness and risk are significantly contributed in shaping the behavior of customers towards the usage of mobile banking in Pakistan. The study concluded that the management of the banks should mitigate the fraud issues by providing more privacy and security to their customers.

Index Terms- Internet Banking, Pakistan, Risk Perceived usefulness.

I. INTRODUCTION

The retail banking services and the unionization of telecommunication is introducing several opportunities for surfacing the mobile commerce specifically in mobile banking. The major benefit of mobile banking is to provide convenience, liberty and swiftness to customers, which is helpful for reducing the overall cost of the bank. The latest statistics published by the Pakistan Telecommunication Authority (PTA) have revealed that the cell phone penetration rate is high in Pakistan especially in urban areas. Moreover, the subscribers of cell phones in Pakistan have reached more than 120.5 million (Raza, S. A., & Hanif, N. (2013), pp. 82-96).

The statistics results have also shown that only 12% of the population in Pakistan is having the access of formal banking. Most of the population in Pakistan is living in rural areas; therefore, they have less access to the services of banks as compared to the urban people. According to State Bank of Pakistan (SBP), the service of mobile banking is onset in Pakistan; however, the acceptance rate is low in both urban and rural parts of the country (Kaleem, A., & Ahmad, S. (2015)).

The new innovation in technology has been brought forward in financial services specifically in retail banking industry. The need of these changes has been caused by the rising demanding factors of customer satisfaction, use of IT and communication technology and parallel competitive pressure (Akhlaq, A., & Ahmed, E. (2013), pp. 115-125). In this high competitive market, the need is to provide value added services to fulfill the demands of customers. The satisfaction of customer is not the ultimate goal of the bank but it also enhances market share and competitive advantage over the rest of the banks. Most of the banks have made extensive investments in developing the effective infrastructure of mobile banking service for the lower-income population group (Hanafizadeh, P., Keating, B. W., & Khedmatgozar, H. R. (2014), pp. 492-510).

Numerous studies have provided the evidence that the significant factor, which stimulates people to adopt new technology and mobile banking, is the perceived ease of use. Safeena, R., & Date, H. (2015) stated that perceived ease is the level to which people believed that the use of particular product will provide benefit to them and it would be free of efforts regardless on any charges.

A study has been conducted by Raza, S. A., Jawaid, S. T., & Hassan, A. (2015) revealed that the perceived ease is the most imperative factor in rural areas of different African countries. Though, this is not the only factor that influenced the attitude of users regarding the adoption of mobile banking. Oladejo, M., & Akanbi, T. (2012) stressed in study that the intention to adopt online banking is positively related with perceived ease of use in Malaysia. Similar results have been found by Hussain Chandio, F., Irani, Z., Abbasi, M. S., & Nizamani, H. A. (2013) which postulates that perceived ease is the significant factor in usage of internet banking.

The perception that the usage of a particular system or product will enhance the job performance of individual is referred to as a perceived usefulness. However, preceding literature postulates that the usage of computer is directly influenced by the intention and perceived usefulness of individuals. It is pertinent to mention here, that the adoption of technology is highly dependent on the awareness of people. Once the awareness has been created and consumers realized the significance of different alternate service delivery channels based on technology, the adoption of these services will be increased (Raza, S. A., & Hanif, N. (2013), pp. 82-96).
Kundi, G. M., & Shah, B. (2015) stressed that perceived usefulness is the focal factor, which influenced the attitude of consumers towards the mobile banking. The investigator has collected the data from 435 universities of Turkey and found that majority of the students prefer mobile banking because they perceived that it enhance their performance and it is convenient in use (Kesharwani, A., & Singh Bisht, S. (2012)).

Martins, C., Oliveira, T., & Popovic, A. (2014) have also collected the data from different consumers of mobile banking in Malaysia and found that perceived usefulness is the major determinant that triggers the adoption of mobile technology services. Similar results have also been found by Kaleem, A., & Ahmad, S. (2015).

Perceived risk is also a major determinant that influences the mobile banking in Pakistan. Though, most of the Pakistanis perceived that internet banking is not a secured channel therefore, most of the customers reluctant to use this service for any transaction. The most highlighted risk factor perceived by consumers during internet transactions is risk of service performance, financial risk, time risk and psychological risk. Guru, B. K., Shanmugam, B., Alam, N., & Perera, C. J. (2015) found that in African countries reliability and perceived risk are the main hurdles for the usage of mobile banking.

Chavan, J. (2013) has conducted a study to identify the attitude of people towards the adoption of internet banking in Tunisia. The investigator has implied theoretical model to determine the most persuaded factors of internet banking usage. The data has been collected from 253 respondents, in which 158 were non users of internet banking; whereas, 95 were users. Regression analysis and factor analysis techniques have been opted for the research. Evidence from the study indicates that security, convenience, risk and prior internet knowledge are the major influencing factors (Akhlaq, A., & Ahmed, E. (2013)). Though, information on online banking does not show any significant impact on the usage of internet banking.

The results from the study also showed that behavior to use internet banking is also influenced by the demographic factors (such as occupation and age group). The findings of the study are beneficial for those who are highly involved in the promotion of new form of banking in this stiff competitive market (Kaleem, A., & Ahmad, S. (2015)).

The perspective of customer towards internet banking has been examined by Akhlaq, A., & Ahmed, E. (2013) in India. The investigator has collected the data by using the convenience sampling method. Furthermore, primary data has been gathered from different educational institutes by using questionnaire technique (Kesharwani, A., & Singh Bisht, S. (2012)). The major variables that analyzed during the study were acceptance of consumers, perceived usefulness and perceived ease and perceived risk of use. Factor analysis technique has been opted to get rigorous results (Hanafizadeh, P., Keating, B. W., & Khedmatgozar, H. R. (2014)). The findings of the study were identified that the most imperative determinants for the adoption of internet banking were perceived risk and perceived ease of use. Evidence from the study also highlighted that these two factors are helpful for the formulation of customer awareness strategies.

The purpose of the study is to identify the determinants that influence the attitude of people towards the adoption of mobile banking in Pakistan. The study posits to find out the customer perspective towards internet banking. Moreover, the investigator has also considered different factors that have an influential effect on the usage of mobile banking in Pakistan. The author has selected the consumers of five banks that were utilizing the service of mobile banking. The selected banks were Habib Bank limited (HBL), United Bank Limited (UBL), Standard Chartered Bank, Muslim Commercial Bank (MCB) and Allied Bank Limited.

The completion of the study is beneficial for both the management of bank and consumers because it creates awareness among people regarding the benefits of mobile banking. Additionally, the hindrance and problems raised in this study is helpful for the management of banks, which are highly involved in the formulation marketing strategies. This study may dearth the gap of preceding studies by highlighting the major influential determinants for the adoption of online banking in Pakistan.

II. METHODOLOGY

2.1 Research Approach

Cross sectional study design and quantitative research approach have been opted to identify the determinants that influence the mobile banking in Pakistan. This study design is helpful for generating rigorous results that have been developed by collecting the primary data from different consumers of internet banking of selected banks.

2.2 Study Variables

The variables that have been assessed during the study were perceived risk, perceived ease and perceived usefulness (Independent variables) and adoption of mobile banking and attitude of people towards mobile banking (Dependent variable). All the variables have been selected by reviewing the preceding studies.
2.3 Study Hypothesis

H₀: Perceived ease and usage is not positively influenced the adoption rate of Mobile Banking in Pakistan

H₁: Perceived ease and usage is positively influenced the adoption rate of Mobile Banking in Pakistan

H₀: Perceived risk of fraud and reliability are not the major influencing factors that affect the attitude towards the use of mobile banking in Pakistan.

H₁: Perceived risk of fraud and reliability are the major influencing factors that affect the attitude towards the use of mobile banking in Pakistan.

2.4 Sample Design

Primary data has been gathered by distributing the questionnaires to consumers of mobile banking of selected banks. Convenience sampling method has been used for the selection of banks because most of the bank's customers were unable to provide relevant information regarding the selected variables. Furthermore, random sampling method has been used for the selection of customers. The selected banks were Habib Bank limited (HBL), United Bank Limited (UBL), Standard Chartered Bank, Muslim Commercial Bank (MCB) and Allied Bank Limited.

The investigator has distributed 150 Likert point scale questionnaires in selected sample of banks. The imperative key stakeholders of the study were potential and recent consumers of mobile banking, board of directors and employees of banks. Customers who were used the service of internet banking from the last one year were included in the study; whereas, customers who were not used the service or exploit the service from the last six months were excluded from the research process. Furthermore, the author has distributed thirty questionnaires in different branches of selected banks. The branches were selected on the basis of customer's traffic and number of accounts.

2.5 Validity and Reliability

Pilot testing has been conducted before distributing the final questionnaire to the customers. It is helpful for eradicating the grammatical mistakes and formatting errors from the research process. After removing all errors, the investigator has personally delivered the questionnaires to the consumers. Hence, the study has accomplished all allegations of validity and reliability.

2.6 Ethical Consideration

The consent of bank's staff has been taken before distributing the questionnaires to the consumers. Furthermore, the sanction of customers was also taken in order to get genuine responses. The data has been gathered, compiled and analyzed in full confidentiality and the foremost importance of the researcher is the anonymity and free consent of customers.

2.7 Statistical Analysis

Statistical Package for the Social Sciences (SPSS software version 20) has been opted to analyses the gathered data. Linear regression, Pearson Correlation and descriptive test were employed to identify strengthen of relationship between variables.

III. DATA ANALYSIS AND RESULTS

3.1 Introduction

The following section discussed about the findings of the study that are based on the hypothesis and research questions, which have been formulated in the preceding section.

Questionnaire Findings

3.2 Descriptive Analysis

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB gives flexibility to conduct banking business 24 hours/day</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.85</td>
<td>1.122</td>
</tr>
<tr>
<td>MB transactions save more time and it’s a free of effort service</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>3.04</td>
<td>1.558</td>
</tr>
<tr>
<td>MB makes it easier for me to do my banking</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.93</td>
<td>1.371</td>
</tr>
<tr>
<td>MB helps me to know the state of my account faster</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>1.83</td>
<td>1.028</td>
</tr>
<tr>
<td>MB provides me prompt and efficient services</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.49</td>
<td>1.246</td>
</tr>
<tr>
<td>MB provides systems to give appropriate feedback</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>3.57</td>
<td>1.172</td>
</tr>
<tr>
<td>MB gives the joy of controlling my financial transactions in a shortest period of time</td>
<td>150</td>
<td>1</td>
<td>4</td>
<td>2.84</td>
<td>.715</td>
</tr>
<tr>
<td>Learning to use MB was easy for me</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>3.11</td>
<td>1.620</td>
</tr>
<tr>
<td>Instructions in the MB system are clear and understandable</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.88</td>
<td>1.146</td>
</tr>
<tr>
<td>I feel that user-friendliness of the MB website or app is important.</td>
<td>150</td>
<td>1</td>
<td>4</td>
<td>2.96</td>
<td>1.164</td>
</tr>
<tr>
<td>MB has more flexible ways to search for information</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.75</td>
<td>.810</td>
</tr>
<tr>
<td>MB will allow unauthorized person to access personal information.</td>
<td>150</td>
<td>1</td>
<td>4</td>
<td>2.33</td>
<td>1.151</td>
</tr>
<tr>
<td>MB provides accurate, relevant and up to date information</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.61</td>
<td>1.209</td>
</tr>
<tr>
<td>MB has the high chance of fraud</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>3.02</td>
<td>1.845</td>
</tr>
<tr>
<td>MB needs expertise and training</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.93</td>
<td>1.398</td>
</tr>
<tr>
<td>MB has inadequate information on the website and less operational reliability</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>3.24</td>
<td>1.617</td>
</tr>
<tr>
<td>I trust the ability of MB to protect my privacy</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.96</td>
<td>1.460</td>
</tr>
<tr>
<td>The flexibility and easiness of use positively impact my attitude towards MB</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>2.43</td>
<td>1.700</td>
</tr>
<tr>
<td>The high risk and chance of fraud negatively influence my adoption rate towards MB</td>
<td>150</td>
<td>1</td>
<td>5</td>
<td>3.70</td>
<td>1.268</td>
</tr>
<tr>
<td>I prefer to use MB because it enhances my performance</td>
<td>150</td>
<td>1.0</td>
<td>5.0</td>
<td>2.213</td>
<td>1.2402</td>
</tr>
</tbody>
</table>

Valid N (list wise) | 150 |
The aforementioned table 1 depicts the descriptive analysis of the questionnaire, which was disseminating in the different banks of Pakistan. Total 150 questionnaires were distributed in customers that are frequently users of mobile banking. The findings of the table 1 showed that the maximum value is 5 and minimum value is 1. Moreover, the highest standard deviation is 1.845; whereas, the highest mean value are 3.7.

3.3 Hypothesis 1

3.3.1 Correlation Analysis

Q1: MB gives flexibility to conduct banking business 24 hours/day
Q2: MB transactions save more time and it’s a free of effort service

<table>
<thead>
<tr>
<th>Correlations</th>
<th>MB gives flexibility to conduct banking business 24 hours/day</th>
<th>MB transactions save more time and it’s a free of effort service</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB gives flexibility to conduct banking business 24 hours/day</td>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>150</td>
</tr>
<tr>
<td>MB transactions save more time and it’s a free of effort service</td>
<td>Pearson Correlation</td>
<td>.894**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>150</td>
</tr>
</tbody>
</table>

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

Table 2 represents the Pearson Correlation analysis of the abovementioned questions. The results highlighted that strong positive relationship subsist between the selected variables. Moreover, it is also depicted that statistically significant relationship exists between the perceived usage and attitude towards mobile banking in Pakistan.

Q1: The flexibility and easiness of use positively impact my attitude towards MB
Q2: I prefer to use MB because it enhances my performance

<table>
<thead>
<tr>
<th>Correlations</th>
<th>The flexibility and easiness of use positively impact my attitude towards MB</th>
<th>I prefer to use MB because it enhances my performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The flexibility and easiness of use positively impact my attitude towards MB</td>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>150</td>
</tr>
<tr>
<td>I prefer to use MB because it enhances my performance</td>
<td>Pearson Correlation</td>
<td>.787**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>150</td>
</tr>
</tbody>
</table>

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

The results in table 3 indicate strong positive relationship between the variables. The aforementioned results also showed significant relationship between enhancement in performance and attitude towards mobile banking.

3.3.2 Regression Analysis

Perceived Ease of Usage and Attitude towards MB

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.438*</td>
<td>.191</td>
<td>.186</td>
<td>.645</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), The flexibility and easiness of use positively impact my attitude towards MB
Dependent Variable: MB gives the joy of controlling my financial transactions in a shortest period of time

Table 4 indicates a significant relationship between the ease of usage and attitude towards mobile banking in Pakistan. Furthermore, the abovementioned table signifies p-value is less than the threshold alpha i.e. 0.05; thus, the study rejects the null hypothesis and accepts the alternative hypothesis.

3.4 Hypothesis 2

3.4.1 Correlation Analysis

Q1. MB will allow unauthorized person to access personal information.
Q2. MB has the high chance of fraud

The results depicted in table 6 shows strong positive relationship between the variables. Moreover, the p-value of 0.000 signifies statistically strong positive relationship between the access of unauthorized person and chances of fraud in MB.

Q.1 MB has inadequate information on the website and less operational reliability.
Q.2 I trust the ability of MB to protect my privacy.

The results depicted in table 8 shows moderate negative relationship between the variables. Furthermore, the results also indicated that statistically significant relationship subsists between the trust factor and operational reliability of the mobile banking.
3.4.2 Regression Analysis

Perceived Risk and Attitude towards MB

### Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.726</td>
<td>.528</td>
<td>.524</td>
<td>.874</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), MB has the high chance of fraud

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Un standardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>5.208</td>
<td>.137</td>
<td>37.932</td>
<td>.000</td>
</tr>
<tr>
<td>MB has the high chance of fraud</td>
<td>-.499</td>
<td>-.726</td>
<td>-12.857</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: The high risk and chance of fraud negatively influence my adoption rate towards MB

The regression analysis shows statistically significant relationship between the variables. Furthermore, the p-value is less than the threshold alpha i.e. 0.05; thus, the study rejects the null hypothesis and accept the alternative hypothesis.

### 3.5 HYPOTHESIS RESULTS

<table>
<thead>
<tr>
<th>HYPOTHESIS</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis 1</td>
<td>Null hypothesis rejected and alternate hypothesis accepted</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>Null hypothesis rejected and alternate hypothesis accepted</td>
</tr>
</tbody>
</table>

### IV. DISCUSSION

The findings of the study illustrate that perceived ease and usage is positively influence the adoption rate of mobile banking in Pakistan. Safeena, R., & Date, H. (2015), indicated that perceived ease and usage are the major factors that influence the internet banking in Pakistan. Evidence from the study also suggested that usefulness of mobile banking helps in the strategy formulation process. Raza, S. A., Jawaid, S. T., & Hassan, A. (2015), conducted a study in Vietnam stressed that perceived usage, trust and government support are the major factors that impact the adoption rate of online banking in Vietnam. Though, the study suggested that perceived ease is insignificant in regards of technology reception model.

Oladejo, M., & Akanbi, T. (2012), have indicated that convenience, risk, security and internet knowledge are the major factors, which effect the internet banking in Tunisia. The results also highlighted that the demographic factors are the most influential determinants that persuade the online banking. According to the customer’s standpoint, the foremost reason of using internet banking is the simplicity and expediency of performing transaction without being restricted from any particular place or specific time. Though, the security of credential is the foremost important issue as it entails the complete account details (Kesharwani, A., & Singh Bisht, S. (2012), pp. 303-322).

Kundi, G. M., & Shah, B. (2015), have discussed that the increase in the usage of internet banking is highly depended on the perception of customers regarding the usefulness of this particular technology. Moreover, if customers perceived a specific technology difficult so it will not lead to the usefulness of the product. Evidence from the study showed that perceived risk and reliability issues are the foremost determinants that impact on the attitude of customers towards online banking. Though, after critically analyzing the views of different customers it has been noted that the issues of risks can be mitigated by enhancing the features of privacy settings (Martins, C., Oliveira, T., & Popović, A. (2014), pp. 1-13).

### V. CONCLUSION

The usage of internet banking is increased after receiving facilities of online bills payments, fund transfer, balance inquiry, mobile recharge and shopping through cards. This study analysis the two determinants i.e. perceived eases and perceived risk. The results corroborates that these two factors are the major factors that impact on the attitude of customers towards the usage of mobile banking in Pakistan. It is highly recommended that the management of the bank should make efforts to provide more facilities to the internet banking users and develop the software that are user friendly and easy to use for the desired customers.
REFERENCES


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PREDICTORS OF TREATMENT OUTCOMES IN ENDEMIC BURKITT’S LYMPHOMA PATIENTS AT JARAMOGI OGINGA ODINGA TEACHING AND REFERRAL HOSPITAL, KISUMU COUNTY, KENYA

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Abstract- Endemic Burkitt's lymphoma is the most common childhood cancer in equatorial Africa, where it is about ten times more common than in Europe. It also is the most prevalent pediatric malignancy among children in Western Kenya. Although it is highly responsive to chemotherapy, the number of its mortality cases associated with it is still high and the underlying reasons for this high mortality rates is still unknown. Therefore, this study describes the demographical and clinical characteristics of eBL patients observed over time and determines the influence of these characteristics on eBL patient treatment outcome at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH). This was a retrospective study design intended to describe the clinical and demographical characteristic and their influence on the treatment outcome of eBL patients. A total of 178 eBL children (103 boys and 75 girls, with a mean age of 7.37 years) who were diagnosed between 2009 and 2014 were enrolled in the study. There was no significant difference in the proportion of boys and girls, and the mean age (7.37 years) at diagnosis remained similar throughout the study period. Those presenting with abdominal tumor only were 72 (40.40%) while those with facial tumor only were 28 (15.70%). Children presenting with a combination of abdominal and facial tumor were 23 (12.90%). HIV positivity was 3.9 %, and did not differ between different periods. A total of 125 (70.2%) children received induction chemotherapy phase and they had no significant difference in proportion throughout the study period. In addition 108 (60.7%) of the children received consolidation phase of chemotherapy while only 35 (19.7%) received maintenance phase of chemotherapy. In terms of eBL patients response to chemotherapy, 49 (27.5%) did not respond, 59 (33.2%) had complete remission, 33 (18.5%) had partial remission, 31 (15.0%) had stable disease, while 18 (5.0%) had relapse. But there were no changes in the proportions in response to chemotherapy. Hematological indices revealed that 46 (26.1%) had severe anemia, 110 (62.5%) had mild anemia while only 20 (11.4%) had normal anemia levels. A total of 62 (34.83%) children died during the follow up; analysis also revealed that 13 of the children who received all phases of consolidation chemotherapy died while 6 died despite receiving maintenance chemotherapy. There was no significant difference in mortality rates in children with symptoms of fever (p=0.095), weight loss (p=0.403), night sweats (p=0.165), severe infection (p=0.774) and malaria (p=0.343). Children presenting with testicular tumour (HR 31.77, 95% CI 3.28-307.62, p=0.003) and lung parenchymal tumour (HR 8.65, 95% CI 2.00-37.24, p=0.004) had increased mortality rate relative to those presenting with other tumors. There was no statistical difference in the children mortality rate by HIV status (HR 1.37, 95% CI 0.60-3.13, p=0.455). Further analysis revealed that those with severe anemia had increased mortality rate (HR 2.07, 95% CI 3.67-0.97, p=0.012). Endemic Burkitt's lymphoma is more prevalent among male children at the age of 5-9 years. Patients who completed the entire treatment cycle up to maintenance therapy had low mortality rate. However, patients who presented with lung parenchyma, testicular tumor, and those who had severe anemia had higher mortality rate. The results of this study indicated that the sensitivity and specificity of the techniques used for BL diagnosis needed to be validated since our studies reveal that children diagnosed using histology had significantly lower mortality rate relative to those who were diagnosed through cytology. This study is helpful in deciding on the feasible therapy and support care system for improving therapeutic strategies and in designing future clinical trials.

Index Terms- Cancer, Patients, Burkitt’s, Lymphoma, Malignancy, Endemic.

I. INTRODUCTION

Estimates are that, by 2020, cancer will become the world’s single leading cause of death and already cancer mortality has eclipsed the total number of deaths attributable to HIV/AIDS, tuberculosis, and malaria combined (WHO, 2011; Ferlay et al., 2011). Furthermore, the World Health Organization (WHO) projects that by 2020, there will be 16 million new cancer cases and 27 million cases by 2030; 70% of these will be in developing nations, and an excess of 1 million will occur in sub-Saharan Africa alone, which is further compounded by the advancing acquired immunodeficiency syndrome (AIDS) epidemic (Mwanda et al., 2009).

There are scant resources in this part of the world to diagnose, treat and support cancer patients through chemo-
radio- and surgical therapy resulting in unacceptably high treatment-related mortality rates, median survival rates on the order of several weeks, and very limited data on how patient demographic and clinical parameters at time of diagnosis influence patient outcomes. Inadequate trained manpower to address this emergent crisis is a most significant challenge for cancer control in Africa (Sissolak et al., 2007; UNAIDS, 2011).

One of the most common Non-Hodgkin’s lymphoma in Africa is Endemic Burkitt’s lymphoma (eBL), which is a pediatric malignancy (Ogwang et al., 2008). This malignancy has high incidence in areas that experience stable Plasmodium falciparum (P. falciparum) transmission, and both Epstein-Barr virus infection (EBV) and holoendemic P. falciparum are etiologically linked to this B cell neoplasm (Rochford et al., 2005; Mwandaet al., 2009). In addition, histopathological studies and diagnosis of cases of BL have revealed that there are three different clinical variants that differ in their geographical distribution and incidences in different populations (Mbulaiteye et al., 2010). These three variants include the eBL, common in Africa especially in malaria endemic regions of sub-Saharan Africa and has a high incidence (Ogwang et al., 2008), the sporadic BL with low incidence mainly in developed countries and northern Africa, and AIDS associated BL which has been associated with rise in HIV infection (Orem et al., 2009). Moreover, eBL present as jaw or orbital (facial) tumors while sporadic BL mainly present as abdominal tumors or tumors with bone marrow involvement (Ogwang et al., 2008).

Burkitt’s lymphoma (BL) is an aggressive extra nodal B cell lymphoma that can present in a number of different sites including jaw, abdomen, central nervous system, thyroid gland, orbital, and breast or a combination of these areas (Mwandaet al., 2004; Owangget al., 2008). It may also present as generalized lymphadenopathy, testicular tumor, renal mass, bone involvement, thoracic involvement, lung parenchymal involvement, mediastinol tumor or pleural disease including effusion (Orem et al., 2011). However, jaw and abdominal tumors are the most common sites of presentation (Mwandaet al., 2004). Interestingly, there are different epidemiologic patterns associated with children presenting with jaw compared to abdominal tumors. For example, while the median age of onset is 6 to 7 years for BL (Rainey et al., 2007; Carpenter et al., 2008), jaw tumors are associated with a younger age of presentation and more frequently found in males, while abdominal tumors are common in older children, and there is a more equal distribution among males and females (Ogwang et al., 2008). A study in Uganda revealed that a third of female cancer patients present with ovarian mass and that there is an increase in patients presenting with hepatic mass and malignant pleocytosis (Orem et al., 2011). Despite the fact that eBL has several distinct demographic and clinical pictures most studies have looked at it as a single clinical entity (Asito et al., 2010). There is still a paucity of data in the demographic characteristics of patients presenting with BL patients at the Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH) which is the main referral hospital for cancer patients offering chemotherapeutic treatment for eBL in the western Kenya region (Asito et al., 2010).

Evidence suggests that demographic and clinical characteristics at the time of diagnosis are predictors of treatment outcomes in BL patients (Mwanda et al., 2009; Orem et al., 2011; Bateganya et al., 2011). A study in in AIDS related non-Hodgkin’s lymphoma revealed that serum lactate dehydrogenase (LDH), hemoglobin levels, and access to antiretroviral therapy were predictors of overall survival (Mwanda et al., 2009). Similarly, a study in Uganda found that while treatment response rates were similar regardless of HIV serostatus, median survival in HIV-infected children was less than HIV-negative in determinate children (Orem et al., 2009). However, this study did not indicate the type of chemotherapy administered to these children. Another study in BL patients in Uganda revealed that, age, site of tumor presentation, HIV status, increased cycles of chemotherapy and symptoms such as fever, weight loss, night sweats, anemia, severe or recurrent malaria are predictors of treatment outcomes (Orem et al., 2011). Several reports have clearly identified the challenges in administering dose-intense chemotherapy to children with eBL in sub-Saharan Africa relative to European countries (Mwanda et al., 2002; Hesseling et al., 2003; Hesseling et al., 2008). In addition, a Ugandan study reported that the median survival of those patients presenting with non-Hodgkin’s lymphoma in whom mortality status was confirmed as 2 months; of these 32% were HIV-seropositive; and median survival among patients with HIV infection receiving antiretroviral therapy was comparable to those without HIV infection (Bateganya et al., 2011).

The main objective was to determine clinical characteristics and predictors of treatment outcomes in eBL patients at Jaramogi Oginga Odinga Teaching and Referral Hospital.

The justification of the study isthat demographic and clinical characteristics are important predictors of treatment outcomes in BL patients (Orem et al., 2009; Orem et al., 2011; Molyneux et al., 2014). For example, abdominal tumors, anemia other hemotological parameters, age and HIV status are associated with poor treatment outcomes (Mwanda et al., 2009; Orem et al., 2009; Orem et al., 2011). Moreover, studies have shown that HIV-infected individuals are at increased risk of AIDS related BL (Mwanda et al., 2009; Rodrigo et al., 2012). This has created enormous challenges to national public health programs for prevention, diagnosis and treatment of this tumor (Orem et al., 2009; Mwanda et al., 2009). Of significance are studies showing that there is a lot of heterogeneity in BL in terms of demographic and clinical characteristics (Ogwang et al., 2008: Asito et al., 2010). A study in Malawi showed that BL patient’s response to therapy correlates with the expression of EBV lytic related genes (Labreque et al., 1999).

II. LITERATURE REVIEW

Epidemiology of Burkitt’s lymphoma

Endemic Burkitt's lymphoma is the most common childhood cancer in equatorial Africa, where it is about ten times more common than in Europe. The incidence is higher in areas with high rates of malaria. In Kenya, the highest rates are seen in the Western region and the Coastal region. The country prevalence of newly diagnosed cases in children under five years of age was 18.8 per 100,000 children. In Tanzania, the incidence is 2.5 per 100,000 children (Ogwang et al., 2008). A study in Malawi showed that BL patients’ response to therapy correlates with the expression of EBV lytic related genes (Labreque et al., 1999).
(eBL) prevalent among children in equatorial Africa, sporadic BL prevalent among adolescents in western countries, Acquired Immunodeficiency Syndrome (AIDS)-related BL, common in 30% of individuals infected with human immunodeficiency virus (HIV) and pleomorphic or atypical variants (Orem et al., 2011; Mbulaiteye et al., 2011). Although all these variants are pathologically indistinguishable with histopathologically showing that they present as poorly differentiated lymphoma with cells showing little variation in size and shape and exhibiting a starry sky appearance (Rochford et al., 2005; Mbulaiteye et al., 2011), they all exhibit c-my chromosome translocation (Wilmore et al., 2015). In addition, BL show a lot of heterogeneity in terms of geographical distribution, gender distribution, clinical presentation and age of occurrence (Klein et al., 1995; Rochford et al., 2005).

Earlier studies have shown that in sub-Saharan Africa, eBL is the most common pediatric malignancy associated with a lot of morbidity and mortality (Ogwang et al., 2008; Mwanda et al., 2009; Orem et al., 2011). This tumor has an average annual incidence of 2 per 100,000 children, with a peak age range of 5 to 9 years (Mwanda et al., 2004; Parkin et al., 2008). In 1964, Epstein- Barr virus (EBV) was discovered in a tumor sample obtained from a patient with eBL indicating that EBV was one of the etiological agent involved virus-mediated oncogenic processes (Thorley-Lawson et al., 2008). Endemic BL is most common in children residing in areas with the highest malaria transmission intensities (Rainey et al., 2007). Studies have shown this pediatric malignancy is common in malaria endemic regions of sub-Saharan Africa, Papua New Guinea and South America (Rochford et al., 2005).

In Kenya there is geographical overlap between the incidence of eBL with endemic malaria transmission with coastal and Western regions having the highest incidences (Mwanda et al., 2004). A study in western Kenya revealed that even in areas with high incidence of eBL there are spatial distribution with some regions presenting as eBL hot spots (having high incidence) while other were cold spots (low incidence) (Rainey et al., 2007). Significantly, this region has the highest prevalence of HIV in Kenya (NASCoP, 2014) and studies have shown that it has an increment of AIDS related non-Hodgkin’s lymphomas (Mwanda et al., 2009; Orem et al., 2011).

Demographic and clinical characteristics of eBL patients

Endemic Burkitt’s lymphoma (eBL) is an invasive B-cell lymphoma that shows predilections for the jaw, abdominal, central nervous system, thyroid glands, orbital areas and the breast or a combination of these areas (Magrath, 1997; Bishop et al., 2000). It can also present as lymphadenopathy, testicular tumor, renal mass, bone involvement, thoracic involvement, lung parenchymal involvement, mediastinal tumor or pleural disease including effusion (Orem et al., 2011). In addition females may also present with ovarian mass (Orem et al., 2011). Although jaw and abdominal tumors are the most common sites of presentation in BL patients’, studies have shown that lymphadenopathy and thoracic involvements are common in BL cases with HIV (Ogwanger et al., 2008; Mwanda et al., 2009; Orem et al., 2011). Interestingly, those with jaw tumors are mostly males and relatively younger than those presenting with abdominal tumors who are mostly females (Rainey et al., 2007; Carpenter et al., 2008; Ogwagater et al., 2008). Although these studies indicate that there is a variation in demographic characteristics of BL patients there is a paucity of data on the demographic characteristics of patients presenting with BL patients at the JOOTRH the main referral hospital for cancer patients offering chemotherapeutic treatment for BL in the western Kenya (Asito et al., 2010). Therefore, this study evaluated the demographic characteristics of patients presenting with BL by HIV status.

Apart from demographic characteristics, BL patients also present with symptoms such as fever, weight loss, night sweats, anemia, severe or recurrent malaria (Bategaya et al., 2011; Orem et al., 2011). They also present with higher levels of LDH especially those with advance stage tumors or HIV infection (Mwanda et al., 2009; Miles et al., 2012). In addition they also present with high EBV viral loads associated with heavy tumor burden (Asito et al., 2010). The other clinical hallmark of BL is hematological perturbation that results in organ failures (Ogowu et al., 2006; Mwanda et al., 2009). Earlier study has shown that the severity of hematological perturbation is associated with tumor burden (Katodritou et al., 2009). Severe anemia is the most common hematological complication in BL patients associated with tumor metastasis (Bhattathiri, 2001; Mittelman et al., 2003; Birgegard et al., 2006) and the severity of anemia is prognostic risk factor for the patient’s survival (Birgegard et al., 2006; Katodritou et al., 2009). The other clinical characteristics associated with BL include splenomegaly and hepatomegaly (Mwanda et al., 2005; Bategaya et al., 2011). Although discrepancy in the incidences and the prognostic influence of pre-chemotherapy anemia in lymphoma patients have been reported in developed countries (Birgegard et al., 2006; Teuffel et al., 2008), there is a paucity of data on the incidences of anemia in BL patients and their prognostic influence on patient outcomes in sub-Saharan Africa. Significantly, clinical features of BL show geographical variation (Mwanda et al., 2005) indicating that the clinical characteristics vary by regions. This is further compounded by the fact that viremia in advanced HIV disease status result in more severe hematological perturbations (Otieno et al., 2006; Dikhit et al., 2009). Thus, due to rapid rise of HIV and AIDS related BL in Kenya (Mwanda et al., 2009), there is need to evaluate the clinical characteristics of children presenting with BL at JOOTRH. Earlier studies have shown that both the demographic and clinical characteristics of BL patients impact on patient treatment outcomes (Mwanda et al., 2009; Orem et al., 2011). Hence there is need for understanding how these factors may impact on treatment outcomes of BL patients in an area with high BL incidence rates and HIV prevalence (Rainey et al., 2007; NASCoP, 2014).

Predictors of treatment outcomes in BL patients

Burkitt’s lymphoma is an aggressive tumor with rapid doubling time. It is easily recognizable and potentially responsive to chemotherapy (Meremikxuet et al., 2005; Orem et al., 2011; Molyneux et al., 2014). However, treatment outcome of BL in sub-Saharan Africa remains poor partly due to socioeconomic factors such as poverty that hinder access to specialized health care and lack of early diagnosis due to poor health infrastructure (Mwanda et al., 2009; Orem et al., 2011; Molyneux et al., 2014). Treatment outcomes are generally
categorized as complete remission where there is no evidence of disease, partial remission where there is 50% or greater decrease in tumor size, stable disease where there is neither decrease nor increase in disease, no response where there is progressive disease with new disease appearance despite chemotherapy, or recurrent disease with appearance of tumor following documentation of remission (Orem et al., 2011; Molyneux et al., 2014). Previous studies on treatment outcomes have been stratified into event-free survival (EFS) and overall survival (OS) (Mwanda et al., 2009). Moreover, several studies have demonstrated that both demographic and clinical factors may serve as prognostic factors for treatment outcomes in BL patients (Orem et al., 2011). Although the types of regimen, dose and schedule of chemotherapy for BL in Kenya is similar to that of developed countries, the prognosis for BL cases in Kenya are relatively low compared to Europe and United States (90%) (OGRA Foundation, 2012). This is comparable to survival rates reported in other equatorial African countries (Buckle et al., 2013). These factors have been summarized in Figure 2.1.

**Independent Variables**

- Demographic Characteristics
- Access to chemotherapy
- Clinical Characteristics

**Proximate Variable**

- Access to ARV
- Treatment outcome

**Dependent Variable**

**III. RESEARCH METHODOLOGY**

**Study location**

Jaramogi Oginga Odinga teaching and referral hospital (JOOTRH) (Appendix 1) is a public regional referral hospital, which serves as the referral center for children diagnosed with cancer in western Kenya (Buckle et al., 2016). It is located in an urban setting in Kisumu City with coordinates of 005°20"N34046°17"E Kenya; the third largest city in the country (CNES, 2015). It has an oncology and palliative care unit, with ward five assigned to be the pediatric oncology ward and acts as the main pediatric cancer diagnostic and management center in western Kenya (Asito et al., 2011). The hospital is also located in a region with one of the highest incidence of eBL in Kenya (Mwanda et al., 2004; Rainney et al., 2007). It serves an area with one of the highest HIV prevalence (18.7%) in Kenya (NASCOP, 2014).

**Study design**

This study used a retrospective study design. It specifically intended to describe the clinical and demographical characteristic and their influence on the predictors of treatment outcome of eBL patients managed overtime at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH).

**Data Collection**

Medical records for BL patients available at JOOTRH from 2009 to 2014 was retrieved and reviewed for demographic and clinical characteristics. eBL patients information on sex, age, diagnosis technique (clinical diagnosis, cytology or histology), clinical symptoms, tumor presentations, HIV status, haemoglobin levels, chemotherapy cycle, treatment complications and response to chemotherapy was abstracted using standardized data abstraction form (Appendix 2). The abstraction form was developed with adequate procedural manual to ensure reliability, accuracy and consistency of information. Patients were considered lost to follow-up if they were referred to other facilities.

Tumor diagnosis: Local Licensed pathologist conducted the clinical examination and requested for either fine-needle aspiration (FNA) or Biopsy for BL diagnosis confirmation. They reviewed the laboratory results and provided the diagnostic information that was based on their observation. Trained medical laboratory personnel prepared the specimen and performed the lab test for examination. Cytology and histology techniques are...
the two laboratory procedures that were used for confirming BL in the FNA and biopsy specimens collected the pathologist at JOOTRH.

Plain radiography and ultrasound were used to determine the tumor presentation sites. Abdominal ultrasound was used to test for abdominal involvement while chest X-ray was used to investigate mediastinal involvement and to rule out tuberculosis. Lumber puncture procedure was used to collect cerebral spinal fluid for cytological test for cerebral involvement before giving the first dose of intrathecal chemotherapy. In addition, before the start of chemotherapy treatment, blood smear for malaria test, HIV test, urine and stool microscopy test was performed. Finally, to qualify the patient fit for chemotherapy; kidney test, liver test and complete blood count were done.

The data was cleaned, edited and coded to avoid incompleteness during entry. Data on the characteristics of children with BL was summarized by means and standard deviations, or with proportions; differences in proportions and means was tested by the chi square test, t-test, z-test or ANOVA procedures where necessary. For analysis of predictors of treatment outcome, the temporal scale was determined as from the time of BL diagnosed, while death due to BL was considered to be a failure status. All other means of leaving the study were considered to censor the observed survival. The Cox proportional hazards model was fitted to estimate the hazard ratio (HR), reflecting the effect of the covariates on survival. In addition, likelihood ratio test was used to adjust the HR for both age and sex. Data analysis was performed using STATA software version 16.

IV. RESULT

Demographic characteristics of the study population
As shown in table 4.1, a total 178 patients aged 0-17 years [103 (57.9%) boys and 75 (42.1%) girls] fulfilled the inclusive criteria for the study and were involved in the consequent analysis. The mean age at diagnosis and first admission at JOOTRH was 7.37 years (SD 3.29). Most children 48.3% were aged between 5 and 9 years at BL diagnosis. There was no significant difference in the proportion of boys and girls, and the mean age at diagnosis remained similar throughout the study period.

Clinical characteristics of the study population
As shown in table 4.2, majority of the children 158 (88.8%) had clinical diagnosis of BL, with 81.5% having cytological confirmation of the disease and only 7.3% having histological confirmation. The proportion for BL confirmation over the study period had increased to 89.5% for cytological technique while none of the patients received histological procedure in the last two years of the study. The most common symptoms at diagnosis were fever, night sweats, weight loss, severe infection, anemia and malaria. However, the proportion of children presenting with fever remained similar throughout the study period as well as the proportion of children presenting with anemia, night sweats and severe infection.

Results:
A total of 125 (70.2%) children received induction phase of chemotherapy but there was no significant difference in proportion throughout the study period (p=0.25). In addition 108 (60.7%) of the children received consolidation phase of chemotherapy while only 35 (19.7%) received maintenance phase of chemotherapy. Although the proportion of children receiving both induction and consolidation phases of chemotherapy remained similar throughout the study period there was a significant reduction in children receiving maintenance phase of chemotherapy over the study period (p<0.0001). The children presented with various forms of complications following chemotherapy (Table 4.4). All children suffering from fall of hair and vomiting, 47 (26.4%) from diarrhea, 45 (25.3%) suffering from pain, 67 (37.6%) suffering from headache, 51 (28.6%) from stomach pain, 25 (14%) from back pain, 2 (1.1%) from shivers, 3 (1.7%) from itching and 7 (3.9%) from constipation. The proportion of treatment complication remained the same during the study period. However, there existed a significant decrease in the proportion of pain over the study period (p=0.035).

There was no significant difference in mortality rates in children with symptoms fever, anemia, weight loss, night sweats, severe infection and malaria. Table 4.8 shows the combination of facial and abdominal tumor had no statistical significance association with mortality rate (HR 0.7 7, 95% CI 0.48-0.90, p= 0.2 8 5). Children presenting with testicular tumor (HR 31.77, 95% CI 3.28-307.62, p=0.003) and lung parenchymal tumor (HR 8.65, 95% CI 2.00-37.24, p=0.004) had increased mortality rate relative to those presenting with other tumor types. Further analysis revealed that those with severe anemia (≥8 g/dL) had increased mortality rate (HR 2.07, 95%-CI 17.3-3.67,p=0.012).

Children with information on chemotherapy, 26 died despite receiving induction chemotherapy while 31 died without receiving induction chemotherapy. Analysis also revealed that 13 of the children who received all phases of consolidation chemotherapy died while 43 of the children died without receiving consolidated chemotherapy. For those who received maintenance chemotherapy there were 6 deaths, similarly among those who did not receive maintenance chemotherapy.

An increase in mortality rate in children who had no record of receiving induction chemotherapy (HR 4.1, 95%CI 1.75-9.59, p<0.001) and those who did not receive induction therapy (HR 2.34, 95%CI 1.57-3.57, p<0.0001) relative to those who received all phases of induction chemotherapy. Similarly there was an increased mortality among children who had no record of receiving consolidation chemotherapy (HR 5.2 95%CI 2.20-12.29, p<0.0001) and those who did not receive any consolidation chemotherapy (HR 2.97, 95%CI 2.07-4.27, p<0.0001) relative to those who received all phases of consolidation chemotherapy. An increased mortality rate was also revealed in children who had no records of receiving maintenance chemotherapy (HR 2.38, 95%CI 1.52-3.72, p<0.0001), those who received none (HR 8.84, 95%CI 3.71-21.07, p<0.001) and those who did not complete maintenance chemotherapy cycle (HR 5.16, 95 CI 3.20-8.33, p<0.001).

Children who achieved complete remission after chemotherapy had lower mortality rate (HR 0.58, 95%CI 0.42-0.81, p=0.001) while those that had no response to chemotherapy had an increased mortality rate (HR 2.91, 95% CI 2.00-4.23, p<0.0001).
**Table 4.** Predictors of treatment outcome of Burkitt’s lymphoma diagnosed patients aged <18 years at JaramogiOgingaOdinga Teaching and Referral Hospital by period of diagnosis

<table>
<thead>
<tr>
<th>Treatment Complication</th>
<th>Alive (n=92) (51.69%)</th>
<th>Deceased (n=62) (34.83%)</th>
<th>Referred (n=24) (13.48%)</th>
<th>HR (crude)</th>
<th>95% CI</th>
<th>(^a)P-value</th>
<th>HR (adjusted for sex and age)</th>
<th>95% CI</th>
<th>(^b)P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarhoea</td>
<td>22(23.9)</td>
<td>21(33.9)</td>
<td>4(16.7)</td>
<td>1.14</td>
<td>0.81-1.61</td>
<td>0.449</td>
<td>1.13</td>
<td>0.78-1.63</td>
<td>0.504</td>
</tr>
<tr>
<td>Vomit</td>
<td>92(100)</td>
<td>62(100)</td>
<td>24(100)</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fall of hair</td>
<td>92(100)</td>
<td>62(100)</td>
<td>24(100)</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pain</td>
<td>19(20.7)</td>
<td>20(32.3)</td>
<td>6(25)</td>
<td>0.93</td>
<td>0.66-1.32</td>
<td>0.691</td>
<td>0.97</td>
<td>0.68-1.38</td>
<td>0.849</td>
</tr>
<tr>
<td>Headache</td>
<td>40(43.5)</td>
<td>19(30.6)</td>
<td>8(33.3)</td>
<td>0.7</td>
<td>0.51-0.96</td>
<td>0.025</td>
<td>0.7</td>
<td>0.50-0.97</td>
<td>0.033</td>
</tr>
<tr>
<td>Stomach pain</td>
<td>34(37)</td>
<td>12(19.4)</td>
<td>5(20.8)</td>
<td>0.96</td>
<td>0.69-1.34</td>
<td>0.811</td>
<td>0.94</td>
<td>0.67-1.31</td>
<td>0.701</td>
</tr>
<tr>
<td>Back pain</td>
<td>16(17.4)</td>
<td>6(9.7)</td>
<td>3(12.5)</td>
<td>0.89</td>
<td>0.58-1.37</td>
<td>0.593</td>
<td>0.81</td>
<td>0.52-1.28</td>
<td>0.371</td>
</tr>
<tr>
<td>Shever</td>
<td>1(1.1)</td>
<td>0</td>
<td>1(4.2)</td>
<td>1</td>
<td>0.25-4.04</td>
<td>1</td>
<td>1.03</td>
<td>0.25-4.24</td>
<td>0.964</td>
</tr>
<tr>
<td>Itching</td>
<td>1(1.1)</td>
<td>2(3.2)</td>
<td>0</td>
<td>0.84</td>
<td>0.27-2.64</td>
<td>0.761</td>
<td>0.82</td>
<td>0.25-2.64</td>
<td>0.741</td>
</tr>
<tr>
<td>Constipate</td>
<td>2(2.2)</td>
<td>4(6.5)</td>
<td>1(4.2)</td>
<td>1.64</td>
<td>0.76-3.51</td>
<td>0.205</td>
<td>1.73</td>
<td>0.73-4.09</td>
<td>0.211</td>
</tr>
<tr>
<td>Chemotherapy Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relapse</td>
<td>8(8)</td>
<td>7(11.3)</td>
<td>3(12.0)</td>
<td>0.92</td>
<td>0.55-1.52</td>
<td>0.735</td>
<td>0.89</td>
<td>0.53-1.49</td>
<td>0.648</td>
</tr>
<tr>
<td>Stable Disease</td>
<td>3(3.3)</td>
<td>12(19.4)</td>
<td>2(8.3)</td>
<td>1.31</td>
<td>0.67-1.91</td>
<td>0.635</td>
<td>1.13</td>
<td>0.67-1.91</td>
<td>0.647</td>
</tr>
<tr>
<td>No response</td>
<td>0</td>
<td>36(58.1)</td>
<td>13(54.2)</td>
<td>2.48</td>
<td>1.76-3.47</td>
<td>&lt;0.001</td>
<td>2.91</td>
<td>2.00-4.23</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Complete remission</td>
<td>56(62)</td>
<td>2(3.2)</td>
<td>0</td>
<td>0.62</td>
<td>0.45-0.86</td>
<td>0.004</td>
<td>0.58</td>
<td>0.42-0.81</td>
<td>0.001</td>
</tr>
<tr>
<td>Partial remission</td>
<td>24(26.1)</td>
<td>4(6.5)</td>
<td>5(20.8)</td>
<td>0.77</td>
<td>0.52-1.13</td>
<td>0.181</td>
<td>0.8</td>
<td>0.54-1.20</td>
<td>0.287</td>
</tr>
</tbody>
</table>

Data are number (%), unless otherwise indicated. \(^a\)P-value refers to crude HR obtained using Cox model. \(^b\)P-value refers to HR adjusted for both sex and age obtained using Cox model and likelihood-ratio test (except for the analysis of testicular cancer or, sex and age themselves, where sex and testicular cancer were adjusted for age, and age was adjusted for sex)
V. DISCUSSION

This study reveals that the peak incidence of eBL is between the age of 5-9 year with a predominance of males. This is consistent with previous findings in East Africa (Ogwang et al., 2008; Orem et al., 2011). Of significance, earlier studies in Kenya indicated that there is geographical variation in clinical presentation of eBL (Otieno et al., 2001; Mwanda et al., 2004). In line with these findings this study found that a majority of patients presented with facial and abdominal tumors indicating that clinical characteristics of BL has remained unchanged over a long period of time (Mwanda et al., 2004; Orem et al., 2011; Aka et al., 2012). However, as opposed to a previous study in Uganda that found more children presenting with facial tumors relative to abdominal tumors (Orem et al., 2011), this study found that there were more children presenting with abdominal tumors relative to facial in line with a study in Tanzania (Aka et al., 2012). This disparity in clinical presentation can partly be due to the reported changes in BL tumor presentation in Africa (Otieno et al., 2001; Oguonu et al., 2002; Mwanda et al., 2004; Sherife et al., 2015).

Although this geographical variations in tumor presentation can be attributed to random variations, several studies from diverse regions in Africa and all over the world indicates that most BL patients present with abdominal tumors (Naresh et al., 2004; Temmimet et al., 2004; Sherife et al., 2015), further indicating that apart from changes in tumor presentation, there are also differences in clinical and epidemiological characteristics of children diagnosed during childhood based on geographical location. Indeed variation in clinical presentation can be partly due to EBV subtype and latent membrane protein (LMP)-1 variation (Rao et al., 2000). Of note a novel K variant of LMP-1 has been identified among BL patients in western Kenya although the functional implication in BL pathogenesis was not determined (Wohlford et al., 2013). Together these data indicate that clinical presentation can be influenced by a multiplicity of factors and there is need for studies to address these factors.

Children who presented with abdominal tumor only were more compare to those with facial tumor only or abdominal and facial tumor combined. However, a study conducted in Northern Uganda found that eBL cases presenting with either abdominal tumor only or with a combination of abdominal and facial tumor were more than those with facial tumor only (Ogwang et al., 2008). This disparity might have been due to geographical variation and age differences at diagnosis, since the average age at in the current study is 7.37 years for both sexes while in Northern Uganda study it was 6 years in both girls and boys. Of significant is the finding in Nigeria study which recorded more of facial tumor presentation (Mava et al., 2013).

This study also revealed an increase in children presenting with generally mphenadenopathy, malignant pleocytosis, and with symptoms such as fever, weight loss, night sweats and severe infection overtime consistent with findings from a previous study (Orem et al., 2011), suggesting that the symptoms at diagnosis are similar across the region.

This study shown that HIV prevalence stood at 3.9%. Of significant is that previous studies have shown that there is an increase in HIV-related BL in East Africa (Mwanda et al., 2001; Mwanda et al., 2009; Orem et al., 2011). Hence there is need to investigate how co-infection with HIV impacts on BL pathogenesis and tumor among children in East Africa.

This study reported a mortality rate of 34.83% which is higher than 15.96% reported in Uganda (Orem et al., 2011), this can be partly attributed to the fact that the Ugandan study was carried out at the Uganda Cancer Institute where there are expert for both early diagnosis and timely initiation of the eBL patients to proper treatment. In fact a recent study in our study setting revealed that mortality in BL patients is mainly due to overdose with cyclophosphamide and doxorubicin as a result of miscalculation of dosages hence the poor treatment outcomes (Buckle et al., 2016). Our data further reveal that there was an increased mortality rate in children who had no record of receiving or those who did not receive induction, consolidation and maintenance chemotherapy relative to those who received all phases of these therapies. In addition children who achieved complete remission after chemotherapy had lower mortality rate. Of note, a study in Malawi found that increased mortality rates in BL patients were due to suboptimal supportive care (Hesseling et al., 2003).

Moreover, our studies reveal that children diagnosed using histology had significantly lower mortality rate relative to those who were diagnosed through cytology indicating that there is need to validate the utility of this diagnostic techniques to ensure proper diagnosis and care for BL patients in poor resource settings (Buckle et al., 2016). According to Uganda study conducted by Ogwanget et al., 2011, Insufficient laboratory procedures compromises the accuracy of clinical diagnosis of BL. Sensitive and specific diagnostic laboratory test is necessary to increase the quality of BL epidemiology studies and its clinical diagnosis as this will minimize the inclusion of the diseases which has same clinical presentation (Ogwang et al., 2011).
A previous study revealed that the rate of mortality was more than twice the mortality rate among HIV negative children before the introduction of ARV (Orem et al., 2011). Our data reveal that there was no difference in the rate of mortality by HIV status. This can be attributed to improved treatment outcomes in cancer patients with underlying HIV infection due to the integration of ARVs in treatment of the patients. In fact a recent study indicated that early diagnosis coupled with highly active antiretroviral treatment (HART) improved both the prognosis and the survival of patients with extranodal non-Hodgkin lymphomas (NHLs) (Corti, 2006). Further suggesting that incorporation of HART in treatment of cancer patients with underlying HIV infection can greatly improve both the prognosis and survival of cancer patients.

Anemia is the most common hematological abnormality associated with lymphomas (Bigegardet et al., 2006; Kirchoff and Silvestri, 2008). While it is evident that the severity of anemia is closely related to tumor progression or burden (Teuffelet et al., 2008), discrepancies on both the incidences and the impact of anemia on survival outcomes based on tumor sub-types have been reported (Advaniet et al., 1997; Birgegardet al., 2006). This study reveals that severe anemia (≤8 g/dL) is associated with increased mortality rate. This is consistent with a recent study in the same hospital that revealed that children with anemia and malaria were less likely to survive relative to those without anemia and malaria. In addition those with severe anemia were less likely to survive (Buckle et al., 2016). Indeed a previous study had shown that hematological abnormalities including severe anemia results in intense hematopoietic compensatory mechanisms in BL patients as evidenced by both anicytosis (variations in red cell sizes) and granulopoiesis, which may result in oxidative stress in the BL patients, consequently leading to fatal outcomes (Feruciet et al., 2005).

More importantly, tumor presentation was another determinant of mortality with children presenting with testicular and lung parenchymal tumors having increased mortality rate. This can be partly attributed to these children presenting with advanced BL stage. Indeed similar findings were found in girls with ovarian mass where increased mortality was associated with advanced BL stage (Orem et al., 2011).

However neither the combination of facial and abdominal nor other presentations had an association with mortality. Moreover this study found that there was neither difference in mortality based on gender, age of diagnosis nor if there was clinical diagnosis. In addition there was no association between mortality with clinical symptoms such fever, anemia, weight loss, night sweats, severe infection and malaria.

VI. CONCLUSION AND RECOMMENDATION

Conclusion

Endemic Burkitt’s lymphoma is more prevalent among male children at the age of 5-9 years and normally it has similar clinical symptoms such as fever, anemia, weight loss, night sweeting, malaria and severe infections. Its presentation has remained unchanged with facial and abdominal tumor being the most common. This Lymphoma is very responsive to chemotherapy treatment as patients who complete the entire treatment cycle up to maintenance therapy have low mortality rate. Moreover, complete remission to treatment results in improved survival rates. eBL patients who present with lung parenchymal and testicular tumor has higher mortality rate.

Severe Anemia is one the hematological abnormalities that develops in patients diagnosed with eBL. It increases the mortality rate therefore its early diagnosis is beneficial to the patients as the children are possibly to survive with prompt management and proper nutrition. The sensitivity and specificity accuracy of the techniques used for BL diagnostic at JOOTRH calls for validation since our studies reveal that children diagnosed using histology had significantly lower mortality rate relative to those who were diagnosed through cytology.

VII. RECOMMENDATIONS

Few children receive maintenance treatment and attend clinic after they leave the hospital. The association of not completing maintenance chemotherapy treatment and relapse of the disease need to be identified. Moreover, the healthcare providers should educate the patients and their caretakers on the importance of attending clinic even after showing complete remission.

Patients diagnosed by cytology techniques had high mortality rate than those who had histology diagnostics. The laboratory quality assurance team therefore needs to ensure the validation of the utility of the diagnostic techniques to for proper diagnosis and care for BL patients.

Further research need to be conducted to identify the factors leading to more cases of eBL presenting with abdominal tumor in the study region compared to majority of facial presentation in the neighboring East Africa region like Uganda.

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Comparative Study of Physical Fitness Components between Physical and Non-Physical Education Male Students in Nekemte College of Teacher Education

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Abstract- The purpose of this study was to compare the significant difference of physical fitness components between physical education and non-physical education department male students in Nekemte College of teacher education. Amongst the total 42 participants of the study, 21 of physical education department students were selected using comprehensive sampling techniques whereas, the rest of 21 students were randomly selected form non-physical education department students in performing five components of physical fitness at age ranging from 20 to 23 years. The data were collected by the use of five selected variables and their criterion measures for physical fitness tests. The data were analyzed and compared with the help of statistical procedures in which arithmetic mean, standard deviation, standard error of mean, and t-test were employed and the level of significance was observed at 0.05. The results of the study were depicted that physical education students were found to be slightly superior to Non-physical education students in performing endurance and inversely true in agility, (t (.033), P=.370, and t (.004),P=..338) scored respectively. This confirms that, there is no statistically significant deference observed between the two groups. Subsequently, significance differences were revealed in strength, speed and flexibility amongst the two groups, (t (.003), P=.000, t (.025), P=.022, and t (.037) P=.007) in which P-values estimated less at significant level of 0.05. On the basis of statistical findings, it was concluded that the data gathered in relation with physical fitness of the participant tremendously designated below the standard rating scale of their age group.

Index Terms- endurance, speed, strength, agility, flexibility

I. INTRODUCTION

In the history of humankind, physical fitness has been considered as a vital element of everyday life of an individual. In being so, the ancient people were mainly dependent on their individual strength, vigor and vitality for physical survival (Manmeet Gill, et al. 2010). These involved performances of some basic skills like strength, speed, endurance, flexibility, agility for running, jumping, throwing and climbing for the persistence of hunting, gathering food and building shelter for their living (Mehtap Özdiirenc, Nihal Gelecek, 2005).

In connection to the idea stated above, international journal of behavioral social and movement science (IJBSMS, 2012) define the concepts of physical fitness as old as mankind, keeping in mind the survival of the fittest, down through the ages, as only strong and agile invader, protect themselves and their property. It is a fact that, physically fit people are in a better position to bear the rigorous and abnormal stress and strain, than those who are less physically fit. The basic movement like running, throwing, climbing, jumping lifting etc. requires specific physical attributes such as muscular strength, muscular endurance, cardiovascular endurance, strength, balance and coordination (W.H.O, 1981).

In the light of this, the expertise committee of the world Organization (1981) describes physical fitness as the ability to undertake muscular work satisfactorily and in capacity to carry out various forms of physical activities without being unduly tired including qualities important to the individual health and well-being. According to Clarke, Harrison, H (1971) physical fitness is defined as ability to carry out daily tasks with vigor and alertness without undid fatigue with ample energy leisure time pursuits to meet usual situation and unforeseen emergencies.

Likewise, regular participation in various exercises increases physical fitness. As a result, high level of physical fitness is desirable for a full productive life. However, sedentary living habits and poor physical fitness have negative impacts on both health and daily living. Every person has a different level of physical fitness which may change with time, place of work and situation. There is also an interaction between the daily activities and the fitness of an individual, the point if where to put the level of optimum fitness. From the physiological point of view, physical fitness may be ability of the body to adopt and recover from strenuous exercise (Kamla-Raj, 2010).

For most individuals, increase in physical activity increases physical fitness. Hence, physical activity and physical fitness are closely related in that physical fitness is mainly not entirely determined by physical activity patterns over recent weeks or months. That’s why; genetic contributions to fitness are important but probably account for less of the variation observed in fitness than is due to environmental factors, particularly physical activity (Bouchard, C., and L.,pe’ Russe, 1994).

The link between physical fitness and activities has been demonstrated in sport, where physically fit individual are able to perform at a higher relative intensity than their rivals. Therefore, the present comparative study was attempted to investigate the current status of physical fitness of 3rd year physical education department students and non-physical education students in Nekemte College of Teacher Education.

1.2. Statements of the Problem
Even if it remains unknown to what extent fitness instruction has been included in physical education program, fitness test program has been implemented in most schools as millions of young people have experienced fitness testing (Placek, et al., 2001). Interestingly, both US and the republic of China start systematic youth fitness testing in schools in the early 1950s for complete different reasons. The force in the US was unsatisfactory performance of American youth compared to European youth on the Kraus Weber test (Freedsonet et al, 2000; Seinfeld and Vogel, 1989). By contrast, the national wide impetus to follow the model of the Soviet Union was one of the primary reasons for the PRC to implement the national fitness test in schools (Ili, 1996).

The underlying assumptions for testing youth people’s fitness in physical education program in both countries, however, were almost identical. It was widely believed that the identifications deficiency of fitness through testing could help teachers to implement appropriate intervention and motivation for youngsters to practice in more physical activates (Fan, 1996: Pangrazi, 2001). Similarly, fitness program in both countries have undergone revolutionary revisions over the years (Keating, X., D, 2003).

The results and experience gained from several European studies suggest that physical form is a key indicator of the health of children and adolescents (Ruiz, et al., 2006) and is a predictor of health in later life (Ruiz et al., 2009). Regular monitoring of the level of physical activity and physical fitness of the entire population should be considered a public health priority (World Health Organization, 2010). Monitoring involves constant measuring and/or estimating (collective test) levels of physical activity and physical fitness of the individual as well as the evaluation of the data (C N S P E C, 1990).

Raising the self-esteem of young people and allowing them to reach their potential through high quality of physical fitness is every research certainly in our Ethiopia context. Hence, the researcher of this study wants to realize the current statues of physical fitness level of Nekemte College of Teacher Education students constructed on previous research that suggest evidence involvement in physical fitness, physical education and sport result in benefits to young people in terms of their fitness, health, confidence, self-esteem, their ability to concentrate and their readiness to learn.

For that reason, the participants for the studies were planned to involve in test at beginning of 2016/017 academic calendar of pre-professional training or professional activities. Physical education students had got exposure to physical fitness related training ahead of one year and one semester but not non-physical students. Therefore, it is very important to examine the significance difference between the participants of physical fitness and sedentary populations adapt differently than trained populations without intervention imposed upon them. It is hoped that, the study helps to fill out the fitness level gap between the two categories. The following basic research questions were attested to explore the significant relation or difference between physical fitness performance level of third year physical education and non-physical education department students of Nekemte College of Teacher Education through selective physical fitness activities.

- What is the current physical fitness status between third year physical education department students and non-physical education department students of Nekemte College of Teacher Education?
- What are the significance differences of fitness level between third year physical education department students and non-physical education department students of Nekemte College of Teacher Education?
- What are the conditions that make disparity of physical fitness level between third year physical education department students and non-physical education department students in Nekemte College of Teacher Education?

1.3. Objectives of the study

1.3.1. General Objectives of the study

The purpose of this study is to compare physical fitness level of third year physical education department students and non-physical education department students and to find out which of the two categories is more physically fit in responding to standardized level of physical fitness test.

1.3.2. Specific Objectives

✓ To estimate the current physical fitness status between third year physical education department students and non-physical education department students of Nekemte College of Teacher Education.
✓ To identify significance differences of fitness level between third year physical education department students and non-physical education department students of Nekemte College of Teacher Education.
✓ To examine conditions that make disparity of physical fitness level between third year physical education department students and non-physical education department students of Nekemte College of Teacher Education.

1.4. Significance of the Study

The success and competence of any physical fitness depend upon the ability of the performer to effectively achieve the given task on time. Therefore, the issues that were discussed in this study would have the following importance:

- The study was expected to contribute in the identification of student physical fitness level of physical education department students and non-physical education department students of Nekemte College of Teacher Education.
- It is intended to create awareness towards the problem among physical education teachers in general and students in particular.
- To provide a hint to the college management and other concerned bodies as to fulfill necessary facilities and equipment for the departments of physical education students.
- To stimulate the interest of individuals to conduct research on the same issues for further investigation.
- To establish norms for investigators and thus make objective comparisons between students of different ages, height, weight and pulse rate level of competition in the college.

1.5. Scope of the Study

1.5.1. Delimitations of the study
To make the study specific and manageable, the researcher delimited the area of the study to Nekemte College of Teacher Education with special reference to third year physical education department students and non-physical education department students in implementing five selective physical fitness test to identify student physical fitness level. Profiling physiological and physical fitness characteristics of the two groups is a very important and imperative part of this research within particular physical fitness activities.

1.5.2. Limitation of the Study

There were a few limitations to the study that need to be considered.
- Lack of motivation of the participants in performing the physical fitness tests, which might affect the results of the study.
- The low performance of the subjects due to their physical lifestyle and physical activity level.
- The performance effect of the subjects due to their difference in physical characteristics.
- Lack of recently published reference materials related to the topic.

1.7. Organization of the Study

This study is organized under five chapters. The first chapter highlights the paper and why the study was conducted. Chapter two reviews related literature to distinguish previously discovered areas to cover the ground for what is to be obtained in this study. Chapter three deals with the design and research methodology, instruments of data collection, sampling techniques, procedure of data analysis and interpretation. Chapter four analyzes data of different sources to see the achievement of the objectives of the study. The final chapter is to summarize, conclude, and forward suggestion and possible recommendations based on what is obtained in chapter four.

II. REVIEW OF RELATED LITERATURE

The recent statue of physical fitness is an out comes of several literatures available on physical fitness variables: strength, speed, endurance, flexibility and agility. This study includes the literature related to construct and standardized physical fitness listed, yet, relevant literature though peripheral to physical fitness believed to be relevant and that is actual to dealing the study was incorporated.

2.1. Why fitness test?

Schools and colleges have the potential to improve the health of young people by providing instruction in physical education that promotes enjoyable lifelong physical activity of the learners. Diseases and health problem resulting from an inactive lifestyle have their origins early in life. This is when an active life style should be established. Fitness begins at birth and should continue throughout a person’s life. Fitness improves general health and it is essential for full and vigorous living. The physically fit child feels more alert and eager to do things. A weak child is a weak brick in the wall of the nation. The wealth of a nation depends entirely upon the health of every citizen of the country (Carbin, C.B.; Lindesy, R. and Welk, G. 2000).

According to American College of Sports Medicine, (1998) performance in any sporting event is the result of a multitude of factors, which include the amount of training performed, the body's adaptation to the training, motivation level, nutritional status and weather conditions to name a few. As you can see, physiological parameters only account for a portion of any performance, and so the role of any exercise physiologist is also similarly limited. Through fitness testing, the factors involving physiological processes, over which there is some control, can be measured and ultimately improved upon.

The complex nature of physical fitness can be best under stood in terms of its components such as cardiovascular endurance, strength, flexibility, speed and muscular endurance. In addition to these components of physical fitness there are many other factor which contribute to physical fitness including heredity, living standard, nutrition, hygienic conditions, environmental and climate factors etc. (Sallis JF, McKenzie TL, 1992).

Competition is the ultimate test of performance capability and is therefore, the best indication of training success. However, when trying to maximize performance, it is important to determine the trainees ‘ability in individual aspects of performance. Fitness testing attempts to measure individual components of performance, with the ultimate aim of studying and maximizing the trainees ‘ability in each component (Chandel AS, 1993).

2.2. Selective Variable of physical fitness

2.2.1. Flexibility

It is interesting to know that there is no ideal standard for flexibility. There is little scientific evidence to show that a person who can reach 2 inches past his or her toes on a sit-and-reach test is less fit than the person who is able to reach 6 inches past his or her toe. Too much flexibility as well as too little flexibility could be detrimental (Corbin et al., 2003). To develop flexibility, it is recommended that muscles are stretched past normal length until resistance is felt. For duration, the stretch should be held from 5 to 10 seconds initially, building to 30 to 45 seconds (Wuest et al., 1994).

Several sit-and-reach tests (SRs) are commonly used in health-related and physical fitness test batteries to evaluate the hamstring and lower back flexibility (Jackson, A.W. & Langford, N.J., 1989; Hoeger et al, 1990; Hui and Yuen, 2000). Such field measures are only moderate indicators of hamstring extensibility. However, the SRs are frequently used to evaluate the hamstring muscle extensibility because the procedures are simple, easy to administer, require minimal skills training and are particularly useful in large scale extensibility evaluation in the field setting (Hui and Yuen, 2000)

For its effective application, the participants sat on the floor, with their shoes off, their legs straight, and feet against the flex meter foot stop. Before the test the researcher asked the participant: do you have a back injury or is there any other reason you should not try to touch your toes? If the participant’s answer was positive, the flexibility test was started. When participant reached forward and touched the stretch foot for 3 seconds, the best measurement of the three was recorded in centimeters (Morteza Jourkesh, et al, 2011).

According to Australian College of Sport & Fitness, (ACSF, 2013) measuring the distance from their toes to their fingertips, and record. If their fingers are passed their toes, the
results are positive, if the fingers are behind the toes, the results are negatively determining the ability the participants measuring in centimeters by means of the chart indicated below.

### Table 1: Standardized Rating Scale of Flexibility

<table>
<thead>
<tr>
<th>Rating</th>
<th>Female</th>
<th>Sex</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poor</td>
<td>&lt; -15</td>
<td>&lt;20</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>-15 to -8</td>
<td>-20 to -9</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>-7 to 0</td>
<td>-8 to -1</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>+1 to +10</td>
<td>0 to +5</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>+11 to +20</td>
<td>+6 to +16</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>+21 to +30</td>
<td>+17 to +27</td>
<td></td>
</tr>
<tr>
<td>Super</td>
<td>&gt; +30</td>
<td>&gt; +27</td>
<td></td>
</tr>
</tbody>
</table>

Source: Australian college of Sport & fitness 2013

### 2.2.2. Agility Test

Agility was assessed using 10 meter agility shuttle test. Mark two lines 10 meters apart using marking tape or cones. The two blocks was placed on the line opposite the line they was going to start at. On the signal "ready", the participant places their front foot behind the starting line. On the signal, "go" the participant sprints to the opposite line, picks up a block of wood, runs back and places it on or beyond the starting line. Then turning without a rest, they run back to retrieve the second block and carry it back across the finish line. Two trials are recorded (Morteza Jourkesh, et al, 2011).

According to Getchell, (1979) the Illinois Agility test is a commonly used test of agility in sports. It measures the ability to change position and direction. The length of the course is 10 meters and the width (distance between the start and finish points) is 5 meters. Four cones are used to mark the start, finish and the two turning points. Another four cones are placed down the center an equal distance apart. Each cone in the center is spaced 3.3 meters apart. Subjects should lie on their front (head to the start line) and hands by their shoulders. On the “go” command the stopwatch is started, and the athlete gets up as quickly as possible and runs around the course in the direction indicated, without knocking the cones over, to the finish line, at which the timing is stopped.

### Table 2: Standardized Rating Scale of Agility

<table>
<thead>
<tr>
<th>Sex</th>
<th>Exc.</th>
<th>Good</th>
<th>Average</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>&lt;15.</td>
<td>16.1</td>
<td>18.1</td>
<td>18.3</td>
<td>&gt;18.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>15.2</td>
<td>16.2</td>
<td>18.2</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>&lt;17.</td>
<td>17.9</td>
<td>21.7</td>
<td>23.0</td>
<td>&gt;23.</td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>17.0</td>
<td>18.0</td>
<td>21.8</td>
<td>0</td>
</tr>
</tbody>
</table>

Sources, Getchell, 1979

### 2.2.3. Cooper Test

Cardiovascular fitness was assessed using 12 minute run test. Place markers at set intervals around the track to aid in measuring the completed distance. Participants were run for 12 minutes, and the total distance covered is recorded. Walking was allowed, though the participants must be encouraged to push themselves as hard as they can (Cooper, K.H.Jama, 1968).

### Table 3: Standardized Cooper test for Male

<table>
<thead>
<tr>
<th>Age</th>
<th>V. good</th>
<th>Good</th>
<th>Average</th>
<th>B/average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-</td>
<td>&gt;270</td>
<td>2400</td>
<td>2200</td>
<td>2100</td>
<td>&lt;210</td>
</tr>
<tr>
<td>14</td>
<td>0 m</td>
<td>2700</td>
<td>2399</td>
<td>2199</td>
<td>0 m</td>
</tr>
<tr>
<td>15-</td>
<td>&gt;280</td>
<td>2500</td>
<td>2300</td>
<td>2200</td>
<td>&lt;220</td>
</tr>
<tr>
<td>16</td>
<td>0 m</td>
<td>2800</td>
<td>2499</td>
<td>2299</td>
<td>0 m</td>
</tr>
<tr>
<td>17-</td>
<td>&gt;300</td>
<td>2700</td>
<td>2500</td>
<td>2300</td>
<td>&lt;230</td>
</tr>
<tr>
<td>19</td>
<td>0 m</td>
<td>3000</td>
<td>2699</td>
<td>2299</td>
<td>0 m</td>
</tr>
<tr>
<td>20-</td>
<td>&gt;280</td>
<td>2400</td>
<td>2200</td>
<td>2300</td>
<td>&lt;160</td>
</tr>
<tr>
<td>29</td>
<td>0 m</td>
<td>2800</td>
<td>2399</td>
<td>2499</td>
<td>0 m</td>
</tr>
<tr>
<td>30-</td>
<td>&gt;270</td>
<td>2300</td>
<td>1900</td>
<td>1600</td>
<td>&lt;150</td>
</tr>
<tr>
<td>39</td>
<td>0 m</td>
<td>2700</td>
<td>2299</td>
<td>2199</td>
<td>0 m</td>
</tr>
<tr>
<td>40-</td>
<td>&gt;250</td>
<td>2100</td>
<td>1700</td>
<td>1500</td>
<td>&lt;140</td>
</tr>
<tr>
<td>40</td>
<td>0 m</td>
<td>2500</td>
<td>2099</td>
<td>1999</td>
<td>0 m</td>
</tr>
<tr>
<td>&gt;50</td>
<td>&gt;240</td>
<td>2000</td>
<td>1600</td>
<td>1300</td>
<td>&lt;130</td>
</tr>
<tr>
<td>0 m</td>
<td>2400</td>
<td>1999</td>
<td>1599</td>
<td>0 m</td>
<td></td>
</tr>
</tbody>
</table>

Source: [http://www.laxymca.org](http://www.laxymca.org) and the cooper institute for aerobics revised on 2002

In addition to this, the cooper 12-minutes running test is designed by Kenneth H. Cooper born in 1931 and he was created in 1968 for military use and the aim is to run as long as you can in 12 minutes with steady pace. The result is based on the distance, age and sex. The result of the test measures maximal oxygen intake, when it is done correctly, which means good motivation and maximal performance. Cooper test result correlates well (r=0.3) with VO2max numbers (Martin, D & Coe, P.N. 1997).

### 2.2.4. Strength

Reiner Van Der Ryst, (2005) defined strength as the maximum ability to apply or resist force. Measuring upper body strength and endurance, participants lower the body to a 90 degree elbow angle and push up. Set to a specified pace. Participants were complete as many repetitions as possible. Students begin performing push-ups according to the rhythm. The correct push-up were performed to a pace of one complete push-up every three seconds 1.5 seconds down and1.5 seconds up, with no hesitation. The number of correctly performed push up with a given time was scored (Franks, B.D. 1989).

### 2.2.5. Speed

Speed is the ability to perform a movement quickly. It is the time takes us to respond to a stimulus. Confirming to, Sanjay Akumar. S, (2014) states that speed is basically how fast the participants can move partial their body or the whole of their
body, and is measured in meters per second. Therefore, speed is the rate of movement and often refers to the ability to move rapidly and it is an important factor in all explosive sports and activities that require sudden changes in space (Baechle, T.R. (1994).

To measure the speed capacity of the student through the distances of 50 meter run two stop watches, two instructors with score card and pen should be needed. This test was administered by two subjects at a time both subjects took position behind the starting line. The starter used the commands ready “go” each runner was assigned to a separate time keeper. The time keeper recorded time at the finishing line. The scores were recorded time taken by the subjects to across finishing line from the starting line time was recorded nearest to the one 10th of a second(Sanjay Akumar., S, 2014).

III. RESEARCH DESIGN AND METHODOLOGY

Comparative study was set to address the current status of physical fitness level between physical education students’ and non-physical education students in Nekemte College of Teacher Education. This study employed quantitative methods of research to gather information through compression of students’ active participation in selective physical fitness activities. To this effect, the methodology of the research involves sources of data, sample of population and sampling techniques, instruments, procedures of data collection and method of data analysis as stated below.

3.1. Research Method

Of the many benefits of fitness testing, the major use is to establish the strengths and weaknesses of the students. This was done by comparing test results between students of two groups involving in the same activities. The results of the groups were investigated as normative through comparing results to successful competitors in sport in which the areas of students' physical fitness level need improvement and the test program can be modified accordingly. Such valuable test time can be used more efficiently. However, some students perform well in their sport despite their physical or physiological attributes, and it may not be advantageous to be like them for others (American Alliance for Health, Physical Education, Recreation, and Dance, 2002).

Likewise, the preliminary testing session can give the students an idea of where their fitness levels are at the start of a program, so that future testing can be compared to this and any changes can be noted. A baseline is especially important if it is about to embark on a new test phase. Subsequent tests are expected to plan for the end and start of each new phase. At the time, by repeating tests at regular intervals, an idea of the effectiveness of the test program implementation can be obtained. The time frame between tests can depend on the availability of time or costs involved, or the phase of the test. Depending on these factors, the period between tests may range from 20-30 second to see a demonstrable change in any aspect of fitness. To obtain reliable and valid information, the researcher employed standard set of tests that are performed for the fitness testing of selective physical fitness activities (Chandel AS, 1993). However, if the researchers have an access to come across the entire of the test at list, the researcher can desire to modify a procedure to suit individual needs to determine the capability of the learners in any component of physical fitness.

3.2. Population and Sampling Techniques

The desired populations of the study were third year physical education department and non-physical education department students in 2016-2017 academic year. Therefore, out of total population of third year physical education department student, all male student taken as a participants of the study using comprehensivesampling whereas, for non-physical education department student’s random sampling techniques was applied to recruit them. The population consisted of only male students from different circumstances from October 2016 to February, 2017. The total populations of the study were 42 students comprising of 21 males from physical education department and 21 male students from non-physical education department students. The exclusion criteria were histories of their health and orthopedic problems, such as episodes of hamstrings injuries, fractures, surgery or pain in the spine or hamstring muscles over the past three months. Since Physical fitness testing was part of mandatory curricula for all physical activity classes, informed consent forms were not collected. For persuasion, the protocol was approved by clinic employees and the research committee of Nekemte College of Teachers Education.

3.3. Instruments of Data Collection

There are probably hundreds of standard fitness tests used and hundreds of variations of these. They can range from elaborate and expensive laboratory tests to simple and inexpensive field tests. Each test also has many advantages and disadvantages that can ultimately determine which is the most appropriate test to perform. Furthermore, physical fitness measurement tools have been utilized in three different arenas: the laboratory setting, epidemiological studies and individual assessment. Tests in these areas measure the components of physical fitness separately with different mechanisms or machines (Caspersen et al. 1985).

In the well-lit of this, individual assessment tests can realistically be used in the primary care setting to measure the attributes of physical fitness. The YMCA, fitness and Amateur Sport in Canada, and the American association of health, physical education, recreation and dance have developed physical fitness testing batteries that are reliable, valid, and have national norms. These batteries measure the components of physical fitness: body composition, aerobic capacity, muscular strength, endurance, flexibility and balance (Nieman, 1990).

Based on the nature of the study, different data collecting instruments were used to conduct the research. For this study, standardization test of physical fitness was involved in view of research criteria of availability, reliability and validity to confirm the consistency of data. To test physical fitness in this study 50 meter sprint run, zigzag run test (Ilino), bend & reach test and cooper's 12 minutes run/walk test were used. The selected components were speed, strength, endurance, agility and flexibility that were measured by different means and methods: speed by sprint run, agility is measured by zigzag run test; strength is measured by push up; flexibility is measured by bend and reach test and endurance is measure by cooper (12minutes run/ Harward step test(Manmeet Gill, Nishan Singh Deol and
The anthropometric assessment comprised measures of body weight, height, WC and tricipital and subscapular skin folds were applied in accordance with World Health Organization guidelines (1995). Anthropometric measurements were used to compare the body composition of the participant across two groups. With the context, though the RHR is influenced by several constitutional and environmental factors; the most important determinants are parasympathetic and sympathetic influences. Thus, quantifying RHR can give an index of the load imposed on the heart and the state of imbalance between sympathetic and parasympathetic activity (Rabbia F, Grosso T, Cat GG, Conterno A, De Vito B, Mulat-ero P, et al. 2002)

**Table 4: Anthropometric parameters of the participants**

<table>
<thead>
<tr>
<th>A.M. P</th>
<th>De pt.</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>t-v</th>
<th>p-v</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>PE</td>
<td>21</td>
<td>21.0</td>
<td>.97</td>
<td>.212</td>
<td>-.15</td>
<td>.7</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>4</td>
<td>21.0</td>
<td>1.0</td>
<td>.227</td>
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<td>2</td>
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<td>21.0</td>
<td>1.0</td>
<td>.227</td>
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<td>2</td>
</tr>
<tr>
<td>Heigh</td>
<td>PE</td>
<td>21</td>
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<td>.05</td>
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</tbody>
</table>

As shown in table 4, the existence of statistically significant differences between student anthropometric parameters in terms of department recorded as, age (M=21.04, SD =.973, and M =21.09, SD =1.04), height (M =1.72m, SD=.05, M=1.68m, SD =.09), weight (M = 56.09kg,SD = 4.89, M =57.47kg,SD =5.67), BMI (M =18.9%,SD =1.28 and M= 20.04%, SD =2.05 and Pulse rate (M=71.47 b.p.m, SD=12.25 and M=74.42 b.p.m and SD=11.58b.p.m) respectively. The calculated independent t-test was to determine mean and standard deviation of anthropometric parameters of the participants of the study. The intended independent t-test estimated (t=153-.844) and statistical significant of p-values is ranged as P=.155-.902. Hence, the calculated data using independent t-test revealed that there were no significant differences of anthropometric parameters between the two groups (‘t’ values is greater than p-values at significant level 0.05 or comparatively the same.).
Table 5: Mean and standard deviation of physical qualities of the participants

<table>
<thead>
<tr>
<th>Variables</th>
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<th>Non-P.E. dept.</th>
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</table>

*Values are expressed in terms of Mean+ SD.

Table 6. Comparative analysis of physical fitness

<table>
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<th>Variables</th>
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<th>N</th>
<th>M</th>
<th>S.D</th>
<th>S.E</th>
<th>“t” -</th>
<th>P-v</th>
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<td>.15</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<td>7</td>
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</tbody>
</table>

"t" values determines, P-values >, < or = 0.000-.338 at significant level of 0.05
differences existed between the two groups in performing endurance and agility. The significant result was observed amongst the two subjects in performing strength, speed and flexibility test that were exposed by means of computing independent “t” test. Either or significant differences might occur due to the contribution of physical fitness factors including heredity, living standard, nutrition, hygienic conditions, environmental and climate factors etc. (Sallis JF, Patrick K, 1994).

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Many research studies have been done on the usefulness of physical fitness. It was proved that fitness has a significant and healthy impact on the life style of individuals. The findings of the studies revealed statistically significant differences or not in the respect of all selected physical education and non-physical education department students. On the basis of the results obtained from the present practical investigation within limitations, the following conclusions were listed.

The results of the “P” value confirm that physical education male students were comparatively slightly better than non-physical education male students in performed endurance and on the opposite to the agility tests. Based on the results of independent t-test and the computed p-values, there were significant differences obtained on sit and reach test, agility and 50 meter dash when the tests carry out for three times within 21 days period. To these effects, anybody can simply conclude that physical fitness test performed by physical education department male students for one half year of their regular classes was not bringing changes on their physical fitnesses level compared with non-physical education students by means of the standardized test categories designated in table 1, 2, and 3.

5.2. Recommendations

The concept of physical fitness is the capacity to do prolong hard work and recover to same state of health in short duration of time (American Health Fitness Foundation, 1986). This is the result of the degree of strength, speed, endurance, agility and flexibility one possesses. These elements of physical fitness are useful for different games and sports depending on several factors such as heredity, hygienic living nutrition and body manners of an individual (Bouchard, C., and L. Pe’Russe, 1994).

The recommendations address a broad range of evidence to underscore concern that college students are still not active enough and physical inactivity remains student pressing health issue. Physical fitness incentives tend to discourage activity by reducing the energy needed for activities of daily living that economics pays more for sedentary than those actively participating in physical exercises.

Therefore, results found in this current study have yielded the following some crucial recommendations to improve physical fitness of college students.

1. An intervention program is recommended for physical education and non-physical education students focusing on re-skilling teachers on how to set-up a student physical fitness program.
2. In addition to scientific updates, the teachers should plan considered issues and advances in understanding the roles and strategies of physical fitness for health and sustainable life prior to current physical activity guidelines directed at school age level.
3. Oromia Educational Bureau should have a detente in collaboration with Ministry of Education and should consider the non-physical education students equality in the implementation of physical education, physical fitness and sport activities as common course having considerable grade so as to produce productive citizen.
4. Furthermore, it is recommended that the Oromia educational bureau should design supplemental physical education curricular activities which have significant effects on students’ physical fitness more coordinated with skill and health related physical fitness exercises at college level.
5. College leaders and teachers should adapt test items to their college, weighing such variables as available equipment, physical space, and availability of test administrators, as well as factors related to cost and students’ privacy in which it might be more feasible and manageable to conduct physical fitness.
6. Researchers should conduct similar studies to ensure that the intervention exercises are both specific and sufficient to improve fitness, and they should design studies that allow for analyzing the effect of complicating factors, such as nutrition, demographic variables, and maturity status of the learner.

ACKNOWLEDGEMENTS

Heavenly Father, I praise you with unending gratitude, for I am honored in your eyes and you have been my strength and source during the progression of this study. I would like to express my thanks to S/r Like Indalu (College health officer), M/r Waktole Sirata (MA) M/r Teshome Guteta (MA) and M/r Fischa Berhanu (PhD candidate) for they were assisting me throughout the period of physical fitness tests. Keeping an eye on, I also acknowledges all students involved in the field work employed as part of the study in great attention.

REFERENCES


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EFFECT OF SUPPORTIVE EDUCATIVE ON SELF-CARE BEHAVIORS IN CHRONIC OBSTRUCTIVE LUNG DISEASES PATIENTS

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**2nd Department of Pulmonology and Respiration Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya
***3rd Community Departement, Faculty of Nursing, Universitas Airlangga Surabaya

ABSTRACT

Self care management is an aid to control and reduce most of the symptoms and complications of respiratory damage and teach COPD patient to achieve an ability of daily activities. The purpose of this study is to analyze the influence of self-efficacy supportive educative models on self-care independence.

This research uses experimental pre-post test control group design. Sample size was 16 patients with COPD at Jombang General Hospital and General Hospital Dr. Wahidin Sudiro Husodo Mojokerto. Sampling technique is with simple random sampling. The variables of this research are: supportive educative, self care knowledge, and self care behavior. Data collection using questionnaire, data was analyzed using paired t-test and simple linear regression.

The results showed supportive educative effect on self-care independence. The result of paired t-test was there was significant difference in the intervention group of self-care knowledge, self care behavior. While in the control group there were no significant of self-care knowledge, self care behavior. The result of regression test of supportive educative is to have an effect on the variable of self care knowledge and self care behaviour.

Advice for COPD patients is to perform physical activity according to their ability, regularly to maintaining the lung function and adhere to the treatment. For nurses need to conduct routine activities of counseling and breathing exercises as well as discussing as a means of sharing experiences about self care.

Index Terms: COPD, supportive educative, self care

INTRODUCTION

Chronic obstructive pulmonary disease is one of the lung diseases that leads to several disorders that affect the movement of air flow in and out of the lungs (Black & Hawks, 2009). According to GOLD (2016) Chronic Obstructive Pulmonary Disease (COPD) is the leading cause of morbidity and mortality worldwide. COPD is a preventable and treatable disease characterized by the constant limitations of air flow that are usually progressive and associated with chronic inflammatory responses in the airways and lungs to particles or gases.

COPD disease is a global health problem that the number is increasing from year to year. By 2020 it is estimated that COPD will rank fifth among the 12 most common diseases in the world and the third cause of death in the world. The prevalence of COPD incidence in the world is around 3-11% (GOLD, 2015). The results of a chronic obstructive pulmonary disease epidemiology study revealed that from developing countries COPD was ranked the sixth cause of death (Murray et al., 1996 in Oemiati, 2013). In Indonesia, COPD is ranked fifth (5th) as the cause of death and is expected to be ranked third (3rd) by 2020 (Senior, 2008).

Peripheral muscle dysfunction is one of the major causes of systemic abnormalities in COPD leading to exercise intolerance thereby decreasing the quality of life of COPD patients (Couillard A et al., 2005). This decrease in systemic effect plays an important role in decreasing daily activity (Nici, 2012). Activity limitations can cause difficulties in performing tasks and routine works which create barriers to socialize in the community (O'shea SD et al., 2004).

Along with the increasing prevalence of COPD and the chronic nature of the disease, the focus on treat COPD shifted the emphasis from medication and extends life expectancy now begins to focus on improving the quality of life, one of which is the belief in the ability to behave healthy. Magfiret & Alberto (2006) mentioned that patients who have confidence will be more likely to perform abilities towards health behavior. Therefore, individuals with high self-efficacy will be able to manage the disease better. It is important for COPD patients to improve their effectiveness in determining self-care regiments, as this is necessary to determine whether or not to take an action. Self-effectiveness assessment bridges the knowledge and behavior of self-care and plays an important role in the initiation and maintenance of health behaviors, so it is believed that increased effi- ciency in health behavior will lead to improved health.

Education on COPD adjusting the limited activity and prevents the speed of disease from worsening. One education that can be given to COPD patients is self care. The ability of
COPD patients for self-care in this study refers to the Nursing Theory of self-care by Orem (1971), according to Dorothea Orem self care is the action that others have the ability to develop or developed the ability to be used properly to maintain optimal function (Orem in Tomey & Alligood, 2006). The ability of self care acquired through the experience of suffering from chronic illness will have an impact on lifestyle changes and will directly affect the patient quality of life (Smeltzer & Bare, 2010).

The study by Sharma MK et al. (2016) mentions that patients provided with health education by using the self-management module of Self Care PPOK management have good knowledge compared to patients who are not given PPOK management by Self Care interventions such as lung rehabilitation, activity and exercise, diet, quit smoking, infection control, personal hygiene and method to get a normal sleep. This is in line with research by Gullick J and Stainton Mc (2008) research on self-instruction modules have high effectiveness. Education and motivation are important when adjusting for the diagnosis of COPD.

METHODS

Quasi Experiment Pre-Post with Control Group Design is application of supportive educative model intervention to self-reliance of self-care that emphasizes self-care knowledge, self-care behaviour of COPD patients. In this study, the experimental group was given intervention of supportive educative model while the control group received only regular or routine care by nurses and doctors at the clinic.

RESULT

Table 1. Value Distribution of Self-Reliance Components to Self-Care: Self-Care Knowledge

<table>
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<td></td>
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<tr>
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Table 2. Value Distribution of Self-Reliance Components to Self-Care: Self Care Behavior

<table>
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</table>

The experimental group used the supportive educative model, that is by the way: do teaching (Teaching), give guidance (Guidance) and the provision of a learning environment (providing environment) related to quitting smoking, physical exercise, breathing exercises, COPD patient nutrition and treatment. The supportive educative model consists of knowledge about COPD (definition, risk factors, signs of symptoms, management), Lung rehabilitation (Breathing exercises, effective cough and physical exercise) and self-care in (stop smoking, COPD nutrition, save energy)

The required sample size was 32, each group of control and intervention was 16 people. The study was conducted in two different hospitals. The study was conducted from 8 February to 17 March 2017

RESEARCH INSTRUMENT

(a) The self-care knowledge questionnaire used in this study has been modified from COPD self-care knowledge previously developed by Walth et al. (1991) which has been tested for the validity and reliability of r=0,707 and Cronbach's alpha 0.978.

(b) The self care behavior questionnaire used has been modified from the previous questionnaire developed by Alberto (1991) which has been tested by the validity and reliability of r = 0,707 and Cronbach's alpha 0.978
Table 1. Self Care Knowledge of intervention group in pre test has a mean value of self care knowledge of 15.00 (SD 1.549) post test result increased to 18.13 (SD 1.310). In the control group the mean value of pre test of 15.44 (SD 2.159) post test increased to 15.56 (SD 1.861). The results of self-care knowledge regression test showed an effect of supportive educative to self-care knowledge of patients with COPD (p = 0.000).

Table 2. The intervention group had a mean pre test of self-care behavior of 30.94 (SD 1.611) and increased to 34.19 (SD 2.136). The control group had a mean pre test of 31.31 (SD 1.922) and the post test increased to 31.56 (SD 1.861). The results of self care behavior regression test showed an effect (p=0.001) of supportive educative to self care behavior of patients with COPD.

Table 3. Regression Results of Supportive Educative Value on Self-Reliance Self-care

<table>
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<tr>
<th>Variabel</th>
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<td>32.88</td>
<td>2.379</td>
<td>2.625</td>
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</table>

Table 3. Results showed that supportive educative had significant effect on self care knowledge (p = 0.000), self care behavior (p = 0.001). The coefficient value indicates that supportive educative intervention has the greatest effect on self care knowledge, secondly effect on self care behavior.

DISCUSSION

1. Supportive Educative on Self Care Knowledge
   Self-care knowledge before the intervention (pre test) obtained the lowest value on the nutrition patterns aspect, while the pre-test in the control group which shows the lowest value was breathing exercises aspect. This is in line with Notoatmodjo’s statement (2010) Knowledge is something that is known by a person by any way and something that other people know from the experience gained.

   The value result of the nutritional pattern aspect on post test of the intervention group has increased. Giving supportive educative on self care knowledge variables have great impact on knowledge about nutrition patterns aspects. The results of this study are in accordance with research conducted by Sharma MK et al. (2016) mentions that self-instructional modules can improve the knowledge of COPD patients by a difference of 59.3% in the intervention group. Other studies were conducted by Efraimsson et al. (2008) also mention the same things that education on self-care can improve knowledge, quit smoking and quality of life of COPD patients.

   The regression analysis result of supportive educative model influencing the knowledge of self care can increase the knowledge of COPD patient especially on nutrition pattern aspect about the energy used by patient with COPD will be more than normal person. So, the patient must be able to fulfill the nutritional needs in a balanced manner with the calories needed. This is in line with Sari & Oesman's research (2015) which states that patient education is effective in improving management of chronic disease drug use, especially COPD and asthma. Sharma MK et al. (2016) which states that self instructional modules with structured teaching programs can improve the knowledge of COPD patients. Education in COPD patients will help prevent disease progression to worsening. Teaching and guiding methods on educative supportive programs that provide teaching and discussion facilities for patients to solve problems that occur in patients by providing solutions that are more reliable and can be done by patients. Problem solving using guiding method with self-care self-reliance module especially on how to make patient able to improve eating habit are more effecting on nutrition pattern aspect.

2. Supportive Educative on Self Care Behavior
   The results of pre-care self-care behavior in the intervention group showed the lowest score on aspect of breathing exercises, especially on the patient's participation component in respiratory exercise activity during the last 1 month. While in the control group the lowest value also on aspects of breathing exercises that occur in three components of respiratory exercise, participation in breathing exercises and the use of abdominal muscles when breathing. This is in line with Lerner & Steinberg's (2009) study, adding that independence is an individual's ability to behave individually and is part of achieving autonomy or self-responsibility that includes aspects of emotional independence, self-reliance aspects and value independence aspects. The mean value of post test of self care behavior of intervention group respondents increased, respondents began to increase intensity of
respiratory exercise every morning on a regular basis after knowing the benefits of such lethargy. The result of control group post test showed no significant difference with pre test result. Although there is an increase in value on the aspect of breathing exercises due to family motivation to exercise. This is in line with Magfiret & Alberto (2007) also mentions a positive relationship between family support with self-care behavior in Turkey. The result of regression analysis supportive educative able to influence self care behavior in COPD patient. This is in line with Gasquez (2012) that the results of logistic regression analysis states, a positive relationship between education with self care behavior score.

RESTRICTIONS
This study was conducted in 2 (two) different hospitals so that it can not control the therapy given which may influence the research result.

CONCLUSION
1) Supportive educative able to improve self-care knowledge of COPD patients, especially on knowledge about nutrition pattern
2) Supportive educative able to improve self-care behavior of patients with COPD, especially on breathing exercises

SUGGESTION
Patients with COPD need to increase their motivation in performing physical activity according to their ability regularly and evenly in order to increase self care ability which can be realized by physical exercise and self-breathing exercise and still adheres to medical therapy. For nurses the need to conduct counseling and breathing exercises routinely at least 2 times a week in accordance with the examination schedule for COPD patients as well as providing time to discuss as a means and ways for sharing experiences on self care to improve self care ability in order not to fall unto worse condition.

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FACTORS AFFECTING VOLUNTARY COMPLIANCE OF CATEGORY ‘C’ TAXPAYERS’ ATTITUDE OF ARBA MINCH, SNNPR, ETHIOPIA

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Abstract: This study aimed to assess taxpayers’ attitude on factors that affect voluntary compliance of category ‘C’ taxpayers’ in Arba Minch City, SNNPR, Ethiopia. The factors like equity and fairness of the tax system, level of awareness of taxpayers, effectiveness and efficiency of tax authority, socio-cultural factors and political factors. To achieve this objective of the study primary source of data was employed via self-administered questionnaires which include both open and close ended questions from the sampled category ‘C’ taxpayers. The study found lack of awareness as major and leading reason for non-existence of voluntary compliance among category ‘C’ taxpayers. Further, efficiency and effectiveness of the authority in improving the tax assessment and collection procedures, creating awareness, enforcing the tax law positively affect voluntary tax compliance of taxpayers. Socio-cultural factors also affect attitude of taxpayers towards taxation positively as well as negatively. However, political related factors were found insignificant in this survey.

Key Words: Factors, Voluntary Compliance, Category ‘C’ Taxpayers’, Arba Minch

1. Introduction
The exact meaning of tax compliance has been defined in various ways. Alm (1999) and Jackson and Milliron (2001) defined tax compliance as the reporting of all incomes and payment of all taxes by fulfilling the provisions of laws, regulations and court judgments. Another definition of tax compliance is a person’s act of filing their tax returns, declaring all taxable income accurately, and disbursing all payable taxes within the stipulated period without having to wait for follow-up actions from the authority (Singh, 2003). Furthermore, tax compliance has also been segregated into two perspectives, namely compliance in terms of administration and compliance in terms of completing (accuracy) the tax returns (Harris, 2006).

The taxpayers’ attitude on compliance may be influenced by many factors, which eventually influence taxpayer’s behavior. Those factors which influence tax compliance and/or non-compliance behavior are differing from one country to another and also from one individual to another (Kirchler, 2007). They include taxpayers perceptions of the tax system and Revenue Authority, peer attitude / subjective norms; taxpayers’ understanding of the tax system / tax laws, motivation such as rewards and punishment such as penalties, cost of
compliance, enforcement efforts such as audit; probability of, detection; difference across - culture; perceived behavioral control , ethics / morality of the taxpayer and tax collector; equity of the tax systems; demographic factors such as sex, age, education and size of income (Murphy, 2004) and use of informants.

Tax compliance leads to increases in income and decreases in tax rates. Compliance is also greater when the individuals perceive some benefits from a public good funded by the tax payments while changes in fine rates appear to have little effect on tax compliance behavior (Murphy, 2004). It therefore appears that there are additional tax policy instruments beyond the standard prescription of enforcement actions that government can enact to achieve its desired degree of compliance with the tax laws. In fact, some of these standard instruments - greater penalties - may be largely ineffective in increasing tax compliance. In short, government should pursue a range of approaches in its efforts to promote compliance. Thus, the payment of fines and penalties appear for overdue taxes. These arises the need to allow audit by tax collectors if deemed necessary, especially if they suspect that there is some kind of some tax non-compliance.A key component of any tax system is the manner in which it is administered. “No tax is better than its administration, so tax administration matters a lot and an essential objective of tax administration is to ensure the maximum possible compliance by taxpayers of all types with their taxation obligations. Unfortunately, in many developing countries, tax administration is “usually weak and characterized by extensive evasion, corruption and coercion & non-compliance. In many cases overall tax levels are low, and large sectors of the informal economy escape the tax net entirely.

Ethiopia, like any other developing countries, faces difficulty in raising revenue to the level required for the promotion of economic growth. Hence, the country has been experienced a consistent surplus of expenditure over revenue for sufficiently long period of time. To address this problem, the government categorized tax payers into three categories & introduced imposition of tax (direct and indirect), among others; as major and important sources of public revenue. However, this categorization & imposition of tax couldn’t still bring the required result due to a number of reasons such as lack of clear understanding about the tax system by the taxpayers, taxpayers don’t comply with their tax obligation, hostility between the taxpayers and tax officials, negative attitude of taxpayer towards the tax system, that is, understating their taxable income by significant amount,... etc. For these reasons, the actual amount of tax couldn’t be collected properly (Tadele, 2010).

Despite the fact that people need to pay taxes based on rationales of vertical and horizontal equities, it is not always the case that tax systems are comprehensible and transparent for category ‘C’ tax payers especially for those who are less literate individuals. Tax systems are usually not elaborated properly with the society. Consequently, these taxpayers complain that the tax assessment method is based on subjective estimation as a result of which they are frequently subjected to over-taxation. The extent of the impact of attitudes and attitudinal change on voluntary tax compliance behavior was not well understood. Hence the study aimed to answer the following basic research questions at the end:-

- What are factors influence the attitude of category ‘C’ tax payers and their level of voluntary compliance with the tax system in Arba Minch city?
- What are problems related to the overall taxation system, tax assessment, collection and service delivery of tax authorities?
- What activities were implemented to create voluntarily compliant taxpayer & to narrow the gaps and work for the better of the business community and the government by the revenue authority?

2. Taxation in Ethiopia
The history of taxation in Ethiopia has a relationship with the government structures of the country; there exist hardly any reliable documentary evidences to justify the relation of emergence of government and taxation, when exactly taxation was introduced. Different stories and evidences point out that Emperor Zeria-Yakob started taxation in Ethiopia during the 15th century. Governments which came to power in Ethiopia at different periods have frequently revised and repealed the statutory bases for various types of taxes providing for tax
bases and tax rates, time and mode payment, exemptions and offenses. However, there has been no document or materials produced which compiles tax proclamations issued at different periods. The initial statutory bases for all the tax proclamations was the 1931 Constitution of Ethiopia which later revised and become Revised Constitution of Ethiopia. Because most of the products on which tax was levied (tax bases) were agricultural products, the type of taxation in traditional periods was unstructured and mostly in kind. Taxation in that period was varying highly from area to area and was often arbitrary, i.e. the amount to pay and the mode of payment depends on the will of the chief tax collector and the kind of resources available in the area (Lemessa, 2005).

According to the Constitution of Federal Democratic Republic of Ethiopia, revenue sources are assigned between Federal government and Regional states. Regional states can endorse their income tax proclamation and regulations based on the constitution in conformity with the federal income tax proclamation. According to the current federal income tax proclamation no.286/2002 taxpayers are categorized into three categories, namely category “A”, “B”, and “C” based on their volume of sales and form of business.

Category “A” includes any company incorporated under the tax law of Ethiopia or in or a foreign country and other entities having annual turnover of Birr 500,000 and more. Those who are categorized under “A” have to maintain all records and accounts which will enable them to submit a balance sheet and profit and loss account disclosing the gross profit, general and administrative expenses, depreciation, and provisions and reserves together with supporting vouchers (Council of Ministers Regulation no. 78/2002: Article 18, Sub Article 2).

Category ‘B’ includes those enterprises having annual turnover of more than Birr 100,000 and less than Birr 500,000. This category of taxpayers must submit profit and loss statement at the end of the year. The law requires all entries in the records and accounts to be supported by appropriate vouchers (Council of Ministers Regulation no. 78/2002: Article 18, Sub Article 2).

Category ‘C’ unless already classified in categories ‘A’ and ‘B’ include those taxpayers whose annual turnover is estimated by the Tax Authority at Birr 100,000 or less. On the other hand, standard assessment is used to determine the income tax liability of Category ‘C’ taxpayers. This type of assessment is a fixed amount of tax determined in accordance with the Council of Ministers Regulation established Schedules. This category of taxpayers is the most problematic category of taxpayers and it is considered as hard to tax group. This is due to the fact that these taxpayers pay taxes at fixed rate on the income estimated by tax administration.

3. Literature review

In this literature review basic concepts about voluntary tax compliance, characteristics of good tax system, factors determining tax compliance such as attitude of tax payers, socio-cultural, political legal, administrative and ethical issues were addressed.

The problem of voluntary tax compliance is as old as taxes themselves. Characterizing and explaining the observed patterns of tax non-compliance, and ultimately finding ways to reduce it, are of obvious importance to nations around the world (Andreoni et al, 1998). The attitudes of the taxpayers (Bhatia, 2001) in this regard are influenced by a host of other factors like the political situation, natural calamities, economic situations, socio cultural and so on. Due and Friedlaender (1999) also state that a person’s preference for a tax may be influenced if the tax- or an increase in it- is tied directly to the expenditures he strongly favors. Generally, attitudes toward choice of taxes and tax structures are greatly influenced by various criteria- often called principles- of taxation that have come to be widely accepted.

As stated in (James, 2000) a good tax system is one which is designed on the basis of an appropriate set of principles, such as equality or fairness and certainty. Since fairness of a tax system is a corner stone for the tax system.Brooks (2001) also states that fairness has always been widely regarded as the most important criteria in
judging a tax system. The problem of unfairness is that a tax system allows taxes to be shifted from dishonest to honest taxpayers. According to Bhatia (2001), the attitude of taxpayers is an important variable determining the contents of a good tax system. It may be assumed that each taxpayer would like to be exempted from paying tax, while he would not mind if others bear that burden. In any case, he would want his share to be within the general level of tax burden being borne by others. If this is not so, he will feel exploited. To sum, regardless of this inherent problem ensuring the fairness or equity of a tax system is second to nothing. To put it differently, it is essential that a good tax system should appear equitable to the tax payers.

Organizational Strength of tax authorities is indicated by many scholars. According to Bird and Oldman (2003), no tax will work effectively, unless its administrators maintain an aggressive attitude with respect to the correctness of the taxpayers' actions. Some taxpayers will fail to file or make mistakes through ignorance or neglect; others will deliberately cheat. A passive attitude by the authorities towards these errors and falsifications will soon undermine the entire structure, since the diligent and honest taxpayers will almost in self-defense be forced to the level of the careless and dishonest. A tax administration which seeks voluntary compliance must protect those who comply or else compliance will not be forthcoming. Bird and Oldman (2003) further state that the sure sign of ineffective tax administration is the presence of a very large delinquency in tax payments for it indicates the lack of taxpayer respect for the tax system. The taxpayer in effect is acting on his belief that the administrative machinery may bark, but that it has no bite. These writers argue that in large part the solution for the large delinquency lies in providing the bite. In this sense effective tax collection is a facet of the larger problem of providing adequate penalties, to which reference will later made. In other words tax is evaded to the extent that tax authorities are perceived as weak by taxpayers. Lemessa (2005) states that tax systems that depend on ad hoc administrative procedures rapidly become discredited and endanger voluntary compliance.

James (2000) argues that the norm is usually to comply rather than not to comply. As already pointed out for a tax system to be effective the majority of the taxpayers have to comply. It follows that there may be greater gains in assisting basically compliant taxpayers to meet their fiscal obligations than in spending more resources in pursuing the minority of non-compliers. Many taxpayers might be willing to comply in full, but are unable to do so because they are not aware of, or do not understand, their full obligations. Even if such tax payers understand their obligations, they may not know how to meet them or may be unable to do so for other reasons. On other side, other writers such as Smith and Kinsey (1987) argue that tax noncompliance is an intentional behavior. In countries like Ethiopia where most of the business community have no access to information, lack of awareness cannot simply be overlooked rather it can be assumed as a major determinant of tax compliance behavior.

According to Fjeldstad and Ranker (2003), increased efficiency of the tax administration, however, is not enough. Many observers conclude that a lack of paying tax ‘culture’ is the largest obstacle to building a firm long-term revenue base. The opposite may, however, also be the case: as long as the tax administration culture is perceived to be influenced by sectarianism, nepotism, and corruption, it is unlikely to contribute to the fostering of a more conducive paying tax culture. It is pointed out by Adams (2003) that the success of income tax rests primarily upon the honesty of taxpayers. Adams further states that one of the factors that contribute to the dishonesty of the taxpayers is the complexity of the tax system, as it may lead to administrative failures. This can be viewed as it has relation with the tax culture of the society. Practically it is difficult to obtain genuine information from taxpayers regarding their income. Hence, tax gap is created to the extent the taxpayers hide information regarding their business activity. Lack of ability to pay, this issue holds true in Ethiopia also where several small business operators (category ‘c’ taxpayers) are accumulating their annual tax obligations due to lack of ability to pay. Generally when taxpayers have no enough disposable income and they used to consume the return from sales, it is clear that tax evasion is inevitable and leads to tax arrears (Lemessa, 2005)
Social factors, the issue of (non-) compliance is not only a question of state-society relationships but also a question of relationship between citizens and/ or groups of citizens within local communities. There is an existing social bond between the society and this bond influences the members of the society in complying with the tax law. That is taxpayers may be influenced by their peer groups to voluntarily comply or not to comply with the tax law. As cited by Slemrod (2000), the dimension of trust that seems to affect compliance is trust in other citizens to pay their share of service charges. In particular, trust in other citizens to pay their share seems to be important. The larger the fraction of the local population that is observed not paying, the lower perceived risk of being prosecuted. This has impacts on the individual taxpayer’s perception of the credibility and trustworthiness of the revenue administration.

Attitudes towards the government (Levi, 2005) may affect the taxpayer’s normative commitment to comply with law. Similarly, Due and Friedlaender (1999), also argue that, attitudes toward the general level of taxation and tax increases are dependent, of course, on attitudes about the desirability of governmental programs and on attitudes toward the government itself. On the other hand, citizens’ willingness to pay taxes voluntarily rests on the local government’s capacity to provide services and its demonstrated readiness to secure the compliance of the otherwise non-compliant.

Empirical literatures related tax compliance factors in Ethiopia also show similar results. For instance, Yohannes Mengesha and Zerihun Ashebir (2013), study conducted on identifying the gaps and problems that exist between the Dire Dawa business community and the tax authority results show that most of the taxpayers, especially those in the category ‘C’, do not exactly know how the tax is assessed or calculated and the procedures in the tax assessment and computations are not objectively understood by most of the taxpayers. The finding also reveal, over taxation as result of over estimation of daily/annual income, Nontransparent, non-participatory standard assessment by the authority on category “C taxpayers”, Lack of fairness or equity of taxation among similar businesses of category “C taxpayers” Poor tax laws enforcement especially for VAT and large number of tax defaulters, Poor communication and understanding between the tax authority and taxpayers, Weakness in tax collection and unsatisfactory service delivery of tax authority.

Study conducted by Suresh Vadde and Srinivas Gundarapu (2010), on major factors that influence attitudes of rental taxpayers and their compliance behavior with tax system in mekele city administration. The study indicated that there were some dishonest rental tax payers. Even there are some individually who entirely don’t report their taxable income to the concerned body. In addition to the above, the study also disclosed that with the exception of minority of the rental tax payers who hold certificate and diploma, majority of them were with an educational background of elementary and high school completed. Hence, it can be concluded that rental tax payers lack knowledge of easily understanding the laws and regulations of the tax system and how their taxable income is computed. Therefore, it can be concluded that still many respondents are not attending or participating in the tax training session.

Wollela A Yesegat and Helge Fjeldstad, (2011) jointly conduct study on tax payers views of business taxation in Ethiopia. The objectives of their study were to assess business peoples’ views of paying taxes in Ethiopia and to identify (perceived) difficulties with the tax system and priorities for tax reform. Hence the result shows that the main reasons for tax noncompliance were; lack of predictability in the tax system forces taxpayers to reduce their current tax liability, difficult to compete with businesses that import goods at manipulated custom duties, It is those who are not paying taxes that are quickly growing, so why should I comply, discrimination by the tax administration forces honest taxpayers to evade taxes. Nuguss et’ al (2014) conduct study on the consequences of tax assessment on tax collection of category ‘c’ taxpayers in Ethiopia: a case study in Mekelle city, Tigray. The study result shows that unless good service delivery is provided, tax related laws are enforced and implemented, effective awareness creation is done and fair tax assessment is conducted, there may not be efficient and effective tax collection. Even though efficient tax assessment and collection cannot be made overnight, it is up to tax administrators to ensure sufficient tax revenue. Multiple approaches are needed to enhance tax collection efficiency. No single approach is likely to fully and effectively address the tax collection
efficiency of category ‘C’. Since it has multiple causes of tax related problems, the category “C” tax payers needs more attention.

4. Research Methodology

Research Design
The research design selected for this study was descriptive research design. Descriptive studies are non-experimental researches that describe the characteristics of a particular individual, or of a group. It deals with the relationship between variables and development of generalizations and use of theories that have universal validity. It also involves events that have already taken place and may be related to present conditions (Kothari, 2004)

Target Population
The target population was category ‘C’ tax payers(are those tax payers whose annual turnover is up to or less than100,000ETB & standard assessment method shall be used to determine their income tax liability)according to income tax regulation number 78/2002. According to the Arba Minch City Tax revenue office report during the last June 2008 E.C the total number of category ‘C’ tax payers in four sub cities were Sikella (1,325), Secha (635), Abaya (610), & those of Nech-sar (734) amounting a total population of 3,304. Hence the total population of the study will be 3,304.

Sampling Technique & Sample Size
The sampling technique might have its own draw back while inferring the findings based on the sample data to the whole population. To minimize this error appropriate sample size will be taken and greater effort and caution was also undertaken to make the samples as representative as possible. The population of the study was category 'C' tax payers of the city due to the fact that these tax payers are not required by law to declare their income or keep books of account, and considered as hard-to tax group. Four city Kebeles will be selected out of eleven based on the density of these taxpayers. That is, these Kebele’s are densely populated business areas so that they can represent the remaining; this follows the concept of purposive sampling. Then proportional numbers of samples (tax payers) were allocated and which can be considered as strata and samples will be randomly drawn from each Kebele’s/ strata’s. To select the required sample size, Michael Savin (1960) model were adopted.

Table 1.1: The distribution of taxpayers in sample Kebeles'(Mandals)

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Name, Kebeles</th>
<th>Population</th>
<th>Sample Size</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Menehariya</td>
<td>356</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>Difana</td>
<td>678</td>
<td>34</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>Mehal ketema</td>
<td>263</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Wuha Minch</td>
<td>328</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1,625</td>
<td>81</td>
<td>100</td>
</tr>
</tbody>
</table>

Source:- Primary Data

Data Source and Method of Data Collection
This study was used primary source of data to get pertinent information. The required data was collected via self-administered questionnaires which include both open and close ended questions from the sampled category ‘C’ taxpayers. For collecting the data suitable technique was used depending up on the nature of data. The primary data was collected from 81 category ‘C’ tax payers by using closed and open-ended self-administered questioner. Using questionnaire as data collecting tool is, due to its ability to generate relevant information as compared to others data collecting instruments which enhances the problem solving ability of the study (Greener, 2008).

Method of Analysis and Interpretation
Data analysis is very important aspect of this paper, as it basically involves the analysis of all the data that were collected. The data collected needs to be analyzed so that can be easily deducing in order to provide the justification for the work will be done during research. Data analysis is a body of methods that help to describe facts, detect patterns, develop explanations and test hypothesis. Having the goal of this study in mind, the raw
data are processed by tabulating and classifying each response provided by respondent. The data were analyzed, presented and interpreted using descriptive statistics method with table and percentage.

5. Survey Result and Analysis
This section contains survey result and analysis on the data collected from the respondents of the study. The survey covered 81 sample taxpayers from 1,625 category ‘C’ target taxpayers. The sample constitutes around 5% of the target population. Questionnaires were distributed to these 81 taxpayers and only 68 taxpayers responded. This shows approximately 84% response rate.

Distribution of business sectors
The Income Tax Regulation No. 78/2002 categorize business sector in Ethiopia in 69 different business sector, for the purpose of this study only the major ones were surveyed and their distribution is presented in the table 1.2.

Table 1.2: Distribution of business sectors included in the sample

<table>
<thead>
<tr>
<th>S.N</th>
<th>Business Sector</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Retail shops</td>
<td>20</td>
<td>29.41</td>
</tr>
<tr>
<td>2</td>
<td>Fabrics &amp; Threads</td>
<td>3</td>
<td>4.41</td>
</tr>
<tr>
<td>3</td>
<td>Hotel</td>
<td>4</td>
<td>5.88</td>
</tr>
<tr>
<td>4</td>
<td>Electronics</td>
<td>2</td>
<td>2.94</td>
</tr>
<tr>
<td>5</td>
<td>Spare parts</td>
<td>1</td>
<td>1.47</td>
</tr>
<tr>
<td>6</td>
<td>Tailoring</td>
<td>4</td>
<td>5.88</td>
</tr>
<tr>
<td>9</td>
<td>Construction material</td>
<td>2</td>
<td>2.94</td>
</tr>
<tr>
<td>11</td>
<td>Cereal &amp; Pulses Trade</td>
<td>4</td>
<td>5.88</td>
</tr>
<tr>
<td>12</td>
<td>Shoe trade</td>
<td>12</td>
<td>17.65</td>
</tr>
<tr>
<td>13</td>
<td>Barber&amp; beauty salon</td>
<td>6</td>
<td>8.82</td>
</tr>
<tr>
<td>14</td>
<td>Household utensils</td>
<td>3</td>
<td>4.41</td>
</tr>
<tr>
<td>15</td>
<td>Music&amp; video shop</td>
<td>7</td>
<td>10.29</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>68</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source:- Primary Data

Factors that affect attitudes of tax payer’s voluntary compliance
1. Taxpayers’ knowledge: Why tax is paid to states?
The influence of tax knowledge on compliance behaviour has been described in various researches. The level of education received by taxpayers is an important factor that contributes to the understanding about taxation especially regarding the laws and regulations of taxation (Eriksen and Fallan, 1996). Previous studies have evidenced that tax knowledge has a very close relationship with taxpayers’ ability to understand the laws and regulations of taxation, and their ability to comply (Singh and Bhupalan, 2001).
The following table 1.3 shows the response of the respondents regarding their reason of paying taxes.

Table 1.3: Why taxpayers pay taxes

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To avoid disturbances</td>
<td>21</td>
<td>30.9</td>
</tr>
<tr>
<td>2</td>
<td>In the anticipation of public services</td>
<td>4</td>
<td>5.9</td>
</tr>
<tr>
<td>3</td>
<td>There is no opportunity to evade</td>
<td>43</td>
<td>63.3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>68</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source:- Primary Data
The above table reveals the result of tax payers’ response on why they pay taxes, majority (63.3%) of the respondents responded that they pay taxes because it is an obligation to the government or state, whereas, 30.9% responded in the expectation of public services from the government. This indicates there is a positive understanding as to why people pay taxes and if successive works are done probably better results can be registered. On the other hand, some of them (5.9%) said that they have no opportunity to evade. Particularly with respect to the response of the other 5.9% who said there is no opportunity to evade indicates the intention not to pay if they have the opportunity to do so or their compliance behavior is questionable.

Table 1.4: The tax evasion with respect to other crimes

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kidnapping</td>
<td>4</td>
<td>5.9</td>
</tr>
<tr>
<td>2</td>
<td>Drunken driving</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Tax evasion/fraud</td>
<td>28</td>
<td>41.2</td>
</tr>
<tr>
<td>4</td>
<td>Stealing someone’s phone</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>5</td>
<td>Bribery</td>
<td>33</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

Source:- Primary Data

Research respondents were also request to compare tax evasion in relation to other crimes. Taxpayers understand that tax evasion is a crime and as it can be observed from table 1.5, 48.6% of the respondents ranked bribery as the most serious crime and 41.2% of the respondents said tax evasion is a serious crime while the remaining respondents chosen stealing, kidnapping, and drunken driving. From this response we can understand that taxpayers perceive tax evasion as a crime, even though it is ranked second, and this indicates that there is an attention towards taxation. But the problem here is the existence of poor compliance even though tax evasion is considered as crime by the taxpayers. Perceiving tax evasion as crime is a normal and desired behavior that has to prevail in the society to build a positive attitude towards taxation and to discourage the problem of non-compliance.

2. Tax equity or fairness

One of the main principles of the taxation system design is equity or fairness, which can be perceived via three dimensional views – horizontal equity (people with the same income or wealth brackets should pay the same amount of taxes), vertical equity (taxes paid increase with the amount of the tax base) and Exchange Equity (Wallschultzky 1984 and Richardson, 2006). The perceived fairness of the tax system also has an influence on the inclination towards tax evasion (Jackson and Milliron, 1986; Richardson, 2008). When people asked whether the tax they are paying is based on their ability-to pay or not, 76.5% of them responded that the tax is not fair and not based on their ability-to pay, which was measured by overstatement or understatement of tax liability.

Table 1.5: Fairness of tax

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is your tax liability overstated or</td>
<td>overstated</td>
<td>52</td>
<td>76.5</td>
</tr>
<tr>
<td></td>
<td>underated?</td>
<td>understated</td>
<td>16</td>
<td>23.53</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

Source:- Primary Data

According to table 1.5, respondents were responded on the fairness if tax they paid. From all respondents, 23.53% said that the tax they paid is fair and equitable or even understated whereas the majority (76.5%) of those who said the tax they pay is not fair responded that it is overstated. On other question in support of this issue, the respondents were asked to rank the major problems in the tax system and they responded accordingly the majority of the respondents felt that the tax rates (tax bracket) are high, and tax revenues are not spent on public services, and also said taxpayers are not willing to pay. From this response it is clear that the tax rate is
not based on the ability-to-pay principle or it is perceived to be unfair by taxpayers. This can be either really true or human beings are benefit maximizes so that it may be difficult to please taxpayers. Even though the principle says the tax should be based on the ability-to-pay, the problem here is in determining this ‘ability’ for each taxpayer. Actually the tax rate may not be as such high but the communication gap between the tax authority and taxpayers might have created this perception and it continues to be the issue as far as the understanding of the taxpayers regarding tax rates, assessment, and calculation are low. Significant number of respondents also responded the reason for tax paid is not fair. The first reason is tax revenues collected are not spent on public services. Theoretically tax revenue is used to finance services provided by the government. This might be practically true, but the public must be made aware of these social services which are being financed by the taxpayers’ money. As long there is a gap in communicating these facts to the public the above attitude problem will not be changed.

3. Organizational effectiveness of the tax authority

The respondents evaluated the Tax Authority with respect to certain parameters. The following table shows their response to these questions in percentages.

<table>
<thead>
<tr>
<th>S. N</th>
<th>Item</th>
<th>Excellent (%)</th>
<th>Good (%)</th>
<th>Fair (%)</th>
<th>Poor (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Service delivery</td>
<td>15</td>
<td>25</td>
<td>38</td>
<td>22</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Tax collection efficiency</td>
<td>9</td>
<td>26</td>
<td>35</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Law enforcement</td>
<td>12</td>
<td>17</td>
<td>43</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Awareness creation</td>
<td>6</td>
<td>14</td>
<td>23</td>
<td>57</td>
<td>100</td>
</tr>
</tbody>
</table>

Source:- Primary Data

Table 1.6 above reveals that the majority of the respondents rated the tax authority from excellent to fair except for awareness creation where 57% of them said poor. In all the parameters most of the respondents rated the authority’s effort as fair and below that. This clearly shows the tax authority is not effective and not providing satisfying service for taxpayers. On the other hand, the effort of the authority in creating awareness was rated poor (57%). This can be quoted as the root cause for all the problems as far as voluntary compliance is concerned.

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Who is responsible for poor tax compliance?</td>
<td>Tax Authority</td>
<td>56</td>
<td>82.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>City administration</td>
<td>9</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tax payers</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

Source:- Primary Data

For the response on question requested in table 1.7, 82.4% of the respondents said that the tax authority and 13.3% the city administration are responsible for poor tax compliance and only 4.5% of the respondents said taxpayers are responsible. This can be directly related to the authority’s strength and effectiveness in providing services, information, and creating awareness. The respondents additionally claimed that both the tax authority and the city administration didn’t play their role in improving the tax administration procedures, creating awareness, providing social services, and other information regarding taxes. Hence the poor effort of both the tax authority and the city administration is believed as the major factor that has contributed to the underlying problem and so that both are responsible for poor tax compliance. On the other hand, even though the above comment given by the respondents cannot be undermined, the fact that people always externalize certain problems and make others responsible for the problem, might be taken into consideration while analyzing this response.
4. Taxpayers’ attitude
Attitude of taxpayers toward taxation and its administration is the other key factor that has to be considered and analyzed duly. Accordingly, the respondents were asked for various questions to measure their attitude and their response is summarized in the following Table 1.8

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>Do you have trust in the employees of Tax Authority?</td>
<td>50</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Do you have trust in the tax system, assessment, and collection procedures?</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>If there is no penalty or legal enforcement, is there a possibility that you may not pay a tax?</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>Do you feel guilty if you are evading a tax, provided that you remain unnoticed?</td>
<td>61</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Have you paid your current tax obligation?</td>
<td>59</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General issues related to tax authority</th>
<th>Agree</th>
<th>Disagree</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>The tax law should be respected</td>
<td>61</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Paying tax is unfair</td>
<td>6</td>
<td>62</td>
</tr>
<tr>
<td>8</td>
<td>Taxpayers evade taxation if possible</td>
<td>26</td>
<td>42</td>
</tr>
<tr>
<td>9</td>
<td>The severity of sanctions and penalties ensure tax Compliance</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>Tax amnesty encourages noncompliance/ evasion</td>
<td>35</td>
<td>33</td>
</tr>
</tbody>
</table>

**Source:- Primary Data**

From the above table it is can be observed that majority (73%) of the respondents have trust in the employees of tax authority. But, only 42% of the respondents said that they have trust in the tax assessment, collection, and overall tax system while the remaining (58%) said they have no trust. From this we can conclude that the taxpayers have trust in the employees but not in the assessment and collection or other procedures. This shows the taxpayers do not know about the internal procedures of the tax authority i.e. how it assesses and collects taxes or sufficient information was not communicated to taxpayers. The fact that the authority’s procedures are obscure from the taxpayers, it is inevitable that loss of confidence on the authority and its procedures will be created in the taxpayers. In other words, the tax system might be considered so complex and time consuming that taxpayers felt they did not have enough knowledge to feel secure about the accuracy of their records and returns despite their best intentions.

The respondents were also asked whether absence of penalty or legal enforcement have impact on their compliance with the tax law accordingly, 57% of them said there is no possibility of not paying tax even though there is no legal enforcement. This response is consistent with the previous response on why taxpayers pay taxes and majority of them responded it is an obligation towards the government or state. In this regard, if this is the assumption by the taxpayers as to why they pay taxes, so it is normal to say taxes will be paid whether legal enforcement is present or absent. But this should not have to lead to the conclusion that legal backup is unnecessary or worthless. The remaining 47% responded there is a possibility of not paying tax if penalty or legal enforcement is not in place. Even if these respondents are not the majority to reverse the finding it has be considered cautiously that this figure (47%) by itself is significant amount and it shows there is a huge gap in voluntary compliance. From the same table, there is another question asked to know whether the respondents feel guilty when they fail to pay taxes provided that they remain unnoticed and accordingly they responded that
90% of them said they feel guilty whatever the case and this is an indication about the taxpayers’ attitude that they believe paying tax is a citizenry obligation which creates a sense of guilt in them when not accomplished.

Analysis continues on the same table and respondents were asked whether they agree or disagree with a number of statements that deal with general issues related to tax. The result shows that 90% of the respondents agreed that tax law should be respected. On the other hand, respondents are against the statement ‘taxpayers evade if possible’ (61%), and they also do not agree that severity of sanctions and penalties ensure tax compliance (59%). This should not be misinterpreted as if taxpayers do not want the presence of penalty or legal enforcement, but it simply means penalty or legal enforcement is not the only way out to ensure tax compliance. Regarding tax amnesty 52% of the respondents said that it does not encourage tax non-compliance or evasion. The remaining 48% said tax amnesty rather encourages tax non-compliance or evasion.

5. Awareness
James (2000) argues that the norm is usually to comply rather than not to comply. As already pointed out for a tax system to be effective the majority of the taxpayers have to comply. It follows that there may be greater gains in assisting basically compliant taxpayers to meet their fiscal obligations than in spending more resources in pursuing the minority of non-compliers. With respect to awareness table 1.9 below shows that 62% of the respondents have attended taxpayers’ education session, 38% said they don’t attended taxpayers’ education session. Similarly, a question was forwarded to know how the respondents estimate the size of taxpayers who are not paying tax voluntarily, 48% responded large number of taxpayers, 32% medium, 17% few and 3% said none. From this response it is easy to conclude the existence of sizable amount of individuals who have the capacity to pay tax but not paying. In other words, this shows there is high tax evasion or tax gap. The respondents were asked for possible reasons on the above problem and it is depicted lack of awareness, lack of ability to pay, negligence and poor and tiresome collection procedures as reasons for why people evade tax.

<table>
<thead>
<tr>
<th>S. N</th>
<th>Items</th>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you attend awareness creation training provided by tax authority?</td>
<td>Yes</td>
<td>42</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>26</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Estimate the size of taxpayers who are not paying tax voluntarily?</td>
<td>Large</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Few</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

Source:- Primary Data

6. Honesty
The respondents were also asked to know how far they are loyal to the tax system. Hence their responses were summarized in the table 1.10.

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How loyalty/ honesty of taxpayers to the tax system is evaluated by the taxpayers</td>
<td>Excellent</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>
According to the response of sampled taxpayers with respect to honesty to tax system, 7% rated the loyalty of the taxpayers is excellent, 36% good, 29% fair, and 28% of them said it is poor. Generally, this response indicates a more or less encouraging result. On the other side, the loyalty of the taxpayers is still under question even though the ratio does not take the major share.

7. Socio-cultural factors
Taxpayers’ compliance behavior can be affected by socio-cultural factors. Hence, the respondents were asked whether these factors really have an impact on tax compliance. Their responses were presented in the table below.

Table 1.11: Response on impact of socio-cultural factors

<table>
<thead>
<tr>
<th>S. No</th>
<th>Items</th>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the compliance of the other taxpayers encourage your own compliance behavior?</td>
<td>Yes</td>
<td>52</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Do you think that social and cultural factors have an impact on tax compliance behavior?</td>
<td>Yes</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>31</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

According to the table above, majority of the respondents (77%) responded that the compliance of other taxpayers encourage their compliance behavior. Similarly 55% of them also responded that social and cultural factors have an impact on tax compliance behavior. This justifies the existence of relationship between various ethnic, religious, and social backgrounds and the tax system of a country. Since there is strong social bond between members of the same group in society, tax compliance behavior of an individual can be affected either positively or negatively by other members of the group. If there are tax compliant and influential individuals in social group or society, there is a possibility that other members follow them and affected by these individuals. Similarly when the influential individuals are tax non-compliant and against the tax law, there is a higher tendency for the followers or members to be influenced by these individual. Hence, the socio-cultural factors can have a direct or indirect relationship with the tax compliance behavior of taxpayers.

8. Political factors
In this study political factors are assumed to be among the factors that determine taxpayers’ compliance with the tax law. Based on this assumption respondents were provided with a question and their responses were summarized in the table 1.12.

Table 1.12: Responses on political factors

<table>
<thead>
<tr>
<th>S.N</th>
<th>Items</th>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the political system have an impact on your as well as other taxpayers’ attitude towards the tax system?</td>
<td>Yes</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>49</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Do you think that you are getting comparable social services from the government for the government for the tax you have paid?</td>
<td>Yes</td>
<td>31</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Tax revenue is not used by the government for public service and it doesn’t provide enough information about how it utilizes the taxpayers’ money</td>
<td>Agree</td>
<td>50</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disagree</td>
<td>18</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>
According to the responses of the respondents, 72% of the respondents said that the political system have no impact on their as well as other taxpayers’ attitude towards the tax system. This can be justified by the respondent as taxis a citizenry obligation rather than a gift to the political party in power. In other words paying tax continues to be an obligation as a citizen regardless of the political ideology of the government in power. This may not be the case always because public attitude towards taxation can be adversely affected when government is highly corrupted and misappropriate the taxpayers’ money. However, majority of the respondents (55%) of the respondents said they are not receiving comparable social services from the government in return of what they have paid as a tax and (73%) said that tax revenue is used by the government for non-public service and it doesn’t provide enough information about how it utilizes the taxpayers’ money.

6. Recommendations and Conclusion

Recommendations

Based the result of study the following recommendations are forwarded to help the tax authority and other policy makers of Ethiopia.

- The most obvious requirement for fairness or equity is to treat equal people in equal circumstances in an equal way. Maintaining tax equity and fairness is not achieved only through levying equal taxes on individuals who have equal income but also each taxpayer should pay according to his ability- to pay. Ensuring equity means encouraging and protecting honest and loyal taxpayers by adopting fair competition. This can be achieved by incorporating those taxpayers who are eligible in to the tax system. The authority must also involve the taxpayers or their representatives while estimating the daily sales or revenue of taxpayers to address the question of fairness and equity. Generally, the authority has to ensure tax fairness and equity among category ‘C’ taxpayers, so that voluntary compliance behavior can be developed.

- An effective compliance program requires that tax administration has sufficient powers that enable it to enforce compliance effectively. Voluntary compliance is promoted not only by an awareness of rights and expectations of a fair and efficient treatment, but also by clear, simple and user friendly administrative systems and procedures. Tax systems that depend on ad-hoc administrative procedures rapidly become discredited and endanger compliance. To encourage compliance it is equally important that tax authority administers the law fairly.

- The tax authority needs to be strong enough in order to implement the tax law effectively and efficiently. Functions such as tax assessment, collection, awareness creation, providing information, and enforcement has to performed effectively and efficiently, so that it will be perceived as strong and powerful by the taxpayers. In addition to this efficient service delivery to taxpayers is a key factor against which the strength of the authority is judged.

- To create an efficient tax administration, the tax authority needs to strengthen itself by educating and training its employees, by computerizing its operations, devoting additional resources. Training should include customer service training and cross functional training for employees so they have an understanding of the entire system of tax administration.

- In addition to this, the authority should make the tax law and procedures simple, understandable, and transparent. Voluntary compliance is enhanced when vibrant and efficient tax authority exists.

- One of the areas to stress on while dealing with the issue of voluntary compliance is the development of persuasive communications between the tax authorities and taxpayers. The most effective tool for making people more positive is to empower them with knowledge. It is submitted that there is no better tool for government to positively influence the taxpayers than to provide them with knowledge on how taxpayers’ money is utilized. Any resistance or inability by government to communicate, will lead to possible speculation and resistance.

- Taxpayers’ attitude toward taxation is changed only through sustainable awareness creation programs. Awareness creation should go beyond simply giving tax education to taxpayers. It should be extended to
having consultative sessions with elderly, religious leaders, prominent personalities in the society or other influential individuals. This can help to influence the whole society through these influential persons who have acceptance in their respective groups.

- There should be more preventative education for the public and increased awareness of tax responsibilities in schools. Students should be educated early in their career about tax responsibilities. All of these promote a positive view to voluntary compliance. This is to inculcate citizens a sense of responsibility toward taxes.
- The existence of positive benefits in the form of public services, security, etc. may therefore increase the probability that taxpayers will comply voluntarily, without direct coercion. Hence, the government has to provide social services to the public and it has to inform the taxpayers that these services are provided by their money. This is to convince the taxpayer that they are getting their money back and this in turn enhances voluntary compliance and increases the trust of the taxpayers on the government.

**Conclusion**

One of the main reasons for the tax gap is non-compliance of taxpayers with tax legislation. One of the causes for non-compliance has been demonstrated to be the attitudes and perceptions of people. It is obvious that different population groups may have differing perceptions of taxation resulting from their cultural backgrounds or social histories. These perceptions may in turn influence their attitudes towards tax compliance. This study was aimed at assessing taxpayers’ attitude on factors affecting category ‘C’ taxpayers’ voluntary compliance with the tax law. In effect the study indicated that although the majority of the respondents did not feel it is unfair to pay tax, all of the respondents have elicited certain factors that affect taxpayers’ voluntary compliance. These factors which affect the taxpayers’ voluntary compliance behavior can be concluded as the tax rate undoubtedly higher than what most taxpayers would like it to be. Most of the respondents feel that people should pay taxes according to their ability; in other words they feel that they do not pay the same amount of tax as others in similar situations. Awareness is a cornerstone as far as voluntary compliance is concerned. The survey data has showed that majority of the taxpayers know why they pay taxes but they have no detail knowledge about taxation. On the other hand, in this study lack of awareness was quoted as the major and leading reason for nonexistence of voluntary compliance among category ‘C’ tax payers in Arba Minch city.

Tax authority is the responsible body for assessing and collecting the tax revenue. The amount of revenue collected is directly depends on the efficiency and effectiveness of the authority. In light of this fact the survey result showed the tax authority is not efficient and effective in various aspects such as, in improving the tax assessment and collection procedures, creating awareness, enforcing the tax law, providing services, and information regarding tax. It can be concluded that, so long as this is the fact it is not easy to bring about voluntary compliance and narrow the tax gap. The respondents additionally commented on this issue and they reasoned out that both the tax authority and the city administration didn’t play their role well.

Majority of the taxpayers believe that tax law should be respected and do not feel paying tax is unfair. Similarly most of the respondents have trust in the employees of the authority but not in tax estimation, assessment and collection procedures. From this it can be concluded that the problems have been emanated from lack of awareness and lack of transparency in the activities of the authority. Still majority of the respondents said that they feel guilty if they do not pay tax and believe that their compliance is not contingent on the presence of penalty, and even agree that severity of sanctions and penalties do not ensure voluntary compliance. To conclude, the survey result shows there is a positive attitude towards taxation and the existing problems are down to lack of awareness and absence of transparency.
The survey data also revealed that socio-cultural factors have an impact on the tax compliance behavior of individuals. Especially with respect to social factors, the result indicates social relationships affect attitude of taxpayers towards taxation positively as well as negatively. Influential individuals such as elderly, religious leaders, community leaders or certain social group leaders will play a great role in influencing the attitude of other individuals. Political factor was considered as a determinant factor of taxpayers’ voluntary compliance. But the results of this survey showed that the political system has no impact on the taxpayers’ attitude towards taxation. The survey result indicated factors that significantly determine taxpayers’ voluntary compliance behavior are equity and fairness of the tax system, level of awareness of taxpayers, effectiveness and efficiency of tax authority and socio-cultural factors.

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The Relationship between Customer Satisfaction and Customer Loyalty: Emotional Brand Image as a Moderating Variable

“An applied Study on (Airtel) for Telecom Services in India”

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I. INTRODUCTION

The marketplace is highly competitive and dynamic in nature. The customers are more intelligent, and have an access to different channels and choices to get their benefits. Therefore, companies are in serious need to differentiate their brands as they resist for permanent business. Unfortunately, one of the problems that consumers are exposed to when purchasing goods is to choose the product of one brand name among various brand names. Customers select the products according to their experience and knowledge of different brand names which especially applies to telecom sector. Customer loyalty is one of the effective factors to maintain and strengthen the relationship between customers and brand. In this era, where intensity of rivalry, customers are the center of organizations' cognizance, their loyalty reduce marketing costs, attract new customers, and gain a competitive advantage over organizations.

In contemporary researches, the focus is on analyzing the concept of loyalty to gain the true loyalty, where customer loyalty that reflects the emotional and attitudinal approach of loyalty is the vital segmentation of loyalty to augment the relationship between customers and brand. From another corner, according to Bennet & Rundle Thiel (2004) customer satisfaction has been viewed as an important theoretical and practical issue for most of marketers and researchers. Satisfied customers are more expected to represent loyal behavior like intention to repeat purchase and readiness to say positive word of mouth (Taylor, 1998; Schultz, 2005). Traditionally, satisfied customers have been thought as less price sensitive, less influenced by competitors, and buying additional products and services (Zineldin, 2000). Moreover, it is considered that there is a direct relationship between satisfaction and loyalty; hence, satisfied customers become loyal and dissatisfied customers move to another competitor (Heskett et al. 1993). On another hand, according to Reichheld et al. (2000) customer satisfaction to be used as the only key to gain the true customer loyalty is not convincing. Consequently, this guided for assessing other indicators like emotional brand image to shift the loyalty level. Brand image according to Keller (1993) is the descriptive features that characterized a product or a service- what a consumer thought the product or service is, or what is involved with its purchase or consumption. A strong brand image is the only asset a company can develop that cannot be copied, and the only feature that will help consumers identify and differentiate the product in the market. To sum, regarding to the emotional aspect of brand image, it is a vital key player to gain committed loyal customers (Lin et al, 2006; Ariff, 2012). Thus, emotional brand image, customer satisfaction, and customer loyalty are very powerful weapon in the field of marketing.

II. LITERATURE REVIEW

1.1 Customer Loyalty:

Loyalty has been defined as a repeat purchase behavior guided by favorable attitudes, or as a consistent purchase behavior resulting from the psychological decision-making and evaluative process. Generally, loyalty is considered a long term strategy that aims to create mutual rewards for firms and customers simultaneously (Reichheld & Detrick, 2003). According to Oliver (1997), loyalty is a deeply held commitment to re-buy or repatronize a preferred product or service consistently in the future, which causes repetitive same-brand set purchasing, despite any situational influences and marketing efforts that might cause switching behavior. In contrast, Richheld declared that loyalty cannot be measured via repeat purchase behavior as oftentimes repeat purchase actions may be due to inertia, indifference, or the presence of exist barriers (Reichheld, 2003). According to Rai & Srivastava (2013) Loyalty is a psychological character formed by sustained satisfaction of the customer coupled with emotional attachment formed with the service provider that leads to a state of willingly and consistently being in the relationship with preference, patronage, and premium. According to Dibb (2006) there are three levels of loyalty in general: 1) Recognition loyalty in which the customer is aware of the brand as a purchase alternative. Thus, he may purchase the brand if the preferred brand is unavailable. 2) Preference loyalty where the customer expresses special interest for a specific
brand, so the use of the brand will be whenever it is available; moreover, the customer will not exert an extra effort to have the brand when it is rare. 3) Insistence loyalty occurs when the customer states a very strong preference towards specific brand and will refuse to purchase any alternatives.

1.2 Customer satisfaction:
The concept of customer satisfaction has received an enormous deal of attention in the literature; it is considered as the most important factor to enhance a successful relationship between organizations and their customers (Reichheld, 1994). Customer satisfaction is essentially a result of the psychological response towards the perceptual difference gap between expectation before consumption and practical experience after consumption of a service or a product. Thus, based on consumption setting, the overall attitude and decision-making will be influenced when the customer purchases a product or service (Lee et al., 2010). According to Anderson (1994) customer satisfaction is used to evaluate the performance of organizations from internal and external sides: internally, to compensate human resources, observe performance, and assign funds. Externally, a satisfied customer is a vital source of information for all stakeholders (customer, public policy makers, competitors, and investors). For developing customer satisfaction, an organization must attempt to increase customer's future expectations, enhance reliability and commitment in providing the service (Lin & Wu, 2011). Roberts & Lombard (2009) described satisfaction as the degree to which a business's product or service performance matches up to the expectation of the customer.

1.3 Customer Satisfaction and Loyalty
According to (Rust & Zahorik) 1993, (Hallowell) 1996, (Johnson) 2005, (Bodet) 2008 Customer satisfaction has direct impact on loyalty, and there is a strong relationship between them. In general, there are three overall components in customer satisfaction: 1) Customer satisfaction is a reaction (emotional or cognitive). 2) This reaction is dependent on specific attention (Expectations, product and experience of consumption). 3) This reaction will occur at a particular time (After consumption, after selecting, and based on multiple experiences). This fact reflects that satisfaction will take place when the expectations are confirmed, while dissatisfaction will take place when those do not meet expectations. Thus, customer satisfaction depends on the gap between expected and perceived quality (Heidarzade, 2011). Thus, many previous studies declared that satisfaction will lead to loyalty, and will reduce the chance of shifting to another company (Heidarzade, 2011). Empirical results have shown that the relationship between satisfaction and loyalty launches with product, and include the product brand. Other studies related to the customer satisfaction and loyalty concentrated on brand more than product.

1.4 Emotional Brand Image:
Image is defined by Kotler (2001) as "the set of beliefs, ideas, and impressions that a person holds regarding an object". A brand comes into being through a creative process in which these selected impressions are elaborated, embellished, and ordered (Reynolds, 1965). According to Aaker (1996) a brand image is how the consumer perceive the brand. He explained that the brand image is a set of associations which might not even reflect the objective reality. According to Arnold (1992) brand image refers to the way in which certain groups decode of all signals resonating from the product or service. Keller (1993) considered brand image as "a set of perceptions about a brand as reflected by brand associations in the consumer's memory. Ballantyne et al. (2005) defined brand image as "the material property that is associated with the brand as reflected by brand name and product package. In terms of emotional brand image, Ariff (2012) declared that emotional perceived value is the most highly noted influential variable of brand image with regards to satisfaction and customer loyalty. Cognitive scientists agreed that 95% of all human behavior is unconscious (Lakoff & Johnson, 1999). Thus emotions have been estimated as a unique antecedent of purchase intentions (Ayadi, 2010). According to (Gobe, 2001) emotions have a significance effect upon consumer behavior, decision making, action, memory, attention, and loyalty. Gobe declared that emotional branding stand upon creating a profound relationship between the brand and the customer through the presence of positive emotional dialogue which aims to transcend material benefits and create emotional satisfaction and real loyalty. The appearance of this concept was in 1957 when Martineau declared that customers purchase products to fulfill the functional and emotional needs. They added value to products and services through their emotions (Damasio, 1994). According to Roberts (2004) emotional branding has been recognized as a deep and enduring way of creating affective bonds between customers and brands.

III. Objectives of the Study
1. To examine the relationship between customer satisfaction and customer loyalty.
2. To explore the relationship between emotional brand image (in terms of perceived emotional value) and customer loyalty.
3. To determine whether emotional brand image may have a role as a moderating variable in the relationship between customer satisfaction and customer loyalty.

4. Delimitation of the Study
1. The sample of this study covers the customers of one company from Indian telecom sector, so there is a need for another study that takes into consideration a number of different companies.

5. Hypothesis of the Study
1. H1: There is a significance relationship between customer satisfaction and customer loyalty.
2. H2: There is a significance relationship between emotional brand image (in terms of perceived emotional value) and customer loyalty.
3. H3: Emotional brand image has a significance moderating effect on customer satisfaction- customer loyalty relationship.

IV. Model of the Study
V. RESEARCH METHODOLOGY

6.1 Research Design
Analytical descriptive method has been used to sustain quantitative measurement and analysis. Data has been collected through different means which include:

Secondary resources: To introduce the conceptual literature of customer satisfaction, customer loyalty, and emotional brand image, the researcher has depended on books, periodicals, articles, published papers and referred previous studies in different countries which have been conducted on the same subject, the Internet sites and the available electronic versions.

Primary resources: a questionnaire has been used as a primary tool for gathering data from the customers of Airtel Company in order to analyze the qualitative and quantitative characteristics of the phenomena.

6.2 Study Population/Sample
The population of the study consists of the customers of Airtel Company for telecommunication, which is one of the well-known companies in India.

The sample consists of a total of 387 customers who were patronizing Airtel company. They have been requested to complete questionnaires (self-designed that captured all the variables) that contained measures of the constructs of concern.

Sampling Method/ Sample Size
The convenient sampling method has been used. Four hundred (400) questionnaires administered to the respondents. However, (387) three hundred eighty-seven questionnaires were duly filled and returned.

6.3 Data Collection Instrument
The study employed a questionnaire as an instrument for data collection. The questionnaire was divided into two sections. Section (1) measures the demographic attributes of the respondents which include age, gender, monthly income, while section (2) measures three variables (customer satisfaction, emotional brand image, and customer loyalty). The items were measured on a 5-point Likert scale ranging from strongly agree (5) to strongly disagree (1).

VI. DATA ANALYSIS

5.1 Methods of Data Analysis
The Statistical Package for Social Sciences (SPSS) was used to analyze the data. The following statistical procedures were used:

- Cronbach's alpha coefficient and correlation coefficients were calculated to assure the reliability and validity of study scales.
- Frequencies and percentages were calculated to describe the characteristics of the sample respondents.
- Descriptive statistics analysis was used to summarize the respondents' answers and to ranking the sub-items of each dimension.
- Independent-Samples T-Test was carried out to test the significance of the difference between the means of the two independent groups.
• One-Way Analysis of Variance (ANOVA) was used to test the significance of the differences between the means of the two independent groups.
• Multiple Regression Analysis was used in step 1 of the moderation analysis to test the effect of the two independent variables on the dependent variable of this study.
• Correlation analysis was carried out to test the presence, strength and direction of the potential relationships among the variables of the study.

7.2 Reliability of the Scale
To check the reliability of the study instruments, cronbach's alpha coefficient was calculated. This coefficient generally varies between zero (for no reliability) and unity (for maximum reliability). Any values equal to or above 0.6 denote that the scale is of acceptable reliability. The closer the value is 1; the more reliable a scale.

Table(1) demonstrates that all reliability coefficient are acceptable, since they all exceed the benchmark of 0.60

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of item</th>
<th>alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer loyalty</td>
<td>5</td>
<td>0.851</td>
</tr>
<tr>
<td>Emotional Brand Image</td>
<td>5</td>
<td>0.692</td>
</tr>
</tbody>
</table>

7.3 Validity Analysis of the results

Self-Validity
Table (2) shows values of self-validity coefficient of the study scale. The coefficient is defined as the square root of the reliability coefficient; Cronbach's alpha.

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of item</th>
<th>alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer loyalty</td>
<td>5</td>
<td>0.912</td>
</tr>
<tr>
<td>Emotional Brand Image</td>
<td>5</td>
<td>0.865</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>5</td>
<td>0.837</td>
</tr>
</tbody>
</table>

The results indicate that the self-validity coefficient ranges between 0.824 and 0.912. These values are considered high and acceptable.

Internal consistency validity
To ensure the validity of internal consistency, the correlation coefficient between each item and the dimension to which it belongs was calculated. The results are shown in table(3)

<table>
<thead>
<tr>
<th>Dimensions and Items</th>
<th>Correlation coefficient</th>
<th>Value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. I am satisfied with the professional competence of Airtel</td>
<td>.606**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>2. I am comfortable about the relationship with Airtel</td>
<td>.574**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>3. I am satisfied with the performance of the employees of Airtel</td>
<td>.589**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>4. The service I get from Airtel meets my need at the current time.</td>
<td>.744**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>5. Airtel does everything that an ideal service provider should do.</td>
<td>.596**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Emotional Brand Image</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I feel emotionally attached to this service provider.</td>
<td>.807**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>7. The service provider's brand image and my self-image are in my aspects. (Fun, serious, classy, professional, confident, etc).</td>
<td>.801**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>8. The services I get from this provider play an important role in my life.</td>
<td>.715**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>9. My identity matches with this service provider.</td>
<td>.626**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>10. I like dealing with this service provider.</td>
<td>.514**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Customer loyalty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Airtel would be my first choice.</td>
<td>.788**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>12. I intend to continue using Airtel for a long time.</td>
<td>.658**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>13. I say positive things about Airtel to the other people.</td>
<td>.768**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>14. I get a good value for the money I pay for Airtel.</td>
<td>.716**</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>15. To me, Airtel clearly is able to provide the best service.</td>
<td>.750**</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

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

From the above table, it is concluded that:
The "Customer satisfaction" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.574 and 0.744 and all are significant at the 5% level of significant.

The "Emotional Brand Image" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.514 and 0.807 and all are significant at the 5% level of significant.

The "Customer loyalty" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.658 and 0.788 and all are significant at the 5% level of significant.

7.4 Characteristics of respondents:
The following table shows the main characteristics of the sample respondents.

Table (4): Characteristics of the sample respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>214</td>
<td>55.2</td>
</tr>
<tr>
<td>Female</td>
<td>173</td>
<td>44.8</td>
</tr>
<tr>
<td>Total</td>
<td>387</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-20</td>
<td>72</td>
<td>18.7</td>
</tr>
<tr>
<td>21-30</td>
<td>244</td>
<td>63.0</td>
</tr>
<tr>
<td>Above 30</td>
<td>71</td>
<td>18.3</td>
</tr>
<tr>
<td>Total</td>
<td>387</td>
<td>100</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than RS 10000</td>
<td>201</td>
<td>52.0</td>
</tr>
<tr>
<td>Above RS 10000-30000</td>
<td>91</td>
<td>23.5</td>
</tr>
<tr>
<td>Total</td>
<td>387</td>
<td>100</td>
</tr>
</tbody>
</table>

It can be concluded from the table above that:

- The sample consisted of 387 respondents; of whom 214 are male (55.2%) and 173 are females (44.8%).
- Regarding age group; more than half of the total sample unites (63.0%) were between 21-30 years of age, while (18.7%) of the respondents were aged between 18-20 years of age and (18.3%) were above 30 years of age.
- In terms of monthly income, (52.0%) of the respondents were reported to receive a monthly income that was less than 10000 Rupees, while (23.5%) of the respondents received a monthly income ranging between 10000-30000 Rupees. The remaining (24.5%) received a monthly income that exceeded 30000 Rupees.

VII. HYPOTHESES TESTING

Testing the first hypothesis:
H1: There is a significance relationship between overall customer satisfaction and customer loyalty.
To test this hypothesis, simple regression and correlation analysis were used. The dependent variable was customer loyalty, and the independent variable was customer satisfaction. The results of the analysis are shown in table (5).

Table (5): Results of simple regression and correlation analysis for testing the first hypothesis

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>T-Test Value</th>
<th>T-Test Sig.</th>
<th>F-Test Value</th>
<th>F-Test Sig.</th>
<th>R</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer satisfaction</td>
<td>0.557</td>
<td>12.902</td>
<td>0.000</td>
<td>165.906</td>
<td>0.000</td>
<td>.551</td>
<td>.304</td>
</tr>
</tbody>
</table>

It can be concluded from the above table:

Significance of the regression model
The results indicate that the overall regression model is highly significant (F= 156.906, Sig.< 0.001).
The value of the correlation coefficient (R) between the independent variable (customer satisfaction) and the dependent variable (customer loyalty) is 0.551, indicating moderate correlation.
The value of the coefficient of determination (R-square) is 0.304, which means that customers satisfaction explains 30.4% of the variance in customer loyalty.

Significance of the independent variable
The results of the T-Test showed that customer satisfaction significantly affects customer loyalty. It is positively related to customer loyalty (T= 12.9, Sig. < 0.001).

Thus, the first hypothesis is accepted.
This means that satisfaction is positively related to loyalty and there is a direct relationship between the numbers above although only 30% of the change in customer loyalty can be attributed to satisfaction. This shows to some extent that satisfaction is the most reliable predictor of loyalty.

Testing the second hypothesis:
H2: There is a significance relationship between emotional brand image (in terms of perceived emotional value) and customer loyalty.
To test this hypothesis, simple regression and correlation analysis were used. The dependent variable was customer loyalty, and the independent variable was emotional brand image. The results of the analysis are shown in table (6).

Table (6): Results of simple regression and correlation analysis for testing the second hypothesis

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>T-Test Value</th>
<th>T-Test Sig.</th>
<th>F-Test Value</th>
<th>F-Test Sig.</th>
<th>R</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional brand image</td>
<td>0.640</td>
<td>18.001</td>
<td>0.000</td>
<td>322.003</td>
<td>0.000</td>
<td>.676</td>
<td>.457</td>
</tr>
</tbody>
</table>

Source: The researcher

It can be concluded from the above table:

**Significance of the regression model**
The results indicate that the overall regression model is highly significant (F= 322.003, Sig. < 0.001).

The value of the correlation coefficient (R) between the independent variable (emotional brand image) and the dependent variable (customer loyalty) is 0.676, indicating moderate correlation.

The value of the coefficient of determination (R-square) is 0.457, which means that emotional brand image explains 45.7% of the variance in customer loyalty.

**Significance of the independent variable**
The results of the T-Test showed that emotional brand image significantly affects customer loyalty. It is positively related to customer loyalty (T= 18.0, Sig. < 0.001).

Thus, the second hypothesis is accepted.
This means that emotional brand image is positively related to loyalty. The results indicate that there is a stronger effect on customer loyalty than does customer satisfaction because it has a relatively greater correlation coefficient with loyalty.

**Testing the third hypothesis:**
The third hypothesis were conducted to evaluate the existence of a positive moderating effect nature between customer satisfaction and customer loyalty via the influence of emotional brand image.

H3: Emotional brand image has a significance moderating effect on customer satisfaction - customer loyalty relationship.

1) Multiple regression and correlation analysis is used. The dependent variable is customer loyalty, and the independent variables are customer satisfaction and emotional brand image. The results are shown in table (7)

Table (7): Results of simple regression and correlation analysis for testing the third hypothesis

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>T-Test Value</th>
<th>T-Test Sig.</th>
<th>F-Test Value</th>
<th>F-Test Sig.</th>
<th>R</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional brand image</td>
<td>0.3100</td>
<td>6.998</td>
<td>0.000</td>
<td>212.001</td>
<td>0.000</td>
<td>.702</td>
<td>.511</td>
</tr>
<tr>
<td>Emotional brand image</td>
<td>0.5100</td>
<td>13.500</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: The researcher

It can be concluded from the above table:

**Significance of the regression model**
The results indicate that the overall regression model is highly significant (F= 212.001, Sig. < 0.001).

The value of the correlation coefficient (R) between the independent variables (customer satisfaction and emotional brand image) and the dependent variable (customer loyalty) is 0.702, indicating a strong correlation.

The value of the coefficient of determination (R-square) is 0.511, which means that customers satisfaction and emotional brand image as independent variables explain 51.1% of the variance in customer loyalty.

**Significance of the independent variable**
The results of the T-Test showed that customer satisfaction and emotional brand image significantly affects customer loyalty. They are also positively related to customer loyalty (Sig. < 0.001).

The values declared that when the two independent variables (customers satisfaction and emotional brand image) are coupled together they have a stronger correlation to customer loyalty than when the effect of each was isolated.
Again multiple regression analysis is used. The independent variables (customers satisfaction and emotional brand image), and the dependent variables is customer loyalty. The results are shown in table( 8 )

Table ( 8): Results of simple regression analysis for testing the second hypothesis

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>B</th>
<th>T-Test Value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer satisfaction</td>
<td>.3100</td>
<td>7.299</td>
<td>.000</td>
</tr>
<tr>
<td>Emotional Brand Image</td>
<td>.5100</td>
<td>12.865</td>
<td>.000</td>
</tr>
<tr>
<td>Interaction</td>
<td>.299</td>
<td>3.807</td>
<td>.001</td>
</tr>
</tbody>
</table>

Source: The researcher

From the previous table, it could be stated that customer satisfaction and emotional brand image both have significant effect on customer loyalty (Sig. < 0.05). The value of the interaction of the moderation is significant (Sig. < 0.05) which means that emotional brand image can be a moderating variable in the relationship between customer satisfaction and customer loyalty.

**Thus, the third hypothesis is accepted**

**VIII. CONCLUSION**

The presented results showed the importance of emotional brand image as a moderating variable via customer satisfaction and customer loyalty. Furthermore, the results showed that the moderating effect of emotional brand image can enhance customer loyalty to its utmost levels and strengthen customer satisfaction- loyalty relationship to ensure a long-term relationship with the customers. To sum up, to research in emotional brand image would be an effective research for business and companies on boosting loyalty levels in the Indian telecom sector.

**REFERENCES**

AUTHORS

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CLUSTER ANALYSIS OF SEASONAL FISH FAUNAL DIVERSITY AND WATER PHYSICO-CHEMICAL ATTRIBUTES AT PALLATHURUTHY, KERALA SOUTH INDIA.

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Abstract- Pallathuruthy is a meeting point between Pamba River and Vembanad Lake of Kerala, South India. So it is an estuarine habitat. The present study analyses the seasonal variation in fish faunal diversity and its relation with existing water quality parameters through cluster analysis. The study showed that there was significant variation in diversity and fish catch strength between three seasons like pre monsoon, monsoon and post monsoon. High species diversity was observed during monsoon season, while good catch strength was obtained during post monsoon. Results of water quality analysis have showed that TDS, Copper, chromium, cadmium and lead content in water were beyond the limit set by IS (2012). Also regarding the sediment quality the cadmium content was above the threshold effect level prescribed by Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (2001). So, urgent measures were inevitable to sustain the existing fish wealth of this estuarine area.

Index Terms– Pallathuruthy, season, cluster analysis, water quality, pollution.

I. INTRODUCTION

Estuaries provide a unique habitat for a wide variety of biodiversity. It is a suitable breeding and feeding ground for many fish species, due to the convergence of fresh water with brackish water, which can cater the nutritional requirements of fish species. This speciality of estuary demands special attention for the conservation of its biodiversity. Since estuary is an area of fluctuating habitat conditions, it is a challenge for its inhabitants to accustom with these variations. In a surface view, the biodiversity of estuaries were declining for the last few years. Major reasons that propped up for these declines were unscientific fishing practices, water poisoning for fish capture, habitat destruction and pollution (Kurup, 1993; Ujjania and Monika, 2015). The pollution happen to estuary through various sources gives way to changes in water conditions, to which the aquatic fauna is closely linked. High pollution driven fall in oxygen level of water can impose severe stress on fish population especially to migratory fishes like eel and salmon (Etcheber, et al., 2011).

Rich biodiversity and socio economic importance are the hall mark of Vembanad Lake, which is an ecotone between land and sea. The lake which was proclaimed as a Ramsarsite, was enriched by ten rivers, which had its origin from the Western Ghat, a hot spot and finally empties into the Arabian Sea. The mangrove trees in the form of small islands in the Vembanad Lake provide shelter for diverse fauna. This Lake is also a hot bed for tourism related activities like house boat services and boat races (Nehru Tophy boat race), due to its picturesque nature. From this Lake 150 fish species were documented by Kurup and Samuel, (1985). The intensified interventions to raise paddy cultivation in Kuttanad, had plunged the Vembanad Lake provide shelter for diverse fauna. This Lake is also a hot bed for tourism related activities like house boat services and boat races (Nehru Tophy boat race), due to its picturesque nature. From this Lake 150 fish species were documented by Kurup and Samuel, (1985). The intensified interventions to raise paddy cultivation in Kuttanad, had plunged the Vembanad Lake to a gravy of fertilizers and pesticides. Since Kuttanad is a low lying area, to prevent inundation during monsoon, an artificial spillway called Thottappally was constructed in 1955 (Gopalan et al., 1983). But due to the improper construction, it cannot elude the flood completely. Another problem faced by the paddy cultivation of Kuttanad was the salt water intrusion, which was managed to a certain level by the construction of Thaneermukkom bund, which had turned as a boomerang to the plight of Vembanad Lake by turning it to a pool of pesticides and fertilizers that cannot flow down (Thampatti, and Padmakumar, 1999). The repercussions of these interventions were many like a decline in primary productivity, water quality degradation, proliferation of macrophytes and a severe decline in fish wealth. Even massive fish death was also reported from
various areas of Vembanad Lake (Azis and Nair, 1981; Priyadarsanan, 2011). The present study envisages the impact of water quality on the fish fauna of Pallathuruthy, an estuarine area as well as a meeting point between Pamba and Vembanad Lake through Bray-Curtis similarity index (Cluster analysis).

II. STUDY AREA

The area selected for the present study was Pallathuruthy (9.4599° N, 76.3695° E), where Pamba meets with the Vembanad Lake. Busy plying of house boats and other motor boats were a usual sight at this area. Majority of residents on its bank depend this water for their various domestic needs. Microplastic junk was another matter to concern from this area. Map of the study area was given in Figure 1.

III. MATERIALS AND METHODS

Water and fish sample was collected in each month from Pallathuruthy for a period of 12 months, covering three seasons like pre–monsoon (Feb to May), monsoon (June to Sept) and post monsoon (Oct to Jan) from September 2012 to August 2013. Water sample was collected in glass bottles kept in ice box and bought to the laboratory on the same day for analysis. Certain water quality parameters like temperature, PH and DO were checked at the site itself. All parameters were analyzed as per the standard methods of APHA (2012). Instruments and methods adopted for the present study where given in Table 1.

Fish samples were collected once in every month from all the four sites for a period of 12 months from September 2012 to August 2013 to study the difference in diversity during pre-monsoon, monsoon and post monsoon season. Fish samples were collected with the help of local fishermen using different types of nets like gillnets, cast nets and dragnets. Immediately after collecting the fish, it is preserved in 10% formalin and brought to the laboratory. In the case of bigger fishes an incision was made in the abdomen before preservation. In the laboratory each sample was identified up to its species level by analyzing meristic and morphometric characters with the reference of Day (1967), Jayram (1999) and Talwar and Jhingran (1991).

Table 1: Instruments and methods used for water and sediment quality analysis

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Physico-chemical Parameters</th>
<th>Method/Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PH</td>
<td>Eutech (Model- S- 660)</td>
</tr>
<tr>
<td>2</td>
<td>DO</td>
<td>Eutech (Model- S- 660)</td>
</tr>
<tr>
<td>3</td>
<td>Temperature</td>
<td>Digital Thermometer</td>
</tr>
<tr>
<td>4</td>
<td>Conductivity</td>
<td>Eutech (Model- S- 660)</td>
</tr>
</tbody>
</table>
IV. RESULTS AND DISCUSSION

Result of water quality analysis with respect to 20 parameters like PH, DO (mg/l), Temperature(°C), TDS (ppm), Conductivity(µs), Salinity (ppm), Nitrates (mg/l), Nitrites (mg/l), Sulphates (mg/l), Phosphates (mg/l), Cu(S) (mg/kg), Cu (W) (mg/l), Zn (S) (mg/kg), Zn (W)(mg/l), Cr (S) (mg/kg), Cr(W) (mg/l), Pb(S) (mg/kg), Pb(W) (mg/l), Cd(S)(mg/kg) and Cd(W) (mg/l) were given in Table 2. When comparing with the accepted limits set by IS (2012) the level of TDS, Copper, chromium, cadmium and lead content in water were beyond the limit. When considering the sediment quality, cadmium level was above the threshold effect level prescribed by Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (2001). High value for TDS was recorded during pre-monsoon season. High TDs was an indication of pollution through external sources (Pankajetal, 2015). The closure of Thanneermukkam bund also was a reason for this shoot up (Priyadarsanan, 2011). High copper and chromium level in water was recorded during pre-monsoon, while that of lead and cadmium in monsoon season. Heavy load of copper and chromium in pre monsoon may come from domestic sewage, intrusion from pesticides, from the oil exhaust of tourist boats and other mechanized boats, dumping of plastic wastes and high precipitation. Raised level of cadmium in sediment was the result of dumping of plastic waste results from unplanned tourism related regulations, fertilizer intrusion and washing of vehicles.

Regarding to the fish faunal diversity, 33 fish species were collected from Pallathuruthy during the three seasons, which belongs to 7 orders and 22 families(Table 3). Among the 7 orders, Perciforms dominated over other orders, while among the families, Cyprinidae was the dominant one. More fish catch was obtained in post monsoon and least in monsoon. Regarding the species diversity monsoon season showed high diversity with 29 species, followed by post monsoon with 23 species and pre monsoon with 21 species. The dominance of Cyprinidae family can connect to the eutrophic condition of Pallathuruthy, because cyprinidae increase in an area where zooplanktons are rich, which in turn was linked with the algal blooms (Krishna Kumar and Priyadarsanan, 2008). Pseudotreplusmaculatus, Mystusoculatus, Ambassigymnocephalus, Labeodussumieri and
Dawkinsia filamentosia were the abundant fish species collected during the study period. Being an estuarine area, Pallathuruthy was not reaching the expected level of species richness. The main challenges faced by the fish fauna of here were water poisoning (Priyadarsanan, 2011), usage of prohibited mesh sizes (Priyadarsanan, 2011), indiscriminate use of pesticides and fertilizers in the nearby cultivation areas (Renjithkumar et al, 2011), and overwhelmed service of tourist house boats. During the study 2 exotic fish species like Labe rohita and Catlacatla (Priyadarsanan, 2011), also could record from Pallathuruthy, but the catch strength of these species were poor.

Table 2 Result of water quality analysis for three seasons

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PH</td>
<td>8.5975</td>
<td>7.7775</td>
<td>7.58</td>
<td>6.5-8.5</td>
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</tr>
<tr>
<td>2</td>
<td>DO (mg/l)</td>
<td>1.5225</td>
<td>5.87</td>
<td>2.21</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Temperature (°C)</td>
<td>31.05</td>
<td>29.5</td>
<td>30.95</td>
<td>-</td>
<td>-</td>
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<tr>
<td>4</td>
<td>TDS (ppm)</td>
<td>4654.85</td>
<td>57.685</td>
<td>576.2075</td>
<td>500</td>
<td>-</td>
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<tr>
<td>5</td>
<td>Conductivity (µs)</td>
<td>3055.37</td>
<td>88.76</td>
<td>42004.25</td>
<td>-</td>
<td>-</td>
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<tr>
<td>6</td>
<td>Salinity (ppm)</td>
<td>1931.125</td>
<td>53.3625</td>
<td>496.3225</td>
<td>-</td>
<td>-</td>
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<tr>
<td>7</td>
<td>Nitrates (mg/l)</td>
<td>1.9</td>
<td>1.925</td>
<td>2.175</td>
<td>45</td>
<td>-</td>
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<tr>
<td>8</td>
<td>Nitrites (mg/l)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Sulphates (mg/l)</td>
<td>27.875</td>
<td>14.275</td>
<td>16.625</td>
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<td>-</td>
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<td>10</td>
<td>Phosphates (mg/l)</td>
<td>3.125</td>
<td>2.15</td>
<td>2.1</td>
<td>-</td>
<td>-</td>
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<td>11</td>
<td>Cu(S) (mg/kg)</td>
<td>8.775</td>
<td>9.975</td>
<td>7.275</td>
<td>-</td>
<td>18.7</td>
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<tr>
<td>12</td>
<td>Cu (W) (mg/l)</td>
<td>0.09</td>
<td>0.03</td>
<td>0.0775</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Zn (S) (mg/kg)</td>
<td>17.85</td>
<td>19.575</td>
<td>11.275</td>
<td>-</td>
<td>124</td>
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<tr>
<td>14</td>
<td>Zn (W)(mg/l)</td>
<td>0.2575</td>
<td>0.125</td>
<td>0.03</td>
<td>5</td>
<td>-</td>
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<tr>
<td>15</td>
<td>Cr (S) (mg/kg)</td>
<td>8.175</td>
<td>13.425</td>
<td>6.715</td>
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<tr>
<td>16</td>
<td>Cr(W) (mg/l)</td>
<td>1.16</td>
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<td>0.02</td>
<td>0.05</td>
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<tr>
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<td>Pb(S) (mg/kg)</td>
<td>9.35</td>
<td>9.75</td>
<td>5.7625</td>
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<td>18</td>
<td>Pb(W) (mg/l)</td>
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<td>0.06</td>
<td>0.01</td>
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<td>19</td>
<td>Cd(S)(mg/kg)</td>
<td>0.65</td>
<td>3.325</td>
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</tr>
<tr>
<td>20</td>
<td>Cd(W) (mg/l)</td>
<td>0.01</td>
<td>0.05</td>
<td>0.00</td>
<td>0.003</td>
<td>-</td>
</tr>
</tbody>
</table>
### Table 3 Catch strength of fish species from Pallathuruthy during three seasons

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Name of fish</th>
<th>Order</th>
<th>Family</th>
<th>Pre monsoon</th>
<th>Monsoon</th>
<th>Post monsoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Ambassisgymnocephalus</em></td>
<td>Perciformes</td>
<td>Ambassidae</td>
<td>500</td>
<td>3400</td>
<td>4200</td>
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<tr>
<td>2</td>
<td><em>Anabas testudineus</em></td>
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<td>Anabantidae</td>
<td>3900</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td><em>Carangoidesmalabaricus</em></td>
<td>Perciformes</td>
<td>Carangidae</td>
<td>0</td>
<td>12</td>
<td>0</td>
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<tr>
<td>4</td>
<td><em>Catlacatla</em></td>
<td>Cypriniformes</td>
<td>Cyprinidae</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td><em>Channastriata</em></td>
<td>Perciformes</td>
<td>Channidae</td>
<td>0</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td><em>Cynoglossusmacrostomus</em></td>
<td>Pleuronectiforms</td>
<td>Cyngoloissida</td>
<td>60</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td><em>Eubleekeriasplendens</em></td>
<td>Perciformes</td>
<td>Leiognathidae</td>
<td>4150</td>
<td>1110</td>
<td>15</td>
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<tr>
<td>8</td>
<td><em>Pseudetroplusmaculatus</em></td>
<td>Perciformes</td>
<td>Cichlidae</td>
<td>4100</td>
<td>3500</td>
<td>8000</td>
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<tr>
<td>9</td>
<td><em>Etroplussuratensis</em></td>
<td>Perciformes</td>
<td>Cichlidae</td>
<td>2920</td>
<td>50</td>
<td>700</td>
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<td><em>Gerressetifer</em></td>
<td>Perciformes</td>
<td>Gerreidae</td>
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<td>220</td>
<td>0</td>
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<tr>
<td>11</td>
<td><em>Gerresfilamentoses</em></td>
<td>Perciformes</td>
<td>Gerreidae</td>
<td>260</td>
<td>50</td>
<td>30</td>
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<tr>
<td>12</td>
<td><em>Gerrusoblongus</em></td>
<td>Perciformes</td>
<td>Mojarra</td>
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<td>0</td>
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<tr>
<td>13</td>
<td><em>Glossogobiushiuris</em></td>
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<td>Gobiidae</td>
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<td>520</td>
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<td>Bagridae</td>
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<td>300</td>
<td>400</td>
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<tr>
<td>16</td>
<td><em>Mystusgulio</em></td>
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<td>Bagridae</td>
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<td>0</td>
<td>200</td>
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<tr>
<td>17</td>
<td><em>Labeodusssumieri</em></td>
<td>Cypriniformes</td>
<td>Cyprinidae</td>
<td>1100</td>
<td>3100</td>
<td>3800</td>
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<td>18</td>
<td><em>Labeorohita</em></td>
<td>Cypriniformes</td>
<td>Cyprinidae</td>
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<td>6</td>
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<tr>
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<td><em>Mastacembelusarmatus</em></td>
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<td><em>Megalopscyprinoides</em></td>
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<td>Length2</td>
<td>Length3</td>
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<td>---------</td>
<td>---------</td>
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<tr>
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<td>Siluriforms</td>
<td>Bagridae</td>
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<td>1200</td>
<td>5500</td>
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<tr>
<td>23</td>
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<td>106</td>
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<td>24</td>
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<td>Siluridae</td>
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<td>Perciformes</td>
<td>Ambassidae</td>
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<td>800</td>
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<td>26</td>
<td>Pristolepisrubripinnis</td>
<td>Perciformes</td>
<td>Pristolepidae</td>
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<td>Dawkinsiafilamentosa</td>
<td>Cypriniformes</td>
<td>Cyprinidae</td>
<td>600</td>
<td>2000</td>
<td>4000</td>
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<tr>
<td>28</td>
<td>Puntiusmahecola</td>
<td>Cypriniformes</td>
<td>Cyprinidae</td>
<td>0</td>
<td>3000</td>
<td>1500</td>
</tr>
<tr>
<td>29</td>
<td>Systomussarana</td>
<td>Cypriniformes</td>
<td>Cyprinidae</td>
<td>400</td>
<td>730</td>
<td>2200</td>
</tr>
<tr>
<td>30</td>
<td>Scatophagusargus</td>
<td>Perciformes</td>
<td>Scatophagidae</td>
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<td>2</td>
<td>70</td>
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<td>32</td>
<td>Brachirusorientalis</td>
<td>Pleuronectiforms</td>
<td>Soleidae</td>
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<td>1200</td>
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<td>33</td>
<td>Wallagoattu</td>
<td>Siluriforms</td>
<td>Siluridae</td>
<td>0</td>
<td>17</td>
<td>500</td>
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</tbody>
</table>

**Total**

|       | 25891 | 21318 | 33495 |

**Fig 2** Dentogram for Pre-monsoon fish diversity at Pallathuruthy
Bray-Curtis analysis to determine the fish composition and abundance in three seasons at Pallathuruthy, based on the clusters formed with at least 50-80% similarity in the hierarchical cluster analysis showed that two major clusters at 50% variance were formed during pre-monsoon (Figure 2). Cluster 1 with 3 species like *Anabustestudineus*, *Mystusoculatus* and *Pseudetroplusmaculatus* while cluster 2 with 3 species which were *Dawkinsiafilamentosa*, *Etroplussuratensis* and *Eubleekeriasplendens*. In monsoon season 3 major clusters were formed at 61% variation (Figure 3). Cluster 1 consists of 3 species; they were *Pseudetroplusmaculatus*, *Puntiusmahecola* and *Dawkinsiafilamentosa*. While *Nandusnandus*, *Horabagrusbrachysoma* and *Heteropneustesfossilis* formed Cluster 2. The three species included in cluster 3 were *Labiorohita*, *Wallagoatu* and *Ompokmalabaricus*. Inpost monsoon also 4 major clusters were formed at 63% variation (Figure 4). The cluster 1 consists of 3 species like *Puntiusmahecola*, *Horabagrusbrachysoma* and *Mystusgulio*. Cluster 2 with 4 species like *Megalopsycprinoides*, *Scatophagusargus*, *Channastriata* and *Anabustestudineus*. Cluster 3 consists of 3 species, which were *Mystusoculatus*, *Labeodussumieri* and *Systomussarana*. And finally Cluster 4 formed of 3 species like *Pseudetroplusmaculatus*, *Ambassissgymnocephalus* and *Dawkinsiafilamentosa*. The cluster analysis showed that all the clusters formed for Pallathuruthy in three seasons were individual with respect to its entire species composition. This indicates that changes were happening to the habitat condition in three seasons. At the same time the cluster 4 formed in post monsoon was 67% similar to cluster 1 formed during monsoon season. This shows that the habitat condition during monsoon and after monsoon had some similarities. *Anabustestudineus* present in cluster 1 during pre-monsoon was also found in cluster 2 during post monsoon. This was because of the favorability of certain habitat parameters especially Total dissolved Solids, sulfates, zinc content in sediment and water and copper content in water which were comparatively high in pre monsoon during which this fish showed relative abundance. *Pseudetroplusmaculatus* present in cluster 1 during pre-monsoon was found in cluster 1 of monsoon and cluster 4 of post monsoon. This showed its even distribution at Pallathuruthy due to favorable habitat factors. But high catch
strength was obtained during post monsoon during which certain habitat factors especially zinc content in sediment and water and copper content in water were relatively low. *Dawkinsia filamentosas* was also found in clusters formed in three seasons. But high catch strength was obtained during post monsoon. Here it was seemed that temperature during post monsoon was the most favorable factor for the distribution of this fish. Similarly *Puntius mahecola* found in cluster 1 of monsoon season was also found in cluster 1 of post monsoon season. Regarding the relative abundance it was found that more catch was obtained during monsoon. This relative abundance may be substantiated by certain habitat conditions of monsoon especially a relatively high level of lead and cadmium in water. The reason behind how cadmium become favorable for this fish lies in the fact that in nature cadmium is usually found together with zinc in fewer concentrations ("Water quality and fish health", 2014). Since zinc is a component of some food wastes, it can attract fish to there. *Horabagrus brachysoma* found in cluster 2 in monsoon was also found in cluster 1 formed in post monsoon. The relative abundance of this fish was more during post monsoon may be because of the habitat favorability in post monsoon.

V. CONCLUSION

The study showed that the habitat condition of Pallathuruthy was different in three seasons. But monsoon and post monsoon habitat have some similarities with respect to habitat condition for survival of fish species. Regarding the species diversity monsoon season showed high species diversity while pre monsoon with low diversity. But considering the fish catch strength post monsoon topped the other two seasons. Pertaining to the water quality of Pallathuruthy, it was not in a safe side for the sustenance of existing fish diversity. During pre-monsoon and post monsoon, majority of water quality parameters crossed the standard limits, which can pose a serious threat to the existing fish wealth of this estuarine area.

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REFERENCE


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A General Study on Schwarz-Christoffel Transformation and Its Applications

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Abstract: Two German Mathematician H.A.Schwarz (1843-1921) and E.B.Christoffel (1829-1900) established Schwarz-Christoffel transformation independently. The Schwarz-Christoffel transformation referred by many researchers due to have a vast applications in solving 2nd order partial differential equations like as Laplace’s and Poisson’s equations[3,4] and to study the different phenomena’s of fluid flow. In this paper we would like to show the applications of Schwarz-Christoffel transformation directly to the solutions of problems in fluid flow and electrostatic potential theory.

Index Terms: Transformation, Polygon, Half plane, Analytic function, Degenerate Polygon, and Fluid flow.

Introduction

The Schwarz-Christoffel transformation is very much familiar as which maps the x-axis and the upper half of the z-plane onto a given simple closed polygon and its interior in the w-plane. Generally we represent the unit vector which is tangent to a smooth arc c at a point z₀ by the complex number t and let the number τ denote the unit vector tangent to the image Γ of C at the corresponding point w₀ under a transformation w=f(z). We assume that f is analytic at z₀ and that f'(z₀) ≠0. From the general rules of conformal mapping (preservation of angles)

We can write, arg τ =argf'(z₀)+arg t (1)

Particularly, if C is a segment of the axis with positive sense to right then t =1 and arg t = 0

At each point z₀=x on C, in that case equation (1) becomes arg τ =argf'(x) (2)

If f'(z) has a constant argument along the segment ,it follows that arg τ is constant. Hence the image Γ of C is also the segment of straight line.

Let us construct a transformation w=f(z) that maps the whole x axis onto a polygon of n sides where x₁,x₂,x₃,.....xₙ₋₁ and ∞ are the points on that axis whose images are to be the vertices of the polygon and where x₁<x₂<x₃<....<xₙ₋₁

The vertices are the n points w_j = f(x_j) where j= 1,2,3,......n-1 and w_n = f(∞). The function f must be as such that argf'(z) jumps from one constant value to another at points z=x_j as the point z traces out of the x axis.
If the function \( f \) is chosen or expressed such that

\[
f'(z) = A(z - x_1)^{-k_1}(z - x_2)^{-k_2}(z - x_3)^{-k_3} \ldots \ldots (z - x_{n-1})^{-k_{n-1}} \quad (3)
\]

Where \( A \) is the complex constant and each \( k_3 \) is a real constant then the argument of \( f'(z) \) changes in the prescribed manner as \( Z \) depicts the real axis then we can express the argument of the derivative (3) as

\[
\text{Arg } f'(z) = A \cdot (z - x_1)^{-k_1} \cdot (z - x_2)^{-k_2} \ldots \ldots (z - x_{n-1})^{-k_{n-1}} \quad (4)
\]

When \( z = x \) and \( x < x_1 \) then

\[
\text{Arg } (z-x_1) = \text{Arg } (z-x_2) = \cdots = \text{Arg } (z-x_{n-1}) = \pi
\]

When \( x_1 < x < x_2 \) the argument \( \text{arg } (z-x_1) \) is 0 and each of the other argument is \( \pi \).

According to the equation (4), then \( \text{Arg } f'(z) \) increases suddenly by the angle \( k_1 \pi \) as \( z \) moves to the right through the point \( z = x_1 \). It again jumps in value by the amount \( k_2 \pi \) as \( z \) passes through the point \( x_2 \). When a finite point \( z = x_n \) on the \( x \) axis instead of the point at infinity represents the point whose image is the vertex \( w_n \). It exposes that the Schwarz-Christoffel transformation takes of the form

\[
w = A \int_{x_0}^z (s - x_1)^{-k_1} (s - x_2)^{-k_2} \ldots \ldots (s - x_n)^{-k_n} \, ds + B \quad (5)
\]

Where \( k_1 + k_2 + k_3 + \ldots + k_n = 2 \quad [1] \)

**Research Elaborations**

In this section we will discussed Schwarz-Christoffel transformation to some degenerate polygons for which the integrals represent elementary functions. For purposes of research and materials here we discuss two examples in transformation where the Schwarz-Christoffel transformation maps the half plane onto the strip and the strip onto the half plane [2].
Example 1: Here we show that the transformation \( w = \sin z \) is a one-one mapping of the semi infinite strip \( -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}; y \geq 0 \) in the \( z \) plane of the upper half \( \nu \geq 0 \) of the \( w \) plane.

At first we show that the boundary of the strip is mapped in a one-one manner onto the real axis of the \( w \) plane as focused in figure -2. The image of the line segment BA is found by writing \( x = \pm \frac{\pi}{2} \) in the equation \( u = \sin x \cosh y \) and \( v = \cos x \sinh y \) and restricting \( y \) to be nonnegative. Since \( u = \cosh y \) and \( v = 0 \) when \( x = \frac{\pi}{2} \), a typical point \((\frac{\pi}{2}, y)\) on BA is mapped onto the point \((\cosh y, 0)\) in the \( w \) plane and that image must move to the right from B' along the \( u \) axis as \((\frac{\pi}{2}, y)\) moves upward from B. A point \((x, 0)\) on the horizontal system DB has image \((\sin x, 0)\) which moves to the right from D' to B' as \( x \) increases from \( x = -\frac{\pi}{2} \) to \( x = \frac{\pi}{2} \) or \( x \) goes from D to B.

![Diagram](image)

Figure-02

At the end, as a point \((-\frac{\pi}{2}, y)\) on the line segment DE moves upward from D, its image \((- \cosh y, 0)\) moves from left from D' as shown in directed fig-02.

Now each point in the interior \( \frac{\pi}{2} < x < \frac{\pi}{2}, y > 0 \) of the strip lies on one of the vertical half lines \( x = c_1, y > 0 \), \( (-\frac{\pi}{2} < c_1 < \frac{\pi}{2}) \) that are also shown. Also it is important to note that the images of those half lines are distinct and constitute the entire half plane \( \nu \geq 0 \).

This completes our presentation that the transformation \( w = \sin z \) is a one-one mapping of the strip \( \frac{\pi}{2} < x < \frac{\pi}{2}, y \geq 0 \) onto the half plane \( \nu \geq 0 \).

Example- 2: Let us consider another strip \( 0 < \nu < \pi \) as the limiting form of the rhombus with vertices at the points \( w_1 = \pi i, w_2, w_3 = 0 \) and \( w_4 \) as the points \( w_2 \) and \( w_4 \) are moved infinitely far to the left to right respectively (Fig -03). In the limit of the exterior angles become

\[ k_1 \pi = 0; k_2 \pi = \pi; \ k_3 \pi = 0; k_4 \pi = \pi. \]

We leave \( x_1 \) to be determined and chose the values \( x_2 = 0, x_3 = 1, x_4 = \infty \).

![Diagram](image)
Making the derivation of Schwarz-Christoffel mapping function becomes

\[ \frac{dw}{dz} = A(z - x_1)^0 z^{-1} (z - 1)^0 \]

Then we can get \( W = A \log z + B \)

Now if \( B = 0 \) because \( w = 0 \) when \( z = 1 \). The constant \( A \) must be real because the point \( w \) lies on the real axis when \( z = x \) and \( x > 0 \). The point \( w = \pi i \) is the image of the point \( z = x_1 \), where \( x_1 \) is a negative number;

Consequently, \( \pi i = A \log x_1 \)

\[ = A \ln x_1 + A \pi i \]

By identifying real and imaginary parts here, we see that \( x_1 = 1 \) and \( A = 1 \)

Hence the transformation becomes \( w = \log z \).

So we can understand that this transformation maps the half plane onto the strip.

The procedure used in these two examples is not in critical conditions because limiting values of angles and co ordinates were not introduced in an orderly way. Limiting values were used whenever it seemed to be appropriate to do so. But if we verify the mapping obtained, it is not essential that we justify the steps in our derivation of the mapping function. The method which is used here are less tedious and simpler.

**Results and Discussions**

Now let us consider the two dimensional steady fluid flow between two parallel planes \( v=0 \) and \( v=\pi \) when the fluid is entering through a narrow slit along the line in the first plane that is perpendicular to the uv plane at the origin. Let the rate of flow of fluid into the channel through the slit be \( Q \) units of volume per unit time for each unit of depth of the channel where the depth is measured perpendicular to the uv plane. The rate of flow out at either end is then \( Q/2 \).

The transformation \( w=\log z \) is a one one mapping of the upper half \( y > 0 \) of the \( z \) plane onto the strip \( 0 < v < \pi \) in the \( w \) plane (Example-2).
The inverse transformation $z = e^w = e^u e^{i\omega}$ (6)

Maps the strip onto the half plane. Under the transformation (6) the image of the u axis is the positive of the x axis and the image of the line $v=\pi$ is the negative half of the x axis. Hence the boundary of the strip is transformed into the boundary of the half plane.

*Electrostatics potential about an edge of a conducting plate*

Two parallel conducting plates of infinite extent are kept at the electrostatic potential $V=0$ and a parallel semi infinite plate placed midway between them, is kept at the potential $V=1$.

The coordinate system and the unit of length are chosen so that the plates lie in the planes $v=0$, $v=\pi$ and $v = \frac{\pi}{2}$ (Fig-05). Let us find out the potential function $V(u,v)$ in the region between those plates.

The cross section of that region in the uv plane has the limiting form of the quadrilateral bounded by the dashed lines in figure-05, as the point’s $w_1$ and $w_3$ move out to the right and $w_4$ to the left. In applying the SchwarzChristoffel transformation here, we let the point $x_4$, corresponding to the vertex $w_4$, be the point at infinity. We choose the points $x_1=-1, x_3=1$ and leave $x_2$ to be determined. The limiting values of the exterior angles of the quadrilateral are

$$k_1\pi = \pi; k_2\pi = -\pi; k_3\pi = k_4\pi = \pi$$

Thus

$$\frac{dw}{dz} = A(z-x_2) \left( z+1 \right)^{-1} \left( z-1 \right)^{-1}$$

$$= A \left( \frac{z-x_2}{z^2-1} \right)$$

$$= \frac{A}{2} \left( \frac{1+x_2}{z+1} + \frac{1-x_2}{z-1} \right)$$

And so the Schwarz-Christoffel transformation of the upper half of the z-plane into the divided strip in the w plane goes to the form

$$w = \frac{A}{2} \left[ (1+x_2) \log(z+1) + (1-x_2)\log(z-1) \right] + B$$

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Improvement in Estimating the Population Mean Using Exponential Type Estimator in the Presence of Non-Response

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Abstract- This paper proposes a class of exponential type estimator to estimate the population mean \( \overline{Y} \) in the presence of non-response adapting the estimators suggested by Singh et.al [1], Kumar and Bhougal [2], and Rachokarn and Lawson [3]. The general expressions for bias and MSE of the proposed class of estimator have been obtained. In addition, theoretical and numerical studies were used in order to access the performance of proposed class of estimator. The results of this study showed that the proposed class of estimator is always efficient under the percent relative efficiencies (PREs) criterion as compared to other relevant estimators.

Index Terms- Exponential estimator, Study variable, Auxiliary variable, Non-response.

I. INTRODUCTION

In the survey sampling practice, many statisticians attempt to improve the performance of interest estimators by focusing on the uses the benefits of auxiliary information. Unfortunately, in many practical of survey sampling, the required data cannot be collected from all units in the sample, which is an important problem caused by non-response. An estimate derived from such incomplete data may be lead to misleading interpretation and conclusions. In order to deal with such situations, the technique of Hansen and Hurwitz [4] is utilized.

Let \( (Y_i, X_i) \) be the non-negative values for the \( i^{th} \) unit of the population \( U = (U_1, U_2, \ldots, U_N) \) on the study variable and the auxiliary variable \( x \) with their population means \( (\overline{Y}, \overline{X}) \). Supposed the population \( U \) of size \( N \) is divided in \( N_1 \) responding units and \( N_2 = N - N_1 \) non-responding units. Using simple random sampling without replacement (SRSWOR), a sample of size \( n \) is drawn from the population of size \( N \) which observed that \( n_1 \) responding units and \( n_2 \) non-responding units. From \( n_2 \) non-responding units, a sub-sample of size \( r = n_2 / k; k > 1 \) is randomly drawn again by making extra efforts.

Therefore, the estimator for \( \overline{Y} \) and \( \overline{X} \) based on \( n_1 + r \) proposed by Hansen and Hurwitz [4] are given respectively by:

\[
\overline{Y}^* = (n_1 / n)\overline{Y}_1 + (n_2 / n)\overline{Y}_2, \tag{1}
\]

\[
\overline{X}^* = (n_1 / n)\overline{X}_1 + (n_2 / n)\overline{X}_2, \tag{2}
\]

The estimator (1) and (2) are unbiased with variance

\[
V(\overline{Y}^*) = \lambda S^2_Y + \lambda^* S^2_{Y(2)}, \tag{3}
\]

\[
V(\overline{X}^*) = \lambda S^2_X + \lambda^* S^2_{X(2)}, \tag{4}
\]

where \( (\overline{Y}_1, \overline{X}_1) \) are the sample means that based on \( n_1 \) of study and auxiliary variables respectively. In the other hand \( (\overline{Y}_2, \overline{X}_2) \) are respectively sub sample means based on \( r \) of study and auxiliary variables.

\[
\lambda = (N - n) / Nn, \quad \lambda^* = W_2(k - 1) / n, \quad W_2 = N_2 / N, \quad S^2_Y = \sum_{i=1}^{N} (Y_i - \overline{Y})^2 / (N - 1), \quad S^2_{Y(2)} = \sum_{i=1}^{N_2} (Y_i - \overline{Y}_2)^2 / (N_2 - 1), \quad S^2_X = \sum_{i=1}^{N} (X_i - \overline{X})^2 / (N - 1), \quad S^2_{X(2)} = \sum_{i=1}^{N_2} (X_i - \overline{X}_2)^2 / (N_2 - 1).
\]

Using technique of Hansen and Hurwitz [4], Singh et.al [1] introduced an exponential ratio and product type estimators for the population mean \( \overline{Y} \) when non-response occurs, are respectively given by

\[
t_1 = \overline{Y}^* \exp \left( \frac{\overline{X} - \overline{X}^*}{\overline{X} + \overline{X}^*} \right) \tag{5}
\]

\[
t_2 = \overline{Y}^* \exp \left( \frac{\overline{X}^* - \overline{X}}{\overline{X}^* + \overline{X}} \right) \tag{6}
\]
Later, Kumar and Bhougal[2] extended the Singh et.al [1] by proposing a class of ratio-product estimators for estimating population mean $\bar{Y}$ of the study variable $Y$ in presence of non-response, as

$$t_3 = \bar{Y} \left[ \gamma \exp \left( \frac{\bar{X} - \bar{X}}{\bar{X} + \bar{X}} \right) + (1 - \gamma) \exp \left( \frac{\bar{X} - \bar{X}}{\bar{X} + \bar{X}} \right) \right]$$  (7)

where $\gamma$ is the arbitrary constant number.

Recently, Rachokarn and Lawson [3] proposed a family of estimator to estimate the population mean $\bar{Y}$ for incomplete data due to non-response problems, as

$$t_4 = \bar{Y} \left( \frac{a\bar{X} + b}{a(a\bar{X} + b) + (1 - a)(a\bar{X} + b)} \right)^{\gamma}$$  (8)

where $a(a \neq 0)$ and $b$ are either real numbers or functions of population parameters, and $\alpha, \gamma$ are suitably chosen constants.

To the first degree of approximation, the mean squared errors (MSEs) and minimum MSE of the estimator $t_1$, $t_2$, $t_3$, and $t_4$ are respectively given by

$$\text{MSE}(t_1) = \bar{Y}^2 \begin{bmatrix} A_1 + \frac{A_2}{4} - A_3 \end{bmatrix}$$  (9)

$$\text{MSE}(t_2) = \bar{Y}^2 \begin{bmatrix} A_2 + \frac{A_1}{4} + A_3 \end{bmatrix}$$  (10)

$$\text{Min.MSE}(t_3) = \text{Min.MSE}(t_4) = \bar{Y}^2 \begin{bmatrix} A_1 - \frac{A_2^2}{A_2} \end{bmatrix}$$  (11)

where

$$A_1 = \lambda C_y \gamma^2 + \lambda^* C_y^2(\tau), \quad A_2 = \lambda C_x + \lambda^* C_x(\tau), \quad A_3 = \lambda C_{xy} + \lambda^* C_{xy}(\tau),$$

$$C_y = S_y / \bar{Y}, \quad C_x = S_x / \bar{X}, \quad C_{xy} = S_{xy} / \bar{Y} \bar{X}, \quad C_{yxy}(\tau) = S_{yxy}(\tau) / \bar{Y} \bar{X}.$$

In this study, the authors propose a class of exponential type estimator for population mean $\bar{Y}$ of a study variable under the assumption that the population mean $\bar{X}$ of auxiliary variable $x$ is known and information on the study and auxiliary variables is incomplete. Motivation for the proposed class of estimator is based on Singh et.al [1], Kumar and Bhougal[2], and Rachokarn and Lawson [3]. The general expressions for bias and MSE of the proposed class of estimator have been obtained up to the first order of approximation. In addition, comparative studies of the proposed class of estimator with other relevant estimators have been considered through the theoretical and numerical studies, which show that the performance of the proposed class of estimator was clearly more efficient than the other relevant estimators.

II. THE PROPOSED CLASS OF ESTIMATOR

On getting motivation from Singh et.al [1], Kumar and Bhougal[2], and Rachokarn and Lawson [3] when the population mean $\bar{X}$ of auxiliary variable $x$ is known in advance. A class of exponential type estimator to estimate the population mean $\bar{Y}$ in the presence of non-response has been proposed, as

$$t_5 = \bar{Y} \left( \frac{a\bar{X} + b}{a(a\bar{X} + b) + (1 - a)(a\bar{X} + b)} \right)^{\gamma} \left[ \gamma \exp \left( \frac{\bar{X} - \bar{X}}{\bar{X} + \bar{X}} \right) + (1 - \gamma) \exp \left( \frac{\bar{X} - \bar{X}}{\bar{X} + \bar{X}} \right) \right]$$  (12)

where $\bar{Y}$ are the Hansen and Hurwitz [4] estimator for population mean of the study variable.

Note that: the proposed class of estimator $t_5$ can reduce to the estimator $t_1$, $t_2$, and $t_3$ when one replace the parameters $g = 0$ and $\gamma = 1$, $g = 0$ and $\gamma = 0$, and $g = 0$ into equation (12) respectively.

III. BIAS AND MSE OF THE PROPOSED CLASS OF ESTIMATOR

Whenever the sample size is large compared to the population size, one can retain only the terms of order $n^{-1}$ and ignore all terms of order greater than or equal to $n^{-2}$. To study the large sample properties of the proposed estimator, the following notations are used: $\bar{Y} = \bar{Y}(1 + e_0)$, $\bar{Y} = \bar{X}(1 + e_1)$.

Then, one have

$$E(e_0^2) = E(e_1^2) = 0, \ E(e_0 e_1) = \lambda C_y^2 + \lambda^* C_y(\tau) = A_1,$$

$$E(e_0^2) = \lambda^2 C_x^2 + \lambda^* C_x(\tau) = A_2, \ E(e_0 e_1^*) = \lambda C_{xy} + \lambda^* C_{xy}(\tau) = A_3.$$

The equation (12) can be rewritten in terms of $e$’s, as

$$t_5 = \bar{Y}(1 + e_0)(1 + \alpha e_1) \gamma \exp \left[ -\frac{e_0^*}{2} \left( 1 + \frac{\alpha e_1}{2} \right) \right] + (1 - \gamma) \exp \left[ \frac{e_1^*}{2} \left( 1 + \frac{e_1}{2} \right) \right]$$  (13)

where $\tau = a\bar{X} / (a\bar{X} + b)$.

Expanding the right hand side of equation (13), multiplying out, and then subtracting $\bar{Y}$ on both sides, one have

$$t_5 - \bar{Y} = \bar{Y} \left[ \left( \frac{\gamma - 1}{2} + g\alpha \right) e_1^* \right.$$

$$+ \left( \frac{\gamma - 1}{2} + g\alpha \right) e_1^* \left( \frac{\gamma - 1}{2} + g\alpha \right) e_1^*$$

$$\left. - g\alpha \right] \bar{Y} - \bar{Y}$$  (14)
The Bias of the proposed class of estimator to the first order of approximation is obtained by taking expectations on both sides of equation (14), one have

\[
Bias(t_3) = \frac{Y}{8} \left[ (4\gamma - 1 + 8\gamma \alpha \tau - 4\gamma \alpha \tau + 4\gamma (g + 1)\alpha^2) \phi_2 - 4(2\gamma - 1 + 2\gamma \alpha \tau) \phi_3 \right]
\]

(15)

Similarly, MSE of the proposed class of estimator is obtained by squaring and taking expectations on both sides of equation (14), one get

\[
MSE(t_3) = \frac{Y}{8} \left[ \phi_2 + (\gamma - \frac{1}{2} + \gamma \alpha \tau)^2 \phi_2 - 2(\gamma - \frac{1}{2} + \gamma \alpha \tau) \phi_3 \right]
\]

The MSE of the proposed class of estimator in equation (16) is minimized when

\[
\gamma = \frac{2A_1 - (2\gamma \alpha \tau - 1)A_2}{2A_2} = \gamma_{(opt.)}
\]

(17)

Substituting the equation (17) in equation (16), one gets the minimum MSE of the proposed class of estimator given by

\[
Min.MSE(t_3) = MSE(t_{3(opt.)}) = \frac{Y}{8} \left[ \phi_2 - A_1^2 \phi_3 \right]
\]

(18)

IV. COMPARISON OF THE PROPOSED CLASS OF ESTIMATOR WITH THE RELEVANT ONES

In this section, the authors compare the efficiency of the proposed class of estimator \(t_{3(opt.)}\) with the various relevant estimators such as the unbiased estimator \(\overline{Y}\), the estimator \(t_1\), \(t_2\), \(t_3\), and \(t_4\) by considering expressions of MSE from these estimators up to the first order of approximation. The details are as follows:

\[
MSE(\overline{Y}) - Min.MSE(t_3) = A_2^2 > 0
\]

(19)

\[
MSE(t_1) - Min.MSE(t_3) = (A_2 - 2A_3)^2 > 0
\]

(20)

\[
MSE(t_2) - Min.MSE(t_3) = (A_2 + 2A_3)^2 > 0
\]

(21)

\[
Min.MSE(t_3) = Min.MSE(t_4) = Min.MSE(t_5) = \frac{Y}{8} \left[ \phi_2 - A_1^2 \phi_3 \right]
\]

(22)

Therefore, when the conditions (19) to (21) are satisfied, one can infer that the proposed class of estimator \(t_{3(opt.)}\) will be more efficient than the other relevant estimators.

V. NUMERICAL STUDY

To study the performance of the estimator discussed in the present paper, the authors considered the data set given in Hazra[5]. The data consists of a list of 96 villages in West Bengal India along with their populations in 1981, assumed that the number of agricultural labors and the area of the village were taken as the study and auxiliary variables respectively. In this study, the 24 villages, whose area was greater than 160 hectares, have been considered to contain non-response. The population parameters and the constants computed from this population are given as follows:

\[
N = 96, \quad n = 40, \quad \overline{X} = 144.87, \quad \overline{Y} = 137.93, \quad C_x = 0.81, \quad C_y = 1.32, \quad \rho_{xy} = 0.77, \quad C_s(2) = 0.94, \quad C_y(2) = 2.08.
\]

The criteria for comparing the efficiency of estimators in this study, the percent relative efficiencies (PREs) of different estimators with respect to the unbiased estimator \(\overline{Y}\) for various values of \(k\) have been used and presented in Table 1 as follows:

<table>
<thead>
<tr>
<th>Estimator</th>
<th>(1/k)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\overline{Y})</td>
<td>100.00</td>
</tr>
<tr>
<td>(2550.98)</td>
<td>(2034.67)</td>
</tr>
<tr>
<td>141.99</td>
<td>143.01</td>
</tr>
<tr>
<td>(1796.56)</td>
<td>(1422.70)</td>
</tr>
<tr>
<td>70.72</td>
<td>70.26</td>
</tr>
<tr>
<td>(3607.23)</td>
<td>(2895.84)</td>
</tr>
<tr>
<td>213.79</td>
<td>215.05</td>
</tr>
<tr>
<td>(1193.20)</td>
<td>(946.15)</td>
</tr>
</tbody>
</table>

*Figures in parenthesis give the MSE (.).

From Table 1, one observed that the PREs of estimator \(t_1\), \(t_2\), \(t_4\), and \(t_{3(opt.)}\) decreases as the value of \(k\) increases, while the PRE of estimator \(t_4\) increase as the value of \(k\) increases. It is also noted that the estimator \(t_3\), \(t_4\), and \(t_{3(opt.)}\) under minimum conditions perform better than the estimator \(\overline{Y}\), \(t_1\), and \(t_2\). Therefore, one can infer that, besides the estimator \(t_{3(opt.)}\), the estimator \(t_3\) and \(t_4\) can use also in practice.

VI. CONCLUSION

The present article considers the problem of estimating the population mean \(\overline{Y}\) of a study variable \(Y\) in the presence of non-response when non-response occurs on both the study and auxiliary variables while the population mean \(\overline{X}\) of auxiliary variable is known. Following Singh et.al [1], Kumar and Bhogal [2], and Rachokarn and Lawson [3], a class of exponential type estimator has been proposed and their properties are studied. The minimum MSE of the proposed class of estimator is also obtained. Furthermore, one also investigated the relation between the proposed class of estimator and other relevant estimators in
terms of the percent relative efficiencies (PREs). The results from the theoretical and numerical studies can be confirmed that the proposed class of estimator have the best efficiency as same as the estimator proposed by Kumar and Bhogal (2011), and Rachokarn and Lawson (2016) and it has efficiency better than the estimator considered by Singh et.al (2010). Therefore, one can recommend that the proposed class of estimator is efficient and should be used in practical surveys.

REFERENCES

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Analysis of Students’ Difficulties in Transferring Calculus Knowledge to Physics: The Case of Mettu University

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Abstract: This research investigated students’ transfer of learning from calculus courses knowledge to an introductory physics course. In this study we used interviews and questionnaires methods to assess the extent to which students transfer their calculus knowledge when solving problems in a physics course. Difficulty problems present interviewees with an intermediate step in the form of a mathematical integration and ask students to come up with a physical scenario relevant to the integral provided. Results indicate that students often had difficulty taking apart the given problem and they needed prompting to connect the calculus knowledge with the physics problem. We also observe the result from pre-test to interviews of the students’ background and knowledge of calculus, which is very poor. Generally, from all tests, quiz and final exam of students result almost 45% of them transfer calculus knowledge to introductory physics courses whereas 55% of them are still with confusion of identifying the derivatives and integrands. This is proven by questioning their calculus instructors and introductory physics instructors. Both department instructors are satisfied very deeply 28.6% to students calculus background, 42.9% medium, 14.3% deep and shallow satisfaction calculus respectively.

Keywords: Calculus, calculus instructor, physics course, Students’ difficulties, Transferring knowledge

I. INTRODUCTION

“...it is impossible to explain honestly the beauties of the laws of nature in a way that people can feel, without their having some deep understanding of mathematics.” (Feynman, 1992)

There are many other physicists emphasizing like Feynman the deep interrelation between mathematics and physics. It is not the technical toolbox mathematics provides but rather the creative aspect producing new insights into physical structures that hints at a deep conceptual relation between both sciences. Einstein for example states that “Our previous experience justifies the belief that nature is the realization of the most basic mathematical thoughts. [...] Experience remains certainly the sole criterion of usefulness of a mathematical structure for physics. But the truly creative principle is in mathematics” (Einstein, 1956).

Calculus is the “language of change” and has been considered one of the fundamental courses for engineering and science majors. The calculus reform movement began because of mathematicians’ dissatisfaction with undergraduate calculus education. The calculus reform movement suggested changes in calculus instruction that emphasized deep understanding of calculus concepts and their applications in problem situations. In spite of the advances of the calculus reform movement, multiple-choice and short-answer questions still appear to be the dominant tools to assess students’ learning in calculus. Since the ancient times, mathematics played a major part in the study of nature. Today, most physics instructors would agree that mathematics is the language of physics. Thus, it is imperative for students to have a solid mathematical background in order to succeed in physics courses. Research has reported that students are unable to explain their own solutions to physics problems within a mathematical context.

Today the fundamentals of calculus and classical physics are taught at the high school, college and university level throughout the world. Yet these two subjects are so closely related that may be important to investigate how this century students see the connection between calculus and physics. Unlike few countries, in Ethiopia, these classes are typically taught sequentially, calculus followed by physics, it is also relevant to investigate, and how students apply or transfer the knowledge they learned in their calculus course in to physics courses. Many researches are made in different countries in a similar perspective.

Most science and engineering majors are required to take calculus-based physics. Students are usually required to concurrently take both their first calculus and physics courses, or take at least one calculus course prior to taking physics. To understand how students apply what they have earned in a calculus course to a physics course, it is essential to investigate their transfer of learning. Transfer of learning as (Byrnes, 1996), has often been referred to as the ultimate goal of education and is defined as the ability to apply what has
been learned in one context to a new context. In most cases, students were unable to apply a principle or schema extracted from a particular learning situation to a new target situation. Throughout our experience of teaching we have often seen some physics teachers claiming that their students lack the pre-requisite calculus knowledge that could help them to solve the physics problems. Many students also perform poorly in introductory calculus-based physics courses. In addition, only few students are willing to join the physics department. Therefore it is essential to investigate the real problem entrenched behind all these by researching their transferring ability of calculus knowledge to physics. In this research then it was attempted to explore the problem in Mettu University, in the undergraduate physics students. Therefore, investigating transfer of learning from calculus to physics is the central focus of this study.

**Statement of the problem**
Most physics students, in Ethiopian universities, have seen refusing to study physics by their first, second, or third choice. They even do not like it; however, they obliged to study physics by their last choice. As a result, most instructors had seen complaining by assuming that they did not have mathematics and physics background in preparatory level as well as at the university level. In our teaching experience, most students have focused on the mathematics than the physical concepts; that is they have gotten the answer of the problems by calculating but they cannot explain what does the physical meaning of the result. Moreover, they have seen facing difficulties to interpret the physical meaning in to mathematical meaning and solve the physics problems. Therefore, the researchers believed that students have difficulties in transferring the knowledge they had acquired from calculus in to the introductory physics courses.

To investigate the transfer of knowledge from calculus to physics, the following research questions were raised and answered by this research.

1. To what extent do students retain and transfer their calculus knowledge when solving problems in the introductory physics courses?
2. What are the main difficulties of students not to capture the knowledge and transfer what they have learned in calculus to introductory physics?
3. What strategies may facilitate students’ transfer of knowledge from calculus to physics?

**Objective of the study**
The main objective: The main aim of this study is to explore and suggest ways of solving the difficulties of the Mettu University physics students transferring ability of calculus knowledge to physics.

**The specific objectives**
The specific objectives are:

- To investigate to what extent students retain and transfer the calculus knowledge in to physics.
- To sort out the main difficulties of students to transfer knowledge of calculus to physics
- To indicate the strategies that help students to transfer the calculus knowledge to physics.
- To indicate the strategies that help instructors how to teach calculus and physics.

**Significance of the study**
Both instructors and students were benefited from the result of this study. Since most instructors have applied science backgrounds, pinpointing the difficulties and the strategies of transferring knowledge of calculus in to physics will have an immense use to teach calculus and introductory physics. In addition, it will serve as springboard to young researchers who are interested in this field of study for further investigation.

**Population of the study and sampling technique**
In this study, the population was all first year applied physics majors students who took electromagnetism in the second semester of 2012/13 academic year. Seven instructors who taught calculus course and eight instructors who taught electromagnetism in the previous semesters and those offered these courses during the second semester of the academic year were also participated.
II. RESEARCH DESIGN AND METHODS

A grounded theory approach was used at the beginning of this study to understand the problem deeply and then descriptive survey study was employed to collect and analyze data from a wide range of sources. Interviews were designed for seven volunteer students and questionnaires for seven calculus and eight physics instructors who offered/ offering the course. The information gathered from different sources was analyzed qualitatively and quantitatively.

Research methods

Grounded theory approach was used at the beginning of this study to excavate the data carefully. Descriptive survey was then employed to see the existing relationship between calculus and physics and the practice of instructors that exists. Descriptive research, according to (Best, 1970), is concerned with conditions or relationships that exist, practices that prevail, beliefs, points of views, or attitudes that are held, processes that are going on, effects that are being felt, or trends that are developing. Descriptive research is also concerned with how what is or what exists is related to some preceding event that has influenced or affected a present condition or event.

Materials and methods

The following primary data gathering instruments were used in order to collect the sufficient information.

Questionnaire

A questionnaire is the most popular type of data gathering instrument, which used to collect appropriate information easily. The questionnaires for eight physics instructors who offered the course electricity and magnetism and those mathematics instructors who offered calculus courses were participated. The questionnaire contained both close-ended and open-ended items. The close-ended items were comprised of options while the open-ended items have a space to suggest their idea.

Interview: The interview was conducted for volunteer 4 female and 3 male students and was paid to compensate the time they spent.

Tests and Exams

The tests and exams, which were administered to the students, were taken from Lilli Cui’s (2006) research and their reliability was tested. Such tests were similar to the chapter end problems and they were calculus based.

Data sources and data analysis techniques

Source of Data

The information from calculus and electromagnetism instructors was gathered with the questionnaires, the necessary information was also gathered with in depth interview of seven volunteer students. The information from tests and exams was also gathered to get all the essential information.

Method of data analysis

The data, which were collected through questionnaires: the closed ended questions, were analyzed quantitatively using mean and percentage. However, the data gathered from the open-ended questions, the interview, tests and exams were analyzed qualitatively using the descriptive analysis technique and the grounded theory analysis techniques as Strauss and Corbin (1998): open coding, analysis of axial coding and selective coding.

III. MAJOR FINDINGS

The information gathered from Test1 (T1), interviews (I), Test2 (T2), questionnaires and final exams were presented and analyzed qualitatively and quantitatively and interpreted accordingly.

Pre-test: Before starting the entire research, each participant was assigned a written test, which was comprised of pure calculus questions to investigate students existing status of calculus knowledge. A brief summary of the result was presented in table-1 below.

| Table 1. A Pre-test: Students’ result on pure calculus question. |
Pie chart 1: Students result out of 33 on based research pallet exam.

**Interpretation:** From the above table and pie chart, it is possible to say that 67.5% of the respondents didn’t have deep, background knowledge in calculus. Majority of the respondents, 77.5%, who were enrolled to study applied physics in the year 2011/12 have scored less than 50% in pure calculus test.

In a similar way students were interviewed in this respect. It was summarized as followed: students have learned calculus in preparatory schools. However, they have difficulties to understand the concept of calculus though they can solve the problems using similar contexts as the example given in the chapter end questions.

From the analysis of written pre-test provided one of students’ difficulties was confusion between derivatives and integral. However, for the majority of responses, it was not clear whether or not the students had an in-depth understanding of the definite integral concepts because most of the responses provided by the students lacked detail.

**Analysis of students’ responses from tests and exams**
Table 2.(Test 1). Students’ result out of six on calculus based physics test
From table 2 we observe that the percentage result of scoring students between 0 – 0.9 is 52.5%, between 1 – 2 is 17.5%, between 2 – 3 is 20%, between 3.1 – 4.5 is 7.5% and between 4.6 -6 is 2.5%. This implies that almost student have less background calculus transfer to physics.

Table 3. (Test 2) Students’ result out of 6 on calculus based physics test

<table>
<thead>
<tr>
<th>Students’ score -6%</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18</td>
<td>45.0</td>
<td>45.0</td>
<td>45.0</td>
</tr>
<tr>
<td>0.5</td>
<td>2</td>
<td>5.0</td>
<td>5.0</td>
<td>50.0</td>
</tr>
<tr>
<td>1-1.9</td>
<td>4</td>
<td>10.0</td>
<td>10.0</td>
<td>60.0</td>
</tr>
<tr>
<td>2-2.9</td>
<td>4</td>
<td>10.0</td>
<td>10.0</td>
<td>70.0</td>
</tr>
<tr>
<td>3-4.5</td>
<td>9</td>
<td>22.5</td>
<td>22.5</td>
<td>92.5</td>
</tr>
<tr>
<td>4.6-6</td>
<td>3</td>
<td>7.5</td>
<td>7.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The above table reveal that 45% of the respondents score zero out of 6 and 70% of them were scored less than half, whereas, 30% of the respondents score more than half in this test. From students result basic difficulty in determining of the limit of integration calculus concept in physics can be observed.

Table 4. (Final exam). The respondents’ result on final exam out of 17%

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.9</td>
<td>10</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>1-2.4</td>
<td>7</td>
<td>17.5</td>
<td>17.5</td>
<td>42.5</td>
</tr>
<tr>
<td>2.5-3.9</td>
<td>6</td>
<td>15.0</td>
<td>15.0</td>
<td>57.5</td>
</tr>
<tr>
<td>4-4.9</td>
<td>2</td>
<td>5.0</td>
<td>5.0</td>
<td>62.5</td>
</tr>
<tr>
<td>5-6.5</td>
<td>5</td>
<td>12.5</td>
<td>12.5</td>
<td>75.0</td>
</tr>
<tr>
<td>6.6-8</td>
<td>3</td>
<td>7.5</td>
<td>7.5</td>
<td>82.5</td>
</tr>
<tr>
<td>9-9.5</td>
<td>2</td>
<td>5.0</td>
<td>5.0</td>
<td>87.5</td>
</tr>
<tr>
<td>10-13</td>
<td>4</td>
<td>10.0</td>
<td>10.0</td>
<td>97.5</td>
</tr>
<tr>
<td>13.5-17</td>
<td>1</td>
<td>2.5</td>
<td>2.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

From table 4, the numbers of students scored out of 17 between 13.5-17 and 0-0.9 are 1 and 10 respectively. The percentage of respondents getting marks between 0-0.9 and 13.5-17 is 25% and 2.5% respectively and most of the students scored less than one, therefore, we can conclude that applied physics students have poor performance on calculus based physics exams.
Analysis of the responses from calculus and physics instructors

Information was gathered through questionnaires from both calculus and physics instructors and was analyzed and interpreted as follow.

a) Analysis of the responses from calculus instructors

Table 5. Instructors’ response about students’ background of calculus knowledge.

<table>
<thead>
<tr>
<th>value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very deep</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
</tr>
<tr>
<td>Deep</td>
<td>1</td>
<td>14.3</td>
<td>42.9</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
<td>42.9</td>
<td>85.7</td>
</tr>
<tr>
<td>Shallow</td>
<td>1</td>
<td>14.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Pie chart 2. Instructors’ response about students’ background of calculus

From the above table and pie chart, students’ background understanding in calculus, as viewed by instructors was medium (42.9%). However, 28.6% of them said students have very deep understanding and 14.3% of them said they have deep understanding. So, majority of the instructors believe that students have medium understanding of the calculus concept however, in the preliminary calculus test it was revealed that majority students who were registered as physics major have little knowledge of calculus except few students that is 22.5% of them scored above half.

As seen in the table 6 all participant instructors were taught calculus while the research was made or before one semester. So it is possible to say that all participants gave genuine and reliable information to this study.
Table 7. Calculus Instructors’ response about their most instructional methods.

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture methods</td>
<td>3</td>
<td>42.9</td>
<td>42.9</td>
<td>42.9</td>
</tr>
<tr>
<td>Gapped lecture</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>71.4</td>
</tr>
<tr>
<td>Group discussion</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Tt total</td>
<td>7</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Bar graph 1: Calculus Instructors’ response on use of instructional methods.

As above on the table most instructors use lecture methods and gapped lecture and group discussion when they believed appropriate to teach introductory calculus. This implies that the instructors were in a hurry to finish the course by simply lecturing the concepts mostly.

Table 8. Mathematics instructors’ response about the calculus knowledge/skills that established by students after end course.

<table>
<thead>
<tr>
<th>VALUE</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5</td>
<td>71.4</td>
<td>71.4</td>
<td>71.4</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/12 first semester</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>28.6</td>
</tr>
<tr>
<td>2012/13 first semester</td>
<td>1</td>
<td>14.3</td>
<td>14.3</td>
<td>42.9</td>
</tr>
<tr>
<td>2012 second semester</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>71.4</td>
</tr>
<tr>
<td>2013/ second semester</td>
<td>1</td>
<td>14.3</td>
<td>14.3</td>
<td>85.7</td>
</tr>
<tr>
<td>Before 2011/12 first semester</td>
<td>1</td>
<td>14.3</td>
<td>14.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Bar graph 2: Mathematics instructors’ response about calculus knowledge/skills

Table 8 and bar graph reveals that most mathematics instructor response calculus knowledge/skill that established to student after end of the calculus course. We suggest that the instructors’ knowledge/skill were transformed efficiently to maximum potential so student will be capable of calculus concept.

Table 9. Calculus instructors response concerning the belief that calculus knowledge/skills that established by their students are useful for other subjects.

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5</td>
<td>71.4</td>
<td>71.4</td>
<td>71.4</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Pie chart 3: Calculus instructor course coverage for given academic semester.

As seen from chart 3 majority of the calculus instructors, that is 71.43% of them, covered all of the topics that must be covered with in the semester. On the other hand 28.4% of the instructors couldn’t cover the topics. It has its own influence in the performance of calculus as well as physics.
From the above table and graph we can see that majority of the instructors that is, 71.4% of them, agreed and have the belief the knowledge/skills learned in calculus class were useful for other subjects like physics. Surprisingly few of them, that is, 28.6% of them do not have such belief or they have other reason to believe. It is possible to say that 71.4% of the respondents agreed that students were not adequately prepared in calculus. Whereas 28.4% of them said that, students were adequately prepared in calculus.

**Table 10. Calculus Instructors response concerning the question whether students were adequately prepared in calculus or not.**

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>28.6</td>
<td>28.6</td>
<td>71.4</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>71.4</td>
<td>71.4</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Analysis of the responses from physics instructors**

Table 11) Physics instructors’ response concerning the relation between calculus and physics
As seen in the above table, question number 1, 2 and 3, although they all believe that the concept of calculus are very useful for physics learning, majority of the respondents, that is 62.5% of them were agreed that students didn’t learn all the necessary calculus concepts at appropriate level. In addition 75% of them believe that students didn’t have prepared well that would help them for further physics learning. So, it is possible to say that their background knowledge of calculus as well as physics was not as intended from the applied physics major students in Mettu University during this academic year.

In question number 4 to 8 we try to ask when students apply their calculus knowledge in physics. Accordingly, majority of the students, which is 87.5% of them, said that students apply the knowledge of calculus when the problem is familiar, that is as examples provided in class. Some of them, 37.5% also said that they apply their calculus knowledge whenever necessary. As a result, most instructors, 75% of them were not satisfied in the students’ performance.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>1</td>
<td>I associate calculus to physics:</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>sometimes</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Whenever necessary</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>never</td>
<td>8</td>
</tr>
</tbody>
</table>

In the above table it intended to see when the physics instructors associate their calculus knowledge to physics. However, only 50% of the respondents associate whenever necessary and 25% of them associate sometimes. 12.5% of them never tried to associate calculus concepts to physics while they taught electromagnetism.

In general, we investigated students’ transfer of learning from calculus courses to an introductory physics course. We used interviews to assess the extent to which students transfer their calculus knowledge when solving problems in a physics course, because how students transfer the knowledge learned in their calculus course can be critical to their learning in physics. So, we conducted one-to-one think interviews to assess how students transfer their calculus knowledge in a physics context. We have chosen electricity and Magnetism (phys1013) for pilot test because it requires a significant application of differential and integral calculus and basic for all courses. Electricity and magnetism is a one semester, calculus-based physics course. Each participant was interviewed over two sessions, each lasting about half an hour. The interviewee was left alone to solve an assigned problem. Upon completion, we asked them to explain what they had written down on a pilot test and encouraged them to verbalize their thinking process. We also asked them to describe any difficulties they had when solving the problem. We asked general questions about their calculus background and application of their calculus knowledge in physics at the end of the interview.

We were asked interviewees to solve physics problems that were similar to their homework or exam problems and required use of simple integration or differentiation. The four physics problems we used were: (1) E-field caused by a half-circle charge distribution, (2) electric potential caused by changing E-field, (3) B-field caused by a non-uniform current distribution and (4) current induced in a wire loop when the loop is moved through the field produced by a straight current-carrying wire. We will discuss the students’ responses to each of these follow-up interview questions as the following manner.

**Realization that calculus is required in physics**

All of the students realized that physics and mathematics were inextricably linked. As one student commented: “Physics talks about why to solve it, math talks about how to solve it.” They also realized that they needed calculus knowledge to solve the physics problems. Six out of seven interviewees thought their calculus knowledge was insufficient for them to use in physics class. But, students were evenly split when asked whether it would be possible to set up the physics problems without calculus. Furthermore, when asked to compare the calculus and physics problems, only the students who successfully solved the physics problem could see the similarities in the problems. Solving the calculus problem did not help interviewees solve the physics problem.
Confidence in setting up physics problems
All of the students had previously seen physics problems similar to the interview question. We rise for the students about their confidence on transferring the calculus knowledge to physics problems. Some of them were confident of their physics solution strategy by using their previous calculus knowledge. But for most of them it was particularly unclear about the criteria that determined whether calculus should be applied in a given problem.

Situations in which students use integration in physics
One out of eight interviewees appropriately used integration and derivatives to solve the physics problems, while seven students did not use calculus even after being given several hints. When a student that used calculus were asked about the criteria he applied to decide why calculus was applicable to the problem, the interviewees said the problems were similar to the examples he had seen in the text; however, he could not explain why he used integration. Two out of seven interviewees had a rough idea as to why they needed to use integration in terms of adding up the infinitesimally small elements: “...you can not add up an infinite number...then I used integral...”

Difficulties when applying integrals in physics
When the question ‘do you feel the need to use your math knowledge to solve physics problems?’ asked, their responses about difficulties in applying integrals was:

- Determining the variable of integration:

Generally all interviewees complained that they had difficulty in figuring out the “real” variable that needed to be integrated or differentiated.

- Deciding the limits of integration.

Most interviewees had difficulties in setting up the limits of integration. About half approved the difficulties to the physics class. One remarked that it has “...not really to do with my math class...I know how to integrate it, but it is just figuring out what to integrate.”

When the students were asked about their satisfaction of in transferring calculus knowledge to physics problems, most interviewees tended to use pre-derived formulae rather than using calculus to derive the formula from integration, not being clear about the criteria which determine whether calculus is applicable in a given physics problem; and they tended to use oversimplified algebraic relationships to avoid using calculus because they do not understand the underlying assumptions of the relationships.

VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary
From the students result the researchers concluded that transferring calculus knowledge to physics introductory courses is very poor. This is due to the lack of background knowledge of calculus and the lack of relating calculus application to physics courses. In the other words, from the SPSS statistical data of the students result on pure calculus tests and calculus based physics tests almost 75% of the students have confused in the use of proper integral and derivations.

In general, in this study, we observe the difference between students’ knowledge, based on pure calculus courses and calculus based physics courses. The result indicated the students are less in calculus based tests and they performed 45% to solve calculus tests. Based on physics questions they performed 50% but due to the lack of their calculus knowledge they don’t perform as well as they asked and confused with the mathematical formulas they apply in physics. From the interview result of mathematics instructors and physics instructors, it is obtained both department instructors are not satisfied to the student’s calculus background knowledge and according to their views, 28.6% of the students have very deep calculus background, 42.9% of the students have medium calculus knowledge and the rest of 14.3% of the students have deep and shallow calculus background respectively. So, majority of the instructors believe that students have medium understanding of the calculus concept however, in the preliminary calculus test it was
revealed that majority students who were registered as physics major have little knowledge of calculus except few students that is 22.5%

Conclusions

This research attempted to investigate if the difficulties with the physics concepts are indeed due to the difficulties with the conceptual understanding of the definite integral and derivatives itself. These difficulties include deciding the appropriate variable and limits of integration and derivations, clear about the criteria which determine whether calculus is applicable in a given physics problems; and they tended to use oversimplified algebraic relationships to avoid using calculus because they do not understand the underlying assumptions of the relationships. Students also seem to believe that focus on conceptual understanding and concurrent teaching of calculus and physics would facilitate their application of calculus in physics. Our interview result represented a small portion of students taking these courses, but was helpful in identifying the aforementioned issues. One important reason for student difficulties with the physics concept that involve definite integrals and derivatives might be due to lack of coherence between the math and physics instruction. Overall, these findings strongly indicate that students have specific difficulties with definite integrals and derivatives, particularly, with negative integrals and derivatives that have physical significance. The results in this study also suggested that students understand some integrals and derivatives better when they are able to link the mathematical concepts of integrals to some physical meaning. Several physics instructors have started to introduce basic calculus for a few weeks in their classes. The researchers considered this as a good practice because it gives students an opportunity to learn the basic calculus required for the course. They also learn about notation and representational inconsistencies, if there are any, between physics and calculus. Instructors should help students recognize definite integral and derivative ideas when they come up in physics and tie the physics concept explicitly to prior math instruction.

Recommendations

There should be some sort of consistency in notation and representations between physics and calculus in order to prevent student confusion. The researchers found students inappropriate use of ideas related to derivatives to deal with integrals. In order to deal with this issue, the calculus curriculum should focus towards distinguishing between relating the two concepts derivative and integral. This could be achieved by designing problems that prompt the students to deal simultaneously with derivative and integral. For example, one could ask the students to determine both the signs of the slope and the sign of the integral, and then tell the difference between the two. This could be done by reviewing the distinction between when the second concept is taught to help and keep the ideas incomplete. Integrated curricula and textbooks should be developed to teach calculus and physics concurrently to maximize the possibility that students can apply their knowledge in calculus to learn of physics. Sequence of physics courses and calculus courses could be restructured to enhance students’ achievement. This means, calculus courses could be come first before introductory physics courses for students and additional mathematical courses should be given for students to minimize their calculus knowledge gap because of their background of calculus.

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Performance and design Analysis of an Implantable Antenna for Biotelemetry

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Abstract- An implantable patch antenna is designed to work in ISM band (2.4-2.5 GHz) for biomedical applications. The effect of human body on the different performance parameters of antenna is studied. To examine the effect of human body on antenna output characteristics, the patch antenna is tested by implanting in three layered body phantoms consisting of skin, fat and muscle and their performance is analysed by using different substrates for the same phantoms.

Index Terms- Biocompatibility, human tissues, implantable, patch antenna, embedded.

I. INTRODUCTION

In recent years flexible and portable electronics have received increasing attention due to their wide variety of applications [1] and applicability. They are particularly interested in bio-medical applications, in which they now are being widely deployed. Implantable antennas are widely being used in biomedical applications. Antenna is crucial component in implantable biomedical telemetry, because antenna plays the important role for the communication link between the implanted device inside the body and the receiver out of the body. So implantable antennas are specifically designed keeping in view of the various physical as well as biological constraints inside the human body and the FCC regulations of radiation for implanted devices [2].

Human body is electrically lossy and consists of different tissues of variable values of permittivity and conductivity. Different implantable antennas are designed for different sites of implantations in the human body [2], some are designed to work beneath the skin [3], some in muscles [4] and few in bones [5]. The ITU-R recommendation SA.1346 [6], which outlined the use of the 402-405 MHz frequency band for Medical Implant Communication Systems (MICS). The MICS band is regulated by the FCC (Federal Commission for Communication) [7] and the ERC (European Radio-communication Commission) [8]. The ISM band (2.40 - 2.5 GHz) is also used for implantable medical devices in some countries [9]. Patch antenna designs have received considerable attention for implanting applications as they are highly flexible in design, small in shape and easily conformable [10 - 12], thus allowing for relatively easy miniaturization and integration with implantable medical device. For optimum performance, it is necessary to design the implantable antenna in the environment in which it is expected to operate with optimum performance. So the dielectric properties of the biological tissues such as skin, fat and muscles must be considered [13]. In this paper an implantable patch antenna with inset type feed is designed with PDMS (Poly Dimethyl Siloxane) as a superstrate and it is tested by implanting in 3 layered body phantoms. Its various performance parameters are studied and analysed using HFSS simulator.

II. ANTENNA DESIGN

To design a patch antenna, all the dimensional parameters for simple patch antenna are initially calculated using the conventional formulaes given below [14].

Width of patch, \( W_p \), can be calculated as

\[
W_p = \frac{\nu_f}{2(\sqrt{\varepsilon} \times f)^2}
\]

where, \( \nu_f \) is velocity of light, \( f \) is resonant frequency and \( \varepsilon \) is dielectric constant.
Due to the air-dielectric interface, effective dielectric constant can be calculated as the combination of dielectric constant of substrate and dielectric constant of air above it at the edges of the patch given by [14].

\[
\varepsilon_e = \frac{\varepsilon + 1}{2} \frac{\varepsilon - 1}{2} \frac{1}{\sqrt{1 + 12 \times \frac{h}{W_p}}} (2)
\]

Due to the effect of fringing length of patch looks electrically wider than its physical length. Now actual length of patch can be calculated as the function of effective dielectric constant as [11]

\[
L_p = \left[ \frac{\sqrt{f_f}}{2 \times f \times \sqrt{\varepsilon_e}} \right] - 2 \left[ 0.412 \times h \times \frac{(\varepsilon_e + 0.3) \times \left( \frac{W_p}{\pi} - 0.264 \right)}{(\varepsilon_e - 0.258) \times \left( \frac{W_p}{\pi} - 0.8 \right)} \right] (3)
\]

So using equations (1), (2) and (3) all the required parameters for a three layer simple patch antenna with inset type of feed with lowermost layer as ground plane of PEC material with thickness approximately equal to thickness of patch is evaluated. Above the ground plane there is substrate of material Rogers 3210 and the uppermost layer is patch of PEC and biocompatible rectangular capsule. The calculated parameters are tabulated in table 1.

<table>
<thead>
<tr>
<th>Table 1: Design parameters for patch antenna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating frequency</td>
</tr>
<tr>
<td>Substrate length and width</td>
</tr>
<tr>
<td>Length and width of patch</td>
</tr>
<tr>
<td>Substrate thickness</td>
</tr>
<tr>
<td>Inset feed</td>
</tr>
<tr>
<td>Inset distance</td>
</tr>
<tr>
<td>Feed length</td>
</tr>
<tr>
<td>Feed width</td>
</tr>
<tr>
<td>Substrate thickness</td>
</tr>
<tr>
<td>Biomaterial dimensions</td>
</tr>
</tbody>
</table>

![Fig.1: Proposed antenna design](image)

To consider the effectiveness of antenna in human body, three layer body phantoms of rectangular and cylindrical shapes are modelled. These body phantoms consists of muscle, skin and fat layers [15-17] with the parameters as detailed in Table 2.
Further medical wireless applications such as implanted devices and on-body sensors require an antenna to transmit and receive signals from the human body. In this paper a patch antenna at 2450 MHz is designed for implantable purpose.

A. Biocompatibility
Implantable antennas must be biocompatible in order to ensure patient safety and prevent rejection of the implanted device. Further human tissues are electrically conductive and would short circuit the metallization of the antenna. Biocompatibility and prevention of unwanted short circuits are crucial for long term implantation. The most widely used approach for preserving the biocompatibility of the antenna is to separate the metal radiator from human tissue by encasing the structure in a superstrate [18] which is a biocompatible material called Poly Dimethyl Siloxane ($\varepsilon_r = 2.8$, $\tan \delta = 0.005$) [19].

B. Miniaturisation
For miniaturization purpose high permittivity dielectric material is used for substrate because they shorten the effective wavelength and resulting to lower the resonance, thus assisting in antenna miniaturization [15]. The proposed antenna is simulated using Rogers 3210 ($\varepsilon_r = 10.2$, $\tan \delta = 0.003$) as substrate.

### III. MATHEMATICAL ANALYSIS

When a microstrip line feed antenna is covered by a dielectric layer the characteristic impedance, phase velocity, losses, Q-factor varies as a function of the dielectric constant [20]. The resonant frequency of a microstrip antenna covered with a dielectric layer can be determined when the effective dielectric constant of the structure is known which is shown as example by the Fig.2 for a microstrip antenna [20-21]. This concept is used to find the resonant frequency at which the proposed antenna design will resonate in air.

With reference to Fig.2 the fractional change in the resonant frequency is evaluated using equation (4) given below [20]

$$\frac{\Delta f_r}{f_r} = \frac{f_r(d=0) - f_r(d)}{f_r}$$

(4)

$$\frac{\Delta f_r}{f_r} = \frac{1}{2} \times \frac{\Delta \varepsilon \varepsilon_0}{\varepsilon_0}$$

(4a)

where,
- $f_r$ = resonating frequency
- $d$ = thickness of the dielectric
- $\Delta f_r$ = change in the resonant frequency
- $f_r(d=0)$ = resonating frequency when no dielectric is loaded
- $f_r(d)$ = resonating frequency when thickness of dielectric “$d$” is loaded, here dielectric refers to the biomaterial encapsulation.
- $\varepsilon_0$ = effective dielectric constant without encapsulation which is fixed for any material.
- $\varepsilon_e$ = effective dielectric constant with biomaterial encapsulation which can be calculated using equation (2).

Using equations (4) and (4a) we obtain equation (5) as,

$$\frac{f_r}{f_{rd}} = \frac{2(\varepsilon_0 + 0.5\varepsilon_e)}{(2\varepsilon_0 - \Delta \varepsilon_e)}$$

(5)

### Table 2: Dielectric parameters of the human body tissues at 2.45 GHz

<table>
<thead>
<tr>
<th>Tissue</th>
<th>$\varepsilon_r$</th>
<th>$\sigma$ (S/m)</th>
<th>Density (kg/m$^3$)</th>
<th>Thermal conductivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>38.0</td>
<td>1.46</td>
<td>1100</td>
<td>.53</td>
</tr>
<tr>
<td>Fat</td>
<td>5.28</td>
<td>0.10</td>
<td>909.4</td>
<td>201</td>
</tr>
<tr>
<td>Muscle</td>
<td>52.7</td>
<td>1.73</td>
<td>1040</td>
<td>.293</td>
</tr>
</tbody>
</table>
\[
\Delta \varepsilon = \varepsilon - \varepsilon_{eo}
\]  
(5a)

where,

\(f_r\) = resonating frequency

\(f_{rd}\) = when thickness of dielectric “d” is loaded, here dielectric refers to the biomaterial encapsulation

\(\varepsilon_{eo}\) = effective dielectric constant without encapsulation which is fixed for any material.

\(\varepsilon_e\) = effective dielectric constant with biomaterial encapsulation which can be calculated using equation (2).

Fig.2: Fractional change in resonant frequency versus resonant frequency for polystyrene (\(\varepsilon_r=2.5\)) when dielectric thickness is varied.

Using equation (5), we can calculate the resonant frequencies of the antenna when dielectric is loaded or not by using the values of the relative and effective dielectric permittivities of the used substrate. The equation (5) is important to determine the resonant frequency of the antenna in air. Using the equations (2) and (5) and Fig.2 [20], it is depicted that the fractional change in resonant frequency for polystyrene has been observed by varying the thickness ‘d’ of the dielectric loaded, ranging from 0 to infinity. It is also observed that the decrease in the resonant frequency for thin dielectric layers is less than 1 per cent for frequencies below 3 GHz and maximum is 5.8 % for antennas resonating below 10 GHz [20].

IV. SIMULATION AND RESULTS

The patch antenna is designed for bio-telemetry applications like health monitoring system to work in range of (2.4 - 2.5 GHz) ISM band for wireless communication networking. For performance evaluation of the antenna parameters viz; resonant frequency, return loss, gain, directivity and radiation pattern are essential characteristics for patch antenna in free space and then after implanting the patch antenna encased inside the superstrate (PDMS) inside the human body phantoms of various types.

A. Antenna inside rectangular phantom.

The characteristics of the antenna; dielectric constant and conductivity are affected by the depth of the antenna inside the different layers; of skin, fat and muscle, of body phantoms. In simulation for human body model, rectangular phantom is first used. For the rectangular model we have the antenna embedded into muscle layer at a depth of 13.5 mm from the top of the skin layer, the rectangular phantom represents implantation under the human torso [13]. For simulation purposes we have used standard dielectric parameters of skin, fat and muscle at 2.45 GHz as shown in Table 2.

The antenna is designed with Rogers 3210 as substrate as per the dimensions given in Table 1. The antenna has been simulated without biomedical encasing and surrounded with air medium. The \(S_{11}\) parameter characteristics of the antenna have been shown in Fig. 3. In the next instance the antenna is covered with biomaterial encasing and simulation results of the \(S_{11}\) parameters are shown in Fig. 3. The detailed dimensions used to design the rectangular phantom is shown in Table 7 and the detailed representative figure of the rectangular phantom used is shown in Fig. 4. For instance I, the designed antenna has a return loss of -9.9 dB in air at resonant frequency of 2.52 GHz. In instance II, the same antenna when encapsulated with the biomaterial encasing, \(S_{11}\) of the antenna is -10.2 dB at resonant frequency of 2.5 GHz. In both I and II instances the -10 dB bandwidth of the antenna has been observed very sharp. In instance III, the antenna developed in instance II is placed inside a rectangular phantom mimicking human body tissues and simulated.
In instance III, when antenna is placed inside the phantom, as shown in Fig. 3, $S_{11}$ is observed at -16.6 dB at resonant frequency of 2.36 GHz. The resonant frequency shift $\Delta f$ for the antenna is less than 1 per cent for the resonance frequency is below 3 GHz, when antenna covered with the thin layer of dielectric encasing [20], which is 0.793 % as per analysis of instances I and II. Since the rectangular phantom again acts as another dielectric loading to the antenna because the antenna gets loaded with dielectric, its resonance frequency decreases and return loss changes depending on the electrical properties of the loaded dielectric. The comparative fractional resonant frequency change observed is tabulated in Table 3 and the performance analysis of section-A is tabulated in Table 4.

**Table 3: Comparison of three different types of mediums**

<table>
<thead>
<tr>
<th></th>
<th>Fractional change in resonant frequency</th>
<th>Percentage fractional change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance II</td>
<td>0.00793</td>
<td>0.793 %</td>
</tr>
<tr>
<td>Instance III</td>
<td>0.052</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

a) *Instance I*-antenna without biomaterial encasing  
b) *Instance II*-antenna encased in biomaterial encasing  
c) *Instance III*-antenna encased in biomaterial encasing inside rectangular phantom

Fig. 3: Comparison of $S_{11}$ parameters for the three types of mediums for the proposed antenna for rectangular phantom

Fig 4: Antenna encased in the three layered rectangular phantom used for testing.
Table 4: Performance parameters of the designed antennas in various mediums

<table>
<thead>
<tr>
<th>Type of medium</th>
<th>Resonant frequency (GHz)</th>
<th>3D gain</th>
<th>Directivity (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna in air</td>
<td>2.52</td>
<td>5.8694</td>
<td>3.8632</td>
</tr>
<tr>
<td>Antenna encased in biomaterial</td>
<td>2.5</td>
<td>4.9393</td>
<td>5.8308</td>
</tr>
<tr>
<td>Antenna encased in biomaterial inside</td>
<td>2.36</td>
<td>4.3005</td>
<td>3.4943</td>
</tr>
</tbody>
</table>

A. Antenna inside Cylindrical phantom.

Now the antenna is implanted into cylindrically shaped multi-layered phantom at a depth of 40 mm inside the muscle layer from the top of skin layer, all other parameters are kept same as used in Section-A. the cylindrical phantom is used for simulations to mimic the human arm [13]. Again for simulation purposes we have used standard dielectric parameters of skin, fat and muscle at 2.45 GHz as shown in Table 2. As mentioned in Section-A the antenna is designed with Rogers 3210 as substrate as per the dimensions given in Table 1, by simulating the antenna without biomedical encasing and surrounded by air medium. The $S_{11}$ characteristics of the antenna is shown in Fig. 5. In the next instance the antenna is covered with biomaterial encasing and simulation results of the $S_{11}$ parameter is shown in Fig. 5. The detailed dimensions used to design the cylindrical phantom is shown in Table 7 and the detailed representative figure for the designed cylindrical phantom used is shown in Fig. 6.

As mention in Section-A, in instance I designed antenna have a return loss of -9.9 dB in air at resonant frequency of 2.52 GHz. In instance II, the same antenna when encapsulated with the biomaterial encasing, $S_{11}$ of the antenna is -10.2 dB at resonant frequency of 2.5 GHz. In both I and II instances the -10 dB bandwidth of the antenna has been observed very sharp. In instance III, the antenna developed in section A, is covered with biomedical encasing and placed inside a cylindrical phantom mimicking human body tissues and simulated.

Fig 5: Comparison of $S_{11}$ parameters for the three types of mediums for the proposed antenna for cylindrical phantom

As we know for instance III, antenna is placed inside the cylindrical phantom as shown in Fig. 4, the $S_{11}$ is recorded at -19.0 dB at resonant frequency of 2.375 GHz. The resonant frequency shift $\Delta f$ for the antenna when antenna covered with thin layer of dielectric encasing is less than 1% for 3 GHz [20] as observed as same in Section-B, thus the cylindrical phantom again acts as another dielectric loading to the antenna because the antenna gets loaded with dielectric, its resonance frequency decreases and return loss changes depending upon the electrical properties of the loaded dielectric. The detailed performance analysis of Section-B is tabulated in Table 6. And the comparative analysis for the fractional change of resonant frequencies is tabulated in Table 5.

Table 5: Comparison of three different types of mediums

<table>
<thead>
<tr>
<th>Instance</th>
<th>Fractional change in resonant frequency</th>
<th>Percentage fractional change</th>
</tr>
</thead>
<tbody>
<tr>
<td>I with comparing I</td>
<td>0.00793</td>
<td>0.793 %</td>
</tr>
<tr>
<td>III with comparing II</td>
<td>0.05</td>
<td>5%</td>
</tr>
</tbody>
</table>
d) Instance I-antenna without biomaterial encasing  
ed) Instance II-antenna encased in biomaterial encasing  
f) Instance III-antenna encased in biomaterial encasing inside cylindrical phantom

Table 6: Performance parameters of the designed antennas in various mediums

<table>
<thead>
<tr>
<th>Type of medium</th>
<th>Resonant frequency (GHz)</th>
<th>3D gain</th>
<th>Directivity (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna in air</td>
<td>2.52</td>
<td>5.8694</td>
<td>3.8632</td>
</tr>
<tr>
<td>Antenna encased in biomaterial</td>
<td>2.5</td>
<td>4.9393</td>
<td>5.8308</td>
</tr>
<tr>
<td>Antenna encased in biomaterial inside cylindrical phantom</td>
<td>2.375</td>
<td>7.514</td>
<td>1.3728</td>
</tr>
</tbody>
</table>

![Image of three layered cylindrical phantom]

Fig.6: Three layered cylindrical phantom used in the testing of the antenna

Table 7: Human phantom models dimensions used in the testing of the proposed antenna

<table>
<thead>
<tr>
<th>Model type</th>
<th>Size [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangular</td>
<td>82×120×40</td>
</tr>
<tr>
<td>Cylindrical</td>
<td>R=40, H=90</td>
</tr>
</tbody>
</table>

D.Performance observation of the designed antenna by using different Substrates by placing inside phantoms

Table 9: Dielectric values of the substrates used

<table>
<thead>
<tr>
<th>Name of substrate</th>
<th>Relative permittivity</th>
<th>Tangent loss</th>
<th>Mass density (kg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rogers 6002</td>
<td>2.94</td>
<td>0.0012</td>
<td>0</td>
</tr>
<tr>
<td>Rogers 3003</td>
<td>3.0</td>
<td>0.0013</td>
<td>0</td>
</tr>
<tr>
<td>Fr_4 epoxy</td>
<td>4.4</td>
<td>0.02</td>
<td>1900</td>
</tr>
<tr>
<td>Bakelite</td>
<td>4.8</td>
<td>0.002</td>
<td>1300</td>
</tr>
<tr>
<td>Tmm 10</td>
<td>9.2</td>
<td>0.0022</td>
<td>0</td>
</tr>
<tr>
<td>96%</td>
<td>9.4</td>
<td>0.066</td>
<td>3800</td>
</tr>
</tbody>
</table>
By using the dielectric values as given in Table 9. And keeping all the parameters for designing rectangular and cylindrical phantoms same as given in Section A and B respectively, the antenna is tested for six different types of substrates and their return losses graphs is plotted for rectangular and cylindrical in Figures’ 9 and 10 respectively. The detailed performance parameters are tabulated for both types of phantoms in Tables’ 10 and 11.

### Table 10: Performance comparison of rectangular phantom by testing various types of substrates when antenna is implanted at a depth of 13.5 mm keeping the dimensions of biomaterial encapsulation same as in Table 1.

<table>
<thead>
<tr>
<th>Types of substrate</th>
<th>Return Loss (dB)</th>
<th>Resonant frequency (GHz)</th>
<th>Directivity (dB)</th>
<th>Band Width (GHz)</th>
<th>Dielectric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rogers 6002</td>
<td>-19.4</td>
<td>2.55</td>
<td>6.3836</td>
<td>1.86</td>
<td>2.94</td>
</tr>
<tr>
<td>Rogers 3003</td>
<td>-19.6</td>
<td>2.51</td>
<td>6.3933</td>
<td>1.74</td>
<td>3</td>
</tr>
<tr>
<td>Epoxy</td>
<td>-19.4</td>
<td>2.42</td>
<td>6.2286</td>
<td>1.61</td>
<td>4.4</td>
</tr>
<tr>
<td>Bakelite</td>
<td>-19</td>
<td>2.4</td>
<td>6.1846</td>
<td>1.73</td>
<td>4.8</td>
</tr>
<tr>
<td>Tmm 10</td>
<td>-17.15</td>
<td>2.25</td>
<td>6.3836</td>
<td>0.86</td>
<td>9.2</td>
</tr>
<tr>
<td>96% Alumina</td>
<td>-16.10</td>
<td>2.28</td>
<td>4.7604</td>
<td>0.8</td>
<td>9.4</td>
</tr>
<tr>
<td>Rogers 3210</td>
<td>-18.8</td>
<td>2.25</td>
<td>4.4839</td>
<td>0.77</td>
<td>10.2</td>
</tr>
</tbody>
</table>
Table 11: Performance comparison of cylindrical phantom by testing various types of substrates when antenna is implanted at a depth of 40 mm keeping the dimensions of biomaterial encapsulation same as in table 1.

<table>
<thead>
<tr>
<th>Type of substrate</th>
<th>Return loss (dB)</th>
<th>Resonant frequency (GHz)</th>
<th>Directivity (dB)</th>
<th>Bandwidth (GHz)</th>
<th>Dielectric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rogers 6002</td>
<td>-17.1</td>
<td>2.59</td>
<td>2.2428</td>
<td>7.8</td>
<td>2.94</td>
</tr>
<tr>
<td>Rogers 3003</td>
<td>-17.5</td>
<td>2.58</td>
<td>2.6732</td>
<td>7.81</td>
<td>3</td>
</tr>
<tr>
<td>Epoxy</td>
<td>-16.7</td>
<td>2.51</td>
<td>3.2244</td>
<td>9.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Bakelite</td>
<td>-16.3</td>
<td>2.5</td>
<td>1.8022</td>
<td>1.783</td>
<td>4.8</td>
</tr>
<tr>
<td>Tmm 10</td>
<td>-18.4</td>
<td>2.39</td>
<td>2.2428</td>
<td>0.615</td>
<td>9.2</td>
</tr>
<tr>
<td>96% alumina</td>
<td>-17.8</td>
<td>2.41</td>
<td>1.8363</td>
<td>0.588</td>
<td>9.4</td>
</tr>
<tr>
<td>Rogers 3210</td>
<td>-19.2</td>
<td>2.39</td>
<td>1.3382</td>
<td>0.551</td>
<td>10.2</td>
</tr>
</tbody>
</table>

From Table 10, it is clear by observation that as the dielectric values of the substrate increases the bandwidth of the antenna decreases, it is also clear by observation from Table 10 that as the values of dielectric increases the resonant frequency gradually decreases, also it is clear that the variation in $S_{11}$ is not much since it ranges from -16.10 dB to -19.6 dB. Also by observation from table 10 we can choose to decide which type of substrate suits best for better bandwidth for the proposed antenna which is rogers 6002 it is also clear that for return loss performance the best substrate is again rogers 6002, the trade off in choosing rogers 6002 is that its resonant frequency skids off the unlicensed ISM band limitations of 2.4-2.5 GHz.

From Table 11, it is clear by observation that as the dielectric value increases the bandwidth of the antenna initially increases then decreases rapidly again, also it is clear that as the values of dielectric increases the resonant frequency decreases this is in par with the observation of Table 10. From table 11, the $S_{11}$ variation is from -16.3 to -18.4 dB. It is clear that the substrate with the best return loss from Table 10 for rectangular type of phantom is shown by Rogers 3003, again in observation from table 11 the best bandwidth is observed in epoxy, where as the best return loss is shown by rogers 3210. so each parameter has its own superior performance and its trade off, as rogers 3210 has best S11 however its bandwidth is very low.

It is also observed that the overall directivity is better when the antenna is tested in the rectangular phantom compared to cylindrical phantom by comparing Tables 10 and 11. From Tables 10 and 11 again it is also clear that the best bandwidth performance for testing the rectangular type of phantom is given by rogers 6002 and the best bandwidth performance for the cylindrical type of phantom testing is shown by Epoxy. Finally, from the analysis done we can now decide which type of substrate to choose as per the required designed parameter and up to what extent we can compromised the trade off of each substrate’s performance parameters.

V. CONCLUSION

This paper proposed an implantable antenna for biotelemetry applications. Miniaturisation and biocompatibility are two important aspects of antenna designing. So for miniaturization a high dielectric material is used and for biocompatibility the antenna was encased in a biocompatible material. So an antenna is designed at 2.5 GHz which falls within the ISM band inside the human phantom model. The antenna was designed using Rogers 3210 as substrate. The performance of the antenna was observed in two types of human phantom models by implanting the antenna in three layered phantoms, using different types of substrates and compared. This mode of analysis can be further used to determine the choice of a substrate for various types of implantation of biomedical implants. Further work can be done to reduce the size of the antenna and to exhibit multi band frequencies.

REFERENCES


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[9] International Telecommunications Union-Radiocommunications (ITU-R), Radio Regulations, Section 5.138 and 5.150, ITU, Geneva, Switzerland


AUTHORS

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Factors Associate for the Class Irregularities of Private University Students in Bangladesh

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Abstract- At this present time, there is a great opportunity to take higher level of education in private sector universities in Bangladesh. At present, there are 38 public and 85 private universities are functioning their academic activities in Bangladesh. Private sector university has offered both bachelors and masters level programs in the fields of business, arts, social sciences and science and engineering in that order. Now a day's, around 4,63,767 both home and international students are getting the education from private universities in different programs but a huge number of students did not attend in the class regularly. In spite of class irregularities they are getting the chance to take part in final examinations. Most of the private universities did not properly maintain students class regularities. To identify the major affecting factors for class irregularities of private university students are the main objectives of the study. The findings of the study may help to the related authority to develop such policy to make sure class regularities in the private universities. Survey and interview research techniques were used for data collection of this study. Both descriptive and inferential statistics were used to analyze the data. Descriptive statistics were used to explain the class irregularities of private university students while inferential statistics such as, Factor analysis was used to identify the factors that are highly affecting class regularities of private universities and multiple regression analysis was used to explain that the relationship between identified factors and class irregularities. Findings show that there are seven factors are immensely affecting class regularities of the private university in Bangladesh. The identified factors are Certificate necessity and disinterested to acquire knowledge, Inadequate physical facilities in individual department such as classrooms, seminar library, and computer lab, Teachers did not take class regularly and come in the class lately and out early, Teachers are biased in different aspects of political matter, gift and money etc, Engagement of full-time job and private tuition of students, Insufficiency of transports, indoor and outdoor sports and recreational facilities and University taught traditional and old syllabus. Multiple Regression Analysis shows that the identified factors are significantly related to the class irregularities in private universities of Bangladesh. This study suggests that if there is a change in identified factors, there will be changed in the class irregularities of private universities in Bangladesh.

Index Terms- Bangladesh, Private University Students, Factors Associate, Class Irregularities.

I. INTRODUCTION

This study demonstrates that the students class irregularities of private university students in Bangladesh are affecting by some important factors. Near about 4,63,767 students are getting the education both bachelors and masters programs in the fields of business, science and engineering, arts and social sciences in 85 private universities in Bangladesh. But a huge amount of students of private universities did not attend in the class regularly and they are getting the chance to take part in the final examinations in spite of class irregularities. Most of the private universities of this country did not keep up class regularities properly. There are some important factors are affecting for students class regularities in private universities. This study tries to find the major factors that affect the class regularities of private universities students in Bangladesh. If the private university improved the identified factors, the class regularities of private universities will make sure.

There are some research works has conducted on private university education in Bangladesh. Most of the works have conducted on the quality of education. Some of the researchers focused on the index or indicators of quality of education (Addur Rouf et al, 2015, Malaya Tashbeen Barnamala, 2015, Nazamul Hoque et al, 2013, Husain Salilul Akareem et al, 2012, SSM Sadrul Huda et al, 2010, Mobasser Monem et al. 2010, Abu Naser, 2008, Touhida Tasnima, 2008, Syed Saad Andaleeb, 2003. Another researcher discussed that the calculation of the web impact factors of private universities in Bangladesh (Anwarul Islam et al, 2011). A study compared that the quality of public and private universities between Bangladesh and USA, it also focused on the comparison of satisfaction level between public and private university students (Quamrul H. Mazumder, 2014). The private universities are playing the important role to ensure higher education and nation building in Bangladesh (K.M.Anwarul Islam et al, 2016). Most private universities in Bangladesh have commodified their service. The focus is less on quality education, research and innovation, and philanthropic contribution to society. Business-minded people took this section as an industry, revenue, and profit maximization are first on their agenda rather than education (Jashim Uddin, 2015). The quality of education are highly affecting due to some structural weaknesses such as answers script do not examine by the second examiner, students class irregularities, incompletion of credit hour and syllabus, and questionnaire do not moderation by moderation committee (Ashadujjaman et al, 2017). There are some factors that establishing a private university, admission,

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courses and curriculum, examination system and good governance in higher education. Proper interactions of these systems confirm quality of education (Moajjam Hossain, 2015). The above mention study discussed different aspects of private universities in Bangladesh. Some of the researcher focused the quality of education, index of quality of education and some others discussed the role of the private university to enhance higher education in Bangladesh and some researchers focused on public-private university comparison. One of the studies focused on some structural weaknesses of the private university which are affecting the quality of education. This study shows that the students class irregularities is one of the vital structural weaknesses of private universities which is tremendously affecting the quality of education. This study did not discuss about the reasons for class irregularities of private university students in Bangladesh. The present study tries to identify the factors which are affecting the class regularities of private university students in Bangladesh.

The rest of the article is ordered as follows: First, the aims of the study will be stated, this is followed by a explanation of the research methods and rules used in the study. The findings of our study are then discussed. In conclusion, the managerial implications and limitations of the study and directions for future research will be presented.

II. RESEARCH OBJECTIVES

The overall objective of this study is to discover the impact factors for class irregularities of private university students in Bangladesh. The specific objectives are outlined below.

i. To identify the factors for class irregularities of private university students in Bangladesh.

ii. To show the significant relationship between identified factors and class irregularities of private universities.

iii. To provide some recommendations to reduce class irregularities of private sector universities of Bangladesh.

III. METHODOLOGY OF THE STUDY

This study tries to identify the impact factors concerned with the class irregularities in the private universities of Bangladesh. Primary sources of data were used to carry out the study which was collected from existing students and graduates of the private universities of Bangladesh.

3.1 Determination of Sample Size

This study includes the existing students and graduates of the private universities of Bangladesh as its sample. The universities were selected for this inquiry by using purposive sampling technique and respondents were selected by using random sampling techniques. According to statistics 2016, there is 97 government approved private universities in Bangladesh but, around 85 private universities are running their academic activities. (University Grant Commission’s Report, 2016). At present, approximately 4,63,767 students were studying in private sectors universities in Bangladesh. We determined our sample size from 4,63,767 current students and graduates. The sample can be determined by using the following formula suggested by Yamane (1967)\(^1\) with 5 percent sampling error. The formula used in this study is given away below.

\[
n = \frac{N}{1 + Ne^2}
\]

Where,

\(n = \) Sample Size
\(N = \) Population
\(e = \) Percentage of sampling error

In calculating sample size\(^2\) the following assumptions were made to determine, \(n = 399\)

(i) Population\(^3\) size is > 4,63,767 Students

(ii) Percentage of sampling error\(^4\) is 5%

However, this study collected all data from 20 private universities of Bangladesh.

3.2 Sample Sufficiency Test and Sphericity Test

The following table (Table-1) provides information's about the hypothesis of factor analysis. From the following table, we find out the sample sufficiency index KMO\(^5\) by Kaiser-Meyer-Olkin, which compares the sizes of the observes correlation coefficients to the sizes of the partial correlation coefficient for the sum of analysis variables is 86.8 percent and it is reliable because it overcomes 80 percent by far. In addition, supposition test of sphericity by Bartlett's Test of Sphericity\(^6\) \((H_0 : All\ correlation\ coefficients\ are\ not\ quite\ far\ from\ zero)\) is rejected on a level of statistical significance \(p < 0.05\) for approx. For these data, Bartlett's Test is highly significant \((p < 0.001)\). As a result, both acceptances for the conduct of factor analysis are satisfied and we can proceed to it.

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin measure of sampling adequacy</th>
<th>0.868</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett's Test of Sphericity</td>
<td></td>
</tr>
<tr>
<td>Approx Chi-Square</td>
<td>6.161</td>
</tr>
<tr>
<td>df.</td>
<td>595</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
</tr>
</tbody>
</table>

3.3 Sample Distribution

To conduct this study three hundred ninety nine students were interviewed from the 20 private universities of Bangladesh. The sampled universities are: North South University, East West

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\(^2\) Sample size is a part of the population which is systematically determined and that represent the characteristics of the population.

\(^3\) Population is a complete set of items that information is desired.

\(^4\) Sampling error is the level of precision, is the range in which the true value of the population is estimated to be. This is range is expressed in percentage points.

\(^5\) KMO is a measure of sampling adequacy and it is an index used to examine the appropriateness of factor analysis. Values below 0.5 imply that factor analysis may not be appropriate.

\(^6\) Bartlett's Test of Sphericity is a test statistic used to examine the hypothesis that the variables are uncorrelated in the population.
University, Independent University, Manarat International University, Green University, Brac University, Prime University, City University, Ibas University, Dhaka International University, Uttara University, Shanto Mariam University of Creative Technology, Asian University of Bangladesh, Atish Diponkar University, South East University, Daffodil International University, American International University-Bangladesh, Stamford University, International University of Business Agriculture and Technology, Royal University. Details are given in the following table (Table 2).

Table 2 : Distribution of the Respondents

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the University</th>
<th>Number of Students Interviewed</th>
<th>Percenta ge %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>North South University</td>
<td>10</td>
<td>2.51</td>
</tr>
<tr>
<td>2.</td>
<td>East West University</td>
<td>10</td>
<td>2.51</td>
</tr>
<tr>
<td>3.</td>
<td>Independent University</td>
<td>10</td>
<td>2.51</td>
</tr>
<tr>
<td>4.</td>
<td>Manarat International University</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>5.</td>
<td>Green University</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>6.</td>
<td>Brac University</td>
<td>15</td>
<td>3.76</td>
</tr>
<tr>
<td>7.</td>
<td>Prime University</td>
<td>25</td>
<td>6.27</td>
</tr>
<tr>
<td>8.</td>
<td>City University</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>9.</td>
<td>Ibas University</td>
<td>25</td>
<td>6.27</td>
</tr>
<tr>
<td>10.</td>
<td>Dhaka International University</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>11.</td>
<td>Uttara University</td>
<td>25</td>
<td>6.27</td>
</tr>
<tr>
<td>12.</td>
<td>Shanto Mariam University of Creative Technology</td>
<td>25</td>
<td>6.27</td>
</tr>
<tr>
<td>13.</td>
<td>Asian University of Bangladesh</td>
<td>25</td>
<td>6.27</td>
</tr>
<tr>
<td>14.</td>
<td>Atish Diponkar University</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>15.</td>
<td>South East University</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>16.</td>
<td>Daffodil International University</td>
<td>25</td>
<td>6.27</td>
</tr>
<tr>
<td>17.</td>
<td>American International University Bangladesh</td>
<td>20</td>
<td>6.27</td>
</tr>
<tr>
<td>18.</td>
<td>Stamford University</td>
<td>24</td>
<td>6.27</td>
</tr>
<tr>
<td>19.</td>
<td>International University of Business Agriculture and Technology</td>
<td>20</td>
<td>5.00</td>
</tr>
<tr>
<td>20.</td>
<td>Royal University</td>
<td>20</td>
<td>5.00</td>
</tr>
</tbody>
</table>

3.4 Questionnaire Design and Test of Reliability

The questionnaire of the study was considered with Likert scale method. Likert scale questionnaire was designed with 5 point scales which range from 5 to 1 where 5 is indicating strongly agree and 1 is indicating strongly disagree. Table 3 shows the reliability coefficient of the questionnaire. It shows that the Cronbach’s alpha of the questionnaire is 0.887 which is excellently acceptable as per Nunnally (1978).

Table 3 : Reliability statistics

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.887</td>
<td>35</td>
</tr>
</tbody>
</table>

The questionnaire set up with the following aspects of the private universities in Bangladesh such as Infrastructural aspects like classroom, seminar library, computer lab, common room, wash room, indoor and outdoor sports, transports and hostel facilities. Academic aspects like teaching staff, teaching-learning process, academic environment teachers irregularities in the class, course assessment system and teachers dishonesty in different aspects and Students personal aspects like job engagement, private tuition, disinterest to acquire knowledge, only certificate necessity and others aspects like traffic jam, political chaos, eve-teasing etc.

3.5 Data Collection Techniques

A survey has been conducted among 399 current students and graduates from 20 private universities of Bangladesh by using random sampling technique. Most of the data of the study were collected from primary sources by interview through questionnaire. The interviewers were bachelor students of Sociology & Anthropology and Economics department of Asian Universities of Bangladesh. Interviewers were properly trained on the matters representing the questionnaire for the data collection before resuming the interview. All the data of the study were collected from September 2016 to March 2017.

3.6 Data Analysis methods

Descriptive and Inferential statistics were used to analyze the data. A Principal Component Analysis (PCA) with an Orthogonal Rotation (Varimax) using the SPSS (Statistical Package for Social Sciences) was performed on the survey data.

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8 A measure of the accuracy of a test or measuring instrument obtained by measuring the same individuals twice and computing the correlation of the two sets of measures.
9 Cronbach’s alpha is a measure of internal consistency that is how closely related a set of items are as a group. It is considered to be a measure of scale reliability.
10 Nunnally (1978) offered a rule of thumb of 0.7. More recently, one tends to see 0.8 cited as a minimum alpha. One thing to keep in mind is that alpha is heavily dependent on the number of items composing the scale. Even using items with poor internal consistency you can get a reliable scale if your scale is long enough.
11 Reliability refers to the consistency or repeatability of an operationalized measure.
12 Descriptive statistics consists of methods for organizing, displaying and describing data by using tables and summary measures.
13 Inferential statistics is concerned with making predictions or inferences about a population from observations and analysis of a sample.
14 Varimax rotation is an orthogonal rotation of the factor axes to maximize the variance of the squared loadings of a factor (column) on all the variables (rows) in a factor matrix, which has the effect of differentiating the original variables by extracted factor. Each factor will tend to have either large or small loading of any particular variable. A varimax solution yields results which make it as easy as possible to identify each variable with a single factor. This is the most common rotation option.
Multiple Regression Analysis\textsuperscript{15} was used to identify the relationships between the dependent and independent variables for developing a model in this study.

IV. FINDINGS OF THE STUDY

The analysis and interpretations of this study have been divided into two divisions such as (i) Factor Analysis and (ii) Multiple Regression Analysis. Factor analysis was used to reduced the items to impacts factors related to the class irregularities of the private university students in Bangladesh and Multiple Regression Analysis was run to identify the significant factors that affect the students class regularities of private sector universities. Factor analysis was run to identify the factors relating to the student's irregularities in the class and it identified the number of eight factors that affect the class regularities of private university students in Bangladesh. The result shows that the communalities of the variables are high (The average communality is greater than 0.6) indicating the higher level of association among scale items on variables, (Appendix 1). Results also show that there are 8 factors as whole affect the class regularities of private university students in Bangladesh, such as, Certificate necessity and disinterested to acquire knowledge (25.635%), Department wise computer lab, seminar library and classroom facilities are not adequate (10.585%), Teachers did not take class regularly and come in the class lately and out early (6.011%), Teachers are biased in different aspects of political matter, gift and money etc (5.446%), Full time job engagement and private tuition hampered the class regularity (4.310%), Transports and indoor and outdoor sports and recreational facilities are inadequate (3.472%), University taught traditional and old syllabus (3.228%) and Traffic jam hampers the class regularity (2.935%), (Table 4).

Table 4 : Total Variance Explained

<table>
<thead>
<tr>
<th>SL.</th>
<th>Components</th>
<th>Initial Eigen values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tota1</td>
</tr>
<tr>
<td>1.</td>
<td>Certificate necessity and disinterested to acquire knowledge</td>
<td>8.97 2</td>
</tr>
<tr>
<td>2.</td>
<td>Department wise computer lab, seminar library and class room facilities are not adequate</td>
<td>3.70 5</td>
</tr>
</tbody>
</table>

\textsuperscript{15} In statistics, regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'Criterion Variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed.

Extraction Method: Principal Component Analysis

Multiple Regression Analysis shows that the factors identified by the factor analysis can explain about 74% of the dependent variable. This means that the identified factors through this analysis are highly important and have significant influences on the class regularities of the private universities of Bangladesh (Table 5).

Table 5: Model Summary\textsuperscript{b}

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.860*a</td>
<td>.740</td>
<td>.735</td>
<td>.314</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), REGR factor score 8 for analysis 1, REGR factor score 7 for analysis 1, REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1
b. Dependent Variable: Overall

Analysis of variance (ANOVA)\textsuperscript{16} shows that the factors identified this analysis together significantly related to the dependent variable. This means that the factors identified in this analysis significantly related to the class irregularities of the private university students in Bangladesh (Table 6). If there is a

\textsuperscript{16} Analysis of variance (ANOVA) is used to determine whether there are any significant differences between the means of two or more independent (unrelated) groups.
change in the factors, this will be changed the class irregularities of private university students in Bangladesh.

**Table 6 : Analysis of Variance (ANOVA)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Regression</td>
<td>110.001</td>
<td>8</td>
<td>13.750</td>
<td>139.069</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>38.560</td>
<td>390</td>
<td>.099</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148.561</td>
<td>398</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), REGR factor score 8 for analysis 1, REGR factor score 7 for analysis 1, REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1
b. Dependent Variable: Overall

Table 7 shows that the individual factor relationship with the dependent variable of the regression model. It shows that except 1 factor such as, traffic jam hamper class regularity (.293), other factors like Certificate necessity and disinterested to acquire knowledge (15.380), Department wise computer lab, seminar library and classroom facilities are not adequate (18.272), Teachers did not take class regularly and come in the class lately and out early (10.212), Teachers are biased in different aspects like political matter, gift and money etc (13.505), Full-time job engagement and private tuition hampered the class regularity (10.176), Transports and indoor and outdoor sports and recreational facilities are inadequate (10.831) and University taught traditional and old syllabus (5.875) are significantly related to the students class irregularities of private universities in Bangladesh. It has also been identified from the analysis that the factor such as traffic jam hamper class regularity (0.293) does not have the significant relationship with the overall irregularities of the students.

**Table 7 : Coefficients**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2.28</td>
<td>.88</td>
</tr>
<tr>
<td>Certificate necessity and disinterested to acquire knowledge</td>
<td>.242</td>
<td>.397</td>
</tr>
</tbody>
</table>

Department wise computer lab, seminar library and classroom facilities are not adequate: .288, .016, .471, 18.272, .000
Teachers did not take class regularly and come in the class lately and out early: .161, .016, .263, 10.212, .000
Teachers are biased in different aspects like political matter, gift and money etc: .213, .016, .348, 13.505, .000
Full-time job engagement and private tuition hampered the class regularity: .160, .016, .263, 10.176, .000
Transports and indoor and outdoor sports and recreational facilities are inadequate: .171, .016, .279, 10.831, .000
University taught traditional and old syllabus: .093, .016, .152, 5.875, .000
Traffic jam hamper class regularity: .005, .016, .008, .293, .769

a. Dependent Variable: Overall

V. CONCLUSION AND RECOMMENDATION

The main purpose of the study was to identify the factors for class irregularities of private university students in Bangladesh. To our knowledge, it is the first study that clarifies the impact of identified factors on the class regularities of private university students in Bangladesh. After analyzing the data our study got some findings. Factor analysis has identified eight factors that immensely affect the class regularity of private university students. The identified most important factors are Certificate necessity and disinterested to acquire knowledge (25.635%), Department wise computer lab, seminar library and classroom facilities are not adequate (10.585%), Teachers did not take class regularly and come in the class lately and out early (6.011%), Teachers are biased in different aspects of political matter, gift and money etc (5.446%), Full-time job engagement and private tuition hampered the class regularity (4.310%), Transports and indoor and outdoor sports and recreational facilities are inadequate (3.472%), University taught traditional and old syllabus (3.228%) and Traffic jam hampers the class
regularity (2.935%). The eight factors as a whole (61.622%) significantly associated to the class irregularities of private university students in Bangladesh. Multiple Regression Analysis shows that the number of seven factors, such as (i) Certificate necessity and disinterested to acquire knowledge, (ii) Department wise computer lab, seminar library and classroom facilities are not adequate, (iii) Teachers did not take class regularly and come in the class lately and out early, (iv) Teachers are biased in different aspects of political matter, gift and money etc, (v) Full-time job engagement and private tuition hampered the class regularity, (vi) Transports and indoor and outdoor sports and recreational facilities are inadequate and (vii) University taught traditional and old syllabus are significantly related to the class irregularities. It has also been identified from the analysis that one factor like traffic jam hampers the class regularity does not have the significant relationship with the overall irregularities of the students.

Our study suggests that if there is a change in the identified factors, there will be changed in the class irregularities of the private universities in Bangladesh. If private university appoint high qualified teachers, ensure sufficient and well furnished classrooms, teachers perform class regularly, timely and properly, teachers show neutral and value free behavior with the students, start to teach up to date syllabus, established department wise seminar library, installed separate computer lab with internet for each department, initiate transport facilities and established indoor and outdoor sports facilities for students, taught updated syllabus and if the interest of students to acquire knowledge are enhanced and the students may be advised to give more attention to knowledge acquire rather than to obtain a certificate, it will be significantly improved the class regularities of private university students in Bangladesh.

There are some limitations might be related to data collection. The first limitation of the study is that we collected our data from Dhaka city base private universities. The second limitation might be deducted of an important variable, such as research facilities for students. Another shortcoming of the study is that it did not include government universities of Bangladesh.

This study has identified the impact factors for the class irregularities of private university students in Bangladesh. But it did not include public sector universities of Bangladesh and it also did not include an influencing variable like research facilities for students. Nevertheless, there is a boundless scope for future researchers to conduct the further study by taking more samples with the inclusion of the government universities of Bangladesh for obtaining more accurate results in this regard.

Appendices
Appendix 1 Communalities of the variables

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of the variable</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAR 01</td>
<td>My University is not providing available class room facilities</td>
<td>1.00 0</td>
<td>.611</td>
</tr>
<tr>
<td>VAR 02</td>
<td>My class room is not highly furnished and decorated</td>
<td>1.00 0</td>
<td>.653</td>
</tr>
<tr>
<td>VAR 03</td>
<td>My university is not providing audio-visual class room (projector based)</td>
<td>1.00 0</td>
<td>.708</td>
</tr>
<tr>
<td>VAR 04</td>
<td>My university is not providing a rich seminar library</td>
<td>1.00 0</td>
<td>.711</td>
</tr>
<tr>
<td>VAR 05</td>
<td>My department haven't separate computer lab</td>
<td>1.00 0</td>
<td>.693</td>
</tr>
<tr>
<td>VAR 06</td>
<td>My university is not providing separate washroom for male and female</td>
<td>1.00 0</td>
<td>.508</td>
</tr>
<tr>
<td>VAR 07</td>
<td>My university is not providing separate common rooms for male and female students</td>
<td>1.00 0</td>
<td>.516</td>
</tr>
<tr>
<td>VAR 08</td>
<td>My university is not providing play ground facilities</td>
<td>1.00 0</td>
<td>.727</td>
</tr>
<tr>
<td>VAR 09</td>
<td>My university is not providing indoor sports room for playing</td>
<td>1.00 0</td>
<td>.668</td>
</tr>
<tr>
<td>VAR 10</td>
<td>My university is not providing hall and hostel facilities</td>
<td>1.00 0</td>
<td>.606</td>
</tr>
<tr>
<td>VAR 11</td>
<td>My university is not providing transport facilities for the students</td>
<td>1.00 0</td>
<td>.713</td>
</tr>
<tr>
<td>VAR 12</td>
<td>My university taught us very traditional and old syllabus</td>
<td>1.00 0</td>
<td>.587</td>
</tr>
<tr>
<td>VAR 13</td>
<td>My University assigning poor quality teachers</td>
<td>1.00 0</td>
<td>.628</td>
</tr>
<tr>
<td>VAR 14</td>
<td>Our teachers did not take class properly</td>
<td>1.00 0</td>
<td>.615</td>
</tr>
<tr>
<td>VAR 15</td>
<td>Our teachers come in the class room lately and out early</td>
<td>1.00 0</td>
<td>.663</td>
</tr>
<tr>
<td>VAR 16</td>
<td>Teachers can't clearly understand a topic to the students</td>
<td>1.00 0</td>
<td>.635</td>
</tr>
<tr>
<td>VAR 17</td>
<td>Teacher always underestimate and misbehave with the students</td>
<td>1.00 0</td>
<td>.542</td>
</tr>
<tr>
<td>VAR 18</td>
<td>Teachers make threatened environment in the class</td>
<td>1.00 0</td>
<td>.599</td>
</tr>
<tr>
<td>VAR 19</td>
<td>Teachers did not examine answer script properly</td>
<td>1.00 0</td>
<td>.600</td>
</tr>
<tr>
<td>VAR 20</td>
<td>Teacher manipulate the results by taking</td>
<td>1.00 0</td>
<td>.496</td>
</tr>
</tbody>
</table>
money, gifts and others benefit

| VAR 21 | Teachers gave number by counting the pages of answer script | 1.00 | .495 |
| VAR 22 | Teacher focus more on political matter than study in the class room | 1.00 | .632 |
| VAR 23 | Teacher favors those students who follow his/her political thought | 1.00 | .491 |
| VAR 24 | Financial crisis hampered to attend in the class regularly | 1.00 | .618 |
| VAR 25 | Full time job hamper my regular class | 1.00 | .670 |
| VAR 26 | Private tuition hamper my regular class | 1.00 | .624 |
| VAR 27 | As I can't understand, I don't attend class | 1.00 | .566 |
| VAR 28 | As I have no interest to acquire knowledge, I don't attend class | 1.00 | .711 |
| VAR 29 | As I need only certificate, I haven't need to attend the class | 1.00 | .691 |
| VAR 30 | As I live in long distance from university, I don't attend the class | 1.00 | .584 |
| VAR 31 | Self frustration discourage me not to attend in the class | 1.00 | .602 |
| VAR 32 | Political chaos discourage me not to attend in the class | 1.00 | .610 |
| VAR 33 | Traffic jam hamper my time to attend in the class | 1.00 | .654 |
| VAR 34 | For eve teasing, I don't attend the class | 1.00 | .617 |
| VAR 35 | As I got class materials from internet, so I don't go class | 1.00 | .521 |

Extraction Method: Principal Component Analysis.

Appendix 2 Certificate necessity and disinterested to acquire knowledge

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the Variables</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As I have no interest to acquire knowledge, I don't attend class.</td>
<td>.817</td>
</tr>
<tr>
<td>2.</td>
<td>As I need only certificate,</td>
<td>.780</td>
</tr>
<tr>
<td>3.</td>
<td>As I can't understand, I don't attend the class</td>
<td>.681</td>
</tr>
<tr>
<td>4.</td>
<td>Self frustration discourage me not to attend in the class</td>
<td>.613</td>
</tr>
<tr>
<td>5.</td>
<td>As I live so long distance from university, I don't attend the class</td>
<td>.588</td>
</tr>
<tr>
<td>6.</td>
<td>As I got class materials from internet, I don't go class</td>
<td>.535</td>
</tr>
<tr>
<td>7.</td>
<td>Political chaos discourage me not to attend in the class</td>
<td>.477</td>
</tr>
<tr>
<td>8.</td>
<td>For eve teasing, I don't attend the class</td>
<td>.475</td>
</tr>
</tbody>
</table>

Appendix 3 Department wise computer lab, seminar library and class room facilities are not adequate

<table>
<thead>
<tr>
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<th>Name of the Variables</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My department haven't separate computer lab</td>
<td>.802</td>
</tr>
<tr>
<td>2.</td>
<td>My university is not providing audio-visual class room (projector based)</td>
<td>.789</td>
</tr>
<tr>
<td>3.</td>
<td>My university is not providing a rich seminar library</td>
<td>.778</td>
</tr>
<tr>
<td>4.</td>
<td>My class room is not highly furnished and decorated</td>
<td>.621</td>
</tr>
<tr>
<td>5.</td>
<td>My university is not providing separate washroom for male and female</td>
<td>.612</td>
</tr>
<tr>
<td>6.</td>
<td>My University is not providing available class room facilities</td>
<td>.595</td>
</tr>
</tbody>
</table>

Appendix 4 Teachers did not take class regularly and come in the class lately and out early

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the Variables</th>
<th>Factor Loadings</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Our teachers come in the class room lately and out early</td>
<td>.712</td>
</tr>
<tr>
<td>2.</td>
<td>Our teachers did not take class properly</td>
<td>.680</td>
</tr>
<tr>
<td>3.</td>
<td>Teachers can't clearly understand a topic to the students</td>
<td>.658</td>
</tr>
<tr>
<td>4.</td>
<td>My University assigning</td>
<td>.543</td>
</tr>
</tbody>
</table>
Appendix 5 Teachers are biased in different aspects like political matter, gift and money etc

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the Variables</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Teacher focus more on political matter than study in the class room</td>
<td>.755</td>
</tr>
<tr>
<td>2.</td>
<td>Teachers make threatened environment in the class</td>
<td>.688</td>
</tr>
<tr>
<td>3.</td>
<td>Teacher always underestimate and misbehave with the students</td>
<td>.547</td>
</tr>
<tr>
<td>4.</td>
<td>Teachers gave number by counting the pages of answer script</td>
<td>.541</td>
</tr>
<tr>
<td>5.</td>
<td>Teachers did not examine answer script properly</td>
<td>.535</td>
</tr>
<tr>
<td>6.</td>
<td>Teacher manipulate the results by taking money, gifts and others benefit</td>
<td>.493</td>
</tr>
</tbody>
</table>

Appendix 6 Full time job engagement and private tuition hampered the class regularity

<table>
<thead>
<tr>
<th>Sl.</th>
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<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Full time job hamper my regular class</td>
<td>.767</td>
</tr>
<tr>
<td>2.</td>
<td>Private tuition hamper my regular class</td>
<td>.724</td>
</tr>
<tr>
<td>3.</td>
<td>Financial crisis hampered to attend in the class regularly</td>
<td>.447</td>
</tr>
</tbody>
</table>

Appendix 7 Transports and indoor and outdoor sports and recreational facilities are inadequate

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the Variables</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My university is not providing play ground facilities</td>
<td>.814</td>
</tr>
<tr>
<td>2.</td>
<td>My university is not providing transport facilities for the students</td>
<td>.737</td>
</tr>
<tr>
<td>3.</td>
<td>My university is not providing indoor sports room for playing</td>
<td>.708</td>
</tr>
<tr>
<td>4.</td>
<td>My university is not providing separate</td>
<td>.435</td>
</tr>
</tbody>
</table>

Appendix 8 University taught traditional and old syllabus

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the Variables</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My university taught us very traditional and old syllabus</td>
<td>.729</td>
</tr>
</tbody>
</table>

Appendix 9 Traffic jam hamper class regularity

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Name of the Variables</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Teacher favors those students who follow his/her political thought</td>
<td>-.541</td>
</tr>
<tr>
<td>2.</td>
<td>Traffic jam hamper my time to attend in the class</td>
<td>.501</td>
</tr>
</tbody>
</table>

REFERENCES


AUTHORS

First Author – Asma Akter, Lecturer of Economics, Asian University of Bangladesh, Uttara Model Town, Dhaka-1230.
Second Author – Md. Ashadujjaman, Lecturer of Sociology & Anthropology, Asian University of Bangladesh, Uttara Model Town, Dhaka-1230.
Professional Development: A Reflective Overview

Fazluz Zaman

Instructor, TSP, Al Ain Womens college, Higher College of Technology

Abstract - Professional development (PD) is a tool used to learn new skills or update existing ones and help professionals to achieve their career goals. Unfortunately, some people consider PD to be worthless because it may not always align with career goals. PD is never a substitute for mainstream tertiary studies and it is not a magic solution to all career aspirations. This is why it is important to make educated decisions about what PD to undertake and to be informed about the value that PD may or may not add. We must always consider the learning outcome of any chosen PD and balance this against our professional goals, budget and/or overall compliance requirements of the industry that we are working in.

In this article, I have discussed my personal PD goals and provided evidence and support for how the PD that I have undertaken positively impacted upon my knowledge, skills and my abilities. I believe that PD has significantly supported and updated my skills, adding value to my academic qualifications.

Index Terms - ASQA, PD, Logs, CEO, QMS, RMS, NSU

I. INTRODUCTION

Professional development (PD) refers to various educational experiences undertaken in relation to one’s work. According to Fletcher and Barufaldi (2002), PD is key in upgrading skills, knowledge and capabilities in order to remain both compliant as well as effective (Fletcher & Barufaldi, 2002). PD can include formal, structured type learning (Feiman-Nemser, 2001) or informal learning opportunities, which extend professional competencies such as knowledge, beliefs, motivation or self-regulatory skills (Graham, 2001).

Professionals in various industries including accountants, teachers, lawyers, doctors and engineers require PD opportunities to improve their knowledge and enhance their professional performance (McIlveen, 2011). Technology and practices are ever changing, bringing new challenges to the work environment. Additionally, globalisation has led to relatively free importation and exportation of labour forces across borders, making the labour market quite competitive (Tams & Arthur, 2010). Therefore, in order to retain jobs in this competitive climate, employees must undertake PD to ensure their knowledge and skills remain current (Egan, 2007).

When companies attempt to motivate their employees, they are often found to be more productive overall; their performance and commitment levels improve, and they tend to work for longer periods of time, leading to improved organisational productivity and profitability (Zhao, Seibert, & Hills, 2005). Therefore, it is crucial that professionals in all industries undertake PD to enable them, not only to address new challenges, but also to improve their performance for the organisations in which they work (Goleman, Boyatzis & McKee, 2002). Professional development can make employees or managers stand out amongst their colleagues, with their achievements, skills and knowledge (Fletcher and Barufaldi, 2002). It allows people to gain professional respect and credibility, making them more marketable and valuable in the labour market (Harris, 2005). This reflective review is based on my own personal experiences with PD. It aims to specifically analyse how my learning objectives, were aligned with program outcomes and demonstrate successful implementation of relevant PD.

II. CONSIDER THIS AS AN ADDITIONAL TITLE

Who is responsible for the delivery and recognition of professional development to the workforce?

Several studies have proven that PD adds remarkable value to individuals across a wide range of disciplines. Therefore it is imperative that the chief executive at any professional organisation takes charge and encourages the PD of its employees. Indeed spending funds on employee PD ensures that they are compliant, employable, marketable and more productive. Nonetheless, from my professional experience, even if the CEO funds PD, the contract of employment is considered one of the biggest negative motivation factors in employees productivity. Trainers’ could write in their resume about the list of PD logs, but the organisation’s existing assessment culture failed to show the new assessment work practice due to frequent change of workplace and new contracts - new opportunities in different workplaces. Unfortunately, the culture in many organisations fails to acknowledge the PD of its workers. Rather than attending conceptual workshops with zero application of scripted routines, Butlera, and Schnellert (2012) suggested that contextualised decision-making cements pedagogical principles and practices to best meet students' needs.

My overall professional development activities and their main objectives

All PD sessions I undertook were self-funded and motivated by my own desire to learn new things. The majority of my PD activities were face-to-face, teaching issues through reality-based workshop exercises. Appendix B provides an overview of the courses and workshops that I have attended, and their link with the intended learning objectives and outcomes in my work practices. These PD courses were intended to make me feel more empowered and give me a sense of fulfillment by helping me to work towards my dream of a successful career in Human Resources. After attending all these workshops, I did an internal audit and found many discrepancies between organisational practice and regulatory requirements.

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Examples of my successful professional development activities

One of the first PD experiences that I had was with SAI Global. SAI Global provides organisations around the world with information services and solutions for managing risk, achieving compliance and driving business improvement. In December 2013, I attended comprehensive training sessions on the theory and practice of auditing in a five-day, face-to-face Quality Management Systems (QMS’s) course, based on ISO 9001:2008. My intention was to gain a practical understanding of the responsibilities of a quality auditor, as well as the techniques and methodologies required to effectively audit a QMS. Lessons learned in the Risk Management session facilitated my understanding of integrated governance, risk management and compliance. It built on my basic knowledge of the risk process and taught me how to establish a framework for managing risk through three days of face-to-face training using Standard ISO 31000:2009 Risk Management: Principles and Guidelines. This knowledge will add significant benefit to the way I work and I will be applying my new skills and understanding from this PD course together with other assessment related PD in at least two different ways.

Many vocational colleges currently focus on implementing QMS’s as part of their work process. Based on the government’s regulatory audit requirements Risk Management training has taught me the mechanisms for developing assessment tools for various training packages that reduce the risk of non-compliance. Each time I attended PD sessions my main objective was to learn new skills and knowledge, update my industry currency, or both. Throughout the PD I did relating to “assessment design”, the facilitator used two AQF level assessments to design and redesign two assessments – so that we were able to detect the changes and identify where improvements were necessary. Following this learning opportunity, not only did I recognise the mistakes that I had made in my own work, but I was also able to apply my new found knowledge to achieve more compliant assessment practice.

As a professional employee holding different positions across numerous private education businesses, I believe that PD makes workers to better equipped to dealing with unexpected challenges and it helps them to think outside the traditional framework/practice when planning a course of action.

Professional learning goals

To be marketable in the labour force, I must be productive employee, with relevant skills and knowledge in designing units and assessments for dealing with the current and future issues and challenges in my career. Sometimes and particularly in my case, PD goals need to align with the compliance requirements. After attending many audits with my clients’, ASQA is seeking PD relevant to the industry and vocational education. As a result, I decided to split my PD budget into two categories—up skilling and updating my industry currency. In my PD logs, anyone can detect types of PD and organisation sources and topics are wide range industry relevant compliance choice. My PD logs demonstrate that I have covered a wide range of topics related to industry compliance throughout my formal PD learning.

How professional development helped me achieve my learning goals

I believe PD to be an important necessity in today’s world. As Speck & Knipe (2001) depicted, PD enabled me to feel more marketable in the competitive labour market, giving me a sense of fulfillment while, despite the aforementioned experience, making me more employable.

All my PD sessions have provided advanced knowledge and skills in working within the VET as sound practitioner, obtained respect among the Vocation college principals and owners, confident in client/student enquiry and overall improved my confidence when facing vocational workplace challenges and changes, thus make me more employable in diverse roles.

My professional goal in undertaking all this PD was to update my skills and knowledge in teaching and managing the educational workplace, to obtain a sense of fulfillment through meeting targets in terms of compliance versus money, and to increase my marketability and employability. PD was my gateway to the acquisition of my current skills and knowledge on the QMS, RM, Educational Leadership and assessment creation, validation and moderation in alliance with the national training package to improve the quality of work output.

North South University (NSU), the first private university in Bangladesh, was established by a group of philanthropists, industrialists, bureaucrats and academics. The university follows the North American academic system with all its distinctive features: semesters, credit hours, letter grades, a one-examiner system and so on. I was asked to teach as a full-time faculty member in the spring 2013 (Jan – April) session. It was during this time that I realised, my efforts into advancing my abilities through PD had truly paid off.

In my Human Resource Management class at NSU, I was teaching Workplace Health and Safety. Being the first private university in Bangladesh, my intention was to apply the ISO 9001 Quality Management System (QMS) and AS ISO 31000 Risk Management (RM) to NSU operations. Around 65 students participated in my session and pointed out fire preparedness as one of NSU’s prime risks. Exactly three months after the course began, on 24 June 2013, the university had a fire in its 10-storey academic building (Appendix C). Fortunately, there was no casualties, but the university had to stop its academic operations for 28 days, consequently hampering the entire 2013 academic sessions.

Before this real life event, I was given the opportunity to teach students and assess their understanding of the QMS and RM framework. This meant that more than 45 students of two different sections were ready to deal with the real life risk that they faced when the fire incident took place. My students even informed me via social media on the expected class simulation and actual risk context and consequences. This tragic, but somehow serendipitous course of events proved that my PD activities had indeed made me better equipped with the skills and knowledge to work and teach in the areas of HR and WHS.

III. CONCLUSION

It is easy to see how acquiring new or updating current skills and knowledge makes an individual more marketable and appealing to different employers (Wilson, 2000), as was my
experience after attending PD sessions. My pursuit of PD was intended to achieve four main objectives, including updating my skills and knowledge in my field, obtaining a sense of fulfilment, being marketable and employable. On a personal level, PD has empowered me to seek better employment opportunities across the world.

Provided that individuals do their research and only participate in PD that is highly relevant and in line with their career aspirations, the value that this type of learning can add to any professional career is exponential.

REFERENCES


APPENDIX A: PD TOPICS AND LEARNING OUTCOMES

<table>
<thead>
<tr>
<th>TOPICS: QMS</th>
<th>TOPICS: RISK MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ How to apply QMS audit principles and practices to ISO 9001</td>
<td>➢ Using an integrated approach to managing risk systems</td>
</tr>
<tr>
<td>➢ Personal and interpersonal skills required for auditing</td>
<td>➢ Introduction to GRC; understand the specific interaction between governance (G), risk (R) and compliance (c) in an operational capacity</td>
</tr>
<tr>
<td>➢ Processes involved in managing audit programs</td>
<td>➢ Introduction to compliance requirements as they relate to risk management</td>
</tr>
<tr>
<td>➢ How to initiate and prepare for an audit</td>
<td>➢ Using a risk management framework and integrated risk management approach to make more effective business decisions</td>
</tr>
<tr>
<td>➢ How to conduct on-site audit activities, reporting on audit findings and conducting post-audit activities</td>
<td>➢ Implementing risk management systems and supporting others to manage risk</td>
</tr>
<tr>
<td>➢ Appropriate oral, written and non-verbal communication techniques needed to lead an audit</td>
<td>➢ Evaluating the effectiveness of the risk management system and programs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEARNING OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Review auditee documentation</td>
<td>➢ Understand the concept of governance and its relationship to risk and compliance obligations</td>
</tr>
</tbody>
</table>


AUTHORS

First Author – Author name, qualifications, associated institute (if any) and email address.

Second Author – Author name, qualifications, associated institute (if any) and email address.

Third Author – Author name, qualifications, associated institute (if any) and email address.

Correspondence Author – Author name, email address, alternate email address (if any), contact number.
- Participate in developing audit schedules
- Identify, gather, analyse and evaluate information
- Compile results and report findings
- Assess the scope and objectives of a quality audit
- Communicate with an auditee regarding the proposed quality audit
- Identify the resources required to conduct a quality audit
- Develop and submit a quality audit plan
- Prepare and manage an audit plan
- Identify and prepare checklists and audit related documentation
- Conduct entry and exit meeting
- Guide team members in continuously improving their performance
- Negotiate the follow-up process with auditees
- Monitor and review audit systems and activities

- Understand the concept of compliance and its relationship to risk and governance expectations
- Understand the links between governance, risk and compliance and identify appropriate areas for integration
- Establish infrastructure and processes for managing governance, risk and compliance requirements
- Understand what factors to consider when implementing risk management and compliance strategy
- Monitor and review system implementation

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**APPENDIX B: CONTINUOUS PROFESSIONAL DEVELOPMENT: AT A GLANCE**

<table>
<thead>
<tr>
<th>D Sources</th>
<th>Description</th>
<th>Professional Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Centre Continuing Education, University of Sydney</strong></td>
<td>Introduction to Counseling (Face to Face), English Grammar and Pronunciation, NLP Confidence Buildup and Emotional Intelligence</td>
<td>47.0 Hours</td>
</tr>
<tr>
<td><strong>Higher College of Technology</strong></td>
<td>Sharjah Conference 2017 - Collaborative Learning and Experiential learning, Introduction to Blackboard learning</td>
<td>9.0 Hours</td>
</tr>
<tr>
<td><strong>Project Management Institute (PMI, Sydney Chapter)</strong></td>
<td>Managing organization Change, How To run a program Women in Project Management (WiPM) Networking</td>
<td>9.5 Hours</td>
</tr>
<tr>
<td><strong>ASQA, DEEWR and ACSF</strong></td>
<td>Information Session, Australian Core Skills Framework (ACSF), Transition, Information Session</td>
<td>48 Hours</td>
</tr>
<tr>
<td><strong>AUSTRADE and Department of Privacy Commissioner</strong></td>
<td>International Education Seminar Series 2011 on Latest trends, MENA - Middle East Market developments and opportunities</td>
<td>12 Hours</td>
</tr>
<tr>
<td><strong>Australian Institute of Technology</strong></td>
<td>Hot Topic: Training Session</td>
<td>12 Hours</td>
</tr>
<tr>
<td>Management</td>
<td></td>
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</tr>
<tr>
<td>COMCARE</td>
<td>Seminar on the Harmonization of 2012 Work, Health and Safety</td>
<td>8 Hours</td>
</tr>
<tr>
<td></td>
<td>Australian Flexible Learning: National Seminar and Workshops</td>
<td>16 Hours</td>
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<tr>
<td></td>
<td>Outsource E-learning: Commlab India</td>
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<tr>
<td>Department of Education and Training (DET)</td>
<td>Workshops on Compliances and Training-Assessment</td>
<td>144 Hours</td>
</tr>
<tr>
<td>The Australian Workforce and Productivity Agency (AWPA) Former Skills Australia</td>
<td>Industry Consultation Session on the National Workforce Development Strategy</td>
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</tr>
<tr>
<td>Dynamic Web Training</td>
<td>Workshop on to Adobe Acrobat 9 for Preserving Document Integrity and Learning Various Tips and Tricks on Applications as part of E-Learning Curriculum Design</td>
<td>8 Hours</td>
</tr>
<tr>
<td>Innovation Business Skills Australia (IBSA)</td>
<td>ESCAN, Industry Consultation and Workshops</td>
<td>18 Hours</td>
</tr>
<tr>
<td></td>
<td>Energy Efficiency and Business Sustainability (VELG)</td>
<td></td>
</tr>
<tr>
<td>Others: Indian Institute of Management, Calcutta, India and IVEY School of Business, Canada</td>
<td>Residential Workshop on exploring and understanding leadership dimensions, strategies and the art of stimulating a positive work culture and Case Study writing workshops</td>
<td>55 Hours</td>
</tr>
<tr>
<td>University of New South Wales (UNSW)</td>
<td>Presentation and Communication Skills for Non-English Speaking Background (NESB) and Principles of Tutoring – Preparing to Tutor, Facilitating Interactions and Self Managing</td>
<td>30 Hours</td>
</tr>
<tr>
<td>Service Skills Australia</td>
<td>Foundation Skills, LLN and ACSF Documents</td>
<td>13 Hours</td>
</tr>
<tr>
<td></td>
<td>Literacy and numeracy needs for a LLN specialist</td>
<td></td>
</tr>
<tr>
<td>BEC Southern Sydney, Bankstown, Sydney</td>
<td>Starting a Business, Linked In Optimization</td>
<td>12 Hours</td>
</tr>
<tr>
<td>VELG</td>
<td>Suggested Evidence For Audit, TAE Workshop, Extending Assessment Practice, VET Question and Answer, Networking - NCVER, Copyright Issue</td>
<td>30 Hours</td>
</tr>
<tr>
<td><strong>Total Hours as of 1 May, 2017</strong></td>
<td><strong>475.5 Hours</strong></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Fire breaks out at NSU

A fire broke at North South University in the city's Bashundhara Residential Area on Sunday night, reports UNB. Fire Service and Civil Defence sources said the fire originated at the power substation on the basement of the 10-storey university building around 8:45pm. On information, eight firefighting units rushed in to douse the blaze, said operator Nazrul Islam at the Fire Service and Civil Defence control room.

Identification and Characterization of Bacteria Isolated From the Gut of Metal Treated Earthworms

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1. INTRODUCTION

Soil pollution is an important environmental problem as soil is the major sink for a variety of toxicants being released into the environment. Heavy metals released into the environment tend to persist for a long time, as they do not undergo microbial or chemical degradation. They accumulate throughout the food chain, thus posing a serious threat to the environment, animals and humans. Thus, heavy metal resistance is a general demand of every living cell.

The common heavy metal contaminants found in the soil are Cadmium (Cd), copper (Cu) and zinc (Zn). Cadmium is one of the largest three heavy metal poisons and in the body, it is known to affect several enzymes. Copper, being the third most used metal in the world, is essential for the body, but in high doses it can cause anemia, liver and kidney damage, stomach and intestinal irritation. Zinc is relatively harmless when compared to several other heavy metal ions. It is important in forming complexes such as zinc fingers in DNA and as a component in cellular enzymes (Nies, 1999). Zinc plays a significant role in cytotoxic events and is prominently involved in cell death in the brain. The free zinc ion in solution is highly toxic to plants, invertebrates, and some fish (Plum et al., 2010).

Assessing pollutants in different components of the ecosystem and using indicator species to estimate the levels of contaminants in different parts of the ecosystem have been developed in preventing risk to natural life and public health. The earthworms have been proved to be sensitive indicators of contaminated soils. They are eco-system engineers and have been involved in bioremediation for many years. Endogeic earthworms like Pontoscolex corethrurus are a major component of soil faunal communities in ecosystems of the tropics (Lavelle et al., 1992). They bio-accumulate the heavy metals, detoxify them and improve the quality of soil (Sturzenbaum et al., 1999) (Spurgeon and Hopkin, 1999) (Nahmani et al., 2007). The heavy metals are taken up by the earthworms either by immobilization in the cells of gut wall or by storing in waste nodules formed within body cavity or by excretion through calciferous glands (Andersen and Laursen, 1982).

Earthworms consume large quantities of soil and thereby disperse microorganisms. Earthworms have many complex interrelationships with microorganisms and harbor millions of microbes in their gut. They depend upon microorganisms for production of degradative enzymes to decompose organic matter, nitrogen fixation (Morgan and Morgan, 1999; Kumaret al., 2010). But whether these microbes harbored by the earthworms have any significant role in detoxification process is still not very clear and is yet to be found out.

Microorganisms are ideally used in bioremediation because they possess enzymes that allow them to use environmental contaminants as food. Due to the selective pressure from the metal in the growth environment,
microorganisms have evolved various mechanisms to resist the heavy metal stress. Tolerance and removal of toxic heavy metals have been studied in bacteria (Silver and Phung, 2005) and algae (Feng and Aldrich, 2004). Bioaccumulation of heavy metals is the retention and concentration of heavy metals by microbes. The heavy metal ions are transported across the microbial cell membrane from the outside to the inside of the cell where they are concentrated. In bio sorption, heavy metal ions, especially the positively charged metal ions, are sequestered through the adsorption of metals to the negative ionic groups of cell surfaces (Terry and Stone, 2002; Akhtar et al., 2008; Liu et al., 2004; Malik, 2004).

This study investigates the interaction between the endogeic earthworm *Pontoscolex corethrurus* and their gut micro flora in uptake of heavy metals from the polluted soil samples. The endogeic earthworms have been selected for the study because these earthworms live and feed in the mineral soil layers. Hence these earthworms are in constant contact with the polluted soil and are directly influenced by the presence of metal pollutants in the soil. This study will be helpful to characterize the microorganisms harbored in earthworm’s gut that take part in uptake/detoxification of heavy metal pollutants. This knowledge can further be applied to field studies to increase the efficiency of bioremediation of soil.

2. MATERIALS AND METHODS

2.1 Collection and exposure of *Pontoscolex corethrurus* earthworms to heavy metals Cadmium, Copper and Zinc

Earthworms (*Pontoscolex corethrurus*) were collected from the garden soil and maintained under normal conditions for a period of two weeks. To maintain uniform initial conditions in the gut, the gut of the earthworms was cleared by allowing them to feed on wet filter paper inside a box for a period of 48 hours.

The concentrations of cadmium (Žaltauskaitė and Sodienė, 2010), copper (Spurgeon et al., 2004) and zinc (Lev et al., 2010) in the soil, exposed to the earthworms were found out from reviewing the literature. Six earthworms of uniform size were weighed (day 0) and introduced to increasing concentrations of cadmium (0, 40, 80, 160, 320 and 640mg/kg dry wt. of soil), copper (0, 100, 200, 400, 800, 1600 and 3200mg/kg dry wt. of soil) and zinc (0, 400, 800, 1600, 3200 and 6400 and 13200mg/kg dry wt. of soil) in triplicates. The soil without any addition of heavy metal was used as control. The earthworms were maintained for 15 days with adequate aeration, moisture content and were regularly monitored for percentage of weight gain/loss and mortality on days 3, 7, 10, 12 and 15. The earthworms that survived the metal treatment were used for isolation of gut micro flora.

2.2 Isolation of microorganisms from the gut of earthworms subjected to heavy metal treatment

The earthworms that survived the heavy metal treatment for 15 days were used for isolation of the gut micro flora. They were surface sterilized and the region below the gizzard (Intestine) was divided into three parts- anterior, middle and posterior parts of the intestine. The gut homogenate of control earthworms and metal treated earthworms was prepared. A diluted sample of homogenate was spread plated on the nutrient agar plates to obtain pure cultures.

2.3 Biochemical characterization and identification of bacteria isolated from the gut of earthworms subjected to heavy metal treatment

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The bacterial colonies obtained, were characterized using different biochemical assays like Gram Staining, IMViC Test, Catalase test, Oxidase test, Urease test, Nitrate reduction test, Mannitol agar test, Hydrogen sulphide production Test, Endospore forming test and Sugar fermentation assays for the identification of the species (Cappuccino and Sherman., 2004). The microbes isolated from the gut of earthworms subjected to metal treatment were compared with the gut micro flora of control earthworms to identify the bacteria that were specifically harbored in the gut of earthworms subjected to heavy metal treatment.

The various microorganisms that were selectively accumulated in the gut of metals (Cd, Cu and Zn) treated earthworms were identified using 16Sr RNA sequencing technique. This was done by outsourcing to Serene Biosciences, Bangalore.

2.4 Analysis of heavy metal concentration in soil samples using Atomic Absorption Spectroscopy (AAS)

The ability of Pontoscolex corethrurus earthworms to bio-accumulate the heavy metals in the soil was assessed using Atomic Absorption Spectroscopic studies in the soil samples, used before and after the growth of earthworms.

A known concentration (ppm) of cadmium chloride, copper chloride and zinc chloride were added to respective boxes where Pontoscolex corethrurus earthworms were grown for a period of 15 days. About 2 grams of soil sample was collected from each box used for the growth of earthworms under metal stress (CdCl2, CuCl2 and ZnCl2), after the introduction of earthworms and were processed in triplicates for each metal concentration according to standard procedures of AAS sample preparation. The samples were analyzed for the quantity of heavy metals using AAS, which was outsourced to Chemical Laboratory, Department of Mines and Geology, Government of Karnataka.

2.5 Characterization of isolated microorganisms based on their tolerance to heavy metals, Antibiotic Sensitivity and resistance to Herbicides using agar diffusion assay

Agar Well Diffusion assay was performed to study multi metal tolerance of the isolated bacterial cultures. Petri plates containing 20ml Luria Bertani medium were seeded with 100 µl of overnight grown culture of bacterial isolates. Stock solutions of copper chloride, zinc chloride, cadmium chloride were prepared and introduced into wells so as to obtain required concentration of 4µg/well, 16µg/well, 32µg/well, 64µg/well, 128µg/well and 256µg/well of the metals. The plates were incubated to observe the microbial growth. The assay was conducted in four trials and multi metal tolerance was assayed by measuring the diameter of the inhibition zone formed around the well in centimeters (NCCLS, 1993).

The sensitivity of the isolated bacterial species to different antibiotics was evaluated by agar well diffusion method. Four antibiotics tablets namely Ampicillin, Tetracycline, Streptomycin and Kanamycin were placed at equidistant places from each other in the LB agar plates. The test was carried out in triplicates. The plates were incubated and the zone of inhibition for each was recorded.

As the study was carried out on earthworms harboring soil microorganisms, the ability of soil bacteria to resist herbicides was studied using agar well diffusion technique. The normal concentration generally sprayed and applied in fields for these herbicides was 10ml/l for glyphosate (liquid), 1.25g/l for 2, 4, Dichlorophenoxyacetic acid (powder form) and 2.67g/l of atrazine (powder form). Ten times higher and ten times lower concentrations of these herbicides were used to check the resistance of these four bacterial
strains. Different stock concentrations of the herbicides were prepared and introduced into the wells to obtain required concentration of the herbicides. The plates were then incubated and the zone of inhibition was recorded in centimeters.

2.6 Characterization of microorganisms for differential expression of metal resistant proteins using SDS PAGE

All the isolated organisms were inoculated in 3 ml of LB broth with 128µg of different metals used in the study and incubated overnight. Crude protein extracts were prepared from the bacterial samples and was loaded into Polyacrylamide gel with 12.5% of resolving gel and 5% of stacking gel and electrophoresed. The gel was stained in coomasie blue staining solution (Laemmli, 1970) and analyzed for the presence of differentially expressed proteins under the influence of metals compared to the control conditions.

2.7 Characterization of microorganisms based on the presence of plasmids conferring metal resistance

The bacterial pellet obtained from 3ml of overnight grown culture of the bacterial strains was subjected to alkaline lysis method (Birnboim and Doly 1979). Each isolated sample was loaded on 1% agarose gel and electrophoresed to look for the isolated plasmid DNA.

3. RESULTS AND DISCUSSION

3.1 Exposure of Pontoscolexcorethrurus earthworms to heavy metals Cadmium, Copper and Zinc

Cadmium had a deleterious effect on growth of the earthworms. All the earthworms that were introduced in the soil spiked with Cadmium salt, irrespective of its concentration, showed decrease in their weights by day 3. The earthworms exposed to concentration of Cadmium more than 80mg/kg were found dead within 8 days (Table 1).

There was a gradual weight loss of earthworms, observed under the effect of Copper. The earthworms exposed to a concentration of more than 1600mg of copper /kg of dry weight of soil, died within three days and there were no earthworms surviving at or above 800mg/kg at the end of the fifteen-day period (Table 2).

Pontoscolexcorethrurus earthworms were able to tolerate zinc chloride up to a concentration of 1600 mg/kg of dry weight of soil. All the earthworms introduced in the soil spiked with zinc salt, irrespective of its concentration, showed variation in their weights by day 3. The earthworms exposed to concentration of zinc more than 1600mg/kg were found dead within 6 days (Table 3)

| Table 1 Effect of Cadmium on the growth of earthworms, Pontoscolexcorethrurus. |
|---------------------------------|-------|--------|--------|--------|--------|--------|
| Concentration of CdCl₂ (mg/kg of soil) | 0     | 0.19(18) | 100   | 0.19(17) | 0     | 0.23(17) | +21    | 0.22(16) | +15.8  | 0.2(14) | +5.3   |
Table 2: Effect of Copper on the growth of earthworms, *Pontoscolexcorethrurus*

<table>
<thead>
<tr>
<th>Conc. of CuCl$_2$ (mg/kg of soil)</th>
<th>Average weight &amp; percentage weight gain/loss on the days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0$^{th}$ day</td>
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<td></td>
<td>g$^a$</td>
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<tr>
<td>0</td>
<td>0.17(18)</td>
</tr>
<tr>
<td>100</td>
<td>0.18(18)</td>
</tr>
<tr>
<td>200</td>
<td>0.18(18)</td>
</tr>
<tr>
<td>400</td>
<td>0.18(18)</td>
</tr>
<tr>
<td>800</td>
<td>0.19(18)</td>
</tr>
<tr>
<td>1600</td>
<td>0.16(18)</td>
</tr>
<tr>
<td>3200</td>
<td>0.21(18)</td>
</tr>
</tbody>
</table>

Table 3: Effect of zinc on the growth of earthworms, *Pontoscolexcorethrurus*

<table>
<thead>
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<th>Conc. of ZnCl$_2$ (mg/kg of soil)</th>
<th>Average weight &amp; percentage weight gain/loss on the days</th>
</tr>
</thead>
<tbody>
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<td>0$^{th}$ day</td>
</tr>
<tr>
<td></td>
<td>g$^a$</td>
</tr>
<tr>
<td>0</td>
<td>1.12(18)</td>
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<tr>
<td>100</td>
<td>0.97(18)</td>
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<tr>
<td>400</td>
<td>0.86(18)</td>
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<tr>
<td>800</td>
<td>0.61(18)</td>
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<tr>
<td>1600</td>
<td>0.59(18)</td>
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<tr>
<td>3200</td>
<td>1.08(18)</td>
</tr>
<tr>
<td>6400</td>
<td>0.74(18)</td>
</tr>
<tr>
<td>13200</td>
<td>0.65(18)</td>
</tr>
</tbody>
</table>
a: Average weight of the earthworms alive on the day of observation. The number in parentheses indicates the number of the earthworms alive on the day of observation.
b: Percentage change in the average weight of the earthworms compared to the 0th day.

3.2 Biochemical characterization and identification of bacteria isolated from the gut of earthworms subjected to heavy metal treatment

Depending upon the Gram’s nature and morphology of the microorganisms, they were subjected to a series of different biochemical tests.

*Delftia* sp. and *Staphylococcus aureus* were bacteria that were enriched or selectively accumulated under in the gut of earthworms subjected to cadmium treatment. *Staphylococcus aureus* and *Bacillus cereus* were found to be selectively accumulated in the gut of earthworms exposed to copper treatment. When the bacteria isolated from the gut of earthworms subjected to zinc treatment were compared with the gut micro flora of control earthworms, *Aeromonas hydrophila* and *Bacillus cereus* were found to be selectively accumulated in the gut of earthworms exposed to zinc stress. The microorganisms that were selectively accumulated in the gut of *Pontoscolex corethrurus* earthworms on metal treatment were identified using 16Sr RNA sequencing technique. This was done by outsourcing to Serene Biosciences, Bangalore.

3.3 Analysis of heavy metal concentration in soil samples using Atomic Absorption Spectroscopy (AAS)

AAS was carried out to find the cadmium, copper and zinc concentrations in soil samples used for the growth of earthworms and after the growth of *Pontoscolex corethrurus* earthworms. When the results were statistically analyzed using student T test, it showed a significant difference at (p < .05) (95%) indicating drastic decrease in the concentration of these heavy metals after the growth of earthworms. This study proved the ability of *Pontoscolex corethrurus* earthworms to bio-accumulate the heavy metals like cadmium, copper and zinc present in the soil.

3.4 Characterization of isolated microorganisms based on their tolerance to heavy metals Antibiotic Sensitivity and resistance to Herbicides using agar diffusion assay

These isolated microorganisms, *Staphylococcus aureus*, *Delftia* sp., *Bacillus cereus* and *Aeromonas sp.* were assessed based on their ability to tolerate different concentrations of heavy metals (CdCl₂, CuCl₂ and ZnCl₂), antibiotics and herbicides.

*Staphylococcus* sp., showed zone of inhibition in all concentrations of cadmium chloride indicating that the organism was sensitive towards cadmium even at lower concentration of 4µg/well. However, the organism was able to tolerate Cu even at higher concentrations up to 256µg/well. In case of zinc chloride, no inhibition was observed even up to 64µg/well indicating that the organism could tolerate or resist the metal at that concentration. *Delftia* sp. was able to tolerate Cd better when compared to *Staphylococcus* and *Bacillus*. The organism was able to tolerate Cu even at high concentrations of 256µg/well. *Delftia* sp. showed tolerance to Zinc up to 128µg/well. *Bacillus* was more sensitive towards Cd as was indicated by increased zone of inhibition. *Bacillus* was able to only tolerate Zn and Cu even at high concentrations of 256µg/well. *Aeromonas* was able to
tolerate cadmium up to a concentration of 16µg/well. The organism was able to tolerate Cu and zinc even at concentrations of 256µg/well. It was observed that all the four bacterial strains were relatively more sensitive to cadmium however were able to tolerate copper and zinc.

The antibiotic sensitivity of the bacterial strains isolated from the gut of *Pontoscolexcorethrurus* earthworms exposed to heavy metals, were evaluated by disc diffusion method (Kirby-Bauer, 1972). All the bacteria were sensitive to all the four antibiotics, (Ampicillin, Streptomycin, Chloramphenicol and Tetracycline) showing different ranges of sensitivity (Figure 1).

![Fig1 Zone of inhibition shown by different bacteria against antibiotics](image)

All the four organisms (*Staphylococcus*, *Delftia*, *Bacillus* and *Aeromonas*) used were found to be resistant to all the three herbicides (Glyphosate, 2, 4-D and Atrazine) used in three different concentrations respectively.

### 3.5 Characterization of microorganisms for presence of plasmids conferring metal resistance and differential expression of metal resistant proteins

In the presence of Cadmium, all the four bacterial strains showed over expression of certain proteins compared to the control (Figure 2). In *Bacillus cereus*, when compared to control, over expression of a protein corresponding to molecular weight of 97kDa, was observed in the lane, where protein extract from bacteria grown in the presence of cadmium was loaded. *Delfta* sp. showed over expression of three different proteins when compared to control, bearing molecular weight of approximately 43kDa, 66kDa and a high molecular weight protein > 200kDa. In *Staphylococci*, a protein corresponding to a molecular weight of approximately 80kDa was over expressed, in the presence of Cadmium, when compared to control. A high molecular weight protein > 97kDa and > 200kDa was also observed. In *Aeromonas*, over expression of proteins was observed in presence of Cadmium whose molecular weight was found to be 80kDa and high molecular weight protein which was more than 205kDa (Figure 3).

![Fig2 Analysis of crude protein extract from Bacillus, Staphylococci and Delfta spp. in the presence of Cu, Cd, Zn metals](image)

<table>
<thead>
<tr>
<th>MW</th>
<th>KDa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>205</td>
</tr>
<tr>
<td>2</td>
<td>97.4</td>
</tr>
<tr>
<td>3</td>
<td>66</td>
</tr>
</tbody>
</table>

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When the bacteria isolated from earthworms treated with heavy metals were investigated using alkaline lysis method, Plasmid DNA was not found in any of the four bacterial strains.

**CONCLUSION**

The present study analyzed the effect of heavy metals, cadmium, copper and zinc on the earthworms *Pontoscolecoscorethrurus* and its gut microbial communities. The observed changes in the bacterial communities of the earthworms could be used as an indication for the possible contamination of the soil areas. Upon exposure to the heavy metals, the earthworms have shown enrichment of a few bacteria by harboring them in their gut in higher amounts than in control. The presence of these selective bacteria or enrichment of bacteria under stress conditions could imply their positive role in aiding the earthworm’s tolerance to the metal. This also
indicates an association between the earthworms and the microorganisms to bio-remediate the toxic conditions created by heavy metals. These differentially accumulated organisms may be present in the soil but there might not have been any interaction between the earthworm and these bacteria. Upon exposure to the metal, the organisms might have been taken up and retained by the earthworms that ultimately conferred them the resistance to the metal.

Bacteria like *Delftia* and *Bacillus cereus* can be used for remediation of soils that has been polluted by different heavy metals since they are able to tolerate more concentrations of heavy metal. However, further research on the extent of tolerance and mechanism of the tolerance of heavy metals by these bacteria has to be done before their probable use in bioremediation. This will help in the understanding of the organism’s capability in bioremediation and also throws light on the various methods that can be adapted to enhance this efficiency.

**REFERENCES**

• Spurgeon, D.J. and Hopkin, S.P. 1999. Comparisons of metal accumulation and excretion kinetics in earthworms (Eisenia fetida) exposed to contaminated field and laboratory soils. Applied Soil Ecology. 11: 227-243
• Žaltauskaitė, J and Sodienė, I. 2010. Effects of total cadmium and lead concentrations in soil on the growth, reproduction and survival of earthworm Eisenia fetida. Ekologija. 56(1–2): 10–16
Problems of Teaching the Listening Skill to Yemeni EFL Learners

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Abstract- The listening skill seems to be the most difficult among all language skills. This difficulty stems from linguistic and non-linguistic problems i.e. difficulties that accompany the process of teaching and learning listening. This paper aims to investigate the most problematic areas in teaching the listening skill. Two data collection procedures were employed to collect the data for this study: a classroom observation, and a questionnaire for teachers. Fifty teachers of English language responded to the questionnaire and 11 secondary schools in five districts of Aden Governorate were observed for the purpose of collecting data on the teaching of the listening skill. The data were analysed quantitatively and qualitatively.

The findings revealed a set of problems that encounter teachers in teaching listening and consequently contribute to the difficulty of the listening skill.

These problems are classified into linguistic and non-linguistic problems. The non-linguistic problems are the main hindrances to teaching listening in the context of the study including problems relating to learners, teachers, and teaching environment which have mostly led to neglecting this skill. The linguistic problems are observed in the pronunciation, stress, intonation, vocabulary, and syntactic structure. The study suggests some pedagogical implications to improve the process of teaching listening in the secondary schools of Yemen.

Index Terms- Listening, Listening Comprehension, Difficulties of Listening Comprehension, Linguistic Problems, Non-linguistic Problems.

Based on these definitions, it is clear that listening involves both linguistic and nonlinguistic knowledge. The linguistic knowledge includes understanding of lexis, grammar, phonology, and discourse. The non-linguistic knowledge may include understanding the context or situation, the topic, and the purpose of the interaction.

II. The Importance of the Listening Skill

Listening is not only the most important language skill which is overused by people in real life situations, but also a fundamental part of the process of second language learning (hereafter, SLL). So, training in listening comprehension (LC) is necessary to assist students to make the transition from classroom language to real language more easily and effectively. In other words, it has a vital role in the development of general communication skills and the English language competence. According to Bulletin (1952 cited in Saricoban, ibid) listening is one of the fundamental language skills through which children, young people and adults gain a large portion of their education, information, background knowledge of the world, ideals, sense of values, and appreciation. Rost (2001: 7) also supports that "Listening is not only a skill area in language performance, but is also a critical means of acquiring a second language (L2). Thus, in this day of mass communication it is of vital importance to teach pupils to listen effectively and critically.

III. The Difficulty of the Listening Skill

At this point, interpretations of neglecting the listening skill (LS, hereafter) can be put clearly. It is always the most difficult and challenging task for second language (SL) learners (Paulston 1976 and Eastman 1987 cited in Mee, 2001). According to Vandergrift (2007: 191) the characteristic of listening that makes it difficult is that "Listening is an invisible mental process making it difficult to describe", so the listener's task, here, is more challenging. In addition, the listener is engaged in many processes such as discriminating between sounds, understanding vocabulary and grammatical structures, interpreting stress and intonation, remembering and interpreting this within the immediate, as well as the larger socio-cultural context of the utterance (Vandergrift, 2007 and Wipf, 1984: 346). Moreover, it is not often taught and practised, nor possible to go over again what ones heard, whereas it is simple to read and re-read a difficult page in a book (Broughton et. al, 1978: 66).
IV. THE MAIN PROBLEMS IN LISTENING COMPREHENSION

Listening comprehension is an intricate process in which different processes and factors are involved. According to Guo and Wills (2006: 5) “Listening Comprehension is a complex psychological process of listeners' understanding language by sense of hearing. It is an interactive process of language knowledge and psychological activities”. Since LC involves different variables i.e. linguistic and non-linguistic, so it will be clear that any defect in these two variables will affect this process negatively.

In what follows some problems which can affect LC will be discussed. These problems are related to the main two categories of factors i.e. the linguistic and non-linguistic. The first category discusses some different kinds of language problems whereas the second, the third, and the fourth ones discuss other non-linguistic problems. These are the background problems, the students' psychological obstacles, and other sources of difficulty. This classification is inspired from the classifications given by Anderson and Lynch (1988) as well as Guo and Wills’ (2006) classification.

4.1 Language Problems

Some linguistic problems namely those related to the pronunciation area including the sound system, stress and intonation, vocabulary, and syntactic structure will be discussed here.

- Pronunciation

Under this heading different issues of the sound system, stress and intonation will be discussed. As regards some problems related to the sound system of English in contrast to the Arabic sound system, Kharma and Hajjaj (1997) emphasise and discuss the phonemic problems which result in differences in meaning and which may lead to misunderstanding such as the pronunciation of individual sounds, words, phrases, stress, rhythm, and intonation. They also discuss types of mistakes with vowel and consonant sounds which result from differences in the two languages (i.e. Arabic and English) or as a result of existing a sound in one language and the absence of this sound in the other. Such phenomenon causes difficulty in understanding such sounds which do not exist in learners' native language (Hasan, 1991: 142). An example of these problems is the sounds /h/ and /v/ as in fast and vast. These sounds result in problem for Arab learners where the sound /v/ in Arabic is only used in borrowed words whereas in English it is exist as a main sound and /h/ is used by some Arab learners for both sounds in English pronunciation as in of /'əv/ and off /'ɒf/. Similarly, there is a confusion between /ʃ/ and /tʃ/, consonant doubling (as in allow /*æl- laʊ/ instead of /ə'laʊ/), and consonant clusters. They also refer to some problems with the vowel sounds such as the confusion of some pairs of vowels. For example, learners may face difficulty when one sound is really existed in their native language but as an allophonic variation of another i.e. /f/and /fi/. In addition, difficulty in recognition and production of some vowel sounds, the intrusive vowels where the Arab learners tend to insert vowel sound between consonant clusters as in students /*stju:dnıts/ instead of /stju:dnıts/, or spring /*spı'prın/ instead of /spı'nı/. Fox (1974: 15) agrees that "sound confusion seems to be a significant part of the problem of listening comprehension".

The stress and intonation patterns which are not used by foreign learners cause problem of LC (Ur, 1984: 12). This area of stress, rhythm, and intonation represents a problem for Arab learners of English because of the differences between English and Arabic rules in this area. For instance, Kharma and Hajjaj (1997) mention that Arab learners make some mistakes in word stress as misplacement of word stress (e.g. sile'tly /*'sæl'tlntı/ instead of 'silently /'sæl'tlntı/), confusion of some pairs of words (e.g. 'produce /'prıdju:s/ for both noun and verb). Regarding sentence stress, they mention some other problems such as failure to adopt the stress-timed rhythm of English (they eat an apple /*'bet 'ı:t 'æn 'æpl/), and failure to adopt the weak vowels in connected speech (e.g. anatomy /*'ænə'tomi:/ instead of /ə'nætəmı/). So, they have to learn these patterns of stress, rhythm, and intonation as they tend to adopt Arabic intonation when they speak English (Kharma and Hajjaj, 1997: 32).

Similarly, different foreign learners such as Japanese and Chinese find difficulty in understanding the simplest conversations in English. Norris (1993: 49) mentions some reasons behind this. The first reason is the students' inability to perceive certain English sounds accurately as a result of the absence of such sounds in Japanese. The second reason is the students' unfamiliarity with stress and intonation patterns of English. Hamouda (2013) also points out that pronunciation and accents are among the problems that hinder Saudi students in LC. In addition, Solak and Firat (2014) found out that Turkish students at a state-run University in Turkey face difficulties in pronunciation. Yalmız and Yauvuz (2015) found out that the teaching of phonetics is neglected in Turkish public schools.

4.1.2 Vocabulary

Vocabulary is one of the important issues in LC. It is also "a good quality of listening comprehension" (Thomas and Dyer, 2007). Yet, it can be one of the difficulties and factors of LC (Hassan, 2000 and Thomas and Dyer, 2007, and But 2010). One of the matters why it represents a difficulty is that the vocabulary used in conversations or in a spoken language often varies and differs from that for the written language (Broughton et al, 1978: 72). Consequently, students sometimes show inability to understand unfamiliar words a thing which may confuse them (Gilakjani and Ahmdi, 2011). Solak and Firat (2014) also found that "presence of too many unfamiliar words in a text is a reason for the failure in comprehension".

4.1.3 Syntactic Structure

One of the linguistic problems which makes the message more or less complex is the syntactic structure. Guo and Wills (2006) point out that understanding the meaning of words only and inability to recognise the main clause and the subordinate clause and the relationship between them in a sentence will be inaccurate understanding. They also present an example of Chinese students of English who face a clear challenge in listening because of the complexity of many sentence types which are very different from those in their native language. Likewise, studies performed by Hamouda (2013) and Vogely (1998) confirmed that grammatical structures interfered with LC.

4.2 Background Problems (or) Inferential Problems

One of the factors which affect LC is the background knowledge which refers to some differences in culture, sociocultural and sociolinguistic factors. In this regard, Guo and Wills (2006: 6) assert that cultural background knowledge and
thinking affect LC. Anderson and Lynch (1988: 35) state that in learning foreign languages, learners do more than learning the linguistic system of those languages. Such a statement indicates to another area in learning foreign languages i.e. non-linguistic. As a matter of fact a language is the tool through which people express different features of their life such as beliefs, ideas, facts, and different feelings [...] Language is a mirror that reflects the national culture of its speakers". So, this implies that during learning FL learners learn something about the culture of people of that language. In this case, the differences in cultures from a place to another cause a difficulty in LC (Gilakjani and Ahmadi (2011), Vandergrift (2007) and Wipf (1984: 346). This is what Anderson and Lynch (1988: 35) refer to in that "gaps in our knowledge of the L2 culture, of the associations and references available to native users, can present obstacles to comprehension". In addition, Saricoban (1999: 4) adds that lack of sociocultural, factual, and contextual knowledge of the target language can be obstacles to LC. This clearly refers that the problems of comprehension are not only inherent in a language.

4.3 Student's Psychological Obstacles Influence their Listening Capacity

Psychological factors as Guo and Wills (2006: 5) define "refer to those non-mental factors not directly involving cognitive processes such as students' interest, attention, learning emotions, attitudes and willpower". Finocchiaro and Brumfit (1983: 92) and Hasan (1991: 117) state that students' motivation has great importance in acquiring knowledge and skills. Broughton et al. (1978: 59) refer that students "can often mimic the required accent effectively in order to mock it, and their apparent inability to produce it in class is psychological rather than physical". Besides, the low amount of motivation affects learning negatively.

Similarly, Beare (2009) also adds that the mental barrier is often one of the major obstacles for students. For instance, many students just tune out or they seem to be involved unwillingly in an internal dialogue trying to translate specific words. Others convince themselves that they are unable to understand spoken English well and create problems for themselves because of lack of confidence. In this regard, Guo and Wills (2006: 6) found out that many Chinese students lack confidence in their oral English language capability and they also have a self-defeating and defensive attitude to their engagement in it. In addition, Hamouda (2013) showed that Saudi students face difficulty in LC due to anxiety, lack of motivation, and lack of interest.

These factors are of great importance in the learning process in general, and in LC, specifically, where they can increase or decrease the students' ability in LC tasks.

4.4 Other Sources of Difficulty

The discussion of this part will be managed around the main problems in LC which can be related to the main components of the learning process in general and the LC process, in particular. These are the learner, the teacher, and the teaching environment.

4.4.1 Sources of Difficulty by the Listener

There are some behaviours in which the listener affects his comprehension of the message. For example, Flowerdew and Miller (1992:74) state that inability to concentrate is a major problem that students face in LC. In addition, the listener may be preoccupied and not listening or may be so interested in what he/she has to say than listening attentively. Moreover, the absence of desire of asking for clarification and students' trial to evaluate and make judgments about the speaker, the teacher, or the message contribute to the distractions of LC. Nadig (1999) at this point agrees with Dozer (1997) and the latter also asserts the importance of students' interest in increasing listener's comprehension. Similarly, Hamouda (2013) found out that failure to concentrate, preoccupation, and lack of proficiency in English language are major problems that Saudi students face in LC.

4.4.2 Sources of Difficulty by the Speaker

Regarding the difficulties which a speaker causes for a listener, Nadig (ibid) mentions that making the voice too low to be heard, making the message too complex either by including more detailed information or many issues make the task of the listener more difficult. Moreover, as Duzer (1997) points out that the colloquial language, the speaker's rate of speaking either too fast or too slow or using many hesitations contribute to the difficulties for the listener. The speaker's pronunciation sometimes also leads to misunderstanding the message. As Broughton et al. (1978: 58) state "in order to imitate correctly one must have heard correctly". They also add that different reasons cause such problems in pronunciation and it can not only be the responsibility of the teacher. Consequently, students' motivation and psychological abilities and their need to listen to themselves are crucial factors for developing pronunciation.

These can serve as highly significant factors in pronunciation.

4.4.3 Teaching Environment

The teaching environment must be as suitable as possible for learning, in general, and FL teaching, in particular. Chaugule (2009) states that it is basically essential to establish an appropriate physical and psychological atmosphere in classrooms. There must be also special conditions and further facilities for developing teaching and encouraging students to learn an FL because teaching does not only involve methods and techniques but also materials development, sufficient time, class organisation and possibly training. So, classroom organisation should encourage interaction, allowing pairing and grouping of students. Consequently, large classes are not suitable for teaching listening and teachers' strategies for teaching listening are not effective in such an environment (Eltaib, 2011). In addition, Duzer (1997) and Allen and Lusha (2008) assert the importance of visual supports and the non-verbal language in the process of LC. Broughton et al. (1978: 71) also add that visuals are one way of reinforcement of some types of tapes. So, listening is considered as a visual as well as an auditory act, as people communicate much through body language. These visual supports can improve LC. Therefore, unavailability of these visuals or inability to use them effectively in classroom leads to difficulties in LC. In addition, the time devoted to lessons should be sufficient to perform listening tasks. Marysleessor et al. (2012) found out that time and large classes are regarded as challenges teachers face in teaching listening and speaking. Another problem that hinder the teaching of the LS is the fact
that schools pay more attention to other skills such as writing, reading and structures rather than the LS Azmi et al. (2014) and Gilakjani and Sabouri (2016).

V. PREVIOUS STUDIES

In point of fact, there were a number of studies which tried to investigate the difficulties of teaching listening. For instance, Hamouda’s study (2013) aimed to investigate the listening problems encountered by Saudi students in the EL listening classroom. The sample consisted of 60 students of first year English, Qassim University. He used questionnaires and interviews to collect the data. The results of the study showed that accent, pronunciation, speed of speech, insufficient vocabulary, different accents of speakers, lack of concentration, anxiety, and bad quality of recording were the major LC problems encountered by EFL Saudi learners.

Zainol Abidin (2013) also has investigated LC problems encountered by Chinese students learning in Malaysia. He has conducted interviews to collect the data from the students. The findings revealed that the main problem encountered by the Chinese students is the lack of prior knowledge in English vocabulary. Furthermore, there are differences in the accent of the native speakers, the short span of concentration, and the learning habits of Chinese students.

Saidur (2014) tried to find out the difficulties that face both the teachers and the students EFL/ESL listening classroom at Secondary level Education in Bangladesh. He used a questionnaire, focus group discussion and class observation to collect the data. Both the teachers and the took part in this study. The study revealed that the main problem is the exam system where only two skills are tested in the examination, so both the teachers and students are avoiding the LS intentionally. In addition, students are facing some problems such as vocabulary problem, shyness problem, pronunciation problems, speedy conversation, contacted forms, the differences between the features of Bengali and English language, no practice for the LS outside the classroom, and focusing on understanding the meaning of all words rather than the context. Teachers also face a lot of problems such lack of training on listening skills, large classes, unavailability of facilities such as computers, listening passage, sound system, Teachers’ Guide and in some cases electricity. So, he concluded that the teaching of the LS is still disappointing and needs to be improved.

Similarly, Eltaib (2011) investigated the difficulties of teaching the LS to large classes in Sudanese universities. He used a questionnaire for teachers and a test for the students to collect the data. The sample consisted of thirty teachers and fifty students. This research proved that large classes have negative impact on teaching listening because it needs a quiet place and small number of students to ensure good quality of teaching listening. In addition, it proved that teachers’ strategies of teaching listening in large classes are not effective.

Furthermore, Yilmaz and Yavuz (2015) conducted a study to examine the frequency of the problems seen in three listening categories of the problems based on teachers, the problems based on students’ own strategies and the problems based on learner's psychology. The study was conducted in Turkey Soray Primary School in Istanbul in Turkey among 4th grade students in the ages of ten and eleven including 58 students in three classes. A questionnaire and a listening task were utilized to collect the data. The results revealed that the biggest deficiency as a problem is learning and teaching phonetics. It also showed that the students have problems based on some psychological reasons such as the high level of anxiety as well as problems relating to the lack of practicing listening.

VI. METHODOLOGY

6.1 Aims of the Study
The study aims to:
• Investigate the problems of teaching the listening skill in the Yemeni secondary schools in Aden governorate.
2. Find out some solutions for developing the teaching of the listening skill in the secondary schools.

6.2 Context and Participants
This study aims at investigating the problems of teaching the LS in the secondary schools in Aden Governorate, Yemen. The sample of the study consisted of fifty teachers holding a Bachelor of Arts degree and their years of experience range from 1-31 years. They were selected randomly from 11 secondary schools out of 32 secondary schools in five districts of the governorate with a percentage of 43%. The observation has also been conducted at the same schools at the same schools. The total number of the observed periods was 36 periods in different classes.

VII. INSTRUMENTS

The study employed two instruments for collecting the data; a questionnaire for teachers and classroom observation. The questionnaire aimed to elicit sufficient data from the teachers' points of view about the problems that they encounter in teaching listening. It was designed in two main ways: structured and unstructured.

Similarly, the observation is a very important and useful instrument for collecting data on classroom situation. It aimed to observe what is really done in the classroom rather than what is said to be done. In other words, it tries to select the data which cannot be obtained by the questionnaire through focusing more on teachers and students' behaviours and activities in the classroom as well as teaching environment. It was non-participant and structured observation.

VIII. DATA ANALYSIS AND RESULTS

The results of the questionnaire and the observation will be analysed and discussed in what follows. Firstly the results of the questionnaire will be introduced.

• Analysing the Results of the Teachers’ Questionnaire

Q.1- Do you think that the listening skill is more difficult for the students than the other skills? Why?

The data revealed that the majority of the subjects (76%) consider the LS as more difficult for learning a language than the other skills, whereas only 24% of them do not think that. This

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means that most of the teachers are aware of the difficulty of the LS. For the purpose of clarity, those who stated that it is the most difficult were asked to interpret their responses in the open part of this question (i.e. Why?), They attributed that to some reasons. These are the unavailability of the facilities, students' low level, the lack of knowledge and practice of the sub-skills of listening such as identifying sounds, stress, and intonation patterns, demotivation for learning the LS.

Q.2-What are the main problems that you as a teacher face in carrying out the listening tasks in the classroom?

The problems that teachers encounter in teaching the LS as stated in this open question will be summarized as follows:

1) Problems relating to the learners such as students' low level in general and specially in English, demotivation, their negative attitudes towards the TL and the LS, in particular.

2) Problems relating to the facilities i.e. lack of facilities and in most cases unavailability of them such as tapes, recorders, videos, as well as using old books by students where most of the tasks already done by previous batches, so these tasks fail to achieve their aims.

3) Problems relating to the teaching environment such as the physical conditions, noise, the density of students in the classroom, and the insufficient time devoted for lessons.

4) Problems relating to the difficulty of the LS itself.

5) Problems relating to the little amount of training and practice of the TL and the LS whether inside or outside the classroom.

Similarly, based on other questions, the researcher could conclude that teachers and administrations also contribute to the difficulties and problems of teaching LC. This will be shown through the analysis of the following questions.

Q.3- Put the following problems in the order according to the degree of difficulty in teaching the listening skill, by numbering them 1, 2, 3 and 4. 1 is the most difficult problem, 4 is the least difficult:

A- Language problems, B- Background problems, C- Students’ psychological obstacles, D- Unavailability of facilities.

The problems will be represented in the figure by these letters (A, B, C, and D) respectively.

Similarly, the results indicated that the problems of teaching the LS in the context of the study, as stated by the teachers, are ranked as follows. The majority (54%) of the subjects vote for the unavailability of the facilities (D in the figure) as the first problem or the most difficult problem that hinders the teaching of the LS. Then, the language problems (A) take the second level of difficulty. At the third level of difficulty, the students' psychological obstacles (C) are considered to be the first one in this level where 32% of the subjects vote for it. Lastly, 38% of the subjects consider the background problems (B) as the least difficult problem in teaching the LS. The differences among these percentages showed that these problems represent difficulties in both learning and teaching and the degree of difficulty may differ from a teacher to another as well as from a situation to another.

Q.4- Put the following aspects of the listening skill in the order according to the degree of difficulty in teaching it by numbering them 1, 2, 3 and 4. 1 is the most difficult, 4 is the least difficult: - Grammatical differences - Sound system - Stress and intonation - Comprehending the whole message

Figure (2) showed that 76% of the subjects consider stress and intonation patterns as the most difficult aspect of the LS. 76% of the subjects confirm that the sound system is on the second level of difficulty. Vocabulary comes on the third level of difficulty where 80% of the subjects vote for it. Lastly, 84% of the subjects consider the grammatical differences as the least difficult aspect of the LS.

5- Do you carry out listening tasks during the course as it is suggested in the Teacher's Book? If yes, to what extent do you do that? If not why?

The results also showed that 58% of the subjects use the listening tasks during the course as it is suggested in the teachers' book and only a third of them apply such tasks to a great extent, while the majority use them to some and a limited extent. However, 42% of them do not use these tasks during the period of the course at all. Those who say that they do not use these tasks ascribe this to some reasons. These are: unavailability of the facilities in schools such as tapes and recorders, crowded classes, schools administrations' carelessness of teaching listening and involving listening tasks in tests and exams, students' low level, and inadequacy of time for implementing the syllabus. Therefore, it is clear that teachers and administrations sometimes contribute to the problems of teaching the LS by neglecting it.

6- Did/ Do you have any particular course of training in teaching English language focusing on using listening techniques?

The results revealed that the majority of the subjects (84%) did not receive any particular training course in ELT focusing on using listening techniques. This, clearly, shows that the administrations and the policy of education do not pay attention to listening as an effective skill for teaching and learning FL.

8.2 Analysing the Observation Results

The data collected by the observation will be analysed focusing on the place of the LS in the real classroom situation, teachers and students' activities, problems they encounter in the classroom as well as the teaching environment.

- The Place of the Listening Skill in the Classroom Situation

Four issues will be discussed under this category to obtain a complete picture of the place of the LS in the classroom situation. These are: (1) teacher focus (2) carrying out activities (3) aids used (4) types of listening activities.
A- The teacher focuses during the lesson more on:

<table>
<thead>
<tr>
<th>Listening</th>
<th>Reading</th>
<th>Speaking</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>58%</td>
<td>10%</td>
<td>22%</td>
</tr>
</tbody>
</table>

*Table (1): The importance of the listening skill in the classroom situation.*

The observation revealed that the application of the listening tasks in the classroom was very low (10%) whereas teachers focused more on reading (58%) and writing skills (22%).

B- Carrying out listening activities during the lessons:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>11%</td>
<td>89%</td>
</tr>
</tbody>
</table>

*Table (2): Carrying out listening activities.*

It appears through the observation and according to teachers' guide that those lessons for which the listening activities should be carried out were 15 lessons out of the 36 lessons, but the performed activities were only 4 with a percentage of 11% as it is shown in the table above. So, it is clear that the majority of teachers did not follow teachers' guide for conducting English lessons in the class.

C- The aids used:

<table>
<thead>
<tr>
<th>Teacher Model</th>
<th>Taped Materials Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

*Table (3): The aids used for presenting listening tasks.*

Table (3) displays that 50% of the performed listening activities depended on the teacher model and 50% of them used the taped materials model.

The type of the activities given to the students were only three activities in which the aim of these tasks was to extract and write specific information from a recorded monologue and conversation, and another activity was for consolidation. So, it is clear that the listening activities given to the students were very few and concentrating more on comprehension. Thus, it is a good practice, but pronunciation activities were not included in the course or even presented by teachers in the class except reading new vocabulary in chorus.

These limitations, appeared in the three points discussed above, can be attributed to different reasons discussed in the questionnaire results. For example, the main prominent reason, as the teachers stated, is unavailability of the facilities such as taped materials and recorders etc. Similarly, it reflects teacher' demotivation to work properly in such conditions.

2- Teacher's Techniques and Activities

• Using visual supports

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>75%</td>
</tr>
</tbody>
</table>

*Table (4): Using visual supports.*

Table (4) displays that the majority of the teachers (75%) did not use the visual supports to help in introducing the lessons, whereas only 25% of them used such visuals. These visuals were mostly pictures, while only one used real objects and another used drawing.

b) Following Teacher's Book:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>42%</td>
<td>58%</td>
</tr>
</tbody>
</table>

*Table (5): Following the Teacher's Book.*

Table (5) shows that 58% of the teachers in the observed periods did not follow the recommended methodology in the TB, while 42% of them tried to do so.
c) Teacher's pronunciation

<table>
<thead>
<tr>
<th>The items</th>
<th>To a great extent</th>
<th>To some extent</th>
<th>To a limited extent</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) pronounces sounds correctly</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>b) focuses on stress and intonation</td>
<td>0%</td>
<td>14%</td>
<td>42%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Table (6): Teacher's pronunciation.

The results showed also that while the teachers' pronunciation of sounds was to a great extent correct, the focus on stress and intonation was to a limited extent and mostly they never did.

- Students' activities and problems

On the other hand, there were some students' behaviors and distractions in the class such as the noise, preoccupation during the tasks with other activities which represent distractions to listening. In addition, there were some prominent problems in students' performance. These will be shown in Table (7) below:

<table>
<thead>
<tr>
<th>The problems</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) pronouncing sounds</td>
<td>88%</td>
</tr>
<tr>
<td>b) stress and intonation</td>
<td>94%</td>
</tr>
<tr>
<td>c) comprehending the whole message</td>
<td>19%</td>
</tr>
<tr>
<td>d) syntactic distinctions</td>
<td>19%</td>
</tr>
</tbody>
</table>

Table (7): The most prominent problems in students' performance.

It can be referred, here, that the areas of the sound system, stress and intonation, which have great importance in understanding the spoken language were not included in the course.

- Classroom Environment

Furthermore, the teaching environment i.e. the classroom also includes some problems that hinder the teaching of the listening skill such as density, disarrangement, and time inadequacy.

IX. DISCUSSION OF FINDINGS

The general findings of the study will be summarised and categorised as follows:

The results of the study proved that the listening skill is the most difficult and challenging task for learning a language and this goes in accordance with Paulston 1976, Eastman 1987, Mee 2001.

2. The results also showed that the problems of teaching listening can be categorized into two main categories, i.e. linguistic and non-linguistic. It was proved that the non-linguistic problems were the main hindrances to teaching the listening skill in the context of the study. These are as follows:

a) Unavailability of the facilities such as tapes, recorders, videos, computers, data shows, visual supports, and also new copies of course books for the students.

b) Problems relating to the learners such as students' psychological obstacles, the students' low level, demotivation, failure to concentrate and preoccupation as also proved in the studies of Hamouda (2013) and Guo and Wills (2006). In addition, this study added students' negative attitudes towards English and the listening skill, the little amount of students' training and practice of English and the listening skill inside and outside the classroom, the latter is consistent with Sadiur's (2014) and Yilmaz and Yavuz's (2015) results.

c) Background problems as it was also consistent with Anderson and Lynch (1988), Saricoban 1999, Guo and Wills (2006), as well as Gilakjani and Ahmdi (2011).

d) Problems relating to the teaching environment such as crowdedness, noise as well as to the time devoted to the English language lessons. These conditions are not suitable environment for teaching listening and this is congruent with Etaib (2011) and Maryslessor et al. (2012).

e) Problems relating to the teachers themselves such as demotivation for teaching the listening skill as a result of the difficulties surrounding the process of teaching such a skill and also the little amount of training for teachers. So, they tend to neglect the listening tasks during the course. In addition, it was clear through all these conditions surrounding the teaching environment that schools pay more attention to other skills such as reading, writing and structures but neglect the LS and this echoed with the findings of similar researches conducted by Azmi et al. (2014) and Gilakjani and Sabouri (2016).

3. The linguistic aspects of the difficulty of the LS revealed in this study are respectively ranked as follows; stress, intonation perception, sounds system, vocabulary, and the grammatical differences. These results are also consistent with those of Vandergrift (2007) and Wipf (1984).

a) The results of the study with respect to pronunciation problems are consistent with the results of Hamouda (2013) who found out that Saudi students have problems in pronunciation that hinder LC. This also goes in accordance with what Kharma and Hajjaj (1997) assert that Arab learners face difficulties in pronunciation. The results also were consistent with those of Norris's (1993), Solak and Firat's (2014) results that also Chinese students and Turkish students respectively face difficulties in pronunciation that hinder LC.
b) With respect to the lack of and unfamiliarity with vocabulary, Hassan (2000), Thomas and Dyer (2007), But (2010), Gilakjani and Ahmadi (2011), Solak and Firat (2014) also concluded in their studies of LC problems that the presence of too many unfamiliar words in the text is a reason for the failure in comprehension.

c) The results of the study with respect to the grammatical structures are consistent with results of Vogely (1998) and Hamouda (2013) which confirmed that grammatical structures could confuse students and hinder LC.

X. PEDAGOGICAL IMPLICATIONS OF THE FINDINGS

This study provided some implications for English classroom and particularly for teaching listening based on the findings provided previously in this study.

- Availability of the facilities and effective ELT techniques are prerequisite for teaching listening.

- Improving learners' roles in the classroom and helping them to develop positive attitudes towards the listening skill can be fulfilled by grading listening activities and techniques throughout the course and implementing them.

- Improving the classroom environment and the arrangement of the students in suitable classes are very helpful for teaching listening.

- Raising teachers and schools administrations' awareness of the importance of the listening skill and developing training programmes for teachers are seen to be important for developing the teaching of the listening skill.

XI. CONCLUSION

This paper has introduced some main problematic issues that hinder the teaching of the listening skill to Yemeni EFL learners. The results showed that the teaching of the listening skill in the context of the study suffers a set of problems: linguistic and non-linguistic. These non-linguistic problems are represented in the unavailability of the facilities, the learners, the classroom environment, lack of training and practice, the teachers, as well as the time devoted to English language teaching. In addition, there were also the linguistic problems which included pronunciation represented in stress, intonation and the sound system, vocabulary as well as syntactic structure. The study also presented some pedagogical implications for developing the teaching of the listening skill.

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Rivers State: The Challenge of One-City State in the Geography of Underdeveloped Rural Region in Nigeria

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Abstract A clinical study of the challenges confronting Rivers State, an oil producing state south of the deltaic region of Nigeria was carried out by this paper. These challenges were looked at from two perspectives; a state that has only succeeded in developing one city, the state capital after over 40 years of existence and secondly, the implication for that city, Port Harcourt in a state characterized by mass of underdeveloped rural communities. This work is a product of months of intensive field work. Both primary and secondary information contributed greatly to give us a true picture of “the way things are” in our study area. From this picture we were able to draw a conclusion that there exist socio-economic and environmental ‘crises’ in the city of Port Harcourt. This paper was also able to prove that the failure of successive governments in the state to pursue their visions of developing secondary cities was responsible for such ‘crises’. The paper at the end has been able to provide answer to the question of ‘what is to be done’ in the face of the existing ‘crises’.

Keywords: Crises, Population, City, Government

1. INTRODUCTION

From the pre-colonial era evidence of urban bias in the development policies of the government was easily noticed. There was a colossal concentration of economic and social infrastructure in the few but rapidly growing urban centres and cities at the expense of the rural areas. Although the resources needed to sustain the city’s economy came from the hinterland, the urban areas were favoured in the distribution of social and economic infrastructure because of their strategic importance to the colonial masters; centres of administration and by their geographical location provided easy avenue for the export of agricultural products needed to service the economy of the colonial masters back home. Port Harcourt was one of such cities in the then eastern region of Nigeria that enjoyed such favour from the colonial masters. This city came into existence through the Hargroove agreement signed between the colonial masters and some local chiefs from the Ikwerre and Okrika origin (the traditional owners of the land) in which 30,000 acres of land was ceded to the colonial masters in 1913 for administrative convenience (Akpogomeh, 1995). With a very insignificant population at that time the city grew rapidly in commerce and by 1963, the city was accommodating a population of 234,672 persons. Thus when Rivers State was created in 1967, Port Harcourt was the only city in the geographical territory ceded to the new state that qualified to wear the status of the state capital. This change in status increased the economic activities and human population in the city. It was the only urban area that offered job opportunities to the elites, where commerce strived and has a mass concentration of economic and social infrastructure. By the end of the 1980s, its land mass had been overstretched by the competing land uses resulting into several social problems in the city (Kio-Lawson and Dekor 2014). By 2006, the city’s population was already close to 1.5 million persons leaving the question of “what is to be done” on the lips of every development scholars in the region. Both development scholars and successive government in the state had agreed in common that development of other urban centres in the state is one way of taking the population pressure away from the city. Several policies and programmes had been advanced by successive government towards this direction. As at 1996, there were over twenty of such urban centres in the state using population as criteria for definition. Some of these urban centres function as local council headquarters but in terms of development, they are several miles away. Thus several years after the creation of Rivers State, Port Harcourt had remained the only primate city in the state. It had continued to be the final destination for most rural migrants in the region as well as highly favoured in the distribution of social and economic infrastructure in the state. The implications for such a state with a population of over 5 million persons having just a city surrounded by a mass of traditional settlements miles away from development can be predicted. A more appropriate answer is undoubtedly needed to the question of “what is to be done” if any progress is to be recorded in the face of these implications.

II. METHOD AND TECHNIQUES

Rivers State was created in 1967 with Port Harcourt as the administrative capital. In 1987, another state, Bayelsa, was carved out of the state with a significant part of its population and geographical area ceded to the new state. Despite this development, Rivers
State still stands as one of the highest oil producing states in the country, Nigeria. Its capital city, Port Harcourt, also boast of having the highest agglomeration of oil producing companies in the country.

The state is administratively made up of twenty three local government areas housing approximately 1108 rural communities and few underdeveloped urban centres. The state is segmented politically into “Upland and Riverine” areas as a result of its geographical characteristics. The target populations for which this research study shall be primarily directed at are rural residents. A sample size of 345 rural communities was randomly selected from a total of 1108 communities. The twenty three local council areas were considered in the sample. From each local council area fifteen rural communities were randomly picked for the study. The “town hall meeting” approach was adopted in the study. In each community, a listing of all the identifiable local groups was made. Two representatives from the identified local groups in each community were drawn to participate in the “town hall meeting” for that community. Personal observation method was also helpful in the research. Relevant documented information from previous scholars also contributed greatly to the success of this research. The difficult geographical nature, the high level of insecurity occasioned by militant activities and poor communication network in rural Rivers State were major challenges that confronted this research work. Despite these challenges the study was a success.

III. HISTORICAL DEVELOPMENT OF RIVERS STATE

Rivers State was part of the Oil Rivers Protectorate from 1885 till 1893. In 1893 it became part of the Niger Coast Protectorate. In 1900 it became a part of the region that was merged with the chattered territories of the Royal Niger Company to form the colony of Southern Nigeria. It became part of the Eastern region when the regional structure was created in 1963. The state was officially created in 1967, one of the twelve states created by the military administration. Port Harcourt was chosen as the capital of the new state. In 1996, another state, Bayelsa was carved out of Rivers State. Today, it is one of the six states in the South-South geopolitical region of Nigeria. It is also one of the oil producing states in the Niger Delta. Its surface geology consists of fluvial sediments. The land surface can be grouped into three main divisions; the fresh water, the mangrove swamps and the coastal sand ridges-zone. Beside Port Harcourt that stands out as the only city in the state, the rest of the state is made up of rural communities and few underdeveloped urban centres. There are about 1108 rural communities scattered across the coastal plain of the Eastern Niger Delta with a population of more than five million people. The state is very poor in drainage; lying under water. There is so much surface water couple with high rainfall which had made virtually all parts of the state to suffer one form of flooding or the other in the year. This trend has limited agricultural practices which is a major occupation of the people. It has also become a major challenge to development efforts aimed at enhancing social welfare. However, beside agricultural activities which its rural population is noted for, the state is famous for its high reserves of oil and natural gas. Presently, the state is accounting for more than 40% of the country crude oil production (NDEBUMOG, 2016). The geographical location of its capital, Port Harcourt with its beautiful and peculiar topography has earned it the name “Garden City”. The city is easily accessible by road, rail, air and sea. Its seaport and airport stands among the busiest in the country. With a population of over 1.5 million people, this capital city has the highest agglomeration of oil companies in the country and is considered as one of the fastest growing cities in the country.

![Figure 1 Map of Nigeria Showing Rivers State](image-url)
The geographical location known as Port Harcourt today was a product of an agreement reached between the Ikwerre and Okrika land owners on one hand and the Colonial Masters on the other hand. The agreement was signed in May 1913 which saw the ceding of 30 acres of land to the Colonial Masters. Before the agreement, the area was a meeting point for trade between the agricultural upland communities and the fishing and trading communities of the riverine areas (Akpogomeh, 1995). Thus when the need arose on the part of the Colonial Masters to establish a seaport for easy evacuation of the agricultural products from the Eastern region, the coal and minerals from Northern Nigeria, Port Harcourt was chosen ahead of other riverine towns like Bonny, Okrika and Degema. The establishment of a seaport in Port Harcourt also facilitated the construction of railways to link it with other cities and towns for easy transportation of the needed agricultural products to the seaport for onward transportation to the home countries of the Colonial Masters. This new development sparked off mass movement of commerce and human population into the new city. Most trading firms doing business in the deltaic region saw the new city as ideal place to locate their operational offices. To the colonial government, it became a seat of administration. It was not long when it became a lucrative commercial city for the Hausa from the North, the Ibo businessmen from the East, and the highly educated Yorubas from the West. When oil was discovered in 1958 in commercial quantity in the region, new business entered into the city fuelling increased migration. It was therefore not surprising when the city was chosen as the capital of the Ijaw Rivers State created in 1967 by the military administration. The state was created out of the need to take development to the backward region of the Ijaw people. Before the creation of Rivers State, there was an existing local government structure established by the colonial administration as a bridge for regional development. The reason for the establishment of such structure was to muster local resources, arousing general interest, supporting and meeting local needs more efficiently and extensively. With the outbreak of the civil war in Nigeria in 1967, the local government system came to an end. After the civil war and with a new government in place in 1969 in Rivers State the old local government system was seen as ineffective and inefficient towards rapid development of the local government units. Under Edict No.5 of 1969, the old county councils were reconstituted and put under the field Administrative Division of the government functions. With Edict No.40 of 1971, the county councils were finally removed and replaced with eighteen divisional structure. The creation of these new divisions was associated with government strategy of deliberate urbanization. This was followed by decentralization of the operations of state government ministries. The primary objective was to take development to the hinterland and reduce the rate of migration to Port Harcourt, the state capital. The 1976 local government reform of the federal government was seen as a right step in the right direction. It was aimed at involving an integrated rural-urban framework for development planning. The local government headquarters were considered as “growth points” through which development will trickle down to the surrounding rural areas.
Figure 2 Spatial Expansion of Port Harcourt

Southern part of the City where available land space has been exhausted leaving a larger percentage of the low income to find ‘a roof over head’ at marginal land known traditionally as ‘waterside settlements’

Current direction of pressure on land for physical development is towards the Northern boundary of the city were there are still more arable land housing some traditional settlements of the Ikwerre’s who are traditional farmers.

Central Business District of the City (CBD)

Area infested with Marginal Settlements. This area is mainly occupied by the fishing Okrikas’, the traditional owners of the land and other riverine population from the State

Initial concentration of development in the City

In Rivers State it was regarded as a channel to decentralize development and take the pressure away from Port Harcourt. However, this reform was not backed up with the investment necessary to enable these “induced growth centres” to achieve self sustaining growth. Secondly, there was no provision made on the part of the government for an integrated approach to the development of these local government headquarters. These flaws are reflected in the status of the twenty three local council headquarters today. They have been reduced to mere “administrative units”. Port Harcourt still remain today as the only city in Rivers State. From a population of 234,672 in 1963, the city today is housing a population over 2million persons (NPC, 2015) Next to the city in terms of population among the urban centres in the state is Bori with a population of less than a 300,000. The city has grown to exhaust the original 30,000 acres of land ceded to it by the traditional land owners. Land space south of the city that is housing some of the traditional homes of the Okrikas’ has been fully exhausted pushing some residents especially the low income to find “roof over head” at the waterfront where land is less desirable. In this part of the city alone, there are about thirty two of such identifiable settlements on marginal land (Kio-Lawson, D. 2013). The current pressure on land in the city is towards the north, the home of the Ikwerre’s who are traditional farmers and where there is still wide expanse of arable land.

V. SPATIAL DEVELOPMENT POLICIES OF SUCCESSIVE GOVERNMENT IN RIVERS STATE

Spatial development pattern of the regional government that was in operation in the country before the creation of Rivers State had favoured development from “above”. This was the trend during the colonial administration and was adopted after independence. There was a colossal concentration of economic and social infrastructure in the major cities across the country. Rural development was primarily associated with agricultural development by the urban elites (Igbokwe and Ajala, 1995). This pattern gradually turned major urban centres especially the state capitals into attractive centres in the eyes of the rural population. Thus while the cities continually boast of rapid population growth, the rural areas on her part became continually depopulated. It was partly in recognition of this fact and the desire to avoid any possible social and environmental nightmare in the future that led to the introduction of several policies and programmes by successive government in the state. These programmes and policies were all targeted at decentralizing development and taking population pressure away from Port Harcourt the state capital. Some of these programmes were;

a) The government of Alfred Diette Spiff (1967-1975)-The central objective of this administration was captured in the governor’s 1968/69 budget speech, “it will be the cardinal point of my government policy to bring the benefit of modern utilities to the rural areas of the state. This measure will be the first step in the state in the development of the sadly neglected areas of the state which with purposeful planning could be transformed into beautiful cities and tourist attractions” (Government of Rivers State, 1976).

This was reaffirmed by the governor in his 1973/74 budget speech “The policy of my government to take development to the rural areas is reaffirmed. It will be pursued with full vigour this year”. In line with this vision specific programmes were designed by the administration;

i) The establishment of a utility board

ii) The establishment of a special ministries with rural development division

iii) The establishment of community development committees

iv) Village Integration Scheme

www.ijsrp.org
b) The Zamani Lekwot Regime (July 1975 - October 1979) - This administration adopted the policy of the last administration. In addition, the administration encouraged the establishment of Rural Development Association which was seen as a self help organization sponsored by the government to promote rural development. The governor also established a small unit in his office tasked with the responsibility of promoting rural development activities (Government of Rivers State, 1976).

c) Chief Melford Okilo (1979 - 1983) - The central focus of this administration was “Even development and Decentralization”. For the first time money was sent directly to the rural people to develop their localities according to their needs. It encouraged the provision of government services to every urban and district council areas using the rural development committee system. To ease the population pressure on Port Harcourt, the government commissioned the development of seven New Towns; Ekeremor, Boro, Woji, Bori, Ogbia, Abua, and Oyigbo. The New Town scheme was partly seen as a means of meeting up the policy of the federal government in the 3rd National Development Plan (1975-80) on housing. In line with this, the government set out to build 600 housing units of one, two and three bedroom houses in each new town (Government of Rivers State, 1980). These houses were to be handed over to the people on completion. This vision was not actualized when the second republic was terminated by the military government in 1983.

d) The Fedelis Oyakhilome Regime (1984-1986) - This regime from her budgetary statement was “maintain utilities and services in addition to embarking on new projects”. The government invested massively on projects and vigorously implemented increased participation of the rural people in food production. Another point to note was that the administration encouraged communities to engage in self help projects by offering them marching grants.

e) The Anthony Ukpo Regime (August 1986-June 1988) - The regime came in at the time when the Directorate for Food, Road and Rural Infrastructure (DFRRI) was established as well as the Structural Adjustment Programme (SAP). In order to key into these programmes the state government established the Rivers State Accelerated Integrated Rural Development Programme. The primary objective of the programme was among others, the enhancement of the economic power of the rural dwellers. This by extension meant harnessing the ability of and mobilizing the rural people to effectively utilize their environment for their socio-economic wellbeing.


The government made a firm commitment to Rivers State to rebuild the city of Port Harcourt which had fallen into a terrible state of decay due to huge population pressure. In line with this the Greater Port Harcourt Development Authority was established. This was followed by the preparation of the Greater Port Harcourt Master Plan which covers eight local councils in the state; Port Harcourt, part of Oyigbo, Okrika, Ogu/Bolo, Obio/Akpo, Ikwerre, Okehi, Nchia (Greater Port Harcourt City Brochure 2009). The building of the new city is to make Port Harcourt a mega city.

VI. THE GENESIS OF SOCIO-ECONOMIC CRISSES IN THE CITY OF PORT HARCOURT

‘Crisis’ is one word that can be used to describe the current socio-economic situation in the city of Port Harcourt. This ‘crises’ is occasioned by the lack of commitment of successive administration in the state to decentralize development. Though policy statements were made on paper but no administration was able to pursue the goals behind it successfully. This singular act is responsible for the situation the state has found itself today; the only state in the country with one city. Development scholars believed that the city today is at a breaking and horrifying point in terms of spatial growth and infrastructural development (Ochereome, George and Jimirotiota, 2009). Its rapidly increasing population, the continuous influx of economic activities into the city occasioned by a favourable business environment and the lean finances of the government in power have functioned together to push the city into a ‘Crisis’ point, This has left us with several questions that urgently has to be answered as policy makers and development scholars.

This ‘Crisis’ is experienced in the housing sector, health, educational, social, economic and physical environment of the city. For Joachin (2007) ‘the city of Port Harcourt has degenerated into a jungle today’. With the lack of commitment on the part of government to promote development from ‘below’ the other urban centres in the state had merely been reduced to administrative centres. They lacked the opportunities to stimulate the needed growth that is expected to trickle down to the surrounding rural communities. Port Harcourt city is viewed by the rural population as holding the resources that will bring them out of the yoke of poverty and economic deprivation. The implication is that while the city will continue to boast of astronomically rising population, the rural communities in the state will continue to suffer from depopulation occasioned by rural-city migration. The over 1.5 million persons that the city is currently housing has already created some nightmarish problems to the government and residents.
One major area this “crises” can easily be noticed even by a first time visitor to the city is in the area of housing. Successive government in the state had done little or nothing in the area of public housing provision especially for the low income earners. Housing provision has been completely left in the hands of the private sector in the city that are desirous of making huge profit from their investment. The high cost of building materials in the city has also affected housing supply. Thus with a large population chasing the few available stock in the housing market accommodation in the city is almost out of the reach of the common man especially in the main Port Harcourt township. The desire to have a “roof-over-head” by those who could not afford the high rent in the planned residential areas has fuelled the development and spread of marginal settlements in the city. Today, there are about thirty-two of such identifiable marginal settlements in the city housing over 200,000-500,000 persons (Kio-Lawson, 2013) While the cost of residential accommodation can be considered to be on a relatively high side when compared with rent in some cities in neighbouring states, the spatial expansion of these marginal settlements is not without its own social and environment problems. With the increasing profile of the city in cultism, kidnapping, drugs, armed robbery and other forms of criminality the government and residents of the city believe that these settlements are providing “dens” for these criminals. The last administration of Hon. Ameachi succeeded in clearing two of such settlements during his eight years reign. The present administration of Barrister Wike is already threatening to destroy about fifteen of such settlements with high profile criminal records with the Nigerian police.

Table 1. Rise in yearly rent in residential accommodation in main Port Harcourt Township between 2000 and 2014 (in Naira)

<table>
<thead>
<tr>
<th>Accommodation type</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>One bedroom apartment</td>
<td>30,000</td>
<td>60,000</td>
<td>100,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Two bedroom apartment</td>
<td>50,000</td>
<td>100,000</td>
<td>200,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Three bedroom apartment</td>
<td>75,000</td>
<td>150,000</td>
<td>250,000</td>
<td>400,000</td>
</tr>
<tr>
<td>One room self contain</td>
<td>15,000</td>
<td>30,000</td>
<td>70,000</td>
<td>150,000</td>
</tr>
<tr>
<td>One room apartment</td>
<td>12,000</td>
<td>24,000</td>
<td>30,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>

Source: Compiled from author’s field work

Table 2. Current Cost of Rental Residential Accommodation (per annum) in the medium density areas of Port Harcourt, Owerri and Aba (in Naira)

<table>
<thead>
<tr>
<th>Accommodation type</th>
<th>Port Harcourt</th>
<th>Owerri</th>
<th>Aba</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Room Apartment</td>
<td>60,000</td>
<td>30,000</td>
<td>36,000</td>
</tr>
<tr>
<td>One Bedroom Flat</td>
<td>250,000</td>
<td>75,000</td>
<td>120,000</td>
</tr>
<tr>
<td>Two Bedroom Flat</td>
<td>300,000</td>
<td>150,000</td>
<td>170,000</td>
</tr>
<tr>
<td>Three Bedroom Flat</td>
<td>400,000</td>
<td>200,000</td>
<td>230,000</td>
</tr>
<tr>
<td>Self-Contain</td>
<td>150,000</td>
<td>70,000</td>
<td>90,000</td>
</tr>
</tbody>
</table>

Source: Kio-Lawson and Dekor, 2014

The health sector is not left out in the “crises” that has engulfed the city. The available health facilities have been over stretched to a breaking point. There have been frequent calls from members of the public on the government to recruit more doctors and other medical staff to enable the government owned hospitals and health centres cope with the pressure on the demand for their services. At the government owned Braithwaite Memorial Specialist Hospital, it is common to see one doctor attending to over thirty patients a day. The development and spread of health centres across the state by the last administration of Hon. Ameachi to bring some measure of relief to the health sector in the state has been hindered by the shortage of medical personnel. This singular factor combined with the lack of adequate equipment in the public health institutions in the city and incessant strike by medical staff working for the government had provided a fertile market in the city for private hospitals and clinics with very exorbitant charges. Traditional herbalist are also striving in the city providing health care for the poor who could not withstand the frustration a patient has to undergo in public hospitals before getting medical attention or afford the exorbitant charges in the private hospitals.
In the area of public water supply, there was a complete breakdown of the existing structures long before the last administration of Hon. Ameachi took over. The four major pumping stations in the city are no longer functioning. Government officials at the water stations had claimed the machines were not provided to supply water to the present population in the city hence the breakdown. Thus the public water taps that were popular in the streets of the city in the 70’s up to the early 90’s have disappeared replaced by private commercial boreholes. Commercial water hawkers have taken over the business of supplying water to residential homes in the city. It will cost an average household size of five persons six hundred naira weekly to provide water for the family through a commercial water hawkers in the city(kio-Lawson and Dekor,2014)

Despite the Amnesty Programme of the federal government which many believed had brought relative peace to the Niger Delta region, there are still chains of cult and militant groups working against each other to remain relevant in the political and economic landscape of the city. The high level of joblessness among these youths driven away from the rural areas by poverty and misery, and the desire to survive in a very expensive city had driven them into criminality. The frequent clashes among the various cult groups in the city and their nefarious activities had made the city unsafe to live in and do business.

With the ever increasing population and commercial enterprise the city is ranked among the busiest cities in the country. This has subjected the various classes of roads to immense pressure. Residents have to contend with terrifying traffic hold ups to get to the office, to drop kids at school, to get to the market place. The implication of this development is an increase in travel time.

Table 3. Service availability in the major 20 urban centres in Rivers State

<table>
<thead>
<tr>
<th>No.</th>
<th>Urban Centre</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td>Port Harcourt</td>
<td>1</td>
<td>10</td>
<td>60</td>
<td>85</td>
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<td>6</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
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<td>Okere</td>
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<td>6</td>
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</tbody>
</table>


Power supply in the city is dropping by the day. Despite the assistance given to the Power Holding Company by the state government and the Niger Delta Development Commission no significant improvement has been recorded. The reason advanced by the electricity company is that its facilities are over loaded by the astronomically increasing demand for electricity by the ever increasing human population and commercial activities in the city. They disclosed that the city is rapidly expanding daily and that most of the newly developed areas in the city are not included in the power distribution master plan of the company. The company has managed to include such areas in the power distribution plan and this has grossly affected power distribution in the city. Study has shown that average power supply in some residential neighbourhoods in the city is as low as seven hours daily(Kio-Lawson and Dekor,2014). Most enterprises in order to remain in business are depending on private electricity generator which means increase in running cost. This also means the consumer paying more for the goods and services. The city today is also ranked among the most expensive cities in the country. The population of Port Harcourt has grown astronomically surpassing the population of the other nineteen urban centres by a wide margin between 1963 and 2006(see table 4). This wide gap is also reflected in the Rivers State urban hierarchy presented in table 5.
### Table 4. Population growth between Port Harcourt and the other Urban Centres from 1963-2006

<table>
<thead>
<tr>
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<td>60991</td>
<td>68950</td>
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</table>

Source: Nigeria Population Commission

In table 5 presented below, Port Harcourt is the only first order urban centre in the State. The theoretical urban hierarchy order holds that the first order settlement in the hierarchy is twice the population size of the second order settlement and thrice the population of the third. Taking a look at table 5 there are no second and third order urban centres in the state. The urban centre after Port Harcourt in the hierarchy is Bori which is a fourth order town. The primary reason behind this wide gap can be attributed to the policies of successive government which had always favoured the state capital in terms of spatial development. This development had hindered the growth of other urban centres into city status or world class urban centres. There is over concentration of population in Port Harcourt occasioned by over concentration of investment and infrastructure in the city. This has resulted into structural weakness in the distribution of population among the urban centres since 1963.

The population data between 1963 and 2002 shows that Port Harcourt population alone constitute over fifty per cent of the population of the twenty urban centres added together between 1963 and 1983 and about twenty-five per cent between 1983 and 2002. It can be concluded therefore that “Primacy” is the main feature of the urban system in Rivers State as reflected in table 6.

### Table 5. Rivers State Urban hierarchy using the 2006 population

<table>
<thead>
<tr>
<th>Urban Centre</th>
<th>Population Size</th>
<th>Order</th>
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<tr>
<td>Bori</td>
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</tr>
<tr>
<td>Okehi</td>
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</tr>
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<td>Omoku</td>
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<td>4th</td>
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</tr>
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<tr>
<td>Ayama</td>
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<td>5th</td>
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<td>Isiokpo</td>
<td>180492</td>
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<tr>
<td>Degema</td>
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Table 6. Primacy Indicator of the Urban system in Rivers State using the 1963-2006 population

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<th>Year</th>
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<th>1982</th>
<th>2002</th>
<th>2006</th>
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<tr>
<td>Percentage of Port Harcourt urban population to the other urban centres</td>
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<td>65.0</td>
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<td>Primacy ratio</td>
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<td>0.23</td>
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<td>Primacy index</td>
<td>1.87</td>
<td>1.53</td>
<td>4.31</td>
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</table>

Source: Dekor, 2015

VII. THE GEOGRAPHY OF UNDERDEVELOPED RURAL REGION SURROUNDING PORT HARCOURT IN RIVERS STATE

The colossal concentration of public infrastructure in Port Harcourt at the expense of other towns gave it an edge when the choice for a new state capital was to be decided. In order to stop the continuous depopulation of the hinterland and to avert the problems usually associated with congested cities the pioneering administration of Diette Spiff set out as its central agenda the development of neglected rural region of the state through the provision of modern infrastructure. This was intended to raise more beautiful cities and tourist towns beside Port Harcourt. However, his administration achieved little or nothing in this direction. The visions of successive administrations from the time of Diette Spiff to the present were not different; developing the other urban centres into economically viable and well developed growth points. But close to fifty years after the creation of Rivers State, Port Harcourt had remained the only city in the state. Considering the economic status of the city and the state, several questions could be raised by development scholars. From the present political structure and by the definition of urban centres using population as criteria there are over thirty urban centres beside the state capital. Twenty three of these urban centres are serving as local council headquarters. These urban centres were looked upon to serve as growth points expected to stimulate development that will on the long run trickle down to the surrounding rural communities. Several years after their creation these centres have functioned as mere administrative centres. Despite the fact that money released from the ‘top’ to the local councils is hardly enough to tackle the developmental challenges in the areas, the little released is often channeled into the pockets of their political representatives. In terms of social and economic infrastructural development, these urban centres are miles away from the global definition of urban centres.

Rivers State stands among the highest oil producing states in Nigeria. From 1958 when oil was first discovered in its rural community of Oloibiri, the state has contributed immensely to the growth of the Nigerian economy and that of the multi-national oil companies doing business in the country. It is also on record that both the Nigerian State and the multi-national oil companies doing business in the state had not been fair to the people in the area of provision of public infrastructure that would have helped to better the well being of the people. This neglect had sparked off several protests from the people both in the past and present that had resulted into both economic and humanitarian tragedy (Ukeji, 2001). Today besides Port Harcourt, the totality of the geographical area called Rivers State is still a picture of poverty and deprivation with a large proportion of her population cut off from the basic amenities that would have given them descent existence.
Though the Human Development Index in Rivers State presented in Table 8 is slightly higher than the national average which is 0.453 but if we have to compare it with other gas and oil producing regions of the world it is significantly lower. The HDI of such countries like Saudi Arabia is 0.800, Libya 0.7999, Kuwait 0.844 (Ademola, 2008). Secondly though the HDI gives a picture of the socio-economic and material growth of a region it cannot be used in totality to measure development. The reason is that it is not adequate enough to present a proper picture of the state of poverty in Rivers State. Variables such as potable water, health, electricity, roads etc. are not included in the summation of the HDI. Access to pipe borne water is very poor. Besides the picture in table 7, an analysis of the sources of drinking water in the sample communities gave us a very sad picture in figure 4.
The most common health facility in the rural region is the primary health centres that are inadequately equipped in terms of personnel and facilities. Another problem is that most of them are not centrally located. The high level of poverty in addition to the poor geography of the region; difficult terrain, poor communication network and inadequate transportation structures has made access to public health facilities difficult (see figure 5). This bias in the distribution of services has been the greatest factor that has fuelled high level of migration into the city of Port Harcourt from the hinterland. Analysis of the population growth of the city when compared with other urban centres shows an astronomical increase since 1963 as shown in table 4.

Basic infrastructure such as portable water and electricity is still a luxury while road to link its rural communities with the outside world is still miles away. The rivers, wells and streams polluted by the activities of oil exploration still remains primary sources of drinking water for the people (see figure 4). The level of poverty in its rural areas has denied many of the rural population access to education which would have provided a remedy to some of the social problems in the area. The government of Hon. Amaechi decided to take education to every community with the establishment of primary schools across the rural communities during his tenure. The schools have refused to attract qualified teachers due to the absence of basic infrastructure needed to sustain life in the rural areas; secondly access to majority of these communities is through the sea. This is always frustrating and costly for the poor teachers. The same story goes for the health facilities located in the rural communities. In most of the health centres located in rural Rivers State, patients are often left at the mercy of nurses. Doctors posted to the health centres hardly report for duty. It is the tradition of most doctors to appear in their duty post once a week. The doctors too have their tales to tell; the rigours
involve in the journey, the lack of adequate facilities to work with and the lack of adequate rural security to give them protection from the hands of kidnappers and rural militants are some of the key factors keeping them away from their duty post. This distance one has to cover to get medical attention in the geography of poor transportation network is also a discouraging factor for the sick in rural Rivers State. In figure 5 above more than 50 per cent of the sample communities must cover a distance of 8km and above to get medical services from the nearest public health facility.

![Figure 6. Access to local council headquarter from the sample communities](image)

The local council headquarters play very significant role in the exchange of goods and services between the city and the rural household, enterprise and economies. The population of the city is fed by the products of the rural farmer. This is made possible by urban and city based traders and marketers. Because of the limited market in the rural areas, agricultural products are often taken to the council headquarters where larger markets exist for their products and where urban and city traders easily access them. Accessibility is therefore a key factor and is related in the concept of minimum effort or movement minimization. The ability to get to a destination involves cost which can be measured in time and money. When the cost is on the high side travelling to a place becomes discouraging. Absence of adequate road network as seen in figure 6 to link local council headquarters can hinder agricultural productivity in the rural region. Difficulty in getting to local council headquarters where larger markets exist will ensure that the rural farmer stays within the confines of his subsistence level of production. Embarking on large scale farming will result into wastage since his immediate local environment does not have the market to accommodate such level of production. This explains the reason why rural Rivers State is economically poor and backward. The implication is that the youths in the rural areas do not see agricultural practice as an instrument to change their fortune. The city of Port Harcourt is therefore seen as holding the key to their deliverance from the chains of poverty. This is greatly responsible for the astronomically increasing migration of the rural youths to the city leaving the rural areas in a continuous state of depopulation.

V111. CONCLUSION

The over concentration of socio-economic activities in Port Harcourt at the expense of other urban centres has resulted into the growth of Port Harcourt into a primate city within the urban system in Rivers State. Available evidence has proved that there are potential urban centres in the state that can be developed into secondary cities based on their population, spatial location and functions. Secondary cities all over the world function to take pressure away from a country’s primate city by providing an alternative place to live and do business (Bolay and Robinvich, 2002). Development of other urban centres into secondary cities in Rivers State is necessary to put an end to the skewed development in the state; all demographic and economic activities occurring in just the primate city. It will also on the long run control the growth of Port Harcourt in terms of its population that has been growing at an astronomical rate.

Such secondary cities can also function as markets for the agricultural commodities of the surrounding rural communities as well as administrative and service centres for the hinterland. By playing these roles they could become a bridge between the rural areas and the urban city.
and the primate city of Port Harcourt. Over population does not only affect the spatial size of a city but also the available facilities and the quality of life in the city. Prevention of further decay and threat to the quality of life in the primate city of Port Harcourt can be achieved through the enhancement of the policy of industrialization and administrative decentralization. One way we can achieve this in Rivers State is by giving special attention to the urban centres that has the potential for growth. Location of major industries and infrastructure in such urban centres will generate small scale and information sector industries. This on the long run will lead to the growth of such urban centres into “market towns, gateway towns or service centres”. If this is achieved then these urban centres will eventually become “growth points” or new “growth poles” to a large population thereby reducing the population of Port Harcourt.

Studies have revealed the absence of 2nd and 3rd order towns in Rivers State but 4th order towns like Bori, Omoku, Okehi and Ahoada have the potential to develop into the status of secondary cities based on their population, accessibility, services, functions and spatial location. Studies had revealed that the major factor that stood as a constraint to the development of secondary cities despite the efforts of successive government was the absence of institutional framework and secondary city development policies in the state. Development of these urban centres into secondary cities must start with the setting up of institutional framework for physical planning within the context of the Nigerian Urban and Regional Planning law (Decree No. 88 of 1992 and Decree No. 18 of 1999). The law stipulates the establishment of a Physical Planning Commission at the federal level, an Urban Development Board at the state level and a Planning Authority at the local council level. The development of these urban centres should not be left in the hand of the State Ministry of Urban Development as presently practiced. In the past, development of these urban centres had been tied to rural development policies and programmes. This was an error and stood as obstacles to their development. To make a positive progress, there should be a deliberate policy targeted directly at the development of these urban centres into secondary cities. Such policy should ensure that certain classes of firms that will help in stimulating economic growth be encouraged by the government to locate in some of these urban centres where these firms are compatible with the available local labour, needs and resources. This method will promote development outside the over congested primate city of Port Harcourt. Additional strategy that should be adopted is the selection of these 4th order towns on positive bases in the distribution and development of socio-economic infrastructure. This is an indirect way of pushing economic activities to locate in 4th order urban centres. The government should also adopt deliberate and carefully planned economic activities in these 4th order urban centres to magnet population to the centres. This strategy must be supported by a deliberate, timely and aggressive development of the public housing sector in the locality. Without any argument we know that this strategy may be a long term plan but within the context of good governance and careful implementation of the consciously planned programmes it will help to sustain the population and growth in the locality.

However, precautionary measures should be taken by the government in the development of such secondary cities to ensure that no damage is done to the social structure, natural environment or planetary system of the local people. Any development that shall be put in place should not reduce the value of the resources that gives the local people means of livelihood or employment opportunities.

Reference


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Evaluation of milk production performance of lactating Fogera cows fed with urea and effective micro-organisms treated rice straw as basal diet

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Abstract- The study was conducted for Nine Fogera cows with average age, parity, initial body weight and stage of lactation was 9.3 year, 4.4, 262.7kg and 53.1 days, respectively used for the feeding trial were randomly assigned to three treatments. The treatments were 67% wheat bran and 33% NSC from 2kg concentrate + untreated rice straw (T1), 67% wheat bran and 33% NSC from 2kg concentrate +urea treated rice straw (T2) and 67% wheat bran and 33% NSC from 2kg concentrate + rice straw treated by effective micro-organism (T3). Animals were blocked based on their initial body weight in randomized complete block design. Feeding of Fogera cows with EMO treated rice straw resulted in significantly (p<0.05) higher daily dry matter intake (8.52 kg/cow, higher daily weight gain (27.7 g/day), higher daily milk yield (2.82l/day) and highest net income and marginal return rate (MRR) (82.6 and 194%, respectively) when compared with those cows fed on untreated rice straw. Hence, according to the results of this study feeding of lactating Fogera cows with EMO treated rice straw is efficient for both biologically and economically compared to urea treated rice straw.

Index Terms- effective microorganism, lactating cows, rice straw, milk yield, urea treatment

I. INTRODUCTION

Livestock in Ethiopia provide draught power; serve as source of income for farming communities, means of investment and important source of foreign exchange earnings. Of the total household cash income of farming community, livestock account for 37 to 87% in different parts of the country (Ayele et al., 2003). The livestock population in Amhara National Regional State (ANRS) is estimated at 10.5 million cattle, 8.2million sheep and 5.1 million goats. Of the cattle population in the region, about25, 744 are believed to have indigenous and exotic blood (Eshete, 2007), which is only 0.25% of the population is exotic blood and the remaining vast cattle population of the country (99.75%) belongs to indigenous/local breed.

The Fogera cattle found in Fogera Woreda, South Gondar Zone, is used for milk, meat and draft power by smallholder farmers. They are known to have better performance in terms of milk yield, growth rate and tolerance to heat, parasitic burden and adaptability to marshy areas (Gebeyehu, et al., 2004). However, the population and productivity of Fogera cattle breed is declining due to shifting of grazing land in to rice cultivation, damage of grazing land by flood and lack of adequate feeds (Firew and Getnet, 2010).

In Fogera Woreda, rice straw is the most abundant livestock feed resource. But this straw has high fiber content and low digestibility and protein content (3.35%) (Teshome Derso, 2009). The treated low quality roughages have higher digestibility and crude protein than untreated roughages. According to AlemuYami (2008), farmers feed their high nutrient requiring animals, such as lactating or fattening animals treated low quality roughage by using different mechanism. Therefore, rice straw can be improved by; using different treatment methods like urea and effective micro-organisms. The protein content of feed treated by mixing of different treatment; the mixture of EM contained treatment had highest protein content as compared to the others (Nassia.B. et al., 2013). All the available evidences tend to indicate that EMO could safely and economically be included into animal feed. There is no environmental and public health hazard reported from the use of EM technology in animal feeding. There are experiments done on dairy cows using urea treated rice straw but no work is yet done using effective micro-organism. Hence this study was conducted with the objectives of; evaluating the milk production performance and feed intake of Fogera cows provided with rice straw treated by urea and EMO and to compare the nutritive value and the economic benefits of urea and EMO treated rice straw.

II. MATERIAL AND METHODS

The study was conducted at Andassa Livestock Research Center which is located 11°.4 N and 37°.3 E and is located 19km from BahirDar. The minimum and maximum temperature was 22° and 30°, respectively with annual rainfall of 1300 mm. Before commencement of the experiment, all animas were dewormed for internal parasites and nine lactating cows with parity 4 and 5 and two weeks after calving were selected. The experimental cows were assigned to each treatment based on their initial body weight randomly and experimental cows were given experimental diets for 45 days including 15 days of adaptation and milk yield and feed intake was taken from each treatment for one month.

Experimental feed preparation

The urea treated rice straw was ensiled in polythene sheet with a capacity of 50-100 kg of urea treated rice straw. The ratio
of water: urea: straw used was 100:5:100 kg as per the recommendation of Chenost (1995). The solution of urea and water was uniformly sprayed and mixed to properly incorporate the solution into the straw on batch bases with 100 kg of straw and water each with 5 kg of fertilizer grade urea. The duration of rice straw treatment was for 21 days. After 21 days, urea treated rice straw was provided for the cows based on their requirements (Misra et al., 2006).

For the preparation of effective micro-organism treatment, adequate quantities of an inert form of EM (EM -1) packed in plastic bottles was obtain from Bahir Dar its branch of Weljijie PLC (Debreziet). The procedure was chopped the rice straw within the 2-3cm length, prepared 1 litter of inactive EM and molasses and 18 litter of water. Then the molasses, EM1 and water were thoroughly mixed to activate the microorganism. After stirring, the mixture (one liter of EMO) was inoculated into or sprayed over (50-70 kg) of rice straw. The mixed solution was finally incubate in an airight container for microbial fermentation and multiplication and stored for 10 days in dark room with room temperature (Higa and Widdingana, 2007).

**Experimental design and treatments**

The experiment was conducted by a randomized complete block design (RCBD) involving three treatments. The three treatment combinations were the following;

T1: concentrate+ untreated rice straw
T2: concentrate+ rice straw treated by urea
T3: concentrate + rice straw treated by EMO

**Data Collection**

**Chemical composition of feeds**

All samples of feed offered and refusals were analyzed for DM, N (Kjeldahl-N) and ash content according to AOAC (1990) procedures in Bahir Dar University, Engineering Faculty, and school of Food Technology. Neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) were determined by the methods of Van Soest et al., (1991) in laboratory of international livestock research institute (ILRI) in Addis Ababa.

**Milk yield and composition analysis**

Half of the experimental cow’s teat were hand milked twice a day (at 8:00 am in the morning and 4:00 pm in the evening), the left teat for the first fifteen days and right teat for the next fifteen days and the average daily milk yield per cow was calculated by multiplying the daily milk yield from half of the teat by two and milk yield measurements were taken by using graduated cylinder every day throughout the study period. The average daily milk yield of the individual lactating cow was determined dividing the total milk yield of experimental cow by the number of experimental days. Every fifteen days interval, 100 ml of milk samples were taken using a glass measuring cylinder for each cow after the completion of the adaptation period for chemical analysis. The milk samples were used to determine percentage of fat, protein and ash. Fat content of the milk was estimated using the Gerber analytical method and the formaldehyde titration method was used to determine the total protein content of milk (Van Soest et al., 1991).

**Animal’s body weight**

The body weights (BW) of animals were measured by using heart girth at fifteen days intervals throughout the experiment to determine BW change. Body weights were recorded for each lactating cow against its identification number on a weight registration notebook. The body weights of lactating cows were taken within fifteen days interval by overnight fasting. Body weight changes were determined as a difference between the final and initial body weight, where both measurements were taken as a sum of two consecutive weightings. The daily body weight gains (DBWG) were calculated as the difference between final BW and initial BW divided by number experimental days. The feed conversion efficiency of experimental animals was determined as the ratio of daily body weight gain to the amount of feed consumed for the total experimental days.

**Feed intake**

A weighed amount of feed was offered twice per day at 8:00 am in the morning and 4:00 pm in the afternoon. Orts were collected for the next morning and weighed after removing external contaminants by visual inspection. For each replicate, the feed offered and refusal were recorded. The amount of feed consumed was determined as the difference between the feed offered and refused on dry matter (DM) basis.

**Partial budget analysis**

The partial budget analysis was performed to evaluate the economic advantage of the different treatments by using the procedure of Upton (1979).

The analysis involved the calculation of the variable costs of experimental milk, feeds and benefits gained from the result. At the end of the experiment, experienced milk dealers from Bahir Dar market estimated the selling price of experimental lactating Fogera cow’s milk. In the analysis, the total return (TR) was determined by calculating the difference between selling and purchasing price of lactating Fogera cow’s milk in each treatment at the beginning and the end of the experiment. The cost of feeds was computed by multiplying the actual feed intake for the whole feeding period with the prevailing prices.

III. RESULTS AND DISCUSSION

**Chemical composition of experimental feeds**

The chemical composition of different experimental feeds is shown in Table 1. The dry matter of rice straw treated by urea in this experiment was contradictory to the DM content of 95.5% and 69.1% reported by Teshome (2009) and Promma et al. (1993), respectively. But similar with Hany (2000) reported 91.5% DM content of rice straw. The CP content of rice straw in this experiment disagrees with the CP content of 7.6 reported by Promma (1993); this disagreement is may be due the stage of rice harvested and the time and season differences. But agree with the Cp content of 3.35% and 3.5% reported by Teshome (2009) and (Yuangklang et al., 2009), respectively. The CP content of rice straw used in the current experiment is greater than the Cp content of 2.76% and 4.99% that reported by Parnich (1983) for untreated and urea treated rice straw, respectively. But the ADF of rice straw used in the current experiment was less than that
reported by Parnich (1983) but the ADL was greater in the current finding. The fiber content of rice straw treated by effective micro-organisms was low as compared to untreated rice straw.

Table 1. Chemical composition of rice straw treated by EMO, urea and untreated

<table>
<thead>
<tr>
<th>Chemicals composition of Offered feed</th>
<th>Treatment diet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>DM (%)</td>
<td>91.9</td>
</tr>
<tr>
<td>Ash (%)</td>
<td>18.2</td>
</tr>
<tr>
<td>CP (% DM)</td>
<td>3.46</td>
</tr>
<tr>
<td>CF (% DM)</td>
<td>32.1</td>
</tr>
<tr>
<td>NDF (% DM)</td>
<td>69.1</td>
</tr>
<tr>
<td>ADF (% DM)</td>
<td>43.7</td>
</tr>
<tr>
<td>ADL (% DM)</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Dry matter intake

Dry matter intake (DMI) of lactating Fogera cows fed diet containing rice straw treated by effective microorganism and urea is presented in Table 2. The daily dry matter intake of lactating cows fed rice straw treated by EMO was significantly (P<0.05) higher than untreated rice straw. The intake of rice straw in the current experiments agrees with the report of Wanapat et al, (2013). In the current experiment, the daily dry matter intake of urea treated and untreated rice straw was significantly greater than 5.65 kg and 4.91 kg per day, respectively that reported by Parnich (1983). But daily dry mater intake of urea treated rice straw reported by Wanapat (2013) was in line with the findings of this experiment.

Feed intake is a very important factor that determines the production of milk and body weight, in cows (McAinsh and Riise, 2005). The result of the present study indicates that the feed intake as well as milk production of lactating Fogera cows increased when the rice straw was treated by urea and effective micro-organism as compared to untreated rice straw.

Table 2. Feed intake and milk yield of Fogera cows fed untreated rice straw and treated by EMO and urea

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Treatment</th>
<th>SEM</th>
<th>SL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
</tr>
<tr>
<td>TDMC (kg/cow)</td>
<td>190.2</td>
<td>239.33</td>
<td>255.47</td>
</tr>
<tr>
<td>DDMI (kg/cow/day)</td>
<td>6.34&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.98&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>8.52&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>MY (L/Cow/day)</td>
<td>2.34&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.4&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>2.82&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Milk production and composition

As we observed from the table 3 milk composition of lactating cow for feeding of urea treated rice straw had good protein content as compared to the remaining treatments. As we absorbed from the table the protein content of milk when an animal’s fed urea treated rice straw was also high as compared to other treatments. This is the reason urea has nitrogen rich compound which contribute protein for milk and feed. The nitrogen content of lactating cow’s milk for the current experiment was higher than 3.2% and 3.3% animals that fed untreated and urea treated rice straw, respectively reported by Wanapat (2013) and Thaintip (2013). The fat content of the current experiment was similar with the study of Hart (1992). However, the fat and protein content of milk which animal’s fed urea treated and untreated rice straw was lower than that reported by Wanapat et al. (2013) and Hart (1992), on Holstein crossbred dairy cattle in Thailand and Buffalo in Australia, respectively.

Table 3. Chemical composition of milk used for different experimental treatments

<table>
<thead>
<tr>
<th>Chemical composition</th>
<th>Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T 1</td>
</tr>
<tr>
<td>DM (%)</td>
<td>13.12</td>
</tr>
<tr>
<td>CP (% DM)</td>
<td>3.42</td>
</tr>
<tr>
<td>CF (% DM)</td>
<td>3.50</td>
</tr>
<tr>
<td>Ash (% DM)</td>
<td>0.70</td>
</tr>
</tbody>
</table>
Milk composition and production are the interaction of many elements within the cow and external environments (O’Connor, 1994). High milk yield of satisfactory composition is the most important factor ensuring high economic returns. If the composition of milk varies widely, its implication is that feed value and its availability as a raw material will also vary. Feeding of urea treated rice straw alone had given an extra milk yield of 1.16 kg in lactating animal per day in the study area. which is similar to 1-1.5 kg milk per day reported by Khan and Davis (1981) and Pedock et al. (1982). Similar results were also reported by Mesfin et al (2009), and Getu (2006) indicating that cows fed urea treated teff straw and wheat straw respectively had significantly higher milk yield than non-supplemented crossbred cows In the current experiment there was significant difference (P<0.05) between the cows fed on treated and untreated rice straw taking groups of cows in milk yield. The effect of inclusion of effective micro-organism treated rice straw in lactating Fogera cow’s daily milk yield is depicted in Table 2 and Figure 1. Milk yield of lactating Fogera cows that fed rice straw treated by effective micro-organism was significantly (P<0.05) higher than untreated rice straw. Milk production in all treatments of the current experiment is similar with Teshome (2009). Different experiments showed that cows fed urea treated rice straw produced higher daily milk yields compared to cows fed untreated rice straw (Wanapat, 2013). The milk production depends on the intake of feed. Therefore, this experiment also indicated that the milk yield increased with the increment in dry matter intake of Fogera cattle.

Figure 1. Feed intake and milk yield of lactating Fogera cows fed untreated rice straw and treated by EMO and urea.

Body weight change
The effect of inclusion of rice straw treated effective micro-organism on body weight change of Fogera cows is represented in Table 4. According to Mukassa-Mugerwa (1989), lactating cows will probably lose weight after calving, but weight loss should be minimized through good feeding to allow them to start cycling again and to allow annual calving. During the early lactation (first three months after calving) all cows in the current study lost body weight, with a declining trend with advance in lactation. Requirements for the observed daily mean milk yield (2.31 kg/day) from this trial were not met at all levels of supplementation; but the estimated MEI requirement (63MJ/day) for maintenance and milk production of lactating dairy cow weighing 250 kg (average body weight of the experimental animals) and producing 4-6kg/day milk of 4.5% butter fat (ARC, 1990). The finding from this trial clearly supports this idea suggested by Preston and Leng (1986) that molasses or alkali treated straw based diets are more digestible, but they support little improvement in animal productivity unless they are supplemented with bypass nutrients. There was no significance difference in initial body weight and final body weight among treatments, but mean daily body weight gain of cows fed diet consisting rice straw treated by EMO was significantly (P<0.05) higher than T1. The result indicated that the daily body weight gain and feed conversion efficiency was increased when lactating cows were fed rice straw treated by urea and effective micro-organism accordingly. The findings of this experiment contradicts with the findings of Teshome (2009), who reported reduced growth rate of lactating cows when fed with untreated rice straw unlike urea treated rice straw. This discrepancy could be due to the supplementation of 2 kg concentrate feed in this experiment for lactating cows which were fed on untreated rice straw. The other reason in this experiment could be the short experimental period; 30 days is not enough to evaluate the change in weight of the experimental animals.

Table 4. Animal body weight and feed conversion efficiency of different treatments

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Treatment</th>
<th>SEM</th>
<th>SL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
</tr>
<tr>
<td>Initial body weight (kg)</td>
<td>262.0</td>
<td>245.33</td>
<td>254.67</td>
</tr>
<tr>
<td>Final body weight (kg)</td>
<td>262.4</td>
<td>245.95</td>
<td>255.5</td>
</tr>
<tr>
<td>MDBWG (g)</td>
<td>13.3abc</td>
<td>20.7abc</td>
<td>27.7a</td>
</tr>
<tr>
<td>FCE</td>
<td>0.069</td>
<td>0.086</td>
<td>0.108</td>
</tr>
</tbody>
</table>

Partial budget analysis
The partial budget analysis for the feeding trial is presented in Table 5. The result of the partial budget analysis indicated that the gross financial margin or total return obtained in this trial was 411, 419, and 493 ETB/cow for lactating Fogera cows fed on T1, T2 and T3 diets, respectively.
As it is indicated from the partial budget analysis in Table 5, lactating Fogera cows fed on effective micro-organism treated rice straw (T3) returned a higher net income (234.33 ETB/cow) as compared to the other treatments.

The net return from each treatment was 194.25, 132.79 and 234.33 ETB/head for T1, T2 and T3, respectively. The percent of marginal rate of return (MRR) was 11 and 194 for T2 and T3, respectively. Thus, it indicated that each additional unit of one ETB per liter of milk cost increment resulted in one ETB and additional 0.11 and 1.94 ETB benefit for T2 and T3, respectively. Lactating Fogera cows fed on rice straw treated by effective micro-organism (T3) had the highest net income and MRR value (82.6 and 194%, respectively) as compared to the other treatment groups. Therefore, feeding of rice straw for lactating cows treated by urea and effective micro-organism had better economic benefits as compared to feeding of untreated rice straw.

Table 5. Partial budget analysis for lactating Fogera cows fed urea treated rice straw and EMO

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing price of milk milk</td>
<td>T1 T2 T3</td>
</tr>
<tr>
<td>ETB/cow</td>
<td>11.16 11.16 11.16</td>
</tr>
<tr>
<td>Feed consumed (kg/cow)</td>
<td>255.47 224.53 251.50</td>
</tr>
<tr>
<td>Rice straw consumed (kg/cow)</td>
<td>255.47 220.13 239.33</td>
</tr>
<tr>
<td>Total supplement consumed (kg/cow)</td>
<td>- 4.4 11.97</td>
</tr>
<tr>
<td>Labor cost ETB</td>
<td>25.5 27.70 31.48</td>
</tr>
<tr>
<td>Total feed cost (ETB/cow)(TVC)</td>
<td>216.99 286.37 259.51</td>
</tr>
<tr>
<td>Cost of rice (ETB/cow)</td>
<td>216.99 186.77 189.88</td>
</tr>
<tr>
<td>Cost of supplements (ETB/cow)</td>
<td>- 99.10 69.63</td>
</tr>
<tr>
<td>Gross income (R) (ETB/cow)</td>
<td>422.4 432.6 508.44</td>
</tr>
<tr>
<td>Total return (ETB/cow)</td>
<td>411.24 419.16 493.84</td>
</tr>
<tr>
<td>Net return (NR) (ETB/cow)</td>
<td>194.25 132.79 234.93</td>
</tr>
<tr>
<td>Change of net income (ANI)</td>
<td>- 7.92 82.6</td>
</tr>
<tr>
<td>Change of total variable cost (ΔTVC)</td>
<td>- 69.38 42.52</td>
</tr>
<tr>
<td>MRR (ANI/(ΔTVC))</td>
<td>- 0.11 1.94</td>
</tr>
</tbody>
</table>

IV. CONCLUSIONS

Lactating Fogera cows fed rice straw treated by effective micro-organism (T3) had the highest net income and MRR value as compared to the other treatment groups. Therefore, feeding of rice straw for lactating cows treated by effective micro-organism had better economic benefits as compared to feeding of untreated and urea treated rice straw. Hence, we recommended that, rice straw treated by effective micro-organism is higher than urea treatment in many aspects, like its effect on milk production, feed intake, and the aroma of the treated straw is also acceptable by the animals. In addition to this it is also economically profitable and hence we recommend effective micro-organism treated rice straw as an efficient way of treating rice straw. However, further on farm trial has to be conducted to verify the on-station findings of this; experiment.

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A Corpus-based Study of Conjunctions in Mohsin Hamid’s Novels

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Abstract - Cohesion as an important linguistic feature has provoked many researchers’ interest. To explore the uniformity and regularity in conjunction devices, this study is designed. Based on cohesion theory proposed by Halliday and Hassan (1976), the study is aimed to analyze the occurrences and frequencies of conjunction devices in the three most famous novels of Pakistani writer Mohsin Hamid. For this purpose a parallel corpus consisting of three books of Mohsin Hamid was established. The results exposed that all of three books share more similarities in the usage of these devices of conjunctions. It also shows that additive conjunction “and” is vigorously utilized in all of three books. The bulk of conjunction devices are used for clarity and logicality. The study not only concentrates on the occurrence of conjunction devices but also focuses on the use and importance of conjunction devices for comprehensive writings moreover clarify how conjunctions link the components in a unified, actual and compound writing.

Index Terms- Conjunctions, cohesive devices, coherence, Linking words.

I. INTRODUCTION

Based on Halliday and Hassan (1976) theory on cohesive devices, the study is designed to examine the vigorous utilization of conjunction devices in the books of Mohsin Hamid. Many researchers have conducted comparative studies of cohesive devices in different text types and have investigated the role of cohesion in different text types. The books of Mohsin Hamid have been analyzed by different researchers on the basis of different stylistic features; this study is designed to analyze the role of conjunctions in his most famous three novels on the base of corpus linguistics. Cohesion has a substantial role in forming linguistic elements into a combined whole text. By discussing cohesive devices, these structures are frequently used to expand written piece of discourse to make it flawless and plausible (Halliday & Hassan 1976). On the basis of Halliday and Hassan’s theory, Conjunctions are categorized into four main types. The foremost type additive conjunctions is used to present more information. The second type adversative includes conjunctions which presents contrast between different situations. Causal conjunctions, the third type, include the words which are used to introduce causes and results. The fourth type, temporal is used to explain relations in time.

<table>
<thead>
<tr>
<th>Types of conjunctions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additive</td>
<td>And, also, besides, in other words, moreover etc.</td>
</tr>
<tr>
<td>Adversative</td>
<td>But, however, although, yet, though, only, nevertheless etc.</td>
</tr>
<tr>
<td>Causal</td>
<td>So, then, hence, if, unless, so, for, therefore, consequently, because etc.</td>
</tr>
<tr>
<td>Temporal</td>
<td>Then, next, before, after, first, firstly etc</td>
</tr>
</tbody>
</table>

Types of Conjunction based on Halliday and Hassan theory (1976)

Purpose of study:
The objectives of this evocative study are to examine;
• The frequency of these conjunction devices.
• The effectiveness and complexity in text because of conjunctions.
• The coherence in the text.

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Research Questions:
- How do conjunctions make writing effective and complex?
- How frequently have conjunctions been used in the novels?
- Which conjunctions are more frequent and which are less?
- How much are conjunctions essential for novel writing?
- What is the purpose of using conjunctional devices?
- How coherence in the text is created because of conjunctions?

Significance Of the Study:
The significance of this study is to make readers familiar about conjunctions used in Mohsin Hamid’s Novels and to aware them about the coherence and comprehensiveness in the text because of conjunctions.

Delimitations:
The main limitation of the study was measuring frequencies of conjunction devices (based on Halliday and Hassan’s Theory) in Mohsin Hamid’s Novels, and to check the coherence in the text because of these conjunctions.

The study focused on the coherence in the text because of conjunction devices and frequencies of these conjunctional devices in Mohsin Hamid’s Novels. There are various other novels of which coherence and frequencies of conjunctions can be measured, but as time was constant, it was difficult to collect all novels. The research is mainly based on the most famous novels of British Pakistani writer Mohsin Hamid.

Literature Review:
Conjunction is different to some extent in nature from other cohesive relations. Most researchers have concluded that conjunctions are words that bind a variety of language units together. Conjunction, according to “Halliday and Hassan(1976)” , is the fourth structural cohesion type which differs from reference, substitution, and ellipsis. If we discuss other cohesive devices in forming text relations, substitution is a structural relation, reference and ellipsis are semantic and grammatical relations, respectively. While with conjunction, there is other type of semantical relation.

Seeing links among sentences of a text, conjunctional devices are important devices that “...make text knowledged continuity more proficiently” (Donnelly 1994, p. 96).
Markkanen, Crismore, and Steffensen (1993) Perceive conjunctions as textual markers which help to form discourse, whereas Hyland (2005), considers them as frame markers.
Conjunction refers to how a writer creates and expresses the consistent interactions between the elements of a text (Eggins, 1994, p. 105). Conjunction depends on words called conjunctions, which are the words we practice to link clauses together. We can say that they are the words which express the rational connection.
Conjunctions are the devices which help the readers to recognize the mechanisms of the writing. Carrell (1982)
Kopple (1985) believes that conjunctions are called text connectives, which are used to link units of a text. With the development of linguistics, many researchers have conducted relative and comparative studies of conjunctional devices in different types of text and have explored the occurrence of cohesion in many types of text.

Methods:
1. Establishment of a corpus:
Three novel books by “Mohsin Hamid”, British Pakistani novelist, are selected according to possibility and accessibility, they are:
- Moth Smoke (2000)
- The Reluctant Fundamentalist (2007)
- How to Get Filthy rich in Rising Asia (2013)
In terms of accessibility, the selected books are available online, or accessible from libraries.

2. Data Collection and Corpus Building:
All of three books were taken as word files and these word files were converted into plain texts one by one which were tagged by using Part-Of-Speech Tagger and were fed to AntConc3.4.4. AntConc3.4.4 is a corpus processing software tool which allows the analysis of the text. Frequencies of conjunctional devices were counted by applying the formulas of conjunctions according to UCREL CLAWS7 Tagset.

3. Data Analysis:
Halliday and Hassan defined five basic kinds of cohesive devices in their book “Cohesion in English (1976)”, which are substitution, reference, conjunction, ellipsis, and lexical cohesion. In this study conjunctional devices are recognized based on their organization. Conjunctional devices between sentences stand out more noticeably. Therefore, it is the intersentence cohesion that is substantial because it signifies the variable aspect of cohesion, distinguishing one writing from another. Conjunction is quite dissimilar in nature from other cohesive devices. Conjunctive elements are cohesive not in themselves but parenthetically, by ascertaining their clear meanings; they are not predominantly devices for getting out into the preceding (or following) sentence, but they express definite meanings which assume the occurrence of other constituents in the discourse.

<table>
<thead>
<tr>
<th>Conjunctions</th>
<th>Novel-1 (Frequency%)</th>
<th>Novel-2 (Frequency%)</th>
<th>Novel-3 (Frequency%)</th>
<th>Total No. of conjunctions (Frequency%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additive</td>
<td>2202 (56%)</td>
<td>1111 (54.1%)</td>
<td>1579 (62.5%)</td>
<td>4892 (57.5%)</td>
</tr>
<tr>
<td>Adversative</td>
<td>568 (14.4%)</td>
<td>325 (15.85%)</td>
<td>308 (12.2%)</td>
<td>1201 (14.1%)</td>
</tr>
</tbody>
</table>
The analysis of these novels provides the frequencies or occurrences of these conjunctions, more than half of conjunctions are additive, which are total as 4892 and having “and” as additive conjunction with 4465 occurrences, which shows that in all of the novels “and” is used more frequently as compared to other additive devices.

Frequency and percentage of four types of cohesive devices

The results gained indicate that the author has adopted all four types of conjunction devices, despite of the notable difference regarding their frequencies in the text. The total percentage of additive conjunctions in parallel corpus covers more than half proportion of total amount of conjunctive devices. The results indicate that additive conjunctions are used more repeatedly and frequently than other conjunction devices. Results also show that use of additive conjunction “and” is more frequent instead of other additive devices. “And” as additive device covers 91% of all additive devices in all three novels, only 8% “or” is utilized while 1% other additive devices are used. Same are the results if we compare additive devices with other conjunctions in each novel separately. Temporal devices are less frequent, these are only 4% of total conjunctions, while there isn’t a big difference of frequencies of causal and adversative conjunctions which are 23.7% and 14.1%, respectively. Conjunction devices are important for novel writing because Conjunctions and conjunctive devices unite elements of a text together. When the writing is united and interconnected, readers are more likely to rely on what the writer is presenting. A writer uses conjunctions to make his writing more readable and to present logical relationship between sentences or ideas, this engenders faith and goodwill in the readers. As Aristotle said, producing that goodwill, what he called philosophy, makes people more vulnerable to persuasion. The results and analysis of the novels show that conjunctions improve the writing as a whole by giving the writing coherence, or flow. Conjunctions assist different purposes: presenting agreement, disagreement, causation, maintenance or prominence, consequence and conclusion. They work like a bridge from one of the writer’s points to another. conjunctions make the points flow smoothly in order to make writing persuasive and influential. The results show that conjunction devices are important and necessary for comprehensive writings. In comprehensive writings too much reiteration and repetition is avoided, so in order to create a flow in writing long sentences are used which are joined through conjunctions. Similarly, Writer, Mohsin Hamid, has also utilized these cohesive conjunctions to make his writings comprehensive, exhaustive and extensive one. He has made use of all kinds of conjunctions to make his writing effective one. Conjunction “and” is used more repeatedly and frequently in his all these writings which shows that he has presented coherence in the writings and it also make his writing descriptive and interpretative. This conjunction has been utilized by him as a bridge from one point to another point of writer in addition it also maintain and establish the texture of text. As cohesive writing is writing which clasps together well. It can be followed easily because it uses language effectively to guide the reader. Similarly, usage of conjunctions in his writings provides the writing a flow. This stream and flow in writing by the use of conjunctive devices show that ideas are interrelated which illustrate coherence in the text.

II. RESULTS AND DISCUSSION

The results gained indicate that the author has adopted all four types of conjunction devices, despite of the notable difference regarding their frequencies in the text. The total percentage of additive conjunctions in parallel corpus covers more than half proportion of total amount of conjunctive devices. The results indicate that additive conjunctions are used more repeatedly and frequently than other conjunction devices. Results also show that use of additive conjunction “and” is more frequent instead of other additive devices. “And” as additive device covers 91% of all additive devices in all three novels, only 8% “or” is utilized while 1% other additive devices are used. Same are the results if we compare additive devices with other conjunctions in each novel separately. Temporal devices are less frequent, these are only 4% of total conjunctions, while there isn’t a big difference of frequencies of causal and adversative conjunctions which are 23.7% and 14.1%, respectively. Conjunction devices are important for novel writing because Conjunctions and conjunctive devices unite elements of a text together. When the writing is united and interconnected, readers are more likely to rely on what the writer is presenting. A writer uses conjunctions to make his writing more readable and to present logical relationship between sentences or ideas, this engenders faith and goodwill in the readers. As Aristotle said, producing that goodwill, what he called philosophy, makes people more vulnerable to persuasion. The results and analysis of the novels show that conjunctions improve the writing as a whole by giving the writing coherence, or flow. Conjunctions assist different purposes: presenting agreement, disagreement, causation, maintenance or prominence, consequence and conclusion. They work like a bridge from one point to another. conjunctions make the points flow smoothly in order to make writing persuasive and influential. The results show that conjunction devices are important and necessary for comprehensive writings. In comprehensive writings too much reiteration and repetition is avoided, so in order to create a flow in writing long sentences are used which are joined through conjunctions. Similarly, Writer, Mohsin Hamid, has also utilized these cohesive conjunctions to make his writings comprehensive, exhaustive and extensive one. He has made use of all kinds of conjunctions to make his writing effective one. Conjunction “and” is used more repeatedly and frequently in his all these writings which shows that he has presented coherence in the writings and it also make his writing descriptive and interpretative. This conjunction has been utilized by him as a bridge from one point to another point of writer in addition it also maintain and establish the texture of text. As cohesive writing is writing which clasps together well. It can be followed easily because it uses language effectively to guide the reader. Similarly, usage of conjunctions in his writings provides the writing a flow. This stream and flow in writing by the use of conjunctive devices show that ideas are interrelated which illustrate coherence in the text.

III. CONCLUSION

The main aim of this study was to identify the occurrences and frequencies of cohesive devices of conjunctions within interpretative and descriptive writings by Mohsin Hamid. It also aimed at disclosing the importance and impacts of conjunctions by the writers or authors in using these devices to establish texture and comprehensiveness in these writings. The results have indicated that the writers can create cohesion and inclusiveness in the texts by employing all the four types of conjunction devices, though some (as additive conjunctions) were used much more repeatedly and frequently than others. The study also identify that conjunctions are used to produce coherence in the writings. It is concluded that conjunctive devices are essential features in the complex writings in order to signify more than single idea. These devices provide the writing a flow and coherence. The consistent interactions between clauses, among sentences, and paragraphs can be conveyed by conjunctions (and, or, because, so etc.)

REFERENCES


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Causes of Delay and Cost Overruns in A Domestic and Commercial Natural Gas supplying Company and Its Analysis Using Research Methodology

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ABSTRACT: The project is considered successful if it is done within estimated cost and time but delay and cost overruns are commonly observed in any construction projects thus the underground natural gas supplying projects are not an exception. The purpose of this analysis is to identify and evaluate the relative importance of the significant factors contributing to delay and cost overruns in gas supply projects. And ranking these factors with their criticality for execution of project. In order to find this methodology carried out is the questionnaire survey, the respondents of this survey are responsible personnel from project managers, engineers, and contractors involved in actual project planning and executing of domestic and commercial gas supply. The results of the study revealed the main causes of delay and cost overruns in such projects included: monthly payment difficulties; poor contractor management; delay in material procurement; poor technical performances; and escalation of material prices, etc. Hence, effective project planning, controlling and monitoring should be established to enhance project performance in order to minimize or avoid delay and cost overrun in gas pipeline laying projects.

Further same questionnaire survey if implemented by employees within organization it can be used for the performance evaluation of overall project and for the contractors working for the company.

Keywords: Cost Overrun, Chi-Square Test, Delay, Factor Ranking, Project Performance Evaluation

I. INTRODUCTION

A successful project means that the project has accomplished its technical performance, maintained its schedule, and remained within budgetary costs. But this will happen only if they are planned accordingly and monitored throughout the project duration that is included in monitoring and controlling phase of a project. Starting from pre-construction activities to commissioning of work the contractors plays crucial role [1]. Delay and cost overrun in any phases of project are major signifying factors of weak performance. This paper identifies and examines causes of both in construction industry keeping in mind the Natural Gas supplying industry. The range of factors considered here are from the technical, management planning, costing, materials, financial and social environment. In preliminary survey I have found that majority of work is done by contractors is suffering from delays and extension of contracts. 75% contract works are delayed and only 25% are found working in budgetary cost. These pipeline laying works generally are of longer duration so to keep on tracking the project is really massive work, in order to help these industries here are few methodologies are applied on the survey data which will find critical factors which are needed to be monitored during project period and that will definitely help in reducing delays and cost overruns.

II. NATURAL GAS SUPPLYING INDUSTRY WITH PROJECT MANAGEMENT & CONSTRUCTION (PMC) CONTRACTS

The Gas supplying industry for both domestic and industrial purpose work with following activities involved in it:

1. Conducting geographical survey for carrying out excavation work for laying of gas carrying pipe line of medium and low pressure.
2. This survey is carried out in order to determine suitability of land for laying gas pipeline which determines road type, existing power supplying cables, optical and other such cables and finding our route through ground.
3. The contractor is given work contract depending upon his qualification to perform the work and bid value he quoted against company estimates. These contractors also do sub-contracting and they are paid with completion of percentage work by Owner Company.
4. Then carrying out excavation work, flushing testing and commissioning are carried out as per specifications mentioned in company’s code of practice.
5. The influencing factors or constraints to this work can be internal or external factors as, poor technical performance due to unavailability of material and equipment. Poor planning, rainy season,unavailability of skilled labours as plumbers are not trained to work at heights which causes halting of work at many sites.

In order to identify which are those factors affect extensively and determine their impact to work this survey is carried out.
III. AIM AND OBJECTIVE

The survey factors are found out by observing day to day working conditions and constraint causing factors in company. This is to define and analyse factors influencing work, causing delays and cost overrun in gas pipeline industry. Identifying most critical factors in order to treat them with their relative importance.

IV. METHODOLOGY

In order to evaluate and analyze the causes of delay and cost overrun in groundwater projects, a wide range of personnel involved in various departments from company were targeted. Personnel were randomly selected from project managers, contractors, project engineers and construction managers. A questionnaire of 27 factors was carefully designed from previous preliminary investigations. It is organised in rating scale as per factors influencing project as, very low = 1, low = 2, moderate = 3, high = 4, very high = 5.

The questionnaire was directed towards three groups in the company listed as:

i. Planning managers and engineers
ii. Project managers and Execution Engineers
iii. Contractors

In numbers nearly 10 – 15 people were asked to give rating for factors and calculations are carried out from received respondents.

V. DATA ANALYSIS

The procedure used in analyzing the results was aimed at establishing the relative importance of the various factors responsible for project delay and cost overruns. The score for each factor is calculated by summing up scores assigned to it by respondents. Therefore, the level of importance as indicated by the planning and project managers, engineers and contractors were used to measure the relative weight of each factor. The relative weight was computed using the following equation:

\[
RIW = \frac{\sum_{i=1}^{5} a_i n_i}{\sum_{j=1}^{N} X_j} \tag{1}
\]

Where:

\(X_j\) = sum of the \(j^{th}\) factor;
\(j = \) factors 1, 2, 3, 4 . . . \(N\);
\(N=\) total number of factors (29);
\(a_i =\) constant expressing the weight given to the \(i^{th}\) response: \(i =1, 2, 3, 4, 5\)
For ‘very high’ \(a_1 = 5\), ‘high’ \(a_2 = 4\), ‘medium’ \(a_3 = 3\), ‘low’ \(a_4 = 2\), ‘very low’ \(a_5 = 1\)
\(n_i =\) variable expressing the frequency of the \(i^{th}\) response
\(n_1 =\) frequency of ‘very high’ response, \(n_2 =\) frequency of ‘high’ response, \(n_3 =\) frequency of ‘medium’ response
\(n_4 =\) frequency of ‘low’ response, \(n_5 =\) frequency of ‘very low’ response.

To determine whether there is degree of agreement among the three groups with respect to their rankings of the factors, Kendall’s Coefficient of Concordance was used. The Kendall’s Coefficient of Concordance says that the degree of agreement on a zero to one scale is:

\[
W = \frac{12S}{m^2 N(N^2-1)} \tag{2}
\]

Where;

\(R =\) sum of ranks
\(A =\) sum of ranks / \(N\)

The calculated Kendall’s coefficient is 0.7542.

In order to know whether there is disagreement or agreement between the three groups on ranking the factors, a test of hypothesis is needed.

Null hypothesis: \(H_0: \) Disagreement in rankings among the three groups.
Alternative hypothesis: \(H_1: \) Agreement in rankings among the three groups.
Since \(n = 29\) is too large for the table of critical values of Kendall’s, chi-square approximation of the sampling distribution of \(W\) is computed with Eq. (3)
\[ \chi^2 = m (N - 1) W \]  

The calculated Chi-square is \( \chi^2 = 63.353151 \), using critical table for \( n = 29 \) and \( a = 0.05 \) is 42.557.

Since computed value \( \chi^2 \) is greater than critical table value thus the null hypothesis \( H_0 \) is rejected and alternative hypothesis \( H_1 \) is accepted. Therefore, concluded that there is a significant degree of agreement between the three groups with respect to how they rank the factors.

VI. SURVEY RESULTS AND ANALYSIS

The questionnaire was analyzed from project managers, engineers, and contractors perspective. In order to identify the most important factors that influence time and cost overruns in gas supplying projects, the items were ranked in the various groups. On the basis of ranking of the factors by the various groups it was possible to identify the most important factors that influenced project time and cost overruns. A summary of all the factors causing delays and cost overruns in projects is shown in the Table 1.

The five most important factors agreed by all 3 groups are safety management at site, Quality of project manager, Mobilization of manpower, Management of multiple contracts (in MGL), Plumber unavailability for work at height.

Contractor ranked the monthly payment difficulties from agencies for completed works first whereas the planning and execution people ranked it seventh and third. This problem may be due to the existing culture in the construction industry.

The second most important factor attributing to the cause of delay and cost overruns in gas supply projects is Quality of project manager. Quality of project manager was ranked first by contractors, second by planning managers and engineers (see Table 1). This can be attributed to the way contracts are awarded. Most cases, projects are awarded to the lowest bidder. Some of the lowest bidders may lack management skills and less attention is paid to contractor’s plan, cost control, overall site management, and resource allocation.

Then third factor is mobilization of manpower this is being ranked one by contractors and execution people while planning people ranked it seventh. Management of multiple contracts is being forth significant factor and individually contractors ranked it first, the planning people ranked it second and projects that is execution people ranked it third.

Next comes plumber unavailability is ranked first critical factor by contractors, third by project execution people and seventh by planning people.

This analysis shows different perspective of factors ranking given by people with different backgrounds. Other factors that emerged clearly as not very important, but of interest, are bad weather and geological conditions. These are the natural factors also the geological condition are the most difficult and unknown factors because they cannot be controlled.

<table>
<thead>
<tr>
<th>RESPONDENTS</th>
<th>Planning</th>
<th>Project</th>
<th>Contractors</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATINGS FOR CONTRACTOR PERFORMANCE</td>
<td>RIW</td>
<td>Rank</td>
<td>RIW</td>
<td>Rank</td>
</tr>
<tr>
<td>Safety management at site</td>
<td>0.467</td>
<td>1</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>Delivery of contractual targets</td>
<td>0.433</td>
<td>2</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>Effective Planning and scheduling</td>
<td>0.333</td>
<td>17</td>
<td>0.27</td>
<td>8</td>
</tr>
<tr>
<td>Proper cost estimates</td>
<td>0.333</td>
<td>17</td>
<td>0.1</td>
<td>29</td>
</tr>
<tr>
<td>Effective liasioning</td>
<td>0.367</td>
<td>11</td>
<td>0.23</td>
<td>10</td>
</tr>
<tr>
<td>Effective use of ground level information</td>
<td>0.267</td>
<td>23</td>
<td>0.2</td>
<td>16</td>
</tr>
<tr>
<td>Quality of construction</td>
<td>0.433</td>
<td>2</td>
<td>0.2</td>
<td>16</td>
</tr>
<tr>
<td>Cash flow management during contract period</td>
<td>0.367</td>
<td>11</td>
<td>0.2</td>
<td>16</td>
</tr>
<tr>
<td>Quality of construction equipment and plants</td>
<td>0.367</td>
<td>11</td>
<td>0.17</td>
<td>21</td>
</tr>
<tr>
<td>Mobilization of manpower</td>
<td>0.4</td>
<td>7</td>
<td>0.33</td>
<td>1</td>
</tr>
<tr>
<td>Quality of project manager</td>
<td>0.433</td>
<td>2</td>
<td>0.33</td>
<td>1</td>
</tr>
<tr>
<td>Material Management</td>
<td>0.267</td>
<td>23</td>
<td>0.17</td>
<td>21</td>
</tr>
<tr>
<td>Decision making at site</td>
<td>0.367</td>
<td>11</td>
<td>0.2</td>
<td>16</td>
</tr>
</tbody>
</table>
Management of multiple contracts (in MGL)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Rating 1</th>
<th>Rating 2</th>
<th>Rating 3</th>
<th>Rating 4</th>
<th>Rating 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day to day site management</td>
<td>0.333</td>
<td>17</td>
<td>0.23</td>
<td>10</td>
<td>0.07</td>
</tr>
<tr>
<td>Effective customer complaint management</td>
<td>0.433</td>
<td>2</td>
<td>0.2</td>
<td>16</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**RATINGS FOR OVERALL PROJECT PERFORMANCE**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Rating 1</th>
<th>Rating 2</th>
<th>Rating 3</th>
<th>Rating 4</th>
<th>Rating 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delays in work approval</td>
<td>0.367</td>
<td>11</td>
<td>0.13</td>
<td>27</td>
<td>0.17</td>
</tr>
<tr>
<td>Delays in inspection and testing of work</td>
<td>0.267</td>
<td>23</td>
<td>0.23</td>
<td>10</td>
<td>0.07</td>
</tr>
<tr>
<td>Plumber unavailability for work at height</td>
<td>0.4</td>
<td>7</td>
<td>0.3</td>
<td>3</td>
<td>0.17</td>
</tr>
<tr>
<td>Monthly payment difficulties</td>
<td>0.4</td>
<td>7</td>
<td>0.3</td>
<td>3</td>
<td>0.17</td>
</tr>
<tr>
<td>Contractor’s financial difficulties</td>
<td>0.367</td>
<td>11</td>
<td>0.27</td>
<td>8</td>
<td>0.17</td>
</tr>
<tr>
<td>If Lowest value bid selected</td>
<td>0.4</td>
<td>7</td>
<td>0.13</td>
<td>27</td>
<td>0.17</td>
</tr>
<tr>
<td>Material procurement</td>
<td>0.267</td>
<td>23</td>
<td>0.17</td>
<td>21</td>
<td>0.1</td>
</tr>
<tr>
<td>Late delivery of materials and equipment</td>
<td>0.333</td>
<td>17</td>
<td>0.23</td>
<td>10</td>
<td>0.1</td>
</tr>
<tr>
<td>Escalation of material prices</td>
<td>0.333</td>
<td>17</td>
<td>0.17</td>
<td>21</td>
<td>0.1</td>
</tr>
<tr>
<td>Difficulties in obtaining construction materials at official current prices</td>
<td>0.3</td>
<td>22</td>
<td>0.17</td>
<td>21</td>
<td>0.13</td>
</tr>
<tr>
<td>Underground problems (Electricity/other cables)</td>
<td>0.267</td>
<td>23</td>
<td>0.17</td>
<td>21</td>
<td>0.1</td>
</tr>
<tr>
<td>Bad weather conditions</td>
<td>0.233</td>
<td>29</td>
<td>0.23</td>
<td>10</td>
<td>0.1</td>
</tr>
<tr>
<td>Unexpected geological (earth) conditions</td>
<td>0.267</td>
<td>23</td>
<td>0.23</td>
<td>10</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Table 1: Factor Ranking

**RESULTS AND CONCLUSION**

The survey is carried out within the company located in Mumbai area supplying natural gas for domestic and industrial applications. The focus is on finding the critical factors and ranking them those causing delays and cost overrun in projects. The major conclusions drawn from this are as follows:

- It is observed that all three groups gave different ranking to factors individually as per their views but if we see the overall responses we can say that all are trying to point at most critical factors such as safety, quality of project managers, mobilization of manpower, multiple contract management such factors show similar influence from all three groups on their work.
- Remaining factors such as Proper cost estimates, Material procurement, Underground problems, Effective use of ground level information they show influence on each individual’s work and those factors can be controlled at certain level individually. Those are not showing criticality on overall project.
- Many factors listed here are concentrating on proper project management that is planning, scheduling, monitoring and executing the projects it means that all the factors can be treated well while working that can reduce the delay and cost overrun of any project.
- Proper preplanning activities, following the schedules, cash flows during execution, continuous monitoring are key factors to be followed in order to get desired results from any project.
- Paper includes factors those can be used for performance evaluation of overall project and for contractors also. Company can develop their software system in order to get responses from their people and can use the results as learning for future projects.

**RECOMMENDATIONS**

- In order to improve contractors’ managerial skills there is need for continuous work-training programs for personnel in the industry to update their knowledge and be familiar with project management techniques and processes.
- Developing effective and efficient technical performances in the gas supplying industry through different types of training programs. The trainings should cover project planning, scheduling, time and cost control, and the information systems.
- Appropriate funding levels should always be determined at the planning stage of the project so that regular payment should be paid to contractors for work done.
- More use of technology can reduce time required to carry out technical works such as inspections, tastings etc.
- Construction material can be made available nearby the working sites, effective contingencies should be considered to cover the effects of escalating material prices.
ACKNOWLEDGEMENT

This research was supported by one of the growing Gas supplying industry in Mumbai. I thank my guides who provided insight and expertise that greatly assisted the research, although they may not agree with all of the interpretations/conclusions of this paper.

I thank Dr. D.K. Shinde, professor and guide at VJTI, for comments that greatly improved the manuscript.

I would also like to show our gratitude to all other staff members from industry as well as my institution for sharing their pearls of wisdom with me during the course of this research.

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CHALLENGES ENCOUNTERED BY SINGLE PARENTS IN THE LEARNING AND DEVELOPMENT OF CHILDREN

Kudenga Mugove

Senior Lecturer, Faculty of Applied Social Sciences, Department of Psychology, Zimbabwe Open University, Harare, Zimbabwe

Abstract: Children are supposed to grow in a family setting where both mother and father take their respective roles in the upbringing of the child. In recent years there has been a sudden rise in the phenomenon of single parent families. Single parent families face challenges in properly raising their children. This research sought to find out the challenges encountered by single parents in the learning and development of their infant children. The research employed mixed methodologies. It used questionnaires, observation checklist and document analysis as research instruments. The sample of research participants consisted of 30 school teachers, 18 school heads and 20 parents and 20 children in grade 1 and 2. The data is presented in the form of tables and excerpts. The study found out that single parents faced challenges in paying fees for their children, supplying their children with adequate stationery, monitoring the school attendance of their children and providing their children with emotional support. The exercise books of the children were in a bad state. The academic performance of the children was poor. The single parents faced challenges in supervising their children’s home assignments and their behaviour. The study recommends that the schools organise support groups for single parents so that they share information on how to improve their situation. The study also recommends that the government legislation and policies should assist low income single parents in their parenting problems. There is need for schools to set up guidance and counselling programmes to assist children from single parents and their children so that they are able to cope with challenges they face and are able to compete with children from intact families.

Key Terms: Single parent family, ECD children, Ecological Systems Theory, Children’s right and Education.

INTRODUCTION

Children are supposed to grow in an intact family where there are both parents who play their expected roles. Recently there has been an increase in the phenomenon of single parent family world over. One parent is present to bring up the children without the assistance of the other parent. This phenomenon presents challenges to the parent whose custody the children are in. The parent faces challenges in adequately providing for the child alone. The single parent may face resource challenges and ways of properly nurturing for the children. This research study intends to find out the challenges faced by single parents in the learning and development of their children.

RESEARCH QUESTION

What challenges are faced by single parents in the learning and development of their infant children?

LITERATURE REVIEW

It is when the family bond between parents is broken that a family becomes a single parent family. Sibanda, Chingove and Munyati (2012) describe a single family style as a family with either father or mother living with their children from their previous marriage. Tassoni (2002) in his findings on causes of single parent
families in the US sites divorce and death as some of major causes of single parent families. In recent years the phenomenon of teen pregnancies has given rise to single parent families as both parents will be immature to make a lasting family. New York Times (2004) made studies in the southern part of Africa and found out that poverty and teenage pregnancies poverty led to a rise in single parent families. These teenage pregnancies actually perpetuate the poverty cycle as the children born will likely be unable to get good education. Single parenting family system can be as a result of a death, divorce or having children out of wedlock.

Provision of children’s learning and development needs, care and support is one of the parents’ most important responsibilities in the upbringing of a child and supporting his or her learning. Bruce and Meggit (2005) explain that during Early Childhood Development children depend on their parents in school readiness, preparation and learning and development provision care and support. Anthony, Glanvile, Naaman, Waander and Shaffer (2005) in their studies point out that children learn best when they are given adequate learning and development materials and psychosocial support. It then follows that parents are obliged to fend for their children’s education needs. It is most likely that single parents face challenges in the provision care and support of their children’s learning and development needs.

Tassoni (2002) in his findings on causes of single parent families in the US sites divorce and death as some of major causes of single parent families. New York Times (2004) made studies in the southern part of African and found out that poverty and teenage pregnancies led to a rise in single parent families. Therefore the current study sought to establish the major cause of single parent families in Zimbabwe.

Due to poverty, illness or unemployment most single parent families fail to provide adequate financial and material resources for their children’s learning and development. Marther (2009) explains that a family is defined as poor when their family income is less than 100% of their official poverty threshold. Studies by Tassoni (2002) shows that most single families in the USA fall into low income bracket where they did menial work as a way of raising their income. The authority above goes on to explain that due to low income most single parent families may not afford to pay bills, buy food and provide adequately for their children’s education resources such as computers, books and other various learning materials to help their children learn concepts at home to achieve success at school. Marther (2009) reveal in her research findings that some single parents may fail to provide their children’s basic needs because of unemployment. The studies reveal that some single parents may not have the opportunity to take their children to various education sites such as museums, zoos, educational centre and other places to equip their children with various educational concepts they learn at school. Marther (2009) also supports Tassoni (2002) that because of economic hardships and unemployment some single parents fail to provide their children’s educational material needs, for their children to acquire academic and skills competence during their childhood development period. From the above previous findings it is clear that it is difficult for most single parents to provide for their children’s education in order for the children to experience quality learning and development at home during the early years of life for children to perform well at school. The current study sought to go deeper into analyzing the extent to which single parents in the high density area of Glenview/Mufakose in Harare can afford to adequately provide for their children’s educational material resources both at home and school.

While the family income is in an influential factor in their children’s learning and development success, Case (2009) in her research study sites the family size and parent child relationships as other contributing factors to single parent challenges for provision of their children’s quality learning and development. The size of the family contribute to single parent challenges in the provision of children’s education needs. Kail (2002) whose research findings reveal that in most parts of Asian and African continents single parents with many children find it difficult to adequately provide for their children’s education hence they tend to seek assistance elsewhere. It then follows that the smaller the size of the family, the more affordable for the single parents to provide for their children’s education needs. It was this current research’s intention to reveal the impact of family sizes and affordability of educational material needs of most single parents in Glenview/Mufakose District.

Case (2009) supported by Anthony et al (2005) explain that sound parent-child relationship contribute positively to the children’s learning and development. However, if the parent child relationship is not
supportive the parent may fail to supervise, control, monitor and guide their children’s socio emotional aspects which enhance positive school achievements and positive behaviour too. Craig (2005) in his research studies on single parent families in Australia found out that parental stress has direct impact on children’s learning and social competences thus compromising quality child care. Craig (2005) explains that quality child care means consistent response to children’s signals, being available for communication, stress alleviation and creating a base for attachment bond with child. Quality child care enables the child to have confidence in the parent as well as other care givers as teachers whom the child interacts with during school time. Craig (2005) is supported by Musiwa and Muzembe (2011) who clarify Mary Ainsworth’s ethological theory as supporting the need to have positive attachment bond between the child and parent in order for the child to develop a sense of security and trust in later life. It is imperative from previous studies that as a family unit the parent should be there for the needed child rearing practices. It was then the purpose of this current study to investigate whether the single parents of the targeted areas were always available for their children to provide the needed psychosocial support for their children to develop a sense of security and trust in other adults such as teachers.

**METHODOLOGY**

The research adopted a descriptive survey research design. According to Belensky (2010) a descriptive research design obtains information concerning the current status of the phenomena and to find out what exists in respect to variables or conditions in a situation. Sage (2010) views that descriptive survey research designs help provide answers to questions who, what, when, where and how with a particular research problem. In the current study the descriptive research design was suitable since it sought to establish the teachers’ views and perceptions towards the impact of single parenting challenges towards the learning and development of their infant children. It focused on problems likely to be faced by children from single parent families and the impact of the problems in the children’s class performance and attendance during the early childhood stage of grade1 and 2.

In the study of human relationships such as parenting techniques or family issues the experimental designs are less suitable as they require strict control of variables which is only suitable in natural sciences thus the descriptive survey is most suitable in the current study. It was the researcher’s intention to probe into how challenges faced by single parents affect their children’s education and how the children can be helped to attain high education achievement despite coming from single parenting families.

Ideally the research strove to investigate the problems faced by children from single parent families during the early childhood education which is the foundation for their future learning. One advantage of this design is that the respondents are the people who are directly in contact with the particular children from single parent homes. They witness the problems faced by the children in the real classroom environment thus making the collected information valid. Sage (2003) noted that descriptive studies can yield rich data collected from individuals who are in direct contact with the issue at hand that leads to important recommendations. This research design becomes suitable since findings can be generalised to the whole population.

The researcher conducted a random sampling procedure to pick six schools from the many schools in Glenview/Mufakose District of Harare. Fordon (2001) states that random sampling involves the selecting of a sample on which each element of the population has an equal chance of being selected. The research participants comprised of teachers, deputy heads, heads, teachers in charge and infant teachers so a stratified sample was made. A stratified sample is a probability sampling technique in which the researcher divides the entire population into different subgroups or strata and then randomly selects the final subjects (Farlon, 2003). This type of sampling was used because the researcher wanted to get the perceptions of the subgroups within the population. The researcher adopted this procedure for the purpose of obtaining the possible richest information required to answer the research question.
The instruments used in the research were questionnaires, interviews, observation checklist and document analysis. It was important to use the instruments for purposes of triangulation. The information got from questionnaires needed to be verified using observation checklist and document analysis. Interviews gave the researcher opportunity further probe information that was not quite clear.

RESULTS

Table 1. DEMOGRAPHIC DATA FOR ALL PARTICIPANTS. (N=68)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptor</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Age range</td>
<td>21-30 years</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31-40 years</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41-50 years</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 50 years</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>28</td>
<td>98%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
<tr>
<td>Professional Qualification</td>
<td>Certificate in Education</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Diploma in Education</td>
<td>16</td>
<td>53%</td>
</tr>
<tr>
<td></td>
<td>Degree</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
<tr>
<td>Teaching Experience</td>
<td>0-10 years</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>11-20 years</td>
<td>15</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Over 20 years</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptor</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>Professional Qualifications</td>
<td>Diploma in Education</td>
<td>2</td>
</tr>
<tr>
<td>Deputy Heads</td>
<td></td>
<td>Degree</td>
<td>16</td>
</tr>
<tr>
<td>Teachers In Charge</td>
<td></td>
<td>Total</td>
<td>18</td>
</tr>
<tr>
<td>Parents</td>
<td>Age Range</td>
<td>21-30 years</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31-40 years</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 40 years</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>20</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>Professional Qualifications</td>
<td>No Qualification</td>
<td>14</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Certificated</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Degree</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>

There were more female teacher respondents than male teacher respondents. There were more teachers who had diploma in education than other professional qualifications. The table also reveals that a high number of teachers had above 11 to 20 years teaching experience.

Most school authority office bearers who responded in the research study where well educated mature professional with a lot of teaching experience as indicated by the data provided. Most of the school authorities had an age range of over 50 years comprising 89% of the respondents. Most of the school authority office bearers who responded where degree holding females whose teaching experience was above 20 years. The gender percentage of females who responded is 78% and those with degree professional qualification comprised of 89% of the respondents.
Of the single parents interviewed, 60% of them were in the range of 21-30yrs being the majority of the respondents. The single mothers comprised of 80% of the gender of single parents. 70% of the respondents had education qualification of below 3 O’ Level passes. Most of the single parents who participated in the research study were unemployed.

Table 2. Questionnaire responses of challenges faced by single parents.  N=30

<table>
<thead>
<tr>
<th>Descriptor/Narration</th>
<th>Positive</th>
<th>%</th>
<th>Negative</th>
<th>%</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children have inadequate fees</td>
<td>25</td>
<td>83%</td>
<td>5</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Children have inadequate stationery</td>
<td>21</td>
<td>70%</td>
<td>9</td>
<td>30%</td>
<td>100%</td>
</tr>
<tr>
<td>Most children have inadequate school attire</td>
<td>16</td>
<td>53%</td>
<td>14</td>
<td>47%</td>
<td>100%</td>
</tr>
<tr>
<td>Most children do not attend school regularly</td>
<td>17</td>
<td>57%</td>
<td>13</td>
<td>43%</td>
<td>100%</td>
</tr>
<tr>
<td>Some children have poor health</td>
<td>16</td>
<td>53%</td>
<td>14</td>
<td>47%</td>
<td>100%</td>
</tr>
<tr>
<td>Class performance is good</td>
<td>12</td>
<td>40%</td>
<td>18</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td>Most children’s homework is not monitored</td>
<td>20</td>
<td>66%</td>
<td>10</td>
<td>34%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Most respondents indicated that most children in the target area had inadequate fees, stationery and school attire. The school attendance of children was said to be irregular by most respondents. A number of respondents indicated that most children’s homework was not supervised and children’s class performance was generally low.

Table 3. Observation findings of challenges faced by single parents  N=30

<table>
<thead>
<tr>
<th>Descriptor/Narration</th>
<th>Positive</th>
<th>%</th>
<th>Negative</th>
<th>%</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children with good health</td>
<td>15</td>
<td>50%</td>
<td>15</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Presentable school and sports attire</td>
<td>13</td>
<td>43%</td>
<td>17</td>
<td>57%</td>
<td>100%</td>
</tr>
<tr>
<td>Presentable exercise books</td>
<td>12</td>
<td>40%</td>
<td>18</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td>Children showing good behaviour</td>
<td>14</td>
<td>47%</td>
<td>16</td>
<td>53%</td>
<td>100%</td>
</tr>
<tr>
<td>Children showing positive attitude towards the teacher</td>
<td>18</td>
<td>60%</td>
<td>12</td>
<td>40%</td>
<td>100%</td>
</tr>
<tr>
<td>Children showing positive interaction with peers</td>
<td>15</td>
<td>50%</td>
<td>15</td>
<td>50%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Observations showed that half the children in the target group had good health. The school and sports attire of observed children were not quite adequate and presentable. The observed children did not quite show positive behaviour although most had positive attitude towards their teachers.

Table 4. Document analysis of children’s attendance and performance  N=30

<table>
<thead>
<tr>
<th>Variable/ Item</th>
<th>Descriptor/Narration</th>
<th>Positive</th>
<th>%</th>
<th>Negative</th>
<th>%</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document analysis</td>
<td>1) Register Regular daily attendance of children</td>
<td>12</td>
<td>40%</td>
<td>18</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Presentable exercise books with good class performance</td>
<td>13</td>
<td>43%</td>
<td>17</td>
<td>57%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>2) Books Evidence of home based education and supervision of homework</td>
<td>12</td>
<td>40%</td>
<td>18</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Good weekly attainment</td>
<td>13</td>
<td>43%</td>
<td>17</td>
<td>57%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Full termly fees payment</td>
<td>11</td>
<td>33%</td>
<td>19</td>
<td>67%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>4) Fees record Children’s health is good</td>
<td>15</td>
<td>50%</td>
<td>15</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>5) Health record</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The documents observed indicated irregular school attendance by most children in the target group. Most of the exercise books indicated low class performance by most of the children. There was little evidence of home based education and supervision of home work. Termly fees payment for most children was not up to date.

INTERVIEW RESPONSES ON THE CHALLENGES FACED BY SINGLE PARENTS.

The interviews carried out with single parents revealed that most of them had problems in paying fees and affording adequate stationery, school and sports attire. Findings revealed that it is just half the children in the target group who had good health. The following excerpts below highlighted parental responses:

Excerpt 1

“I find it difficult to pay term fees for my children. The work that I do does not give me enough money to provide for my children.” Parent 1

Excerpt 2

“My children do not have adequate and presentable school and sports attire. At times they absent themselves from school because they will be shy to go to school without the required attire.” Parent 5

Excerpt 3

“I find it difficult to adequately feed my five children. Some of them are having behaviour problems. It is hard for me to control them when the father is absent.” Parent 3

Excerpt 4

“My children sometimes do not attend school due to lack of school stationery. When they are not in school they end up being involved in unbecoming behaviour. There is nothing I can do as I have to work to get money for food.” Parent 2

Excerpt 5

“I find little time to supervise my children’s homework as I am often busy away selling vegetables for my family income. When I come home I will be too tired to assist my children with their homework. I will just sleep so that I have energy to work the following day” Parent 4

DISCUSSION

The findings in the current research study from the questionnaire responses, observation checklist, document analysis and interview schedules revealed that due to parental stress, low education, unemployment and inexperience in single parenting most single parents faced challenges in providing educational material resources such as school fees, books, school and sports attire and paying for educational events such as trips. The findings revealed that because of low education, most single parents are not gainfully employed resulting in them being unable to provide adequately for their children’s educational needs. In cases where they were employed in most cases they jobs were low paying and physically exhausting. Due to lack of well paying employment as explained by some respondents in the current research study, most single parents in the target area fell into the low income family bracket thus facing financial problems. The family will be depending on the income of a single parent which in most cases is very limited. These findings agreed with those of Tassoni (2002) who notes that because of low income most single parents face problems in
providing for their educational material needs of their children which compromised the learning and development needs of their infant children.

The research study found out that single parents in most instances had no time to supervise their children’s homework. The type of work they did was time consuming and involved a lot of physical activity like vending where they walk from one station to another looking for customers. The returns in such activities were very little. The research results are in agreement with those of Tassoni (2002) who found out that most single parents were either unemployed or involved in work that involved doing menial activities. The activities would be so tiresome that the single parent had no time to assist their children with school work.

The results from the research study indicated that children of single parents had problems with behaviour. 53% of the respondents indicated that the behaviour of children of single parents did not have good behaviour. Most of the time the children will be alone thereby lacking guidance on acceptable behaviour from responsible adult figures. The parents in most instances will be out working in an effort to get some money to provide for the family. This predisposes the children to a situation where they behave in ways that are not acceptable by society. Case (2009) states that sound parent-child relationship contributed positively to children’s learning and development. In situations where the parent is always committed by work means there will be no time to build that sound relationship.

The findings of the research show that the books of children of single parents were mostly unpresentable. The results show that 60% had exercise books that were dirty showing that the children did not get assistance in maintaining them and in doing their school work. 66% of the respondents indicated that the homework of children of single parent showed that it was unmonitored. This was because the children did not get proper guidance on how to maintain their books from home as the single parents did not have enough time to look at their children’s work. The parents come home so exhausted that they did not have time to look at their children’s work. Kail (2002) found similar results in a study conducted in Asia. The single parents did not have adequate time to properly provide and supervise their children due to lack of resources and time.

It is also noted from the findings of the current research that most single parents did not adequately supervise their children’s homework due to busy daily schedules and lack of knowledge in assisting their children’s homework. The single parents in most instances lacked of knowledge in assisting their children in educational concepts such as reading, mathematical concepts and other school work. The other reasons for lack of parental assistance by most single parents in providing home based education to their children could be due to parental stress from parenting pressure. They have to fulfil their usual role as mother and in addition compensate that of the missing parent. The other parenting burdens such as household chores and doing various income earning activities and lack of knowledge to teach their children negatively impacted on their ability to assist their children. The current findings agreed with those of Kail (2002) who attributed parental stress to inhibiting single parents’ monitoring of their children’s learning and development talents. The findings revealed that it is to a great extend that most single parents in Glenview-Mufakose district of Harare cannot afford to provide for their children’s material and psychosocial education needs.

CONCLUSION

The research study came up with the following conclusions:

- Single parents faced challenges in paying the school fees for their children. This was because they were unemployed or if they were employed they were involved in lowly paid jobs.
- Single parents had problems in monitoring their children’s school work. This was as a result of their tiresome work schedule and limitations in their capability to assist their children academically.
- The academic performance of children single parents was below that of children from intact families.
- Children from single parents had behaviour problems. Single parents had problems in monitoring the behaviour of their children due to their busy work schedules.
The exercise books of children of single parents were in most cases in a bad state.

RECOMMENDATIONS

In view of the results of the study the following recommendations are being made:

- Schools should organise support groups for single mothers so that they share information and experiences on how to improve their situation.
- The Government should make legislation and policies that aim at assisting low income single parents maintain their children.
- Schools need to set up guidance and counselling platforms for assisting children from single parents so that they cope with academic work and compete on an equal footing with children from intact families.
- Single parents need to be counselled so that they are in a position to take their responsibilities as single parents with confidence.
- Single parents need to be given training on ways of starting income generating programmes so that they are able to provide for their children.

REFERENCES


Perceptions of Parents on the Use of Corporal Punishment in Schools in Zimbabwe

Mugove Kudenga
Senior Lecturer; Department of Psychology, Zimbabwe Open University

Abstract- This is part of a broad study that sought to find out views of parents in Zimbabwe on the use of corporal punishment in schools. This paper looks at perceptions of parents on the policy that bars the use of corporal punishment in schools. The study used case study as a research design. The study used interview schedules and questionnaires in the collection of data. The research participants consisted of two hundred and fifty parents who were randomly selected when they were attending consultation at selected schools in Goromonzi district. The study found out that teachers were still using corporal punishment in classes as way of enforcing discipline and making sure pupils abide by accepted behaviour. They had ignored the government directive that reserved the use of corporal punishment to the school head or only any other senior teacher delegated by the head. The research also found out that the parents thought corporal punishment was an effective way of disciplining children in schools. Most of the parents were not aware of the government policy that forbade the use of corporal punishment in schools. The study recommends that the government makes an effort to educate citizens on new policies that will have been made so that they are fully implemented. There is need for teachers to be involved in fully implementing government policies. Teachers are also urged to use child friendly methods of making children change unbecoming behaviour to socially accepted behaviours. The study recommends that teachers use methods like guidance and counselling, modelling and positive reinforcement in effecting discipline and behaviour change in pupils.

Index Terms- corporal punishment, perceptions, policy, discipline and behaviour.

I. INTRODUCTION

The use of corporal punishment as a way of correcting misbehaviours has been in existence since time immemorial. To date its use is being frowned at in many circles including the educational circles and the civic society. Many countries including Zimbabwe have passed laws and adopted policies that bar the use of corporal punishment in schools. Despite the adoption of the policies there are some who still believe corporal punishment is a preferred way of disciplining wayward behaviour in children. It is the intention of this research to find out the perceptions of parents in Goromonzi District on the use of corporal punishment in schools.
(2007), the writings of John Locke influenced Polish legislators to call for the ban of corporal punishment in Polish schools in 1783. The Convention on the Rights of the Child which was adopted by the UN in 1989 forbids physical abuse of children by both parents and caregivers. The convention has been ratified by all UN members except USA and Somalia. By the early 21st Century more than 100 countries had abandoned corporal punishment in schools (Corporal punishment, 2011). Corporal punishment has thus been outlawed in many countries of Western Europe, China, Japan New Zealand, Russia, South Africa, Thailand and Zimbabwe. This view was supported by the International Convention on the rights of children (UN Children’s Fund, 1999).

There is a growing worldwide movement to end legal approval of corporal punishment in schools. As a result the following countries have recently banned corporal punishment by legislation or judicial decision. These are New Zealand, South Africa, Namibia, Sri Lanka, Trinidad and Tobago, Fiji and Thailand. (Repeal 43 Committee).In Eastern Caribbean, corporal punishment in schools was socially and legally accepted until UNICEF piloted training for teachers in Barbados in behaviour management techniques which aimed at giving alternative approaches to teachers and eventually proved successful.(UNICEF, 2009).In Mauritania, corporal punishment was broadly practiced in Koranic schools, secular primary schools and within families. However efforts to abolish corporal punishment are being effected after UNICEF in 2009 presented research findings to the president of the Imam’s Network Hademine Onid Saleck. There is now a widespread understanding that corporal punishment is unlawful child abuse and harmful. The eradication of corporal punishment in India is proving difficult. India ratified the UN Convention on the Rights of the Child in 1992 and has many policies that ban corporal punishment in schools but these seem out of kilter with everyday realities. The government of India commissioned research that included more than 3000 children aged from 5-18 asking about physical abuse by teachers. In all age groups 65% reported being beaten at school. (The Guardian May 2015)

In the United States of America many states have banned corporal punishment in public schools, while several others including Texas, allow the practice but give parents the opportunity to opt out. In Texas corporal punishment in public schools is considered lawful unless a parent or legal guardian has refused to give permission with a signed written statement to the school board. (State Laws, 2015). Because the Supreme court of Canada decided in 2004 that school teachers can no longer use section 43 as a defence to corporal punishment of students such punishment is now illegal throughout Canada. (Repeal 43 committee, 2015). In Britain corporal punishment in state schools was banned in 1986 and in all schools in 1998. The 1998 amendment to the UK Education Act expressly allows teachers to use reasonable force to restrain students from committing an offence, causing personal injury or damage to property, or engaging in behaviour prejudicial to good order and discipline. All European countries have banned corporal punishment in schools. In Austria it was banned as long ago as 1870. According to Farrell (2015) British style formal canning for male students only is fully lawful as a punishment in Singapore schools and is strongly supported by the government. Now that school corporal punishment has been completely abolished in the UK and most of its other former outposts, Singapore is probably the country where English school caning traditions are still most faithfully upheld. (Repeal 43 Committee, 2015)

Studies done by Zindi in 1997 found out that corporal punishment is still a popular method of behavioural correction in Zimbabwe in spite of calls to be cautious in its use in schools. Similarly, Peters (1980) argues that of all the forms of punishment in schools, the cane would be effective when used soon after the misbehaviour so that students can associate the punishment and appreciate why the act is forbidden. Spencer and Spencer (2001) maintain that corporal punishment is an integral part of the process through which schools achieve the fundamental objective they were established for, including the developing and moulding of a loyal and productive future citizen of Zimbabwe.

Parents’ perceptions on corporal punishment in schools.

There are differing views on whether corporal punishment should be permissible or not in Zimbabwean schools. Parents seem to be divided on the use of corporal punishment by teachers (Mugabe and Maphosa, 2013). Donoso and Ricas (2009) found that physical punishment still remains in the social imaginary as a permitted and suitable resource for rearing children. According to Makwanya, Moyo and Njenya (2012) some studies have found that parents are of the opinion that students should be taught of their rights to protect themselves from abusive teachers. The parents in this study were found to be against the use of corporal punishment as a way of disciplining their children. It is important to understand the arguments for and against the use of corporal punishment in schools in a bid to lay the ground for the voice of parents concerning their perception on the use of corporal punishment.

Advocates of corporal punishment

Advocates of corporal punishment consider it a necessary and effective way of disciplining students, and to some students it is the only language they understand (Shumba, Ndfirepi and Musengi, 2012). This position is ingrained and has become accepted in black communities. Corporal punishment is seen as a deterrent, a reformative and retributive mechanism with the aim of bringing positive behaviour in schools and society (Chemhuru, 2010). Shumba, et al (2012) point out that some proponents of corporal punishment have a history of being physically abused when they were young and they see no reason why that should stop. Many advocates of corporal punishment argue that it spurred them to work hard and be successful (Hapanyengwi and Chemhuru, 2015). The argument that the advocates presented in support of corporal punishment was that if it worked for them then it should work for their children. Corporal punishment is used at home and at school in Zimbabwe. In black homes, particularly in Zimbabwe, parents view spanking positively and consider it as an appropriate method of moulding positive behaviour (Shumba et al, 2012). Teachers are regarded as parents at the school therefore they act in loco-parentis within the school and use corporal punishment (Matope and Mugodzwa, 2011). Studies have found that corporal punishment is used especially in the remote rural schools (Shumba et al, 2012). The justification for its use is that students are developed and

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moulded into loyal, patriotic and productive citizens of the country (Matope and Mugodzwa, 2011). Matope and Mugodzwa (2011) also present an argument that force must be used when negotiations and peaceful means fail. Advocates of corporal punishment have thwarted voices of children concerning corporal punishment arguing that children are young, do not know what is right for them and are not yet intellectually developed to understand how corporal punishment works for their own benefit (Chemhuru, 2010). The argument is supported by some studies that cite older people as admitting that corporal punishment they got in school helped them become a better person. Hapanyengwi and Chemhuru (2015) posits that countries that campaign for the outlawing of corporal punishment like America have chaos in their own schools because corporal punishment is illegal.

Craigmore College in South Australia uses corporal punishment whenever it is required and all staff and parents are aware of these policies before enrolling in the school (Tucci, 2006). The parents sign a form declaring that they are aware of the school’s disciplinary policies and agree before the child attends school. The corporal punishment is administered by senior staff or the principal. The errant pupil is smacked once or twice on the bottom by a wooden paddle. It is done away from the presence of other pupils. There seems to be similarities with the Zimbabwean scenario except that the implementation used differs with the school. Lansford, Tapanya and Oburu (2011) say that there is little evidence that corporal punishment results in better behaviour with the exception of inducing immediate compliance. However Hapanyengwi and Chemhuru (2015) is of the opinion that some students respond more to corporal punishment than any other form of discipline.

Points against the use of corporal punishment

Humanitarians seek to abolish corporal punishment in Zimbabwe arguing that it is inhuman, abusive and breaches children’s fundamental human rights (Shumba et al., 2012). The impugners of corporal punishment consider it humiliating and say it should never find its way back in Zimbabwean school system and society at large (Hapanyengwi and Chemhuru, 2015). The student may come to believe that the only way that society functions is through the use of force or violence. The teacher in using corporal punishment is modelling to the child that problems can be solved through the use of force. Gudyanga et al. (2014) say that corporal punishment creates enmity between the teacher and student and may in turn result in the student not liking the subject taught by the teacher. This detachment and resentment may affect the emotional development of the student.

IV. METHODOLOGY

This study employed a case study research design. This research method was used as the researcher felt it was the most ideal for the study. Bryman (2004) states that a case study is a type of observational information collection method in which an individual or group of people is studied in depth so as to recognise behavioural, emotional and cognitive virtues that are generally correct. Case study relates to the gathering and presentation of full information about a certain respondent or small group often including the details of participants. Emphasis according to Nkomo (2007) is placed on examination and description of the issue being looked at. A case study looks at the interaction of all variables so as to offer absolute understanding of the situation. Nkomo (2007) puts it that there is an in-depth explanation of the issue under evaluation, the conditions under which it is used, the kind of people included in it and the nature of the area in which it is situated.

The research instruments used in the study were questionnaires. Questionnaires were convenient because it is possible for the research participant to analyse the subject and respond honestly and independently without the interference of the researcher. Tuckman (1972) supports the use of questionnaire saying it solicits information or data from inside a person’s head and makes it possible to measure what a person knows, likes, dislikes and thinks.

The research used probability sampling technique of random sampling where there was a possibility of each person in the population being selected. The sample consisted of two hundred and fifty parents from five randomly selected schools in Goromonzi district who were attending consultation days at their children’s respective schools. The researcher sourced for information on when the randomly selected schools held their consultation days. The researcher then visited the schools on the consultation days to distribute the questionnaires. The data collected was analysed using descriptive statistics and qualitative data analysis techniques.

V. RESULTS

Demographic Data
The pie chart above shows that 12% of the respondents were males and 88% were females. This shows that many females in Goromonzi District stay at home mothers. They were available at home throughout the whole week when the researcher was collecting data.

The presentation above shows that 12% of the respondents are between ages 20-30, 72% are between the ages 31-40, 12% are between the ages 41-50 and 4% are over 50 years.

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage of Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>10</td>
</tr>
<tr>
<td>31-40</td>
<td>70</td>
</tr>
<tr>
<td>41-50</td>
<td>10</td>
</tr>
<tr>
<td>51+</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 1. Respondents according to academic qualifications**

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Grade 7</th>
<th>ZJC</th>
<th>‘O’ Level</th>
<th>‘A’ Level</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Parents</td>
<td>20</td>
<td>70</td>
<td>130</td>
<td>30</td>
<td>0</td>
<td>250</td>
</tr>
<tr>
<td>Percentage</td>
<td>8</td>
<td>28</td>
<td>52</td>
<td>12</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>
The table shows that 8% of the respondents went up to grade 7, 28% attained ZJC, 52% have ‘O’ Level and 12% have ‘A’ Level. The presentation shows that the majority of the parents went up to ‘O’ Level. There are however some who only did primary education. Some went to form 2 and hold the Zimbabwe Junior Certificate. The majority went up to ‘O’ Level and very few had ‘A’ Level.

Table 2: Perceptions of parents on government policy on the use of corporal punishment in schools

<table>
<thead>
<tr>
<th>Option</th>
<th>Yes</th>
<th>No</th>
<th>Don’t</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of parents</td>
<td>30</td>
<td>200</td>
<td>20</td>
<td>250</td>
</tr>
<tr>
<td>Percentage</td>
<td>12</td>
<td>80</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>

From the table above 12% of parents think that corporal punishment is allowed in schools, 80% think it’s banned and 8% do not know whether it is allowed or not. Asked whether they were aware of the use of corporal punishment in school most parents indicated that it had been used on their children.

On the diagram 92% of parents said they used corporal punishment to discipline their children and 8% said they did not use it on their children. Asked how frequently their children had been beaten by teachers the highest number of parents indicated that corporal punishment was administered rarely. The results are shown in table 3 below.

Table 3. Frequency of use of corporal punishment

<table>
<thead>
<tr>
<th>Option</th>
<th>1-3 times a month (a)</th>
<th>1-3 times a week (b)</th>
<th>Almost daily (c)</th>
<th>Rarely (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of parents</td>
<td>80</td>
<td>30</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Percentage</td>
<td>32</td>
<td>12</td>
<td>16</td>
<td>40</td>
</tr>
</tbody>
</table>

From this table 32% of the parents said their children had been beaten 1-3 times in a month, 12% said 1-3 times in a week, 16% said they had been beaten almost daily and 40% said their children had rarely been beaten.
Table 4. Reaction when teachers beat children

<table>
<thead>
<tr>
<th>Reaction when teachers beat children</th>
<th>% of parents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Often</td>
</tr>
<tr>
<td>a) The child must have done something wrong</td>
<td>20</td>
</tr>
<tr>
<td>b) I would go and see the teacher</td>
<td>4</td>
</tr>
<tr>
<td>c) I would report it to the school principal</td>
<td>56</td>
</tr>
<tr>
<td>d) I have to talk to the social worker</td>
<td></td>
</tr>
<tr>
<td>e) There is nothing I can do about it</td>
<td></td>
</tr>
</tbody>
</table>

20% of the parents indicated that it is very often when a child is beaten if he/she has done something wrong. 28% said it is often when they think that a child will have done something wrong and 52% said it is only sometimes when they think the child must have done something wrong. The majority of the parents i.e. 50% indicated that they would never go and see the teacher if their child is beaten at school. 40% of the parents said they would go and see the teacher very often if their child is beaten. 24% said they sometimes go and see the teacher if the child is beaten at school. 84% of the parents said they would never report it to the school principal if a teacher beats their child. 16% said they rarely complained to the principal. 88% of the parents said they would never talk to the social worker if their child was beaten at school and 12% said they rarely talked to the social worker. 56% of the respondents said oftentimes they think there is nothing they can do about it if their child is beaten.

Table 5: Parents’ views on the use of corporal punishment in schools

<table>
<thead>
<tr>
<th>Parents’ views</th>
<th>Advocates of corporal punishment</th>
<th>Impugners of corporal punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of parents</td>
<td>220</td>
<td>30</td>
</tr>
<tr>
<td>Percentage</td>
<td>88</td>
<td>12</td>
</tr>
</tbody>
</table>

The diagram shows that 88% of parents are for the use of corporal punishment in school and 12% are against its use in schools. Those who are for its use gave reasons why it must be used. These reasons included not doing home work, disrupting the class by talking or playing, talking in class and not completing given tasks.

Table 6 Reasons for using corporal punishment in children

N=250

<table>
<thead>
<tr>
<th>Frequency</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Low grades in exams</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>b) Not doing homework</td>
<td>170</td>
<td>68</td>
</tr>
<tr>
<td>c) Giving a wrong answer to a question</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>d) Forgetting books or any of the class material</td>
<td>150</td>
<td>60</td>
</tr>
<tr>
<td>e) Talking behind the teacher’s back</td>
<td>230</td>
<td>92</td>
</tr>
<tr>
<td>f) Disrupting the class by talking or playing</td>
<td>130</td>
<td>52</td>
</tr>
<tr>
<td>g) Attacking another student</td>
<td>160</td>
<td>64</td>
</tr>
<tr>
<td>h) Disobeying teacher’s orders</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>i) Making you take private lessons</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>j) Beating unrelated to the student’s behaviour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20% of the parents indicated that teachers could beat children for getting low grades in exams. 68% of the parents said children could be beaten for not doing homework. 12% of the parents said children could be beaten for giving a wrong answer to a question. 60% of the parents said children could be beaten for forgetting books or any of the class materials. 56% of the respondents thought children could be beaten for talking behind the teacher’s back. 92% of the respondents thought disrupting the class by talking or playing is a reason which may cause teachers to beat children. 52% indicated that pupils could be beaten for attacking another student. 64% of the respondents indicated that pupils could be beaten for disobeying teachers’ orders. 12% of the respondents thought some teachers can beat children to make
them take private lessons and 12% indicated that some children were beaten for reasons unrelated to their behaviour.

Parents expressed their views on the use of corporal punishment when answering question The following excerpts show some of the parents’ views.

Excerpt 1

It should be used in moderation with the intention of helping the child change behaviour to an accepted one.

Excerpt 2

It is a practice that has been used for a long time bearing good results though it is inhuman considering today’s standards.

Excerpt 3

It must be understood that its use shows failure on the part of teachers to use child friendly methods disciplining children.

Excerpt 4

Children should not be given corporal punishment because corporal punishment affects a child’s growth and performance in school.

Responses given were that it is dangerous, it injures pupils, and it hurts children physically and mentally, it affects growth and performance and that it doesn’t change pupils’ behaviour. Most of the interviewed parents were against the use of corporal punishment as it has negative effects on the overall growth of the child. Most of the results of the interview were different from what was got from the questionnaires.

VI. DISCUSSION

During the course of their work as education practice, the researchers encountered many parents in schools who asked them to beat their children so that they may behave well or produce good results. There was also a story in the media about a head teacher who beat a child to death and was being tried at court. This then prompted the researchers to find out the perceptions of parents in Goromonzi Schools on the use of corporal punishment in schools. The results of the study showed that 12% of the parents said it was allowed, 80% of the parents said it was not allowed and 8% did not know whether it was allowed or not. These results show that the majority of the parents know corporal punishment is not allowed and only a small percentage think it is allowed. These findings however may suggest that parents know corporal punishment was being used in schools even though they thought it was banned. This was reflected by the parents’ response to question 1 which asked if their children had been beaten at school to reform their behaviour. 92% of the parents indicated that their children had been beaten. This showed that the parents knew corporal punishment was being used in schools.

When asked how frequently their children had been beaten at school 40% of the parents indicated that children had been beaten on rare occasions and 32% said 1-3 times a month, 16% said almost daily. This shows that corporal punishment was used on children at school. A small percentage indicated their children were beaten almost daily. These results differ from those found by Matope and Mugodzwa (2011) who found that corporal punishment was prevalent and used often in Gweru urban schools. All the parents in this study indicated that they would not report to the school if corporal punishment had been used on their children. This indicates that they were not advocates of the banning of the use of corporal punishment in schools. When asked to give their views on the use of corporal punishment 88% of the parents indicated that they were advocates of corporal punishment and 12% indicated that they were against the use of corporal punishment in schools.

Gomba (2015) did a study to find the perspectives of parents with regards to the use of corporal punishment in schools. His findings showed that parents advocated for the continued use of corporal punishment. The study revealed that parents considered corporal punishment had immediate benefits, future benefits and was also cited in the bible. These results are similar to this study. The research study found that many parents are advocates of corporal punishment. The differences are that in this study was limited to parents in Goromonzi District and Gomba (2011) study was targeted at parents from all over Zimbabwe since he used a private boarding school. Parents from different parts of Zimbabwe attended visitation days at the school.

A study of parents’ perceptions on the use of corporal punishment in pre primary institutions in Kenya done by Kimengi and Mwai (2014) showed that 78% of parents agreed that teachers should use corporal punishment to modify deviant behaviour. These results are similar to the findings of this study in that the majority of the parents which is 88% showed that they were advocates of corporal punishment and 12% showed that they were against the use of corporal punishment. The difference in those studies is that Kimengi and Mwai (2014) looked at pre primary institutions and this study looked at primary school institutions.

The results from the research study showed that most parents felt corporal punishment should be used. However they indicated that it should be used in moderation. Some indicated that the child should be made to understand why corporal punishment was being used. 72% of the parents showed that corporal punishment was an effective method of disciplining children and 28% thought it was ineffective. These results are similar to those found by Kimengi and Mwai (2014). They found that 78% of parents agreed that teachers should use corporal punishment to modify deviant behaviour. 63% of parents agreed that teachers should be allowed to use corporal punishment with discretion.

Wasef (2011) did a study to find out why corporal punishment was still being practised in Egypt despite its legal ban. He found out that some parents wanted their children to be beaten and thus allowed and tolerated teachers who used corporal punishment on children in schools. The parents were also found to be using corporal punishment at home which they find nothing wrong in it being used in the classroom.

VII. CONCLUSIONS

The study made the following conclusions:

- Teachers were still using corporal punishment in classes despite the existence of a policy that bans its use in Zimbabwean schools.
- Parents were still in favour of use corporal punishment in schools despite the existence of
Government policy that forbade its use in schools.

- Most parents knew that corporal punishment was not allowed in schools but still wanted it applied to their children.

**VIII. RECOMMENDATIONS**

The research study makes the following recommendations:

- There is need for the Government to conduct vigorous education campaigns in an effort to publicise their new policies. This will make their citizens have the willpower to implement the policies.

- Teachers are urged to support the Government in implementing modern policies so as to be in line with world-wide trends.

- Teachers should make an effort to use child-friendly methods of instilling discipline among their pupils instead of using methods likely to lead to litigation.

- There is need for teachers to methods like guidance and counselling, modelling and various reinforcement techniques in effecting discipline and behaviour change in their pupils.

**REFERENCES**


AUTHORS

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Business start-up opportunities and funding

Mamadou Bhoye Barry, Salwa Hayikader, Yamam Al Ghourani
Kulliyyah of Information & Communication Technology, International Islamic University Malaysia

Abstract- This project is made as a platform that gives the students and staff the opportunity to start their businesses and make their ideas real. This project will give an opportunity for student and staff to be recognized by donors from industries, government and public.

Index Terms- Business start-up and funding, crowdfunding platform.

I. INTRODUCTION

Students are required to do a good number of projects along with their final year projects for them to graduate and through that they generate many ideas. It is obvious that there are a huge number of students who have the entrepreneurial spirit as well as new creative ideas they are willing to do. Since these young people have that enthusiasm and the determination, it is possible to make them producers instead of consumers through enabling them to work on their ideas and projects. By that, we encourage these positive abilities of students. This paper aims to establish a fund-raising platform for university students along with university staff in Malaysia under the supervision of IIUM. Universities are good place to start with as student’s skills, enthusiasm and knowledge meet with different educational backgrounds and experienced staff. This also can ensure merging study life with practical life. The main objectives of this paper are to utilize student’s projects and ideas and put them in life projects environment in first place. Give staff the opportunities to utilize them researches, observations as they can also contribute with their ideas for them to start their own careers. Also, donors, government, and industries will help the innovative start-up students and university staff as well to make their projects as they can make profits and benefit from them. Volunteered lecturers and practitioners will play a main role in evaluating projects and professional assistance.

II. BACKGROUND

Internet usage is everywhere and entered all industries and everyone's lives, and therefore most services became online through using a web applications. Therefore, applying for jobs, projects or competitions online became the convenient way for almost everyone. It makes rating, analysis and statistical information obtained with less difficulties and less time, it also ease the access and participation. Therefore, crowd fund raising can be effective when it is online based. Where, it gives the opportunity for a great number of donors, industries, government, and variety of students and staff to find the trusted connection with these people. And this will be one solution for supporting innovative people and generating beneficial projects, giving more jobs for university students and fresh graduates and helping industries, government and donors to find the trusted connection with these people. According to Terry Lin Crowdfunding is now a new way to test, validate and get feedback on your new idea. (lin, 2015)

III. PROBLEM STATEMENT

Based on the survey the researchers conducted, the researchers find that there is always a need for new and creative ideas in different fields that many times are wasted whether in universities or life because of the difficulty to start or get a sponsorship. Due to the results the researchers found which are: the great number of students and lecturers, the lack of platforms that publish students’ ideas in a professional way and guide them through implementation which results to failure, and the lack of entrepreneurial encouragement for both students and staff as well as the lack of communication with external or internal sponsors through a trusted channel. And according to Iqbal Abdullah to Vulcan Post that some of the problems regarding entrepreneurship in Malaysia are: difficult access to funding, monopolistic nature of markets, lack of knowledge on entrepreneurship and lesser respect to intellectual property as a whole, compared to established markets (Jhon, 2015).

IV. LITERATURE REVIEW

1. Market Leaders

1.1 Stockholm Innovation Scholarship

The Stockholm Innovation Award, the City wants to reward and encourage creative people to move forward with development. The innovation can be a physical product, a service or a combination of these. The innovation is assessed for its innovativeness and uniqueness as well as its commercial and economic importance. Contributor has to register on this website and upload your entry.
six winning innovations will share 630 000 SEK. The main aim is to encourage people who work without support from businesses or institutions to develop their innovations.

1.2 SME Corp. Malaysia

SME Corporation Malaysia (SME Corp. Malaysia) is a Central Coordinating Agency under the Ministry of International Trade and Industry Malaysia that formulates overall policies and strategies for Small and Medium Enterprises (SMEs) and coordinates the implementation of SME development programmes across all related Ministries and Agencies. It acts as the central point of reference for research and data dissemination on SMEs, as well as, provides advisory services for SMEs in Malaysia. SME Corp. Malaysia also assumes the role of the Secretariat to the National SME Development Council (NSDC), which is chaired by the Prime Minister of Malaysia.

![Figure 1: Interface of Stockholm](image)

![Figure 2: Interface of SME Corp Malaysia](image)
1.3 crowdfunder

Crowdfunder is the equity crowdfunding leader for sourcing and funding high-growth ventures with a network of over 130,000 entrepreneurs and investors.

Crowdfunder and its VC Index Fund provide the opportunity for direct online investment into single ventures, as well as diversification into a broad VC-led portfolio (Index Fund) of early-stage start-ups – backed by many of the world’s leading Venture Capital firms and private investors.

- $160,000,000 investment commitments on the platform
- 12,000 individual & institutional investors
- 36,000 companies
- Funded 100+ deals at an average deal size of $1.8M

![crowdfunder interface](image)

**Figure 3: interface of crowdfunder**

In sum up, Stockholm is widely recognized as one of the most innovative regions in the world. The core investment opportunities are founded on innovation and tech, and the experts will provide information and assistance in making investments within each sector. In fact, Stockholm has the most unicorns per capita in the world after Silicon Valley. International investors increasingly scout the city for the next rising star as many new companies thrive in the creative soil of talent and entrepreneurship.
According to business model canvas of crowdfunding (Figure 4), business and entrepreneurship is the biggest partner. For the customer segment, the two main target customers are project creators who want to start up their business and the second customer is project supporters such as large companies. Crowdfunder generates revenue from two main resources that are project commissions and 4-7.5% for successfully funded projects. Moreover, crowdfunder emphasizes on easy doing business anywhere by connecting to the internet. (Serge Van Oudenhove, 2012)

V. SUMMARY OF MARKET LEADER

1.1 Business Model Canvas framework

<table>
<thead>
<tr>
<th>9 blocks</th>
<th>Stockholm Innovation Scholarship</th>
<th>SME Corp. Malaysia</th>
<th>crowdfunder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1. Key Partners | - Experts  
- Investment  
- Students | - partnership  
- Students  
- private limited company  
- Sole Proprietorship  
- Source of fund | - Payment provider  
- business and entrepreneurship communities.  
- Large organizations and foundations. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Key Activities</td>
<td>reward and encourage people with bright ideas to take the next step towards developing these ideas.</td>
<td>SME-University Internship Programme</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- SME-University Internship Programme</td>
</tr>
</tbody>
</table>
| Education of the market  
- Marketing  
- platform  
- partnership development |
| 3. Key Resources | Creative industries | International organization |
| | | - International organization |
| - Crowdfunding platform  
- Marketing and education team  
- Online social network |
| 4. Value Propositions | encourage people with bright ideas to take the next step towards developing these ideas. | Generate new business |
| | | Build internal expertise |
| | | Raise money online with minimal effort compared to the traditional process. |
| 5. Customer Relationship | - Online customer service  
- Social media | - Interactive service  
- Social media |
| | | - Project setup support  
- social media support |
| 6. Channels | - Website (Stockholm Innovation Scholarship) | Website (SME corp. Malaysia) |
| | | - Website (crowdfunder)  
- social media  
- partner program |
7. Customer Segments

- Those who prefer to get fundraising online

- Those who want to participate programmes online

Project creator:
- Creative people
- Social enterprise
- Start-ups small business

Project supporters
- Large companies
- Philanthropic organization

8. Cost Structure

- Media advertising
- Sponsoring

- Salaries to employees
- Technological infrastructure

- Platform development and maintenance
- Marketing and customer education costs
- Staff salary

9. Revenue Stream

- Advertisements
- Conducted programs

- Project commission
- 4-7.5% for successfully funded projects

1. Environment Map

1.1 Key trend

In its infancy, crowdfunding allowed individuals to raise small amounts of money for personal projects. However, in the last few years we have seen large corporate companies leveraging crowdfunding as a research and validation method. In doing so, major world companies are not only conducting market research on their services and products, but also gaining public support and pre-orders before they go mainstream. As Duncan McCann, researcher at the New Economics Foundation, comments, “It is about understanding the market very quickly, which is a real benefit. It also brings a guarantee of a certain number of purchases and it generates loyalty.”

1.2 Market forces

Platform fees are the main way that crowdfunding sites make money. There are two types of types of fundraisers: All or nothing campaigns: You must hit the goal you set to keep the funds that you have raised. Typically, the platform takes a 5% of funds raised if you are successful.

1.3 Macro-economic forces

Crowdfunder has been globally used for a long time, as SME.corp Malaysia and Stockholm Innovation Scholarship have become worldwide-preferred crowd funder website. Many people believe that entrepreneurship is one of the alternatives to increase people's life.

1.4 Industry forces

Nowadays, crowdfund has become popular as people prefer to buy things including their idea via online. Other than that, pressure from existing system SME.corp Malaysia and Stockholm Innovation Scholarship make researchers come out with Business
start-up opportunities and funding website that focus more on students and alumni to help them to start their own business and provide the sponsorship to support them.

2. Four lenses of innovation
   2.1 Challenging Orthodoxies: Analyse the business model canvas of current global crowd funder such as kick-starters, Innovation scholarship and crowdfunded.
   2.2 Harasing Discontinuities: There will be analysis of mega trend to determine which direction the trend is taking so that changes can be made accordingly to avoid the discontinuities and to finally come up with a big biz plan to change the game.
   2.3 Leveraging Competencies & Strategic Assets: Becoming more innovative and having the technical skills in any ways possible to challenge the existing platforms. This will become possible by using various approaches to have a big business plan.
   2.4 Understanding Unarticulated Needs: Via validation of vpc and a close relationship with the customer will help determine what they need to enable us to develop a new business plan which will fit to relieve their pains. Various methods can be used to find out their pains such as survey, interview or observation. This will help to set a business plan that fits to relieve their pain and become beneficial in any way possible to them (Osterwalder and Pigneur, 2010).

VI. CONCEPTUAL SOLUTION

BUSINESS MODEL CANVAS- INITIAL

<table>
<thead>
<tr>
<th>KEY PARTNER</th>
<th>Key ACTIVITIES</th>
<th>Value proposition</th>
<th>Customer relationship</th>
<th>Customer segments</th>
</tr>
</thead>
</table>
| • IIUM’s students (alumni/final year student)  
• IIUM (alumni/students affairs) | • Business proposition either from students or staffs.  
• Project proposal  
• Project refinement  
• Project development  
• Project finalization  
• Business set-up  
• Marketing | Students:  
• Opportunity to start a business  
• Opportunity to get a job | • Social media  
• Conferences and meetings | • Muslim  
• Students without job  
• Students who want to start-up  
• Students with fyp likely to be a business profit | • Alumni  
• IIUM’s staffs who are interested in entrepreneurship  
• IIUM’s staffs with great idea |
| Key resources | Technology platform  
• Innovative and creative Students  
• Skilled students | Alumni:  
• Good reputation  
• Generate new income revenue | | |

Cost structure
• Money to fund the projects  
• Technological infrastructure  
• Business implantation

Revenue stream
• Partnership  
• Start-up (liabilities)

*Figure 6: Business Model Canvas for Business Start-up*

VII. VALIDATION OF BMC/VPC

Data analysis and discussion:

Set of questionnaires survey was distributed among variety of students, graduates, staff and others in International Islamic University Malaysia (IIUM) and others. The researchers have chosen this population because it simulates the contribution required for this study.

The researchers used Google form survey methodology and the scope of this survey is the percentage of…. Moreover, the researchers research for if users are interested in starting up new businesses so they considered those students that participated in this survey.
From the questionnaire that was conducted, it showed a high percentage of 74% of people who are interested in having their own businesses and starting up. And 18.5% are not sure if they would like to start a business. While 7.4% are not interested in starting a new business.

Figure 7: percentage of people interested to Start-up businesses

The survey also shows that 40% of the participants agreed that finding a job after graduation is a difficult task and the same percentage find there is no enough opportunities that help students to start-up and 15.5% strongly agrees on that. While 3.7% disagree and it not difficult to find a job. And 51% find that final year projects worth a business profit.

Figure 8: percentage of people finds it difficult to find a job

The survey also shows that 40% of the participants find it natural that students projects are wasted while they can be used and implemented. 25.9% agrees and 11% disagree.

Figure 9: University final year projects worth business profit
From the participants 40% find there are no opportunity for students to start-up a business. And 14% strongly agrees on this statement. While 37% find it true or acceptable and only 3.7% disagree.
VIII. ENHANCEMENT

1. Business Model Canvas (BMC)

<table>
<thead>
<tr>
<th>KEY PARTNER</th>
<th>KEY ACTIVITIES</th>
<th>Value proposition</th>
<th>Customer relationship</th>
<th>Customer segments</th>
</tr>
</thead>
</table>
| • IIUM's students (alumni/final year student)  
• Malaysian Universities  
• IT companies | • Business proposition either from students or staffs.  
• Project proposal  
• Sanders of Business case  
• Business project monitoring  
• Fund monitoring  
• Project refinement  
• Project | • Trusted and competent platform  
Students:  
• Opportunity to start a business  
• Opportunity to get a job | • Social media  
• Conferences and meetings | • Students  
• Students without job  
• Students who want to start-up  
• Students with fyp likely to be a business profit |
| | | Malaysian Universities:  
• Mentoring  
• Good reputation  
Funders:  
• Partnership  
• Collaboration  
• Professional | | • Universities  
• Universities' staffs |
| | | Channels  
Conferences  
Portal  
Mobile app  
Network of Mosque. | | • Funders  
• Government  
• Industry  
• Donors |
| | | Key resources  
• Technology platform  
• Innovative and creative Students  
• Skilled students  
• Volunteers (lecturers/practitioners) | | |

Figure 12: Business Model Canvas for My Business Start-up

A. Customer Segment

The students who are interested in entrepreneurship and who are currently taking their final year project which worth a business profit. The Malaysian’s universities staffs who are also interested in entrepreneurship.

B. Value proposition

We provide trusted and competent platform for our customer segments. Students will have the opportunity to start a business, as well as to get job. The universities staffs will be having the opportunity to mentor and collaborate with students. Funders can either choose to donate or to collaborate with students and universities staffs to carry out some good business ideas which worth a business profit.

C. Channels

A portal will be made to provide a means or medium of communication between the key partners. Students and staffs can sell their ideas on the portal, whereby the funders can check some project ideas and get to choose the ones they want to sponsor. The masjid will be used as recruiting ground and for meeting purposes.

D. Customer relationship

Conferences and meetings will be held. Also, the masjid will be used as IIUM students are all Muslims, so, they will be frequently visiting masjid (Dalan, 2016). Other means such as emails, social media platforms and cell phone will be used for divulging information and other things that the customers would be interested in.

E. Key resources

The key resources are technology platform, innovative and creative students and volunteers such as lecturers and practitioners. The volunteers will help with monitoring and evaluating the projects.

F. Key activities

The main activities are business proposal, project development and business set-up.

G. Key partners

Students, universities staffs and funders are our key partners.

H. Cost structure

Technological infrastructures, facilities and money are needed to fund and carry out the projects.

I. Revenue Stream

- Donation from private investors or government agencies
- Commission fees from project which have successfully carried out
- 1% will be deducted from the fund raised successfully
2. Value Proposition Canvas (VPC)

The value proposition is one of the strategic management and execution tools to understand the customer’s needs and design the products and services per customer’s satisfactions.

![Value Proposition Canvas](image)

**Figure 12: Value proposition Design Diagram for Business start-up opportunities and funding - student**

**Figure 13: Value proposition Design Diagram for Business start-up opportunities and funding - university**
IX. CONCLUSION

This a crowdfunding platform for students and universities staffs to sell their business ideas and get fund from companies, private donors and as well as government agencies in Malaysia. Through this platform, the students will not only sell their ideas and get fund, but they will also get supervision and mentoring from volunteers such as lecturers and practitioners. This platform provides a secure method which guarantees the donors that their money will be used for the intended purpose. To conclude, we will be developing a business plan which will be suitable for this platform. In the future, we intended to make it worldwide depending on the success of it in Malaysia.
REFERENCES


AUTHORS

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Second Author – Salwa Hayikader, Kulliyyah of Information & Communication Technology, International Islamic University Malaysia

Third Author – Yamam Al Ghourani, Kulliyyah of Information & Communication Technology, International Islamic University Malaysia
Complications of Pregnancy and Outcome Among Teenage Pregnancy in Al-Najaf City

Rehab Lafta Mohammed.
M.Sc. Maternal Nursing Health and Newborn

Dr. Kafi Mohammed Nasir.
PhD. Community Health Nursing

Abstract:
Objective: this study aimed to complications of pregnancy among teenage pregnancies at Al-Najaf city. Find out the relationship between Sociodemographic data and complications of pregnancy.
Methodology: Retrospective design, cross-Section study was adopted in the current study to achieve the early stated objectives. The study started from November 1st, 2015 until February 2nd, 2017. A non-probability (purposive sample) of 200 teenage pregnant mothers, who admitted to normal labor room for delivery.
Results: the results found most teenage pregnant mothers were non educated, lived in urban with extended family, moderate socioeconomic status and without any past medical diseases and most of them were planned pregnancy; Most teenage pregnant mothers neglected the antenatal care and complicated with preeclampsia; the mode of delivery in most teenage pregnancies were vaginal deliveries without complications during delivery of term baby with low Apgar score and a significant association between Sociodemographic statistics and complications of pregnancy.
Conclusion: The study determined that the majority of the teenage pregnant mothers were illiterate, housewives, moderate economic status, secondary smoking, negative past medical diseases, neglected the antenatal care. Risk of preeclampsia and low Apgar score were higher among teenage pregnant mothers. Complications of pregnancy had strong relationship between Sociodemographic data; age, educational level, occupation, residency, type of family and smoking.
Recommendation: The study recommends that on pregnant teenager to have appropriate antenatal care as well as social support to avoid medical problems during pregnancy. Educational programs should be emphasized to pregnant teenage mothers for increasing their knowledge about pregnancy.

Key wards: Complications of Pregnancy, Outcome, Teenage Pregnancies

INTRODUCTION
Teenage pregnancy is a social problem distributed worldwide, has many significant implications on mother and her baby, specifically, in developing countries. The risk of adolescent pregnancy and outcome remains a public health problems in both developed and undeveloped countries, which leads to maternal and neonatal morbidity and mortality.

According to WHO definition, Teenage is ranged from puppetry age to adulthood conceiving in this period is known as teenage conception. Conception is a different period for women because many physical and psychological change occur to give a new role. These changes increase and may lead to serious complications if expectant mother under 19 years old because of teenage women's incomplete developmental task. Teenager is not well physically, psychologically and economically suitable to be pregnant with high risk for both teenage mother and child), for that reason the teenage pregnancies are considered at high risk pregnancy.

According WHO,2008, teenage mothers are more likely to live in poverty and poor health and less educated than others women, because adolescent mother who have a baby less likely to finish school and unable to care both self and her baby. A higher poor nutritional rate among teenage mothers than older mothers and in adequate taking of recommended daily prenatal multivitamins to maintain adequate...
nutritional status during gestation\(^5\). According to (WHO, 2008), if the period between each birth decreased in teenage mother under 16 years old, the risk of mortality increased compared with other women of age 20 and over. A higher poor nutritional rate among teenage mothers than older mothers and in adequate taking of recommended daily prenatal multivitamins to maintain adequate nutritional status during gestation. Health problems likely may occur with teenage pregnancies due to smoke cigarette, drink alcohol or take drugs during pregnancy\(^5\).

The physiological risk decreased when Teenage mother over 15 years old who takes prenatal care in early time of pregnancy than women over 20 years old. Many teenage women fail to visit early prenatal care and fail to complete her education and more likely to have big families. The smoking, drug abuse and low weight gain are found more likely in Teenage pregnant women than older. Thus risks for pregnant Teenager women increase such as: Low birth weight, Premature birth, Pregnancy induced hypertension, Iron deficiency anemia, pregnancy induced diabetes mellitus\(^3\).

Depression among teenage mothers is higher than adult mothers because teenage experience is lower than adult mother. Considerably the teenage mothers have higher depression levels before pregnancy and after child birth than the adult mothers\(^6\). Literacy among teenage pregnant mother's community become high rate because young mother is unable to complete study and rearing her baby. Loss the governmental income leads the government to design sufficient illegible threatening cost. Social legal requirement for a teenage mother has to have good work and respect from friends and family. Whole social status of teenage mother becomes destructive owing to initial pregnancy and occupy lifetime with impassive suffering and facing negative pregnancy feedback from the society\(^7\).

According to the urban child institute, it is found the women under 19 years old are deprived emotionally supportive, responsibility, poor knowledge and awareness about child bearing and rearing than women over 19 years old\(^8\). Teenage mothers are born children experience social, emotional, abuse and other problems as inadequate nutrient, in sufficient health care, psychological distress and low social stimulation. The outcomes are risk to decrease their education. Teenage mothers who born girls have more than 22 percent likely to become teenage mothers themselves\(^9\).

In developed countries verses developing countries diverse factors for teenage pregnancies comprise to society beliefs, sexual behavior, alcohol and drugs intake, teenager abuse, violence, family trouble, low self-esteem, illiteracy and low education level. In developing countries, adolescent girls have poor knowledge regarding reproductive sexual health, deficit of using tools to prevent pregnancies, engagement with peer pressure in sexual activity, improper use of contraception and sexual abuse which leads to poverty\(^10\).

**METHODOLOGY:**

**Research Design**

Retrospective design, cross-Section study was adopted in the current study to achieve the early stated objectives. The study started from November 1st 2015,1 until February,2nd, 2017.

**Ethical Consideration:**

This is essential principle before gathering the data, to protect mother's values and self-respect. The researcher achieved this approval from the Ethical Committee at the Faculty of Nursing/ Kufa University (appendix B). The researcher promised to keep the mother's information confidential and use these data for this study only then explained the purposes of this study. In addition to above, the researcher told each participant that is a voluntary work and they can leave the interview process at any time.

**Study Setting**

The setting of the study includes (1) hospital/ Alzahraa Teaching Hospital of AL-Najaf City.

**Study sample:**

A non-probability (purposive sample) of 200 teenage pregnant mothers, who admitted to normal labour room for delivery. Purposive sample was used in order to obtain the representative sample according to the following criteria:

- Mothers admitted normal labour room for delivery and lived in al-Najaf city.
- All samples were Iraqi Nationality.
The Study Instrument

An assessment tool was adopted and developed by the researcher to assess the complications of pregnancy and outcome among teenage pregnancies in AL-Najaf city. The last study instrument consisted from parts as the following (appendix D): (5) parts as the following (appendix D).

Part 1: Socio-demographic Data: This part consists of 10 items including the age of teenage mother, Educational level, Occupation, Residence, Economic status, Type of family, no. of family, size of house, no. of rooms, smoking.

Part 2: Medical History: This part includes 9 items, that asked the mother about medical disease and conditions that having or not.

Part 3: Reproductive History: This part consists of 3 section the menstrual history, family planning history, infertility treatment. Part 4: Current Pregnancy: This part deals with present pregnancy and many questions asked the teenage mother about this conception include: GA, conception, pregnancy plane, prenatal care, folic acid, vitamins during pregnancy. Part 5: complications of current pregnancy: This part deals with complications of pregnancy. Part 6: Delivery and Outcome: This part deals with complications of pregnancy.

Objective of the study:

This study aimed to identify risk factors of Infertility among young women, To identify demographic and reproductive variables related to women’s infertility and To find out relationship between demographic and reproductive data with infertility.

RESULTS:

Table (1): statistical distribution of the teenagers studied sample according to their socio-demographic data.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>&lt; 16</td>
<td>72</td>
<td>36.0</td>
</tr>
<tr>
<td></td>
<td>&gt;= 16</td>
<td>128</td>
<td>64.0</td>
</tr>
<tr>
<td>Education level</td>
<td>Illiterate</td>
<td>66</td>
<td>33.0</td>
</tr>
<tr>
<td></td>
<td>Read and write</td>
<td>38</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>Primary school</td>
<td>46</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td>Secondary school</td>
<td>50</td>
<td>25.0</td>
</tr>
<tr>
<td>Occupation</td>
<td>Housewife</td>
<td>174</td>
<td>87.0</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>24</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>Employment</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Economic status</td>
<td>Sufficient</td>
<td>40</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Sufficient to some extent</td>
<td>108</td>
<td>54.0</td>
</tr>
<tr>
<td></td>
<td>Insufficient</td>
<td>52</td>
<td>26.0</td>
</tr>
<tr>
<td>Residence</td>
<td>Urban</td>
<td>140</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>60</td>
<td>30.0</td>
</tr>
<tr>
<td>Type of family</td>
<td>Nuclear family</td>
<td>50</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>Extended family</td>
<td>150</td>
<td>75.0</td>
</tr>
<tr>
<td>Smoking</td>
<td>Non smoker</td>
<td>28</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Smoker</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Secondary smoker</td>
<td>168</td>
<td>84.0</td>
</tr>
<tr>
<td>Crowing index</td>
<td>1</td>
<td>130</td>
<td>65.0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>64</td>
<td>32.0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Table (4.1) shows the socio-demographic data that are related to teenage mother. The majority of study sample are (64.0) within age >= 16 years old. Concerning the educational level, the study indicates that the majority of teenage pregnant mothers (33.0) are illiterate. Regarding to occupational status of teenage mothers, (87.0) are housewives. The socioeconomic status of this study sample is 54.0 moderate socioeconomic status. Most study subject (70.0) lived in urban. Regarding to family type, (75.0) are extended family. In regard to smoking, (84.0) are secondary smoking. The Crowding index in this table is the index 1 calculated 65.0 , the index 2 calculated 32.0 , the index 3 calculated 3.0.

Table (4.2): statistical distribution of the teenager's studied sample according to their past Medical history data.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past medical conditions</td>
<td>No medical history</td>
<td>88</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>anemia, Urinary Tract Infection and Respiratory Disease</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Urinary Tract Infection</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>anemia, hypertension, Urinary Tract Infection, Respiratory Disease and diabetes</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Urinary Tract Infection and Respiratory Disease</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Urinary Tract Infection</td>
<td>16</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>anemia, Urinary Tract Infection, and diabetes</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Heart Disease, Urinary Tract Infection and Respiratory Disease</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Heart Disease+ Urinary Tract Infection+ Respiratory Disease</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Anemia +Arthritis</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Urinary Tract Infection +Respiratory Disease</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Anemia +Respiratory Disease +Urinary Tract Infection</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Arthritis +Urinary Tract Infection +Respiratory Disease +</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Arthritis</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Anemia+ Arthritis+ Respiratory Disease +Urinary Tract Infection</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Anemia +Heart Disease+ Urinary Tract Infection</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Heart Disease +Urinary Tract Infection</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Heart Disease +Urinary Tract Infection +Depression</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Respiratory Disease +Thyroid Disease +Depression</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Heart Disease +Respiratory Disease</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Diabetes</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Arthritis+ Respiratory Disease.</td>
<td>2</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Table (4-2) shows most of the study subject (44.0) without medical disease.

Table (4-3): statistical distribution of the teenager’s studied sample according to their Reproductive history.

<table>
<thead>
<tr>
<th>Items</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menstrual cycle</td>
<td>Menstrual age</td>
<td>70</td>
<td>35.0</td>
</tr>
<tr>
<td></td>
<td>&lt;= 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 and more</td>
<td>130</td>
<td>65.0</td>
</tr>
<tr>
<td>Menstrual period</td>
<td>Regular</td>
<td>58</td>
<td>29.0</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>152</td>
<td>71.0</td>
</tr>
<tr>
<td>Family planning history</td>
<td>Using control device</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>26</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>174</td>
<td>87.0</td>
</tr>
<tr>
<td>Infertility treatment</td>
<td>If yes, type of control device</td>
<td>174</td>
<td>87.0</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pills</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Male condom</td>
<td>12</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>With drawl</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>36.0</td>
</tr>
</tbody>
</table>

Table (4-3) shows the reproductive history of teenage mother. Regarding to menarche, (65.0) Teenage mothers have menarche at age 13 or more. Concerning the regularity of menstruation (71.0) are Irregular. The majority of teen mother (87.0) do not use birth control. In regarding to the infertility treatment, 67.0 with no infertility treatment.

Table (4-4): statistical distribution of the teenager’s studied sample according to their current pregnancy.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational Age</td>
<td>&lt;= 35</td>
<td>54</td>
<td>27.0</td>
</tr>
<tr>
<td></td>
<td>36 and more</td>
<td>146</td>
<td>73.0</td>
</tr>
<tr>
<td>Conception</td>
<td>Single</td>
<td>168</td>
<td>84.0</td>
</tr>
<tr>
<td></td>
<td>Twins</td>
<td>32</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Multiple</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>antenatal visit</td>
<td>Never</td>
<td>72</td>
<td>36.0</td>
</tr>
<tr>
<td></td>
<td>Less than 3 visit</td>
<td>80</td>
<td>40.0</td>
</tr>
<tr>
<td></td>
<td>3-5 visit</td>
<td>24</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>more than 5 visit</td>
<td>24</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>92</td>
<td>46.0</td>
</tr>
<tr>
<td>folic acid during 4 month</td>
<td>Yes</td>
<td>114</td>
<td>57.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>86</td>
<td>43.0</td>
</tr>
<tr>
<td>take vitamins and iron</td>
<td>Yes</td>
<td>108</td>
<td>54.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>92</td>
<td>46.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>200</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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Table (4-4) shows the current pregnancy of teenage mothers. Regarding to gestational age, (73.0) are within gestational age 36 week and more. Most of teenage mothers (84.0) within the conception single. Concerning antenatal care visit, (40.0) are less than 1-3 visit. Regarding to the folic acid, (57.0) are taking folic acid during 4 months gestation. In regard to take vitamin and iron during current pregnancy (54.0) take vitamins and iron during pregnancy.

**Table (4-5): statistical distribution of the teenager's studied sample according to their complications of current pregnancy.**

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating and intervals</th>
<th>Freq.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications of current pregnancy</td>
<td>Antepartum hemorrhage + Urinary Tract Infection</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Urinary Tract Infection + Gestational Diabetes</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Anemia, Threatened Abortion + Hyperemesis gravidarum</td>
<td>32</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Preeclampsia</td>
<td>42</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes + Preeclampsia Anemia</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Preeclampsia + Anemia + Threatened Abortion</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Pregnancy Induced Hypertension + Threatened Abortion + Hyperemesis gravidarum</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes + Anemia + Polyhydramnios</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Threatened Abortion + Hyperemesis gravidarum + Urinary Tract Infection</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes + Anemia</td>
<td>28</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Threatened Abortion + Hyperemesis gravidarum + Polyhydramnios + Antepartum hemorrhage + Urinary Tract Infection</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Pregnancy Induced Hypertension + Threatened Abortion + Urinary Tract Infection + Antepartum hemorrhage</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Pregnancy Induced Hypertension + Threatened Abortion + Urinary Tract Infection + Antepartum hemorrhage</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Preeclampsia + Anemia + Threatened Abortion + Oligohydramnios + Antepartum hemorrhage</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes + Anemia + Polyhydramnios</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Threatened Abortion + Hyperemesis gravidarum + Urinary Tract Infection</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Preeclampsia + Anemia + Urinary Tract Infection + Threatened Abortion</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes + Urinary Tract Infection + Antepartum hemorrhage</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Oligohydramnios</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Threatened Abortion + Hyperemesis gravidarum + Oligohydramnios</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Anemia + Threatened Abortion + HEG + Antepartum hemorrhage</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes + Polyhydramnios + Urinary Tract Infection</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Pregnancy Induced Hypertension Threatening abortion + Hyperemesis gravidarum</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Threatened Abortion + Oligohydramnios</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Preeclampsia + Anemia + Antepartum hemorrhage + UTI</td>
<td>2</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Table (4-5) shows that the complications of current pregnancy. In this study the majority of teenage pregnant mothers (21.0) are complicated with preeclampsia during their current pregnancy.

Table (4-6): statistical distribution of the teenager’s studied sample according to their Delivery and outcome of current pregnancy.

<table>
<thead>
<tr>
<th>Items</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of delivery</td>
<td>Normal delivery</td>
<td>144</td>
<td>72.0</td>
</tr>
<tr>
<td></td>
<td>Vaginal delivery with epidural anesthesia</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Instrumental</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Cesarean</td>
<td>46</td>
<td>23.0</td>
</tr>
<tr>
<td>Complications of delivery</td>
<td>None</td>
<td>160</td>
<td>80.0</td>
</tr>
<tr>
<td></td>
<td>Failure to progress</td>
<td>32</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Umbilical cord issues</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td>State of birth</td>
<td>Live &amp; term baby</td>
<td>158</td>
<td>79.0</td>
</tr>
<tr>
<td></td>
<td>Still birth</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Preterm birth</td>
<td>38</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>Congenital anomalies</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Fetal death</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td>Birth Weight</td>
<td>Normal</td>
<td>120</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>66</td>
<td>33.0</td>
</tr>
<tr>
<td></td>
<td>Very low</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Extremely</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td>Apgar score</td>
<td>More than 7</td>
<td>86</td>
<td>43.0</td>
</tr>
<tr>
<td></td>
<td>Less than 7</td>
<td>114</td>
<td>57.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>200</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4-6) shows that the delivery and outcome of teenage pregnancies. Regarding the mode of delivery, (72.0) are normal vaginal delivery. Concerning the complications during delivery, (80.0) are delivers without any complication during delivery. In this study, most of births (79.0) are a live and term baby. Regarding to the birth weight, (60.0) are normal birth weight. In regard to the Apgar score, most neonate (57.0) with Apgar Score less than 7.

Table (4-7): relationship between complications and their demographic data.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Chi-square (X2)</th>
<th>df</th>
<th>P-value (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>58.471</td>
<td>25</td>
<td>0.000001(HS)</td>
</tr>
<tr>
<td>Education level</td>
<td>108.953</td>
<td>75</td>
<td>0.006(HS)</td>
</tr>
<tr>
<td>Occupation</td>
<td>82.113</td>
<td>50</td>
<td>0.003(HS)</td>
</tr>
<tr>
<td>Economic status</td>
<td>105.198</td>
<td>50</td>
<td>0.00001(HS)</td>
</tr>
<tr>
<td>Residence</td>
<td>52.976</td>
<td>25</td>
<td>0.001(HS)</td>
</tr>
<tr>
<td>Type of family</td>
<td>39.041</td>
<td>25</td>
<td>0.036(S)</td>
</tr>
<tr>
<td>Smoking</td>
<td>86.735</td>
<td>50</td>
<td>0.001(HS)</td>
</tr>
<tr>
<td>Crowded index</td>
<td>119.989</td>
<td>50</td>
<td>0.000001(HS)</td>
</tr>
</tbody>
</table>
Table (4-6) shows the high significant relationship between socio-demographic characteristics; Age, Educational level, Occupation, Economic status, Residence, smoking, Crowded index with complications of pregnancy. Also there is significant relationship between extended family and complications of pregnancy. P value < 0.05.

DISCUSSION:

Throughout the course of the present study (table 4-1) refers to statistical distribution of the observed frequencies, percentage for some related demographic variable characteristics for the study sample. According to the mother's age/years, the majority of study samples are within age >= 16. This result is supported with (11) who reported that young pregnant mother under age 18 years old is a dominant age for complications of pregnancy and adverse outcome.

Concerning the mother's education, the present study indicates that the highest percentage of the study is illiterate. This result is in agreement with (12) who mentioned that most adolescent mother dropout school and also agree with another study mad by (13) who mentioned that most adolescent mothers are illiterate.

In regard to mother's occupation, the highest percentage is housewives. This result is supported by (14) who reported that most adolescent pregnant mothers were housewives.

Regarding the socioeconomic status, the majority of study sample are from the moderate socioeconomic status. This result disagrees with study that made by (15) most teenage mothers are living in poverty because less knowledge in their life and no occupation or work.

Relative to the residency, the present study shows that the majority of study are living in urban residential area. This result disagrees with (16) that state teenage birth rate is greater in rural regions than major urban centers.

Concerning to smoking, The present study found that most of teenage mothers with in secondary smoking. This result disagrees with (17) who mentioned that cigarette smoking is the most common among teenage pregnancy. Also this result disagrees with another study made by (18), that stated smoking rate is much higher among adolescent pregnancies.

According to the table (4-2), the result of present study show that the majority of teenage pregnant mothers are with negative past medical diseases, except few number have RUTI, Hypertension.

According to the 4-3 The study results deal with reproductive history; menarche, regularity of menstruation, infertility treatment, family planning. In present study, the majority of teenage women with menarche age 13 years and more but high percentage of study has irregular cycle. This result is supported by (19) in their study they mentioned that "irregular menstruation are highly rate among adolescent girls".

In addition, this table shows the highest percentage of teenager are has no any treatment for infertility and more likely to get pregnant and not using contraceptive device. This result agrees with (20), who mentioned most teenagers are not using medical contraceptive services and become pregnant in first 6 months after married.

In current pregnancy the table (4-4), it shows higher frequencies among prime gravida teenage mother that give birth with gestational age 36 or more that disagree with (21) who stated in their study that "more deliveries of teenage mother are before or during 32 weeks".

The present study shows that majority of teenage prime gravida mothers have antenatal care less than 3 visits, this study supported by (22) in their study they mentioned that "pregnant mother from 13-19 years old are less likely to seek regular prenatal care".

In addition most teenage prime gravida mothers take folic acid during the first four month of pregnancy and take vitamins that disagrees with (23) who mentioned that teenage pregnancy initiates prenatal care late and not take folic acid during 4 month of beginning pregnancy and vitamins.

According to table (4-5) the present study indicates that the majority of complications during pregnancy among teenage prime gravida mothers are Preeclampsia. This result supported with (24) who mentioned that preeclampsia is a major maternal complications among teenage pregnancy. This result agree with another study made by (25) who stated "Teenage mothers are more susceptible to preeclampsia."

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The table (4-6) shows the delivery and outcome of current pregnancy. Regarding to method of delivery, the present study found that most of mothers are with normal vaginal delivery. This result disagrees with (26), who indicate cesarean section is more common in teenage mothers.

Also the study results shows that the majority of teenage pregnant mothers without complications during labor. This results disagree with (27), who stated that relationship between teenage childbearing and labor and delivery complications.

Adolescent pregnancy record high percentage of term, live birth that disagrees with (28), who indicated teenage pregnancy was associated with higher risk of preterm birth and still birth. Also the study results indicate the higher percentage of normal birth weight that disagree with (29), in their study who stated that "higher incidence of low birth weight among teenage pregnancy".

Regarding to the Apgar score, the present study found that most teenage pregnant mothers who gave birth with low Apgar Score agrees with (30), who mentioned most teenage pregnant mothers given birth with low Apgar score.

The table (4-7) show the result of the present study reveals that a high significant relationship between Socio-demographic data and complications of pregnancy: mother's (Age, Education level, Occupation, Economic status, Residence, Type of family, Smoking, Crowded index).

These results are supported by (31) in their study who mentioned that preeclampsia (proteinuria) was detected in young pregnant mothers. The relationship between educational level and preeclampsia are supported by (32), who mentioned that pregnant mother with low education are more likely to developed preeclampsia than educated pregnant mother.

Also this result agrees with (33), who indicate that the occupation as housewife is a risk factor that associated with severe preeclampsia. But this result disagrees with Ramesh K. et.al (2014) who mentioned that Low income act as numerous risk issues for pre eclampsia, low income are related with nutritional problems, reduced prenatal care and unhygienic hygienic conditions. In addition the relationship between residency(urban) and preeclampsia in this study are supported with another study made by (34) who mentioned that preeclampsia occur in urban with high percentage than rural. (35), found that current tobacco smoking is associated with significantly increased risk of preeclampsia.

ETHICAL CONSIDERATION:
This is essential principle before gathering the data, to protect mother's values and self-respect. The researcher achieved this approval from the Ethical Committee at the Faculty of Nursing/ Kufa University (appendix B). The researcher promised to keep the mother's information confidential and use these data for this study only then explained the purposes of this study. In addition to above, the researcher told each participant that is an voluntary work and they can leave the interview process at any time.

CONCLUSIONS:
According to the results of the present study, they confirm the following conclusions:

- Most teenage pregnant mothers were illiterate and housewives.
- The majority of teenage pregnancies are within moderate economic status and secondary smoking.
- Majority of teenage mothers had negative past medical diseases.
- Most of teenage mothers neglected the antenatal care.
- Risk of preeclampsia and low Apgar score are higher among teenage pregnant mothers.
- Complications of pregnancy have strong relationship between Sociodemographic data; age, educational level, occupation, residency, type of family and smoking.

RECOMMENDATIONS:
Based on the study results discussion and conclusions the study recommended that:

- Confirming on pregnant teenager to have appropriate antenatal care as well as social support to avoid medical problems during pregnancy.

- Educational programs should be emphasized to pregnant teenage mothers for increasing their knowledge and interest about pregnancy.
REFERENCES:


• 23. Kingston,D.; MaureenH. ;Deshegne; chalmers,B.: Comparison of Adolescent, Young Adult,and Adult womens Maternity Experiences and practices 2013.


**Determination of Liver Somatic Index (LSI) and Gonadosomatic Index (GSI) Value of Crap (Cyprinus carpio) and Nile tilapia (Perca fluviatilis)**

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**Abstract** - Heavy metal contamination in water is very dangerous because of its toxicity. Exposure of heavy metal can accumulate in the body tissues of living things lived there. Cadmium (Cd), Lead (Pb) and Mercury (Hg) are heavy metals which highly toxic compared to other heavy metals. Carcinogenic properties of these metals potentially cause cancer in various organs. Kaligarang river is one of the rivers in Semarang which include to the target of Program Kali Bersih (Clean River Program). Its flow is met with the flow of Kreo river which is contaminated by heavy metals. This study aimed to determine the exposure of Cd and Pb heavy metals in the Kaligarang river using *Cyprinus carpio* (Crap) and *Perca fluviatilis* (Nile tilapia) as a bioindicator. 200 samples of Crap and 200 samples of Nile tilapia was used in this study to measure their Liver Somatic Index (LSI) and Gonadosomatic Index (GSI). The result showed that the LSI values of Crap in treatment and control group were respectively (1.930 ± 0.186) and (2.756 ± 0.230). LSI values of Nile tilapia in treatment group and control group were respectively (2.244 ± 0.348) and (2.612 ± 0.451). GSI values of Crap in the control group and treatment group were respectively (0.268 ± 0.051) and (0.160 ± 0.039). GSI values of Nile tilapia in the control group and treatment group was respectively (0.230 ± 0.028) and (0.136 ± 0.026). The conclusion of this study is that there was a significant difference of the crap’s LSI value of the control and treatment group, while there was no significant difference on the Nile tilapia. For the GSI value, there was a significant difference between the control and treatment group of both the crap and nila tilapia.

**Keywords** - Heavy metals, LSI, GSI

**I. INTRODUCTION**

Organic and inorganic pollutants contaminate aquatic environments. Organic pollutants contaminate waters include DDT, PAHs, pesticides, insecticides, detergents and other household waste. While inorganic pollutants often found in waters are heavy metals Cd (cadmium), Pb (lead), Hg (Mercury), As (Arsenic), Zn (zinc), Cu (copper), Ni (Nickel), and Cr (Chromium). The heavy metal pollutants are very dangerous if they contaminate waters because they are very toxic, carcinogenic, bioaccumulative and biomagnification [1], [2], [3]. Exposure of the heavy metal in the environment can accumulate in the body tissues of living things lived there. It can poison all biotic components (animals, plants, and humans) when reaching as toxic concentration and there is a multiplication of the contaminants content by organisms at higher trophic structure through the food chain.

Cadmium (Cd), lead (Pb) and Mercury (Hg) are a heavy metal which is highly toxic compared to other heavy metals. Carcinogenic properties of these metals potentially cause cancer in various organs. Cd, Pb and Hg pollutants can pollute the marine environment, air, and soil, but these contaminants eventually ended up in the water, then the water environment becomes the highest attention in environmental monitoring. In the river waters, Cd, Pb and Hg can be accumulated in the sediment, water or on the river biota [4], [5], [6], [7], [3].

Plaa [2] and Argawala [6] said that in the metal pollution monitoring, water biota analysis is more important than water analysis itself. Biota water is very well used as bio-indicators of the heavy metal pollution in the waters. Animals easily absorbs Cd, Pb and Hg from food and be accumulated in the body tissues such as the kidney, liver and reproductive organs [4], [2], [1]. In the aquatic environment, a contaminant enters to the tissues of an autotroph organisms by direct absorption. In fish, contaminants can enter through direct absorption process, which depends on the attachment site mainly through the gills (branchia) on the branchial epithelium. Meanwhile, the contaminants enter indirectly by trophic way passing through the microvilli of the intestinal surface [5], [1], [7].

Kaligarang river is one of the rivers at Semarang which including to the priority target of Program Kali Bersih (Clean River Program) in Central Java Province. The river meets the river flow of the Kreo river and the Kripik river, further downstream canal merges with the Banjir Kanal Barat river of Semarang city. Water of the Kaligarang river is used as a water source for drinking water by Regional Water Company (PDAM) Semarang, and also used for agriculture, households and industry. Kaligarang gives the dominant water supply for the city of Semarang. Most of the people around the river, especially in downstream, use it to fish which is used for daily food or being traded.

However, the presence of heavy metals is feared at any time exceed the limit on the value of the Water Standard Quality, because of the community and industrial waste which are discharged every day is relatively high.
Badan Lingkungan Hidup Jawa Tengah’s (Central Java Environment Agency) [8] research found that there was a heavy metals eg. Pb and Cd in sediment of the Kreo river streams from the landfill of Jatibarang Semarang, so it was possible that heavy metals found in the Kaligarang river then pollute its water. Kartini and Danusaputro [9] suggested that Kaligarang water contained the heavy metals. Various types of heavy metals, such as iron (Fe), Cadmium (Cd), lead (Pb), Nickel (Ni), copper (Cu) and Mercury (Hg) were found in various quantities of all kinds water samples taken, although not all heavy metals exceed the Quality Standard. However, the presence of heavy metals is worried to exceeds the Standard Quality value at any time, because the contribution of community and industrial waste are discharged relatively high every day.

The heavy metals of Cd and Pb pollution in the Kaligarang river can be detected by using a crap (Cyprinus carpio) and a nile tilapia (Oreochromis niloticus) as a bioindicator by determining of fish’s Liver Somatic Index (LSI) and Gonadosomatic Index (GSI).

II. MATERIALS AND METHODS

All samples of the crap (Cyprinus carpio L.) and the nile tilapia (Oreochromis niloticus L.) were taken from the pool of Balai Benih Ikan Ungaran, Semarang Regency. Each of the Crap and the Nile tilapia was taken 200 then randomly divided into 2 groups, named the control and treatment groups, respectively 100 individuals. Fish samples of the control group were looked after in the Karamba Floating Net (KJA) in the pond of Fish Seed Ungaran Semarang Regency. While the fish samples of the treatment group were looked after in a Karamba Floating Net at the downstream of Kaligarang river. All fish were harvested after 1.5 months maintained to measure LSI and GSI.

Liver Somatic Index (LSI) Measuring Procedure

The procedures to measure LSI was each fish sample was measured its body weight and liver weight first. Then determine the LSI by a pattern bellow.

\[
\text{LSI} = \frac{\text{Liver weight of fish}}{\text{The body weight of fish}} \times 100
\]

Gonadosomatic Index (GSI) Measuring Procedure

The procedures to measure LSI was each fish sample was measured its body weight and gonad weight. Then determine the LSI by a pattern bellow.

\[
\text{GSI} = \frac{\text{The gonad weight of fish}}{\text{The body weight of fish}} \times 100
\]

Statistical Analysis

The data had a normal distribution so this used Parametric Independent Sample t-Test for statistic analyses. This test was done to determine the differences of LSI and GSI on the fish of the control and treatment group.

III. RESULT

Liver Somatic Index (LSI) was a comparison between the liver weight and the body weight of the fish multiplied by 100. The number of the crap’s Liver Somatic Index (LSI) of the treatment and control group were respectively (1.930 ± 0.186) and (2.756 ± 0.230). The number of nile tilapia’s Liver Somatic Index (LSI) of the treatment and control group were respectively (2.244 ± 0.348) and (2.612 ± 0.451). The Value of the Crap’s and the Nile Tilapia’s Liver Somatic Index (LSI) was shown in this table 1.

<table>
<thead>
<tr>
<th>Types</th>
<th>Liver Somatic Index (LSI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Treatment</td>
<td>p-value</td>
</tr>
<tr>
<td>Crap</td>
<td>2.756±0.230</td>
<td>1.930±0.186</td>
</tr>
<tr>
<td>Nile Tilapia</td>
<td>2.612±0.451</td>
<td>2.244±0.348</td>
</tr>
</tbody>
</table>

The crap’s LSI value of the treatment and control group based on the result of the different test-independent T-Test showed the significant value 0.000 (p < 0.01), so there was a significant difference between the LSI value of the treatment and control group although the average value of the treatment group was lower than the control group. Meanwhile, the nile tilapia’s LSI showed the significant value was 0.187 (p > 0.05), so there was no significant difference between the LSI value of the treatment and control group although the average value of the treatment group was lower than the control group.

Gonadosomatic Index (GSI) was a comparison between the gonad weight and the body weight of the fish multiplied by 100. The number of the crap’s Gonadosomatic Index (GSI) of the control and treatment group were respectively (0.268 ± 0.051) and (0.160 ± 0.039). The number of nile tilapia’s Gonadosomatic Index (GSI) of the control and treatment group were respectively (0.230 ± 0.028) and (0.136 ± 0.026). The Value of the Crap’s and the Nile Tilapia’s Gonadosomatic Index (GSI) was
shown in this table 2.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>The Value of Gonadosomatic Index (GSI) on the Crap and the Nile Tilapia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Gonadosomatic Index (GSI)</td>
</tr>
<tr>
<td>Crap</td>
<td>0.268±0.051</td>
</tr>
<tr>
<td>Nile Tilapia</td>
<td>0.230±0.028</td>
</tr>
</tbody>
</table>

Based on the results of the different test-independent T-Test, the crap’s GSI value of the control and treatment group showed that the significant value was 0.006 (p < 0.01), so there was a significant difference between the GSI value of the control and treatment group although the average value of the treatment group was lower than the control group. Meanwhile, the nile tilapia’s GSI showed that the significant value was 0.001 (p < 0.01), so there was a significant difference between the nile tilapia’s GSI value of the control and treatment group.

IV. DISCUSSION

The Nile Tilapia’s LSI value of the control and treatment groups based on the statistical tests showed no significant difference (p = 0.187; p <0.05), whereas the mean value of the crap’s LSI value between control and treatment group was significantly different (p = 0.000; p <0.01). This was because the crap was more sensitive to toxic compounds. As the opinion of Ossana et al [10] found that Cyprinus carpio L. (crap) was a species that was used as a test organism in toxicity bioassay because it had a physiological response to the presence of contaminants which was more sensitive than other fish species. De Conto Cinier et al [11] suggested the same thing that the crap immediately provided the physiological response to the heavy metals exposure. Therefore, considering this species was sensitive to the heavy metals exposure so it was easily adapted to laboratory conditions for experimental research. Based on the value of morphometric record showed that the metal exposure would affect the occurrence of stress on the crap soon, so that the toxic effects on the crap would be immediately known. Thus, the heavy metals exposure in Cyprinus carpio cause sub lethal acute, despite of the relatively short time exposure (five days) [10].

The LSI value of both the nile tilapia and crap treatment group was lower than the nile tilapia and crap control group. This suggested that heavy metals exposure resulted in the low of average LSI value. The low value of LSI might be occured when the waters polluted by heavy metals, then these heavy metals were absorbed through the epithelial membrane, especially the gills. These were carried to the liver by the blood, resulting in the accumulation of heavy metals in the liver; in addition to the heavy metal accumulation in the liver would result in malfunction of enzymes because of bonding of heavy metal with sulfhydryl (-SH) group on the enzymes, thereby disrupting the body's metabolism and causing the fish liver became low so that the value of LSI decreased / low [7], [12]. Given the heavy metals were toxic and carcinogenic, then the accumulation of heavy metals in the liver would damage the liver tissue, so that the fish liver went to have swelling (hepatomegaly) first, but if the level of damage was getting worse due to the greater accumulation of heavy metals in the liver, then the liver would suffer necrosis and cirrhosis [13], [14]. Cirrhosis would decrease the liver size / shrinkage. The size of a small liver would lead to severe liver become low so that the value of LSI low / declining.

Swelling of the liver cells was reversible so that if the toxic compounds exposure did not occur then the cells could be returned to normal. However, if heavy metal exposure occurred lasts longer so the cells could not tolerate the damage caused it. Azis and Ghazaly [15]; Marina and Martinez [13], suggested that the exposure of heavy metals caused swelling of hepatocytes as a direct result of the toxic effects which directly affect the ion transport mechanisms. Continued cell death would cause necrosis. Necrosis caused an inflammatory response in alive tissues around the necrosis area. The aim of this inflammatory response was to recover the tissue and suppress the causative agent of necrosis. When exposed to toxic substances continuously, it would cause the cells lost the regeneration ability which would trigger fibrosis. If the fibrosis extended to all parts of the liver, it would occur cirrhosis (hardening / reduce liver) causing liver failure. This was because of the hepatic portal vein hypertension which could interfere the blood flow that would hamper the supply of nutrients and oxygen exchange.

Larsson et al [16] and Sandstrom et al [17] suggested that LSI was a biomarker that indicated the status of feeding and metabolism. The liver size indicated the high of metabolic activity while the small size of the liver could be caused by lack of food. According to Van der Oost et al [18] Liver Somatic Index (LSI) were significantly decreased when exposed to organic pollutants exposure, such as OCPs, Polychlorinated biphenyls (PCBs) and Polycyclic Aromatic Hydrocarbons (PAH). This decrease was likely caused by the influence of the food limitations and the stress factors.

The result of the different test of the control and treatment group nile tilapia’s GSI value showed significant difference (p = 0.001; p < 0.01). Whereas the different test result of the crap’s GSI value of the control and treatment group showed significant difference (p =0.006; p < 0.01).

The GSI value of both the nile tilapia and crap treatment group was lower than the control group. this showed that the heavy metals exposure affected to the GSI value. The heavy metals exposure caused the GSI value became less than fish group with no heavy metals exposure. The low of the GSI value caused by the heavy metal exposure might be occured when the heavy metals contaminated aquatic environment, then it would be absorbed by epithelial membrane, especially the gills, and then brought to some organs such as liver, gonad, kidney, muscles, and skin by blood. This would cause the heavy metals accumulation in those organs. The heavy metal accumulation in the gonad would cause damage of the gonad tissue because the heavy metal was toxic, carcinogenic and irritative. Thus, gonad would degenerate, smaller size, the low GSI value and affected the heavy metal accumulation in those organs.

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reproductive ability so that caused the fertility decrease [16], [17]. Based on the Van der Oost et al [18], the GSI value including on the biomarker of effect group which was the biomarker related with the measurement of the pollutants pollution effect to the health.

However, Siah et al [19] suggested that the presence of the organic pollutants such as tributynil (TBT) in the water would cause the sexual maturation disruption and reducing the gonad size so that the GSI value lower. Therefor the opinion of Hanson et al [20] suggested that the organic pollutant such as PCBs and PAH in the water caused reducing gonad size of the perch fish (Perca fluviatilis) which caused the GSI value decrease.

V. CONCLUSION

The crap’s Liver Somatic Index (LSI) value of the treatment group and control group was respectively (1.930 ± 0.186) and (2.756 ± 0.230). The nile tilapia’s Liver Somatic Index (LSI) value of the treatment group and control group was respectively (2.244 ± 0.348) and (2.612 ± 0.451).

The crap’s Gonadosomatic Index (GSI) value of the control group and treatment group was respectively (0.268 ± 0.051) and (0.160 ± 0.039). While the nile tilapia’s Gonadosomatic Index (GSI) value of the control group and treatment group was respectively (0.230 ± 0.028) and (0.136 ± 0.026). There was a significant difference of the crap’s LSI value of the control and treatment group, while there was no significant difference on the nile tilapia. There was a significant difference between the control and treatment group of both of the crap’s and nile tilapia’s GSI value.

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A Survey on Road Detection for Autonomous Vehicles

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Abstract: The road detection technique and navigation of vehicle is challenging in different road scenarios in the real urban environment, particularly only when perceptions sensors and lasers were used without position information. Several methods have been used to derive this concept in real time application where illumination of light is invariant. These methods present a novel real-time optimal drivable region and this methods are robust to shadows and lighting variations. Their system uses a multisensory scheme to cover the most drivable area in front of the vehicle. A colour based tracking system is used to get the optimal region on an unmarked road. This methods hold true in different environments and weather conditions. Using a stereophonic vision system of 3D parameters they propose a fast road detections from colour images. It is simple and can be applied on real time scenario. They propose system successfully which handles both structured and unstructured roads. They get better understanding of this concept to produce a result of better understanding following numerous tests.

Keywords: Road detection, 3D image processing, Unmarked Roads, marked roads, HSI colour model, Lane detection, Navigation, Invariant lights.

INTRODUCTION

The main problem is elaborate in this work which deals with unmarked and marked roads for autonomous vehicle driving. The concept of autonomous vehicle is to detecting optimize area for driving through the road without collision and misjudge lane. In present conditions the road detection methods are individually based on low level features with simple scenarios. They generally consider the structured roads, road homogeneity and uniform lighting conditions for their experiments. Development can be possible if they consider the typical roads condition in real urban environment.

There should be enormous methods like using camera, sensor, and laser spectrum may also use in this methods etc. a number of techniques are resolved in this paper to collaborate information needed. Although this technique can’t say as completely reliable for road detection as so many other factors like misaligned lane marking, ambient sunlight and shadows may affect the result. Vision sensors completely works on the principle that they provide useful information without consuming time. It contain information like colour contrast, negative images, depth of that colour. With this survey there are several other vision based approaches. Also research tells that road detection is a straightforward approach which provides information for path planning also it detects obstacle in the path and finds proper road profile estimation. Ideally lane marking are white lines on dark pavement. Thus, the first step is usually based on image edges, defined as extreme of the gradient magnitude along the gradient direction.

RELATED WORK

2.1 A Sensor Fusion Drivable-Region and Lane-Detection System for Autonomous Vehicle Navigation in Challenging Road Scenarios:
In this paper it has been shown that real time optimal drivable region and road detection and ranging LIDAR and vision data. They have considered structured and unstructured roads arriving on path alternately this scientifically is quite difficult task. Pavement structure cannot occur regularly in this field, there are many interrupts such as, heavy shadows. Dirt and puddles. Weather conditions also matter in road detection as they frequently changes.

Experiments and Results:

![ROC of curb point detection by the ANN with different numbers of hidden nodes and iterations. The labels of the curves](www.ijsrp.org)
are sorted by the true positive rate at a false positive rate of 0.5. [1]

### Table 1

<table>
<thead>
<tr>
<th>Drivable-area detection results</th>
<th>True area</th>
<th>Positive area</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sequence 1</td>
<td>2300</td>
<td>2098</td>
<td>91.2%</td>
</tr>
<tr>
<td>Data sequence 2</td>
<td>1650</td>
<td>1537</td>
<td>93.2%</td>
</tr>
<tr>
<td>Data sequence 3</td>
<td>2600</td>
<td>2461</td>
<td>94.7%</td>
</tr>
<tr>
<td>Structured road</td>
<td>3584</td>
<td>3376</td>
<td>94.2%</td>
</tr>
<tr>
<td>Unstructured road</td>
<td>2966</td>
<td>2720</td>
<td>91.7%</td>
</tr>
<tr>
<td>Total</td>
<td>6550</td>
<td>6096</td>
<td>93.1%</td>
</tr>
</tbody>
</table>

The graph shows (Fig.1) a curb point detection results considering maximum 1000 points for 300 positive points and 700 negative points, collected from given data sets. A graph shows mapping of this points for true-false positive rate. Additionally, result table for optimal drivable region has considered three sequence points where the accuracy is calculated from true and positive area of the road. The optimal drivable area tested 6550 frames and apart from that 2966 frames of unstructured roads and 2584 frames of structured road with an accuracy of 94.2%.

### 2.2 Road Detection Based on Illumination Invariance:

In Paper [2] this paper properly works on light illumination variance in autonomous vehicle, because illumination invariance is a real major problem in this topic. A spectral power distribution and the spectral sensitivity of illuminations gives the proper image formation. It has the RGB colour features which may or may not be involves shadows spectrum. They convert the given RGB into shadow free HIS colour model. It is not constrained to specific road shapes. The likelihood-based classifier is build onlineadapted to each frame. Modelling of the background is not required. This does not affect its work because of road shapes and other restriction. Method is robust to shadows and lighting variations. Histograms are required here to fix the numbers, also they join the similar one and eliminates the odd ones. Each and every frame produces a new histogram so it is not a straightforward process. When the traffic is more then there is most probable chance of having mistaken in detection. Difficult to apply with complex road shapes crossing or when the road borders are not clearly visible. The demonstration of light is shown in fig 1 below.

![Light invariance result](image)

Experiments and Results:

Table 2 shows variance of light in different situation with closed vehicles and far vehicles in consideration with shadows, no shadows and dim once etc.

### Table 2

<table>
<thead>
<tr>
<th>Light invariance result</th>
<th>Shadows</th>
<th>No shadows or dim ones</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close vehicles</td>
<td>10%</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>No vehicles or further away ones</td>
<td>34%</td>
<td>16%</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>44%</td>
<td>56%</td>
<td>100%</td>
</tr>
</tbody>
</table>

In this fig.2, they shown that light is invariance in daylight. Shadows may affect the light detection system. A graph is plotted for every frame and it fluctuates for several instance of frame during the shadows and sunlight.

### 2.3 A Colour Vision-Based Lane Tracking System:

In Paper [3] this system deals with the development of a road model which is accurate, distinct, and clear to viewer with stability in autonomous driving. The process is convenient in both structured and unstructured roads for deriving the width of road and forming the specific edges accordingly. Method holds true for different environmental and weather conditions. This algorithm holds true only when if there is no direct incidence of rays on camera, that is it has some drawbacks when there is sunrise or sunset. The conversion of RGB to HIS is given below shown in fig 4.
We consider random fig of road to calculate the road area, width of road and another several factors. Road width estimation is essential parameter. It can be calculated from following few formulas.

\[ w_i = \hat{y}_r(t)|x=x_i - \hat{y}_l(t)|x=x_i \]  

Where \( \hat{y}_r(t), \hat{y}_l(t) \) are the edges from fig 3.

\[ H = \arctan \frac{V_2}{V_1} \]

\[ S = \sqrt{V_1^2 + V_2^2} \]

In Paper [4] in a typical road surface where a stereo vision based 3d parameters are invariant to the shadows and other lighting conditions. A function named as sky removal function is to removes the negative images and other unconditional data in sky light. They do not scatter the information and bound it to one function. It is simple method and works in real time and on line computations. It is independent from prior knowledge of road conditions and temporal constraints. Integration of stereo vision not only improved detection precision but also can provide a reliable platform for obstacle detection with binocular information. There should be difference in light intensity in morning, evening even in afternoon so sensitivity is very low when shadows occurs. The sky light with similar effect collaborate and its result finding the threshold value on classifier to segmentation of light.

**Algorithms involve:**

[1] Axis calibration algorithm  
[2] Stereo vision approach for road extraction

This algorithms are basically performs various operations to calculate different terms related to colour of an image. Which are very much significance in this road detection concept. Maximizing the value, availing multi resources and minimizing errors are essential work for this algorithm.

**Experimental result:**

![Entropy plot without sky factor](image)

![Gray image by whole image](image)

Fig 5 shows the conversion of main image to gray scale images including the sky image. This lead to calculate more info, more dataset has to be filter and normalize. Entropy of image without considering the sky factor is given in fig5 (b). It is more accurate when we do not consider sky image.

Illumination may lead to a mixture of self-shadow and cast shadow which is more complex to separate their optical features.
Table 3

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Dataset1</th>
<th>Dataset2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure (log-chroma)</td>
<td>Robust mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Normal</td>
<td>56.3°</td>
<td>17.19°</td>
</tr>
<tr>
<td>Geometric mean</td>
<td>43.4°</td>
<td>16.09°</td>
</tr>
</tbody>
</table>

Table 1: Comparison of normal and geometric mean chromaticities

• CONCLUSION

The techniques used for road detection in real urban environment are specifically implemented for getting optimal path. We got several new ideas for getting our results more precise. These techniques have offered us future execution scope on our project.

REFERENCES


Kashmiri Language: multi-linguistic approach, issues and role of media in its accomplishments

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Abstract:

The study of Kashmiri Language and its culture has remained the topic of research and interest for a very long time. It has been extensively studied by the foreign writers, authors, scholars, and has equally remained an interest of national and local intelligentsia. Although a lot of research has been carried out on different aspects of Kashmiri culture, from linguistic points of view but how to save this language, has been neglected so far. It was in this back drop, that the idea to carry out the present study was conceived. The objective of the present study is to analyze the impact of other languages like Sanskrit, Persian, Urdu and English on Kashmiri language. An attempt is made to throw light on different dimensions of cultural lexicon of Kashmiri Language and study the changes which it has undergone in the past. These influences came through the contact and borrowing. This paper also highlights the role of media, both electronic and print media in saving this native language. In this study some constructive remedial measures are provided to save Kashmiri language.

Key Words: Kashmiri Language (KL), Media, Sanskrit, Jammu and Kashmir.

Introduction:

Kashmiri language (KL) popularly known as “Kashur” by its inhabitant speakers in the valley of the Kashmir. It is numerically minority language. In other languages( e.g Hindi, Urdu, Punjabi,Tamil, the language is called Kāshmirī ). The “Kashur” and its dialects are spoken in an approximately 10,000 square miles area, in the state of Jammu and Kashmir. English variants spelling include kaschamiri, cashmiri etc.[1] It is a fact that Kashmiri ranks first among the native languages of the state, comprising majority number of speakers, with Dogri in second and Gujari in third position, followed by Punjabi, Bodhi, Balti, Dardi. The KL is one of the 22 scheduled languages of the India and has been included in the 8th schedule of constitution of India. There are approximately 5,527,698 speakers of KL, as per census of India 2001.[2]
Debate on origin of language

There has been a prolonged scholarly debate, on origin and linguistic affinity KL. Discussions are on issues, as whether Kashmiri is affiliated to the Indo-Aryan or Dardic family of languages. Grierson, considers Kashmiri a “mixed language” of a Sanskrit of speech. According to him, Kashmir belongs to the Dardic group of Pisacha family allied to Shina. He identifies several linguistic features that are Pisacha shares with Iranian. Therefore, Grierson argues, kashmiri must be treated as a Dardic language.[3] However, his theory of Kashmiri belonging to the Dardic branch of language has been rejected by the insider scholars of Kashmir. Most of the linguistic analytical study conducted in Kashmir during the past forty years, have find out that Kashmiri bears close resemblance to Sanskrit languages, thereby testifying to close civilization contacts and ties between Kashmir and India since ancient times. Grierson, who has misleadingly adopted the religious distinction between Hindu Kashmir and Muslim Kashmiri has actually followed the colonial approach towards non-European societies. Though it is very hard to know the exact origin of a language, linguists still try to locate it by studying its evolution in history at which point they make conclusion about its roots. The same can be said about Kashmir language. The history of language is rooted in the changing faiths and strategic geographic location of the valley of Kashmir. The language has developed out of Sanskrit and old Indo-Aryan language and has lastly been influenced by Persian and Arabic languages.

Kashmiri Language: Its multi-linguistic approach

The language of literally culture in Kashmir at various periods of its history has been, essentially, Persian, Urdu, Hindi, and much latter to a smaller extent English. The Kashmiri language was never in competition with any of these languages of wider communication. In fact, the KL had a lower status than other languages of power and functionally. It had very restricted domains. The main reason of its decay was attitude of administration of state and indeed attitude of Kashmiris themselves towards their own language.

There are different sources which make it clear the influence of other languages on this language. Following headings showed clearly this impact:

1. Impact of Sanskrit:

Sanskrit has played an important role in the development of all Indian languages and in the preservation of the cultural heritage of India. Kashmiri language also consists of a good number of words from Sanskrit. Until the middle of fourteenth century when Islam made its firm establishment in
the valley, it has been an important cultural language from 300 BC. Due to extra ordinary importance of Sanskrit, it was but natural for Kashmir to have been impressed by Sanskrit languages, literature and culture. The Sanskrit words have either in their original shape or in the modified form become an integral part of the Lexical property of Kashmir.[4] The words from Sanskrit language have nowadays become an integral part of Kashmiri language. The words that are derived from Sanskrit sources are as:

“Ma:ma” mothers brother is used as ma:m and kirma:caste is used as Kram in Kashmiri language, Kangir- fire pot, kh:andar- marriage, Maharaz:z- bridegroom etc.

The above examples make it clear about the significant influence of Sanskrit on the cultural lexicon of Kashmiri in different spheres like marriage, kinship etc. [5]

2. Influence of Persian:

“The influence of Persian on Kashmiri language dates back to the entry of some Islamic missionaries and tradesmen into the valley.”[6] Their influence is significantly visible in every aspect of Kashmiri life, whether art and crafts, dress, diet, architecture, music manners and customs. It has played an important role in the formation of present culture of Kashmir. Due to the strong influence of this language Kashmir came to be known as Iran-e-Sagar (Small iron). Masoodi says that the present dress of the majority of the people of Kashmir like Pheran, Qemize, Shalwar, Sadri, Choga etc. owe their introduction to the Persian influence. The head dress of Kashmiri women called Qasab and Burka was introduced by Persian immigrants. The modern Kashmiri Wazwaan which constitute such like Yakhni, Rista, Qabab, Tabakmaz etc. also found way in the valley for the first time during the period of Sultans and the credit to popularizing there dishes goes to Persian immigrant.[7]

In brief, the above statement shows that word Kashmir has a huge collection of words belonging to the categories of art, music, drama, architecture and other spheres of life.

3. Impact of Urdu:

In Kashmir, Urdu hold a great importance. It is the official language of Jammu And Kashmir State. Urdu has played a dominant role in Kashmir, whether it is education, administration or media etc. Srinagar branch of Doordarshan broadcasts different programmes in Urdu which includes news, dramas, songs and other programmes also. Similarly Radio Kashmir Srinagar mostly broadcasts programmes in Urdu language. The print media of Kashmir is also influenced by Urdu. Different Urdu words are in daily use in kashmiri such as: 

www.ijsrp.org
Da: da- paternal grandfather.

Na: na- maternal grandfather.

Da: di- paternal grandmother.

Di: di- sister.

Bayya- brother.

Above mentioned words are presently used in Kashmiri language showed influence of Urdu as well.

4. Impact of English:

English is the language that has acquired the status of a global language. The influence of English on Kashmiri language is outcome of the language contact between the Britishers and the Kashmiris, setting up educational institutions and also the use of English in administration etc. “A large number of English borrowing words were adopted in Kashmiri unchanged, which included the words for foreign innovations, European dresses, medicines, games and sports etc. The borrowing words like radio, bus, car, houseboat, and hotel etc. started frequent use in Kashmir as such these words did not exist in Kashmir earlier.

Accomplishment and challenges:

During the last half century Kashmir has lost many things. Dal Lake may be one of the most damaging losses as it has been a symbol of Kashmir, the Paradise on earth. The lush green forest cover has been lost to the greed of both locals and outsiders. A community which has formed a part and parcel of Kashmir psyche for centuries has been virtually lost, but still greater loss is native language whether in Kashmir or outside. The loss of a language means loss of identity.[8]

The highest misfortune is that Kashmiris are themselves responsible in destroying the language especially from their homes. The more they progressed towards so called modern education the more they this language neglect and giving emphasis on English and Urdu. In almost every place all over the world people in speaking their native tongue. On contrary, in Kashmir, people boost to use non-native languages. In many cases the children are not able to speak mother tongue. It is interesting to note
that even the famous internet search engine Google has introduced Kashmiri as one of the languages. There are better facilities available on the internet to learn Kashmiri language than there are in Kashmir itself. By now we should have introduced a complete audio visual programme for learning Kashmiri. If future generations of Kashmir do not speak, understand, read and write Kashmiri, whether they are in Kashmir or anywhere else then it is unfortunate, for the future of the Kashmir there may be cultural decay, if they lose KL. They have, to take some urgent and solemn steps to save this language from an onslaught of global threat. To save Kashmir, they have to first ensure that their language should survive. Let them begin by speaking to their kinds in Kashmiri, in homes. Next they have to persuade the concerned authorities to introduce Kashmiri in all educational institutions whether government or private.

The vast chains of the Madrasas (Islamic schools) in the Kashmir valley do not consider Kashmiri a medium of instruction, their focus is on Arabic and Urdu. This situation is in Kashmir under Pakistan in naturally identical. To summarize, this situation the Pakistani writer Mir Abdul Aziz, on Kashmir affair, claims that “Kashmiri” (language) remains a stranger in its own country. Here it seems that not only common people are creating challenges to their native tongue but educational institutions are similarly responsible in its decay. [9]

Whether in parts of India or abroad, the language is going through gradual attrition due to the impact of languages of wider communication, mainly Hindi, Urdu, Punjabi and English, and the resultant language shift, that is the acquisition by Kashmiri speakers of functionally more dominant languages that ultimately causes the decay and “death of Kashmir”.[10]

**Usage of Kashmiri Language:**

Kashmiri has a limited role in its home state of Jammu and Kashmir. It has been recently in 2008, made a compulsory subject in all schools in the valley up to middle level. But it is still taught as an optional subject at the high school and higher secondary level. It is taught as subject in few colleges in the Kashmir at the graduation level. However, there is lack of specialized teachers, who can teach this language as it should be.

Kashmiri has never served as the language of administration instead the language, which served for administration purpose, has not been indigenous to the area. There has been no attempt to introduce Kashmiri as an administrative language in any time by the government.[11]
Mass media is not very well developed as far as Kashmiri language is concerned. In spite of the fact, the Radio Kashmir, and the Doordarshan Srinagar, the two important media institutions of Kashmir valley, have played a great role in the development of Kashmiri language. Srinagar branch of the Doordarshan telecasts programmes in Kashmiri and the Radio Kashmir also telecasts programmes including news, songs and dramas in Kashmiri.

It is unfortunate, that only a single daily newspaper is published in Kashmiri language that is the Sangarmal and only few journals are published in this language. Among these journals published in Kashmiri, are bimonthly Sheeraza is published by Jammu and Kashmir Academy of art, culture and language, Srinagar and the bimonthly Aalove is published by department of information Jammu and Kashmir Government. The department of Kashmiri, university of Kashmir published an annual journal Anhaar. In addition to these journals some literary organizations are also publishing their own journals which include Volrik Malar, Saqafat, Partavand vethiAagur. There was a good initiative to start a daily newspaper the sangermal, of Kashmir language, by Kashmir media under Mr. Farooq Renzu Shah, the director information of Kashmir. He has admitted that the language of Kashmir has to be electronic and print message over this time. This paper has made the inhabitants of this state very knowledgeable and has made people aware about their rights and duties. Another step has been taken by Kashmiri media that a newspaper,"KasurAkhbar" was started online, that carries news and literary pieces in the Kashmiri Language. It is first online newspaper in Kashmir. This newspaper provides an opportunity to Kashmiris all over the world to be informed of events of province of Kashmir.[12]

Conclusion

To summarize, we can say that due to cultural lexicon there was evolutionary change in Kashmiri language, as it seems that it was influenced time by time by other languages like Sanskrit, Persian, Urdu, English etc. This all happens because, from ancient times till now Kashmiri language lacked administrative patronage. Kashmir was mostly ruled by foreigners, they have never taken any constructive step to glorify this language. And even indigenous rulers also have no care of it. This paper make it clear that modern technology has great impact on this language, as people prefer to use or speak English language. In present times, whether it is question of e-mail id, print media, electronic media etc. there is use of the English language. So, Kashmiri language has a big challenge. To save this language., there are some remedial measures as media is the voice of all things, so Kashmir media has responsibility to popularize message that “Loss of native language means loss of our own identity and cultural”. The state government should take initiatives to protect this mother
tongue. As it should inform to the Director of State Information Bureau that maximum newspapers should be published in Kashmiri. It should patronize and encourage the prominent personalities, poets, scholars etc. So that youth will be inspire from them. They will start to read their literature, it would benefit in the progress of language. Also, the People of Kashmir should take their responsibility. They should try to make conversations in their mother tongue. Newspaper editors, columnists, different distinguish writers can play an important role in highlighting its importance through essays, articles and books etc.

References:


2. 2001, census of India.


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Design and Implementation of Agricultural System Using Solar Power


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Abstract- From olden days we are using non renewable sources of energy in excess amount for our needs. As minerals like coal etc are exhausting, we have to depend on the renewable sources of energy like solar, wind, etc. Agricultural sector is backbone of Indian economy as population increases demand of water and food also increases. For smaller applications it is better to use renewable energy. Hence forth solar energy is choosed in order to develop agricultural system. It has been found that PV system is the best solution for remote agricultural system and for needs such as water pumping for crops. It presents the details of a solar-powered automated irrigation system that dispenses the exact amount of water required depending on the soil moisture, hence minimizing the waste of water. A network of sensor nodes is used to collect the humidity and temperature of the soil which is transmitted to a remote station.

Index Terms- solar panel, Moisture Sensor,

I. INTRODUCTION

A solar powered pumping system method needs to take proper account of the fact that demand for irrigation system water varies throughout the year. Solar-powered systems are being preferred for use in developing countries instead of other forms of alternative energy because they are extremely durable and can also exhibit long-term economic benefits. Solar powered water pumping systems can be the most appropriate solution for grid-isolated rural locations in poor countries where the levels of solar radiation are extremely high.

The solar PV panels have proven in time their ability to reliably produce sufficient electricity directly from solar radiation to power livestock and solar irrigation systems. Solar water pumps find their use mainly in small scale or community based irrigation fields, as large scale irrigation requires large volumes of water which in turn requires a solar PV array extremely large in size. As the water maybe required only during some parts of the year, a large PV array would provide excess energy which isn’t necessarily required, thus making the system in efficient.

Drip irrigation is artificial method of supplying water to the roots of the plant. It is also called micro irrigation. In past few years there is a rapid growth in this system. The user communicates with the centralized unit through SMS. The centralized unit communicates with the system through SMS which will be received by the GSM with the help of the SIM card. The GSM sends this data to ARM7 which continuously receives the data from sensors in some form of codes. After processing, this data is displayed on the LCD. Thus in short whenever the system receives the activation command from the subscriber it checks all the field conditions and gives a detailed feedback to the user and waits for another activation command to start the motor. The motor is controlled by a simple manipulation in the internal structure of the starter.

II. THE MAIN OBJECTIVES

- The project includes implementation of irrigation system using solar energy.
- Solar water pump is made to work with solar energy. The rotatory motion of the motor is converted to electrical energy through generator this electrical energy in term is used to lighten the lamps and to drift the water from canal.
- The project includes the mechanism which facilitates irrigation system by measuring moisture level in soil continuously.

III. METHODOLOGY

System description: Proposed irrigation system consists of two main parts, solar pumping and automatic irrigation part. Solar panel charges the battery through charge controller. From the battery, supply is given to the motor directly in this work. Here the sensing circuit controls the motor. The sensors used are soil moisture sensor, temperature & humidity sensor. The sensor detects the values of soil moisture, temperature &humidity at different points in the field. Microcontroller according to pre-set value compares the measured values. Based on the error between the pre-set and measured values, motor ON/OFF condition is controlled.

A

Fig1:Block diagram
IV. COMPONENTS USED

- Solar Panel, Charge Controller & Battery
- Power Supply
- Moisture Sensor
- GSM Modem
- Microcontroller
- LCD display
- Generator
- Pump

A. Solar Panel, Charge Controller & Battery: The solar cells that we see are also called photovoltaic (PV) cells, which convert sunlight directly into electricity. A solar panel pumps electricity into a battery that stores it, but the solar panel has no control over how much it does or how the battery receives it. The charge controller (charge regulator) positioned between the solar panel and the battery regulates the voltage and the current and essentially halts charging activity temporarily when necessary.

B. Power supply: A 12V dc supply of battery is fed to the 7805 regulators which converts it into regulated 5V DC supply. It is then, distributed to the motor drive. 5V is supplied to the Microcontroller.

C. Moisture sensor: The terms humidity and moisture are not interchangeable. Humidity refers to the water content in gases such as in the atmosphere. Moisture is the water content in any solid or liquid. It consists of a connecting probe, which is laid down in the soil. Moisture sensor is used to sense the moisture of the soil and sends the signals to the controller. If the moisture level reaches the below the pre-set value, then the water is sent to the field. These sensors have no moving parts, they are precise, never wear out, do not need calibration, work under many environmental conditions, and are consistent between sensors and readings. Moreover, they are not expensive and quite easy to use.

D. GSM modem: A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network.

E. Microcontroller: Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, and toys. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices and processes.

F. Pumps: DC water pumps in general use one-third to one-half the energy of conventional AC (alternating current) pumps. DC pumps are Classed as either displacement or centrifugal. Centrifugal pumps use a spinning impeller that adds energy to the water and pushes it into the system, submersible or surface types.

G. LCD Display: It is a combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. LCD are super thin technology display screen that are generally used in laptop, tv etc.

H. Generator: It is a device that convert mechanical energy to electrical energy for use in external circuit. The reverse conversion of electrical energy into mechanical energy is done by electric motor. Many motors can be mechanically driven to generate electricity and frequently make acceptable manual generators.

I. Rain sensor: It is consist of base material as mica and in that aluminium wiring has been placed, which senses the rain and sends the notifications to the users through GSM.

V. FUTURE SCOPE

The solar powered automatic irrigation system is going to be very useful in the future. It has various advantages over the other conventional type irrigation system. To demonstrate the functionality and performance of the controller system, the prototype was implemented and tested. This will In future the advances in nano technology, improvements in smart grid and power electronics have major role in implementing solar energy policies. Our government, Research and laboratories, various solar organizations are working hard to make this solar pump set as agriculture and user friendly. Let we have a hope so that in one fine day all farm lands in India are provided with solar pump sets with SMS alert. help to minimize over water in gand crop production cost. The solar powered automatic irrigation system is going to be very useful in the future. It has various advantages over the other conventional type irrigation system. The components required for this type irrigation system is moisture sensors, relays, solenoid valves, and sub-immersible type pump and GSM.

VI. CONCLUSION

Irrigation has been the backbone of human civilization since man has started agriculture. As the generation evolved, man developed many methods of irrigation to supply water to the land. Motor with deep well pump has been utilized for water storage from Dam Lake to pool and motor with centrifugal pump is utilized for the purpose of transferring of water kept in pool to drip irrigation system. Since the increase in price per increase in
unit power output of a photovoltaic system is greater than that for a diesel, gasoline, or electric system, photovoltaic power is more cost competitive when the irrigation system with which it operates has a low total dynamic head. For this reason, photovoltaic power is more cost-competitive when used to power a micro irrigation system as compared to an overhead sprinkler system. Photovoltaic power for irrigation is cost-competitive with traditional energy sources for small, remote applications, if the total system design and utilization timing is carefully considered and organised to use the solar energy as efficiently as possible.

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Driver Information and Security System

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Abstract- Many a times the warning sign on the road sides becomes difficult to watch for the drivers and the driver may sometimes miss the warning notes. These warning notes may be speed breakers ahead or narrow bridges or even accident zones etc. This becomes tedious during rainy seasons and at nights. Sometimes the boards may be so dirty and the driver may not read anything and even if he tries to read it with a wide eye there is a chance for the drive to lose concentration on the road.

Currently almost every individual has own vehicle and chances of accidents has been increasing. This paper deals with the discussion about the technology used in avoiding accidents by giving information about the road conditions using GPS and GSM connected with MICROCONTROLLER.

Index Terms- Micro-Controller, GPS, GSM

I. Introduction

Technological approaches for detecting and monitoring the information about the vehicle and the roads. Now many are interested in the development, validation testing, or early implementation stages. Every year in India, more than 50% casualties and 1.4 million injuries are caused by vehicle-related accidents. Driver information and security systems aim to support the driver on the strategic level of the driving task, such as advanced route navigation.

As the name indicates, this paper is about making vehicles more intelligent and interactive which may notify or resist user under unacceptable conditions, they may provide critical information of real time situations to drivers. The main concept in this design is introducing the mobile communications into the embedded system. This will be accomplished with the help of Global positioning system and Global System of Mobile wireless communication technology. We will use microcontroller which will greatly improve the overall performance of the system. It will effectively improve the security & safety of the vehicle. The client interacts through this system with vehicles and determines their current locations and status using Google Earth. The user can track the position of targeted vehicles on Google Earth.

II. Objectives

- The main objective of this project is to guide the drivers about the road conditions to avoid accidents.
- In the case of accidents, the system sends alert message and location (latitude and longitude) to the family members of the driver through vibration sensors and GPS.
1. MICRO CONTROLLER - P89V51RD2
The Atmel 89S52 is a microcontroller with 8KB Flash memory and 256 bytes data RAM. Microcontroller acquires and stores different parameters of vehicle. The main block of vehicle parameter monitoring system is Atmel 89S52 micro controller which is heart of the system which provides monitoring and controlling actions.
It senses signals from input blocks and processes output blocks. The software program is stored in the microcontroller on chip memory, according to which it provides the controlling actions. With the help of different sensors various parameters are monitored.

2. LCD DISPLAY
The LCD block is provided for visual display of the message. Also it continuously displays the measured parameters. It displays the conditions of the roads according to the data in microcontroller.

3. MOTOR DRIVER – L298D
A very popular and reasonably priced all-in-one H-bridge motor driver is the L298. It can control two motors, not just one. It can handle 2amps per motor, through to get the maximum current be sure to add a heat sink. The L298 has a large cooling flange with a hole in it, making it easy to attach a homebrew metal heat sink to it.

4. BLUETOOTH MODULE -----HC05
The HC05 Bluetooth module can be used in a Master or Slave configuration, making it great solutions for wireless communication. We can use it simply for a serial port replacement to establish connection between microcontroller and GPS, PC to our embedded system. It has 6 pins Vcc, GND, TX, RX, KEY and LED.
After the connection is established the Bluetooth module can transmit and receive data regardless of the mode it is running. Here we are using mobile to connect to Bluetooth module, using Slave mode. The default data transmission rate is 9600kbps. The range for Bluetooth communication is usually 30m or less. The module has a factory set of pins ‘1234’ which is used to connect to mobile.

5. RF RECEIVER-ASK 455MHz
RF receiver transmits the signals from longer distances and making it suitable for long range applications. It can travel even there is an obstruction between transmitter and receiver.
6. VIBRATION SENSOR.
These are used to measure vibration of vehicle in case of accidents. It is made up of a piezo electric material if any stress applied to this material it sends the signal to the microcontroller, in which it stores the data and send the messages to the feeded number through GPS and GSM.

7. GPS RECEIVER-----SIM900A.
It is used for vehicle navigation and it is device capable of receiving information from GPS satellites and then to accurately calculate the Geographical location. Here it sends the information in latitude and longitude manner.

8. GEARED DC MOTOR-12V DC
A geared DC Motor has a gear assembly attached to the motor. The speed of the motor is counted in terms of rotation of the shaft per minute. The gear assembly helps in increasing the torque and reducing the speed.

9. REGULATOR-7805
Voltage source in a circuit may have a fluctuations resulting in not giving fixed voltage outputs. Voltage regulator IC maintains the output voltage at constant value. It provides a +5V regulated supply with provisions to add heat sink as well.

IV. ADVANTAGES
• Security of vehicle.
• Records driving data, collision data and position data.
• Analyze the accident data.
• Sends location of vehicle and its maintenance to base station through GPS.

V. DISADVANTAGES
• Existing system do not work if the system itself damaged in the vehicle accident, Also this system is not very effective in case of accident of heavy vehicles.
• It does not work without network.
• The systems fail in the absence of power supply.

VI. APPLICATIONS
• Automotive application.
• Modern cabs, cars, auto rickshaw and trucks.
• Public transport system

VII. FUTURE SCOPE
• There is a scope for improvement and as a future implementation we can add a wireless webcam for capturing the images which will help in providing driver’s assistance.
• We can extend this project in future by adding anti-theft detection, control and security features.

VIII. CONCLUSION
In this project we can avoid the most of the accidents happens because of the road conditions and high speed. And we can guide the vehicle drivers about the road conditions using sensors.
Even if any accidents happen this system detects an accident and sends information to service provider with location through GPS and GSM. On the whole, this system is very cost effective and efficient. This system can be easily implemented in real time.

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Dynamic Pricing and the Economic Paradigm Shift – A Study Based on Consumer Behaviour in the E-commerce Sector

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Abstract- This article is an attempt to study the impact of dynamic pricing on the behaviour of consumers. Today, dynamic pricing is a common pricing strategy used in several industries such as hospitality, travel, entertainment, e-commerce, retail, electricity etc. Each industry adopts a slightly different approach in pricing the commodities considering their own needs and the demand for the products. This study specifically focuses on the impact of dynamic pricing used in the e-commerce sector on the consumer satisfaction levels and their prospective purchase decisions. t tests and descriptive statistical tools are used in the analysis part. The inferences from the study reveal that the consumers are dissatisfied with the proximity and magnitude of fluctuation in prices. The study also proves that there is no difference in the gender wise reaction towards dynamic pricing.

Index Terms- Dynamic Pricing, Consumer Price Perception, Online Shopping, Consumer Behaviour.

INTRODUCTION

Dynamic pricing as referred by dictionary is the practice of pricing items at a level determined by a customer’s perceived ability to pay. This is not entirely a novel concept. As professor Paul Krugman denoted, ‘dynamic pricing is merely a new version of the age-old practice of price discrimination.’ Yet, today’s price discrimination differs in the sense that current technology has made dynamic pricing not only widely possible, but also commercially viable. The current technological progress has caused a paradigm shift in price determination by taking pricing strategy to a whole new level. Changing minute by minute and sometimes tailoring them individual specific by processing information about what is known about consumer’s income, spending habits, tastes etc. is being practically employed.

Among the various pricing strategies, dynamic pricing has become a commonly practiced price discrimination strategy used by sellers to maximize profits by charging different prices for very similar or essentially the same products or services according to the amount of money individual customer is willing to pay. (Haws & Bearden, 2006). This modern pricing tactic stands in refutation of erstwhile economic theories stating that the prices remain sticky for a long time. The postulation of sticky price model by the new Keynesians was based on a number of factors such as costs associated with changing prices (menu costs), fear of price war etc. With the advent of dynamic pricing in the e-commerce sector, we are witnessing drastic fluctuation in prices. A recent report published by Profitero, one of the leading global providers of online competitor pricing data, points that e-commerce giant Amazon.com is executing more than 2.5 million price changes on a daily basis in its pursuit to be the most competitive retailer on the web. This clearly indicates the presence of asymmetric information among the buyers and sellers. As internet has become the platform for facilitating online trade, price changing can be done without incurring any cost. This modern pricing strategy provides plenty of benefits for businessmen as well as consumers. Dynamic pricing enables the producers to sell products at comparatively low costs when the demand is low and compensating this loss when there is an upsurge in demand.

The magnitude and proximity of price variation is highly uncertain and the impact that it could make on the consumer behaviour needs to be studied. The answer to the question whether consumers get offended by the price changes or consider the change as an opportunity to buy
products at low prices can help the sellers to devise selling strategies accordingly.

LITERATURE REVIEW

Findings from empirical studies have provided evidence that consumers’ price fairness perceptions are influenced by various factors. Overall, consumers tend to rely on several reference points such as past prices, competitor prices, and cost of goods sold when inferring price fairness to make comparisons (Bolton et al., 2003). Conceptually, perceived price fairness is defined as consumers’ assessments of whether a seller’s price can be reasonably justified (Xia et al., 2004). Fairness is more of a subjective than an objective judgment because it is what consumers actually perceive regardless whether such perception is correct or not. Thus, price fairness perceptions may not be critical until consumers perceive a price as unfair (Xia et al, 2004). Previous research has found that price fairness perceptions can be easily influenced by various factors.

Haws and Bearden (2006) examined how consumers perceived fairness of dynamic pricing. The authors compared a price discrepancy among different sellers and consumers at different times under different pricing setting mechanisms. It was found that consumers reported lowest perceptions of fairness when the comparison was made with other consumers. This may be due to the fact that in dynamic pricing, most transaction characteristics (e.g. seller, product) are highly comparable, and differences in prices charged to buyers are distinct and thus comparable. There is little doubt that such a price discrepancy or inequity, especially when it is to consumers’ disadvantage, may lead to a negative emotional state, such as anger, disappointment, and dissatisfaction, which will trigger adverse behaviors, such as complaints, negative word-of-mouth, and revenge action against the seller. Although Haws and Bearden (2006) attested to the importance of price discrepancy, as a result of comparing with reference to others (consumers), on price fairness perceptions, it is not clear whether price discrepancies at different magnitudes or temporal proximity will lead to different levels of perceived price fairness.

K.Vaitheesewaran (2013) examined the convenience of online shopping “With product getting standardized, specifications getting fixed and the concept of service getting eroded, the post-sale responsibility of the retailer has come down drastically. Hence customers go to stores to explore the product physically detail but by online at a cheaper rate. Heavy discounts of e-commerce firms are possible because of their no warehouse model.”

OBJECTIVES

1. To study whether dynamic pricing affects the consumer satisfaction levels.
2. To study whether dynamic pricing has an impact on the prospective purchase decision of the consumers.
3. To study whether there is difference in gender wise reaction towards dynamic pricing.

METHODOLOGY

The data was collected through a structured online questionnaire. The questionnaire was prepared through the inputs taken from the past researches and also from the feedbacks of the pilot study. Thus the validated final questionnaire was used to collect data from 100 respondents. 90 out of 100 respondents answered the questionnaire and 3 of them were excluded for marking false inputs. Random convenient sampling technique was used to gather the data. The survey was passed on mostly to the students of different colleges in southern Kerala. The questionnaire was mainly divided into two parts. The dynamic pricing strategy used by amazon.in was used in the questionnaire to study the consumer reaction. The first part of the questionnaire included questions to assess the consumer attitude towards amazon.in. The second part consisted of a hypothetical purchase scenario in which the respondents were exposed to a major real price change and were asked to rate their reaction. Likert scale ranging from 1 = strongly disagree to 5 = strongly agree was used to collect responses from the above two sections. t statistic was used to test the pre and post purchase scenarios. Descriptive statistical tools were also used to analyse the real price variation of the product.
RESULTS AND DISCUSSION

Table - 5.1. Consumer Satisfaction with Amazon services – Pre and post scenario comparison

Paired t-test no.1

<table>
<thead>
<tr>
<th>Reaction towards dynamic pricing</th>
<th>t value</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy fewer products from amazon due to dynamic pricing</td>
<td>0.60953</td>
<td>86</td>
<td>0.5439</td>
</tr>
<tr>
<td>Switch to amazon’s competitors due to dynamic pricing</td>
<td>0.13827</td>
<td>86</td>
<td>0.8904</td>
</tr>
<tr>
<td>Feel that the purchase was bad</td>
<td>-1.985</td>
<td>86</td>
<td>0.0503</td>
</tr>
<tr>
<td>Overall satisfaction from the purchase</td>
<td>-1.896</td>
<td>86</td>
<td>0.0613</td>
</tr>
</tbody>
</table>

The T test results shown in table 5.1 reveals that the p value is lesser than the significance level (0.05) hence we reject the null hypothesis that dynamic pricing doesn’t affect consumer satisfaction and accept the alternative hypothesis that dynamic pricing affects consumer satisfaction.

Table – 5.2. Respondents’ desire to purchase from Amazon – Pre and post scenario comparison

Paired t-test no.2

<table>
<thead>
<tr>
<th>Reaction towards dynamic pricing</th>
<th>t value</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy frequently (pre-purchase) and buy frequently (regardless of dynamic pricing)</td>
<td>2.3193</td>
<td>86</td>
<td>0.02275</td>
</tr>
</tbody>
</table>

It can be inferred from table 5.2 that the p value is lesser than the significance level (0.05). Hence, we reject the null hypothesis that dynamic pricing doesn’t have an impact on Purchase decision and accept the alternative hypothesis that dynamic pricing does have an impact on the purchase decision of the consumer.

Table – 5.3. Respondents’ reaction variation towards Dynamic Pricing across different gender groups

As per the table given above, the reactions of both male and female customers are alike in all the cases. The p values are above significance level (0.05) and can be concluded that there is no considerable difference in the male-female reaction towards dynamic pricing.
Figure – 5.1. Real price variation of the product

The real price variation of the American Tourister bag (product used in the questionnaire) made by amazon.in for the period between 15th February 2017 – 15th March 2017 is shown above. The following table shows the statistical analysis of the price fluctuation.

Table – 5.4. Analysis of Price variation

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of Variation</td>
<td>1360 - 3400</td>
</tr>
<tr>
<td>Mean</td>
<td>2096</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>978.261</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>43.39%</td>
</tr>
</tbody>
</table>

The standard deviation and coefficient of variation given in the above table shows that the magnitude and proximity of variation in prices are too high and erratic. This can be regarded as the reason for consumer dissatisfaction.

CONCLUSION

The t test results show that dynamic pricing does have an impact on the consumers’ satisfaction level and their prospective desire to purchase. No significant difference was seen in the gender wise reaction towards dynamic pricing, which means males and females alike feel offended by the pricing strategy. Results prove that the consumers are highly dissatisfied with the proximity and magnitude of price variation. The presence of asymmetric information among buyers and sellers make it difficult for the buyers to predict the prices and they feel offended when they realize that the price they paid was much higher than the actual price. The study also concludes that the consumers do not favour continuous and enormous fluctuation in prices. Dynamic pricing should be practiced in such a manner that doesn’t affect the fair price perception of the consumers. The extent of price variation should be set in accordance with the Price elasticity of products.

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Critical Analysis of Approaches for Science Teaching

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Abstract- Researcher has tried to analyse the approaches of science teaching in light the microteaching and different teaching methods. Thus researcher has been ongoing through content analysis in empirical and historical perspectives. This work had theories behind teaching is an art as well as science. As an art, it portrays the Imaginative and artistic abilities of the teacher in creative a worthwhile situation in the classroom in which the learners learn and receive the immediate and ultimate goal of education. As a science, it points to the logical, mechanical and procedural steps to be followed to attain an effective accomplishment of goals. This study has stated the certain fundamental principles of teaching technology.

Index Terms- Methods, Approaches, Educational technology, Content, Communication, Feedback , Microteaching skills, Phases of teaching, Narration etc.

I. INTRODUCTION

Human mind is always busy in the pursuit of exploring the unknown man by his keen observation and faculty of reasoning has come to the conclusion that there can not be any event in the nature without any reason. In the process of search for knowledge and truth, man has accumulated a vast store of knowledge known as science through which we can understand our surroundings and environment, making life adjustment in new discoveries, generation to generation transmit the knowledge and progress in civilization. In the words of Fitzpatrick “Science is cumulative and endless series of empirical observations which result in the information of concepts and theories, with both being concept and theories being subject to modification in the light of further empirical observations .Science is both a body of knowledge and a process of acquiring it.” Thus science is the way of investigation, thinking, systematization of knowledge with approaches of product and process. Science is a body of knowledge in which include the facts, correction of errors in running concept and theories. The scientific knowledge exists in the form of facts, concepts, principles and laws. Science is a method of inquiry for which science teacher should emphasize that scientist approaches the solution of teaching problem as organized with inspirations, imagination and insight. Science teacher should be adapt the steps for solution of problem as identification, observation, statement of hypothesis, testable production and then finding based acceptance, modification or rejection of the hypothesis. Teacher should be develop the thinking process for develop the attitude in trainees through open mindedness, objectivity freedom from superstitions, beliefness, accuracy methodology and aggregation.

On the above discussions it is clear that teaching is a scientific process and its major components are content, communication and feedback. Teaching develop the close relationship with learning and its activities and create environment for it whereas teaching skill development strengthened with sophisticated techniques and different designs. Our planning of teaching should include the first step to content analysis identification of objectives and writing these in behavioural terms. This objectives achieved by teaching strategies and feedback.

UGC designed the course of science teaching with necessity of today on the ground of philosophical, sociological approaches in the light of psychological background. The method employed in its presentation are of much importance to the success of the type of course. Design content by use with not lose the sight of facts and values compile the teaching procedure in particular class. VBSPU Jaunpur is running B.Ed. syllabus of science teaching as-

II. PHYSICAL SCIENCES

Objective:-After completing it student teacher will trained about scientific attitude and different methods of science teaching and could developed teaching aids for delivering the knowledge.

Unit-1

- Importance of physical science in school curriculum.
- General aims and objectives of teaching Physical sciences at secondary school stage.
- Bloom’s Taxonomy of educational objectives.
- Formulation of specific objectives in behavioural terms.

Unit-2

- Nature of Modern Physical science its impact on communities.
- Path tracking discovers & land mark development.
- Eminent Scientists(Galileo, Newton, Robert Boyle, Avegadro)
- Profession of the area of physical sciences.

Unit-3

Transaction of contents and development of instructional material:

- Transaction of contents.
- Unit planning and lesson planning.
- Preparation of teching aids.
- Development of demonstation experiments.
- Co-curricular activities.
- Development of self learning material(linear programme).

Unit-4

Methods of teaching and skill involved in teachings:-

Methods of teaching:
Lec- Demonstration method.

Project method.

Problem-solving method.

Inductive and deductive method.

Heuristic method.

**Skills:**

- Practical demonstration using laboratory.
- Improvisation of apparatus.
- Skill of introducing the lesson.
- Questioning.
- Skill of illustrations with examples.
- Skill of explaining.
- Skill of using black board.
- Skill of stimulus variation.

**Transactional Strategies:** The course will be transacted through practicum on developing instructional plans, use of teaching methods and aids for augmenting learning potential as self learners and skills in designing classroom teaching learning processes relating to diverse learner groups.

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**III. BIOLOGICAL SCIENCES**

**Objective:**

Develop awareness about development in the area of teaching and learning of Biological sciences at the national and international development competencies in the prospective teacher related to Biological science at the lower secondary level with specific reference to Indian school conditions Orient prospective teachers in specific educational aspects of science and technology education e.g. general concept of Biological sciences, aims and objectives of biological science, pedagogical analysis of contents in Biological science at the lower secondary level, transaction of contents, methods of teaching, evaluation etc. Enable prospective teachers to be effective teachers in order to perform the required role as a Biological science teacher under Indian school conditions.

**Unit-1**

**Importance, Aims and objectives**-

- Importance of biological science in school curriculum.
- General aims and objectives of teaching Biological science.
- Bloom’s taxonomy of Educational objectives.
- Formulation of specific objectives of Biological science in Behavioural terms.

**Unit-2**

- Nature of modern biological sciences.
- Path tracking discoveries.
- Eminent scientists (Robert hook, Hugo Debridge, Grager John Mendol & Robert coach).
- Profession in the area of Biological sciences.

**Unit-3**

**Development of instructional material:**

- Transaction of contents.
- Unit planning.
- Lesson planning.

- Preparation of teaching aids.
- Development of aquarium, vivarium etc.
- Development of self-instructional material (Linear program).

**Unit-4**

**Method of teaching and skills (Practical and micro teaching)**

**Methods of teaching**-

- Lecture demonstration method.
- Project method.
- Problem-solving method.
- Practical skills.
- Preparation of temporary and permanent mounts.
- Collection and preservation of specimen.

**Microteaching skills**-

- Skill of introducing the lesson (set induction).
- Skill of questioning.
- Skill of illustration.
- Skill of explaining.
- Skill of stimulus variation.

**Transactional strategies:** The course will be transacted through practicum on developing instructional plans, use of teaching aids and methods for augmenting learning potential as self learners and skills in designing classroom teaching – learning processes relating to diverse learner groups.

**Methodology**:

Through above syllabus critically analyse approaches are in terms of microteaching only because it is training technique and not a teaching technique. Students teacher learn through this approach to how will introduce the lesson, illustrations, probing questions, blackboard writing with summary of lesson to developed skill. Microteaching design that is used for the training of teachers to make them learn the art of teaching. For this analysed method had been used.

**Analysis and interpretation**:

Microteaching was first introduced at Stanford university, USA in 1963. It was sought to identify, isolate and build training program for critical teaching skills. It is the one of the innovations and technique that has emerged on the map of teacher education for improving the student teaching programme.

Allen. D.W. (1966) said that “microteaching is a sealed down teaching encounter in class size and time.”
For this training technique involves three phases in which preactive phase is the knowledge acquisition phase, the interactive phase is the skill acquisition phase and the post active phase is the transfer phase.
Above phases reveal that a standard procedure of micro teaching. It has been going to phases in following steps-

1. Orientation
2. Discussion of skills
3. Selection of a particular teaching skill
4. Theoretical concept
5. Analysis of teaching
6. Supporting materials
7. Providing feedback
8. Practical microlesson plan
9. Observational demonstration
10. (train pupil)

- Teaching 6 min to a class 5 to real pupil
- Teaching Feedback
  - Plan 6
  - Reteach 6
  - Referred 6
  - Total 36
Large number of micro teaching skills have been identified. The first effort made by Allen and Ryan resulted in identifying fourteen skills. Research have taken only five skills as 1- Objective writing 2- Introducing 3- Illustrating 4-v Reinforcing and 5- Blackboard writing skill.

**Skills of objective writing:-**

Skill of objectives encompasses the proficiency in the use of behavioral term of the topics as criterion. This skills drill to cognitive, affective and connative domain of content how could achieve. Student teachers learn it accordance action verbs define, select, meaning, discuss etc related with cognitive domain, understand, interpretation, discussion, differentiation, and importance etc action verbs are related with affective domain and performing activities identify, to select, to make, to prepare, to listed action verbs related with connative objectives.
Skill of introducing lesson:
This skill involves the component behavior as utilization of previous experience in introducing a new lesson. Use of appropriate devices and techniques. Maintaining of continuity in the ideas and informations and relevancy of verbal and non verbal behaviors.

Previous knowledge -- Introducing lesson
- Previous related items.
- Series in items.
- Related unit objectives.
- Maintenance of continuity.
- Relevancy of verbal or non verbal behaviour.

Skill of probing questioning:
It is the art of response management comprising a set of behaviors or techniques for going deep into pupils responded with a view to elicit the desired responses. In teaching learning situation questioning is major device. This skill consists Propting, seeking further information, refocusing, redirection and critical awareness.
Skill of Illustrating with examples:-

This skill relates with questions and importance of teacher’s statement with the help of supporting system like giving analogy, telling story, showing objects, model pictures, diagrams, maps and charts, demonstrating experiments etc. The components of this skill as simple example formation, relate with rule or concept, formulating interesting examples, appropriate media examples and using examples by induct – deductive approach.

IV. SKILLS OF USING BLACKBOARD

In teaching activities Blackboard is suitable convenient teaching aid because student teachers have learnt the art and skill of using it. This is the chalk talk medium as right hand teacher. The main components involved in this skill are legible handwriting, neatness of blackboard work, adequate content average in the blackboard, proper sequence of point on the blackboard.

V. CONCLUSIONS

Researcher has been concluded on above analysis that microteaching is essentials of teacher training programme. Microteaching helps a training institutions to overcome the hardships faced and become independent of factors in terms of availability of pupils, classrooms, cooperation from the staff on the practicing schools, simplification the concept of teaching into sets of simpler skills comprising classroom behaviour by it helps in providing proper understanding of the meaning of the teaching. According to miniaturized classroom, size in purpose, time and lesson as drill the skill in the microteaching. It provides feedback immediately, proper opportunities for practicing on e components teaching skill at a time by using single concept of the content. Thus it is clear that a trainee can experiment with several alternatives in a limited time and resources and it works as a laboratory exercise to focus training on the acquisition of teaching skills.

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Comparative Analysis of Different Linearized Expressions of Estimating the Pseudo-Second-Order Kinetic Parameters for the Adsorption of Methylene Blue on Hydrochloric Acid-Treated Rice Husk

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Abstract - A comparison between six different types of linear expression of the widely used pseudo-second-order kinetic model, for the adsorption of methylene blue on hydrochloric acid-treated rice husk was made. The results showed that it was inappropriate to use the type 1 expression of pseudo-second-order equation to calculate the pseudo-second-order rate constant and to predict qₑ for the studied system, even the type 1 expression had high R² value. The modeling of kinetic results showed that the studied system (methylene blue/hydrochloric acid-treated rice husk) was best described by the type 6 expression of the pseudo-second-order equation.

Index Terms - Linear regression; Pseudo-second-order; hydrochloric acid-treated rice husk; Adsorption; Methylene blue; Kinetics

I. Introduction

Elimination of dye pollutants in handling of waste water has long been considered. The most frequently used procedures for elimination of dye are biological, physical or chemical methods (Shih 2012). All these methods have diverse dye elimination abilities, principal expenses, and operating rates. Adsorption referred to the passive uptake and physical chemical elimination of dye to the adsorbate surface, is now broadly recognized as an effective and economically feasible procedure for the elimination of dye pollutants from wastewaters (Chowdhury and Das Saha 2011). So the adsorption research is of great significance for getting maximum elimination of dye pollutants. The adsorption kinetic models illustrate the uptake rate of adsorbate, which can be used to predict the adsorption mechanism. Therefore, an broad investigation of adsorption kinetic models is important. Numerous adsorption kinetic models are established to explicate the reaction order of adsorption systems on the basis of solution concentration (Chowdhury and Das Saha 2011). The pseudo-second-order kinetic model is the most recognized model in most adsorption kinetic research and has been commonly applied to describe time evolution of adsorption under nonequilibrium conditions (Ho, Ng et al. 2000). In most cases, the pseudo-second-order model can be done by using some altered equations that have been established over the past few decades. Among these formulations, Ho’s equation has been intensively used to test for the correlation of the adsorption data for pseudo-second-order kinetic model during the past decade due to its simplicity and its good fitting of many adsorption systems (Shahwan 2014). Because the form of pseudo-second-order as expressed in literatures is nonlinear, the non-linear regression method was utilized to evaluate the values of qₑ and K₂ requires for fitting the equation to experimental data (El-Khaiary, Malash et al. 2010). The calculation of pseudo-second-order equations by using the non-linear regression method presents more difficulties calculated process for determining equation parameters and the scientists need to use some specific softwares or write down some computer programs to solve the non-linear regression equation. Owing to these reasons, the researchers attempt to gain a simple way to solve the pseudo-second-order equation. A conventional alternative technique is to use linearized forms of the pseudo-second-order equation to replace the non-linear form of the pseudo-second-order equation to compute the two parameters, qₑ and K₂. This linear regression method is commonly employed to predict the pseudo-second-order parameters, since this method only involves slight understanding of the data fitting process, and is easily solved by using Excel or similar spreadsheet softwares (El-Khaiary, Malash et al. 2010). However, depending on the method of the pseudo-second-order equation linearized, the error distribution may shift worse. Thus it will become an inappropriate alternative approach to use the linearization process to assess the pseudo-second-order parameters. In this study, 6 different types of linear expressions of the pseudo-second-order kinetic equations have been applied to calculate the kinetic parameters and also to find the best linear type on the basis of the experiment data.

II. Materials and Methods

The experimental data utilized in this research was obtained from the literature (Shih 2012). The adsorbent utilized in this study is hydrochloric acid-treated rice husk (HRH) and the dye utilized in the literature was methylene blue (MB). The amount of dye adsorbed at time t (qt) and the amount of dye adsorbed at equilibrium time (qe) is computed by the following equations (Djeribi and Hamdaoui 2008, Huang and Shih 2014):

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Amount adsorbed at time \( q_t \) (mg/g) is
\[
\frac{(C_i - C_t)V}{M}
\]
(1)

Amount adsorbed at equilibrium time \( q_e \) (mg/g) is
\[
\frac{(C_i - C_e)V}{M}
\]  
(2)

where \( V \) is the volume of dye solution (L). \( C_i, C_t \) and \( C_e \) (mg/L) are the liquid phase concentrations of dyes initially, at time \( t \) and at equilibrium time, respectively. \( M \) is the weight of adsorbent used (g).

The differential form of pseudo-second-order equation derived on the basis of adsorption capacity on solid phase can be written as follows (Ho, McKay et al. 2000, Demirbas, Kobya et al. 2004, Ofohite 2007, Sarı, Tuzen et al. 2007, Neše and T. Ennil 2008):

\[
d\frac{dq_t}{dt} = K_2(q_e - q_t)^2
\]

(3)

where \( q_t \) (mg/g) is the amount of MB sorbed on the surface of HRH at time \( t \) (min); \( q_e \) is the amount of MB sorbed at equilibrium (mg/g) and \( K_2 \), the rate constant of the sorption (min\(^{-1}\)). Integrating Eq. [3] for the boundary conditions \( t = 0 \) to \( t = t \) \( q_e \) to \( q_e \), gives (Huang and Shih 2014):

\[
\frac{1}{q_e - q_t} = \frac{1}{q_e} + K_2 t
\]

(4)

which is the linearized forms of the integrated rate law for the pseudo-second-order equation. Eq.[4] will be the first type of linearized forms of pseudo-second-order equation. Eq.[4] can be rearranged to obtain another 5 alternative linearized types of pseudo-second-order expressions (Kumar 2006, Hamdaoui, Saoudi et al. 2008, Chowdhury and Das Saha 2011):

\[
\frac{1}{q_t} = \frac{1}{q_e} + \frac{1}{K_2 q_e} t
\]

(5)

\[
q_e = q_e - \frac{1}{K_2 q_e} t
\]

(6)

\[
\frac{q_t}{t} = K_2 q_e^2 - K_2 q_e q_t
\]

(7)

\[
\frac{1}{t} = -K_2 q_e + K_2 q_e^2 \frac{2}{q_t}
\]

(8)

\[
\frac{t}{q_t} = \frac{1}{K_2 q_e^2} + \frac{1}{q_e} (t)
\]

(9)

III. RESULTS AND DISCUSSION

Linear regression is frequently applied to find the best-fitting kinetical equation. For the present study, the experimental data for MB adsorbed onto HRH were fitted to the six different linearized forms of pseudo-second-order equations. The theoretical \( q_e \) and the rate \( K_2 \) for the type 1 linearized forms of pseudo-second-order expression can be obtained from the slope and intercept of the plots between \((1/(q_e-q_t))\) and \( t \) (fig.1). In fact, the rate constant \( K_2 \) and the theoretical \( q_e \) for the various linearized form of pseudo-second-order equations, i.e., type 2, type 3, type 4, type 5 and type 6 also can be calculated from the plot of \( 1/q_t \) vs. \( 1/t \) (fig.2), \( q_t \) vs. \( q_t/t \) (fig.3), \( q_t/t \) vs. \( q_t \) (fig.4), \( 1/t \) vs. \( 1/q_t \) (fig.5) and \( t/q_t \) vs. \( t \) (fig.6), respectively (Kumar 2006, Hamdaoui, Saoudi et al. 2008).
The best-fit linear form of kinetic equations is generally selected based on the error functions that produce minimum error distribution between the experimental and predicted values. The calculated results of kinetic parameters and the correlation coefficient, $R^2$ for these 6 different linearized types of pseudo-second-order equations are shown in Table 1. It was observed that the $q_e$ values, $K_2$ values and $R^2$ values calculated from these six linear expressions of pseudo-second-order equations were different. From Table 1, it can be observed that different linear expressions of the same kinetic model significantly affect calculations of the parameters. Also, it was observed that type 6 expression had the highest $R^2$ value (0.9905) for the MB adsorption on HRH, this high $R^2$ value implied that Type 6 linear expression of pseudo-second-order equation would be the most suitable for the experimental results of the MB adsorption on HRH. From Table 1, it was observed that the $R^2$ values of type 3 and type 4 expressions are lower than 0.91, and the $R^2$ values of type 1, type 2 and type 5 expressions are higher than 0.97. These high $R^2$ values of type 1, type 2 and type 5 expressions indicated that these three type linear expressions may also be used to represent the MB adsorption on HRH. From Table 1, the $q_e$ values predicted by type 6 and type 4 linear expressions closely relate with experimental value. However, from Table 1, it was able to be observed that the $q_e$ values of type 1, type 2 and type 5 expressions of pseudo-second-order equation failed to predict the $q_e$ values theoretically. In order to prove the precision of the $q_e$ calculated by these 6 different linearized types of pseudo-second-order equation. The $q_e$ values and $K_2$ values obtained from these six linear types of pseudo-second-order equations were brought into the nonlinear form of pseudo-second-order equation to compute the $q_t$ values. The nonlinear form of pseudo-second-order equation applied here is expressed as followed (Kumar 2006):

$$q_t = \left( \frac{K_2q_e^2t}{1 + K_2q_e^2t} \right)$$

(10)

Comparison between the experimental points and predicted $q_t$ for the adsorption of MB onto HRH by these six linear expressions of pseudo-second-order expressions were showed in Figure 7-12. If the $R^2$ values were used for comparison, the Type 6 linear expression would be most suitable, followed by the Type 1 linear expression. However, compared with the predicted $q_t$ value of the Type 1 linear expression, the predicted $q_t$ of the Type 1 linear expression was greatly deviated from the
The figure 12 indicated that the type of linear expression of pseudo-second-order equation succeed to predict the $q_t$ for the adsorption of MB onto HRH. All these
IV. CONCLUSION

From the survey of literatures, it can be found that the linear technique has been commonly applied in evaluating the quality of fit of a kinetic model to an experimental data in most adsorption researches. However, the transformation of a nonlinear expression to a linear expression could alter the normality assumptions of the linear least square method. A comparative investigation of six different linear expressions of pseudo-second-order equations in determining the kinetic parameters was conducted. The present findings suggest that it is not appropriate to use the $R^2$ values to select the best-fit linear forms of the same pseudo-second-order kinetic equatuion. The present findings suggest that the figures of comparison between the experimental points and predicted $q$, values which were calculated by the $q_e$ values and $k_2$ values obtained from these six linear types of pseudo-second-order equations can be used to determine the best-fitting linear expression of the pseudo-second-order equatuion.

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Light is only particle

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Abstract- Light is electromagnetic radiation within a certain portion of the electromagnetic spectrum. The word usually refers to visible light, which is visible to the human eye and is responsible for the sense of sight.[1] Visible light is usually defined as having wavelengths in the range of 400–700 nanometres (nm), or 4.00 × 10−7 to 7.00 × 10−7 m, between the infrared (with longer wavelengths) and the ultraviolet (with shorter wavelengths).[2][3] This wavelength means a frequency range of roughly 430–750 terahertz (THz).

The main source of light on Earth is the Sun. Sunlight provides the energy that green plants use to create sugars mostly in the form of starches, which release energy into the living things that digest them. This process of photosynthesis provides virtually all the energy used by living things. Historically, another important source of light for humans has been fire, from ancient campfires to modern kerosene lamps. With the development of electric lights and power systems, electric lighting has effectively replaced firelight. Some species of animals generate their own light, a process called bioluminescence. For example, fireflies use light to locate mates, and vampire squids use it to hide themselves from prey.

The primary properties of visible light are intensity, propagation direction, frequency or wavelength spectrum, and polarization, while its speed in a vacuum, 299,792,458 metres per second, is one of the fundamental constants of nature. Visible light, as with all types of electromagnetic radiation (EMR), is experimentally found to always move at this speed in a vacuum. [citation needed]

In physics, the term light sometimes refers to electromagnetic radiation of any wavelength, whether visible or not. [4][5] This sense, gamma rays, X-rays, microwaves and radio waves are also light. Like all types of light, visible light is emitted and absorbed in tiny "packets" called photons and exhibits properties of both waves and particles. This property is referred to as the wave–particle duality. The study of light, known as optics, is an important research area in modern physics.

Generally, EM radiation, or EMR (the designation "radiation" excludes static electric and magnetic near fields), is classified by wavelength into radio, microwave, infrared, the visible region that we perceive as light, ultraviolet, X-rays and gamma rays.

The behavior of EMR depends on its wavelength. Higher frequencies have shorter wavelengths, and lower frequencies have longer wavelengths. When EMR interacts with single atoms and molecules, its behavior depends on the amount of energy per quantum it carries.

Light is a visible ray travelling in straight line with speed of 300000kmps. It has dual nature and shows characteristics of both wave and particle, but its wave nature is a special case under certain conditions. We know that all experiments related to light favours it’s both nature but as we know that nature of anything is free from any external effect and wave nature of light is result of any external effect on it.

Index Terms- Visible ray, dual nature, special case, external effect, collides, vibration and emission, interplaneticalatmosphere, vibrating comes and emitting comes.

I. INTRODUCTION

The speed of light in a vacuum is defined to be exactly 299,792,458 m/s (approx. 186,282 miles per second). The fixed value of the speed of light in SI units results from the fact that the metre is now defined in terms of the speed of light. All forms of electromagnetic radiation move at exactly this same speed in vacuum.

Different physicists have attempted to measure the speed of light throughout history. Galileo attempted to measure the speed of light in the seventeenth century. An early experiment to measure the speed of light was conducted by Ole Romer, a Danish physicist, in 1676. Using a telescope, Romer observed the motions of Jupiter and one of its moons, Io. Noting discrepancies in the apparent period of Io's orbit, he calculated that light takes about 22 minutes to traverse the diameter of Earth's orbit.[14] However, its size was not known at that time. If Romer had known the diameter of the Earth's orbit, he would have calculated a speed of 227,000,000 m/s.

Another, more accurate, measurement of the speed of light was performed in Europe by Hippolyte Fizeau in 1849. Fizeau directed a beam of light at a mirror several kilometers away. A rotating cog wheel was placed in the path of the light beam as it traveled from the source, to the mirror and then returned to its origin. Fizeau found that at a certain rate of rotation, the beam would pass through one gap in the wheel on the way out and the next gap on the way back. Knowing the distance to the mirror, the number of teeth on the wheel, and the rate of rotation, Fizeau was able to calculate the speed of light as 313,000,000 m/s.

Léon Foucault carried out an experiment which used rotating mirrors to obtain a value of 298,000,000 m/s in 1862. Albert A. Michelson conducted experiments on the speed of light from 1877 until his death in 1931. He refined Foucault's methods in 1926 using improved rotating mirrors to measure the time it took light to make a round trip from Mount Wilson to Mount San Antonio in California. The precise measurements yielded a speed of 299,796,000 m/s.[15]

The effective velocity of light in various transparent substances containing ordinary matter, is less than in vacuum. For example, the speed of light in water is about 3/4 of that in vacuum.

Two independent teams of physicists were said to bring light to a "complete standstill" by passing it through a Bose–
Einstein condensate of the element rubidium, one team at Harvard University and the Rowland Institute for Science in Cambridge, Massachusetts, and the other at the Harvard–Smithsonian Center for Astrophysics, also in Cambridge.[16] However, the popular description of light being "stopped" in these experiments refers only to light being stored in the excited states of atoms, then re-emitted at an arbitrary later time, as stimulated by a second laser pulse. During the time it had "stopped" it had ceased to be light.

Light is only particle. When it emits from any sources, it collides with particle present in atmosphere and becomes change into wave form due to vibration of that particle. Emitted light comes on collision, forms wave nature. After collision, mass of particle readily changes into two ways vibration and emission and energies released in both cases are in form of wave. Newton and Heisenberg had their own concept about light but Newton’s concept is much accurate and natural while Heisenberg’s concept is only special case of light.

Explanation:- When light emitted from sun, it be in particle form before leaving surface of sun. When it enters in interplanetary atmosphere or gravitational field of earth and collides with air particle, readily changes into wave form. Light shows particle nature only in vacuum and this is it’s original form because there is no any external effect (particle present in atmosphere). Original form of anything is a state in which no any external effect affect it. On earth, sunlight or other kinds of light are in form of wave because vacuum generated on earth have some impurities as particle in it. If there will be cent percent vacuum on earth then there will be also it’s wave nature due to collision with particle present in between sun and gravitational field of earth. If we manage such a system that a vacuum path may exist from sun to earth then light will show particle nature on earth everywhere and everytime. But we know that this is an impossible event. Projected light in vacuum tube on earth shows particle nature. Photoelectric effect, Compton effect and other such particle theory based experiments occur on earth due to some reason.

When light enters on metal surface, it’s wave form affects the particle of metal. Hence particles of that metal disturb and vibrate. Finally electrons of that metal face vibration and come out from metal surface. On projection of electrons in vacuum, formed fringes on screen occur due to collision of particle (collision of electrons with particle present in that vacuum tube) because some light enters in vacuum tube by refraction. If there will be no any external light then light on screen for fringes be responsible for it and if there will be no light then we can’t see fringes. It’s means to see particle nature of light, we have to form complete vacuum tube and then pass light through it. De-Broglie’s phenomena deals about dual nature of light (quantum theory of light) only in non vacuum region which is obviously not general case of light because it doesn’t say clearly phenomena of light in pure vacuum.

When a beam of light crosses the boundary between a vacuum and another medium, or between two different media, the wavelength of the light changes, but the frequency remains constant. If the beam of light is not orthogonal (or rather normal) to the boundary, the change in wavelength results in a change in the direction of the beam. This change of direction is known as refraction.

The refractive quality of lenses is frequently used to manipulate light in order to change the apparent size of images. Magnifying glasses, spectacles, contact lenses, microscopes and refracting telescopes are all examples of this manipulation.

LightWave 3D combines a state-of-the-art renderer with powerful, intuitive modeling, and animation tools. Tools that may cost extra in other professional 3D applications are part of the product package, including 999 free cross-platform render nodes, support for Windows and Mac UB 64 and 32-bit operating systems, free technical support and more. LightWave is enjoyed worldwide, as a complete 3D production solution for feature film and television visual effects, broadcast design, print graphics, visualization, game development, and Web. LightWave is responsible for more artists winning Emmy Awards than any other 3D application.

Major Studios and Post-Production Houses spend years assembling their custom pipelines, often at great expense and requiring large numbers of technical staff to maintain. Those complex pipelines are perfect for companies with hundreds of employees, but can be overkill for the majority of studios around the world with 40 employees or less.

LightWave fits seamlessly into large multi-software pipelines - with its powerful interchange tools including FBX, ZBrushGoZ, Collada, Unity Game Engine Support, and Autodesk Geometry Cache. Unlike other software packages, LightWave offers artists and studios a complete end-to-end solution right out of the box. Robust polygonal and subdivision surface modeling, unique. Interchangeable layered and nodal texturing, along with powerful dedicated node material shaders. Powerful animation and rigging tools. Eye-popping volumetric and dynamic effects systems. A production proven, award-winning Global Illumination render engine - built in. You decide what workflow or pipeline suits you best and LightWave puts all of the tools in your hands.

LightWave has been the choice of countless studios and artists for over 20 years. Chances are LightWave was used to create many of your favorite films, television programs, and games. Download the LightWave 3D trial today and see why so many artists depend on LightWave to get their work done, on time, on budget, and with amazing render quality - it's all in the box!

LightWave has extremely robust interchange tools tested and production-proven by top Hollywood studios. This allows easy dataflow back and forth between LightWave and the other major 3D animation and effects software packages. LightWave offers a complete pipeline from model to render but the sky is the limit with your pipeline setup. LightWave can solve problems and offer unique solutions for any mixed software pipeline.

For example, rig and animate in Maya and then export your geometry cache files directly into LightWave where you can build your environments, add effects, and then render the entire project in LightWave. Or simply model and texture your geometry in LightWave and export via FBX to any major package. Another example would be quickly rigging in LightWave and exporting the rig to Motionbuilder where you can apply motion capture files and then import the final character performance into Maya or Max. It's your pipeline with your unique needs. LightWave can be a powerful tool to solve a large number of production problems and help streamline your project.
After emitting two types of comets (in wave form) i.e. vibrating and emitting comets. Vibrating comets occur in particle, not can be use to do any work (due to wasting this comes in exciting electrons) whereas emitting comets can use in any work. So we can say that vibrating comets is just showing comets not useful and emitting comets is useful comets.

Technically, quantum theory is actually the theory of any objects isolated from their surroundings but, because it is very difficult to isolate large objects from their environments, it essentially becomes a theory of the microscopic world of atoms and sub-atomic particles. This is especially true for those parts of the theory which rely on the absolute indistinguishability of fundamental particles, an indistinguishability which is impossible to find in the everyday world of composite, large-scale objects.

Quantum theory is used in a huge variety of applications in everyday life, including lasers, CDs, DVDs, solar cells, fibre-optics, digital cameras, photocopiers, bar-code readers, fluorescent lights, LED lights, computer screens, transistors, semi-conductors, super-conductors, spectroscopy, MRI scanners, etc, etc. By some estimates, over 25% of the GDP of developed countries is directly based on quantum physics. It even explains etc, etc. By some estimates, over 25% of the GDP of developed countries is directly based on quantum physics. It even explains the nuclear fusion processes taking place inside stars.

However, some of its findings and principles are distinctly counter-intuitive and fiendishly difficult to explain in simple language, without resorting to complex mathematics way beyond the comfort level of most people (myself included!). This situation is not helped by the fact that the “theory” is largely a patchwork of fragments accrued over the last century or so, that some elements of it are still not well understood by the scientists themselves, and that some of the bizarre behaviour it predicts appears to fly in face of what we have come to think of as common sense.

Richard Feynman, winner of the 1965 Nobel Prize for Physics and arguably one of the greatest physicists of the post-war era, is unapologetically frank: “I think I can safely say that nobody understands quantum mechanics”. Niels Bohr, one the main pioneers of quantum theory, claimed that: “Anyone who is not shocked by quantum theory has not understood it”.

In the 1920s and 1930s, Bohr, Schrödinger, Heisenberg and others discovered that the atomic world is in fact full of murkiness and chaos, and not the precision clockwork suggested by classical theory. Classical physics can be considered as a good approximation to quantum physics, typically in circumstances with large numbers of particles. Indeed, classical physics has served us well up until the 20th Century, and for most everyday purposes it still does. But modern physics, which includes quantum physics and general relativity, is more all-encompassing, more fundamental and altogether more accurate - physics taken to a different level. Momentum and position, for instance, are approximations of the world of larger-sized things that we call the classical world, but the underlying reality of the quantum world is quite different.

As we will see, even a rough understanding of quantum theory requires some background discussion of atomic theory and some discussion of the uncertainty principle before any sense at all can be made of it. Only then will some of the more obscure and bizarre aspects of quantum theory (such as wave-particle duality, superposition, nonlocality, decoherence, etc) make a little more sense. So, please, bear with me.

A central concept of quantum mechanics, duality addresses the inadequacy of conventional concepts like "particle" and "wave" to meaningfully describe the behaviour of quantum objects.

The idea of duality is rooted in a debate over the nature of light and matter dating back to the 1600s, when competing theories of light were proposed by Christian Huygens and Isaac Newton.

Through the work of Albert Einstein, Louis de Broglie and many others, it is now established that all objects have both wave and particle nature (though this phenomenon is only detectable on small scales, such as with atoms), and that a suitable interpretation of quantum mechanics provides the overarching theory resolving this ostensible paradox.

Maxwell calculated the speed of travel for the waves, i.e. electromagnetic waves, revealed by his mathematical formulas. He said speed was simply one over the square root of the electric permittivity in vacuum times the magnetic permeability in vacuum. When he assigned "9 x 109/4π for the electric permittivity in vacuum" and "4π x 10-7 for the magnetic permeability in vacuum," both of which were known values at the time, his calculation yielded 2.998 x 108 m/sec. This exactly matched the previously discovered speed of light. This led Maxwell to confidently state that light is a type of electromagnetic wave.

The light particle conceived by Einstein is called a photon. The main point of his light quantum theory is the idea that light's energy is related to its oscillation frequency (known as frequency and oscillation frequency of wave in the case of radio waves). Oscillation frequency is equal to the speed of light divided by its wavelength. Photons have energy equal to their oscillation frequency times Planck's constant.

After emitting two types of comets (in wave form) i.e. vibrating and emitting comets and emitting comets, Einstein speculated that when electrons within matter collide with photons, the former takes the latter's energy and flies out, and that the higher the oscillation frequency of the photons that strike, the greater the electron energy that will come flying out. In short, he was saying that light is a flow of photons, the energy of which is the height of their oscillation frequency, and the intensity of the light is the quantity of its photons.

Einstein proved his theory by proving that the Planck's constant he derived based on his experiments on the photoelectric effect exactly matched the constant 6.6260755 x 10-34 (Planck's constant) that German physicist Max Planck (1858 to 1947) obtained in 1900 through his research on electromagnetic waves. This too pointed to an intimate relationship between the properties and oscillation frequency of light as a wave and the properties and momentum (energy) of light as a particle, or in other words, the dual nature of light as both a particle and a wave.

II. CONCLUSION

It is clear that particle of light occurs in vacuum as well as entering in metal surface (in medium) whereas wave nature occurs only in medium. Therefore light shows it original form in vacuum which is particle nature. So it is clear that light is only particle.
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AUTHORS

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The Need for a Competency Model of Programming Teachers: a Need Analysis Survey

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Abstract- programming teachers should have appropriate skills or competency to help them impart the knowledge of programming to their students. Further compounding the problem, the subject matter, being a computing course, is subject to continual changes that pose serious challenges to teachers in keeping abreast with new elements of learning contents. Put simply, teachers have to continually enhance their knowledge of the subject to ensure students will receive up-to-date information or knowledge pertaining to programming. Such a case puts a heavy strain on programming teachers, especially the less experienced ones. Against this backdrop, a needs analysis study was carried out to ascertain the requirements needed for the development of a competency model of teachers that can help provide the guidelines and knowledge pertaining to programming teachers. The study was based on a quantitative approach using a semi-structured survey, in which 45 programming teachers were randomly selected from various schools throughout Malaysia. A field survey was performed to yield the frequencies and percentages of the competency items of the research instrument. Overall, a reasonable number of elements of competency construct was determined that can help improve the development of such competency model.

Index Terms- model competency, programming, need analysis, programming teachers

I. INTRODUCTION

Arguably, teaching programming is very challenging, as it demands strong ability and tenacity of computer science educators. More profoundly, programming teachers’ competency will have a huge impact on the current pedagogy used by teachers in their classroom. Furthermore, in programming assessment, such competency is vital to ensure effective teaching. In this respect, good assessment can only be carried out by teachers who have strong content knowledge of programming [1].

As highlighted, teachers’ competency in teaching programming is important and essential to ensure effective teaching. Clearly, programming teachers’ knowledge is different from other subject teachers’ knowledge, because the nature of the former is totally different from the latter [2]. Undeniably, programming teachers need to have sound knowledge of the subject matter, of teaching and learning principles, and of pedagogical content knowledge, as characterized by Shulman [30].

Given the needs to have these characteristics, many scholars have expressed their concerns about the quality of teaching programming among such teachers [4]. To dispel such concerns, programming teachers must strive to find the optimal teaching approach by which they can overcome many of the problems in teaching programming such that student learning is improved. Therefore, it becomes imperative to identify and to determine the essential components or element of competency that can guide the development of competent programming teachers.

Without doubt, developing such teachers is challenging, given the myriad of complex factors, such as teacher’s knowledge, the intricate relations between theoretical and practical aspects of teaching process, and potential problems that may surface during the teaching of a particular programming topic. Together, the problems and challenges in teaching and learning of the subject matter will take a heavy toll on students’ interest and confidence. In such situation, programming teachers must intensify their efforts and seek better strategies to help their students who may be overwhelmed in learning programming.

II. RELATED WORK

The literate is replete with previous studies pertaining to the examination and development of a number of learning tools and innovative methods to improve the teaching and learning of programming for both secondary and tertiary level. Nonetheless, the findings of such studies showed that most teachers often failed to use appropriate teaching methods and teaching strategies [5], which could help improve student learning. Apparently, such failure seemed to stem from the lack of knowledge and skills of the teachers in coping with diverse students’ learning styles.

Additionally, the literature discusses aspects relating to the preparation of competent teachers in the field of science computer. The aspects discussed include teachers preparation [5, 6, 7,8] and teachers’ pedagogical contents knowledge [9, 10]. Likewise, the discussions also delve into the pedagogical contents knowledge of teachers involved in the teaching of programming [11, 12, 13, 14].

Overall, the findings of these studies help explain and highlight the importance of knowledge that each teacher should have in the context of teaching programming. In short, the findings suggest that programming teachers must be equipped with appropriate knowledge and skills to ensure successful teaching and learning of programming.

In a study by researcher [15], it was found that teachers involved in teaching computing lacked not only knowledge but
also motivation. Furthermore, [16] found that teachers did not focus on appropriate students’ learning styles in the teaching and learning process such as to help the latter to think creatively and critically. Based on this study, the researchers assert that teaching styles of teachers will have a huge impact on learning process through which students will be able to improve their creativity and interest in programming. Similarly, past research [16] found that the teaching methods or approaches used by most teachers were quite rigid, which might run counter to the various learning styles of their students. Such teaching approaches may disadvantage certain students, whose learning styles may not be suitable with the type of presentation and delivery of learning contents used by their teachers. Obviously, the lack of pedagogical knowledge or skills among programming teachers will adversely affect students’ motivation to learn the subject matter [17].

III. METHODOLOGY

Naturally, the imperative to develop a particular model is driven by the research gap in a particular area of study. As discussed in the previous section, there is an urgent need to develop a competency model of programming teachers that can help measure such teachers’ competency and ultimately help provide a set of guidelines with which teachers can be guided in carrying out their teaching activities. In this regard, a needs analysis should be first carried out to ascertain the need for the development of such guidelines. Hence, this study was undertaken using a semi-structured survey, in which 45 programming teachers were randomly selected from various schools throughout Malaysia. Essentially, the main purpose of this survey was to explore and identify relevant elements of teaching competency based on the respondents’ feedback and opinions.

A. Participant

The selection of respondents in the first phase of this study was performed using purposeful sampling method. Specifically, the researcher selected such respondents consisting of teachers who are teaching, in general, computer science and, in particular, programming. For this study, the term “programming teachers” refers to both school teachers and lecturers of various universities in Malaysia, who are teaching programming. Forty-five respondents were recruited comprising teachers of public secondary schools and lecturers of several public and private institutions of higher learning.

B. Research Instrument

The development of the research instrument used in this study was guided by the preliminary analysis of the related literature. Essentially, this instrument has three main sections. Section A contains items pertaining to respondents’ demographics. Section B comprises items relating to the knowledge of respondents in programming. Section C consists of items regarding the skills of respondents in programming and their agreement with the needs for the development of a competency model of programming teachers. The validation of the instrument was based on expert validation carried out by an academic who is expert and experienced in both fields of education and technology. In the validation process, individual discussion was performed to obtain the expert’s opinions and recommendations regarding the questionnaire items in terms of their clarity and coherence and the validity of the constructs. Essentially, each feedback and recommendation were noted and incorporated into the instrument to improve its reliability and quality.

IV. DATA ANALYSIS

The needs analysis study was carried out through a survey using a semi-structured questionnaire. This research instrument was administered online to 45 respondents, consisting of teachers and lecturers to obtain relevant data pertaining to elements of a competency model of programming teachers. The researcher used the quantitative approach to analyse the distribution of such data based on the frequency and percentage of each item of the questionnaire using SPSS. These statistical measures helped highlight and emphasize the needs for the development of the competency model of programming teachers in Malaysia.

V. RESULT AND DISCUSSION

The analysis carried out was intended to identify the basic knowledge of the surveyed teachers in programming and to ascertain the needs for the development of the competency model of programming teachers. The following subsections discuss the findings of this analysis.

A. First Findings: Conceptual Knowledge of Programming

The first set of questions of the needs analysis survey pertained to the contents or conceptual programming knowledge of the respondents. Effectively, this question helped highlight the conceptual programming knowledge of respondents that they would use in their teaching. Such highlight enabled the researcher to develop appropriate themes regarding programming concepts based on respondents’ input. Table 1 summarizes the themes of conceptual programming knowledge identified in this survey.

Table 1: The themes of conceptual programming knowledge

<table>
<thead>
<tr>
<th>Themes</th>
<th>Percentage (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Structure</td>
<td>95% (f=43)</td>
</tr>
<tr>
<td>Data Structure</td>
<td>40% (f=18)</td>
</tr>
<tr>
<td>Variables</td>
<td>37% (f=17)</td>
</tr>
<tr>
<td>Array</td>
<td>28% (f=13)</td>
</tr>
<tr>
<td>Algorithm</td>
<td>17% (f=8)</td>
</tr>
<tr>
<td>Function</td>
<td>15% (f=7)</td>
</tr>
<tr>
<td>Constant</td>
<td>15% (f=7)</td>
</tr>
<tr>
<td>Logical Thinking</td>
<td>15% (f=7)</td>
</tr>
<tr>
<td>Syntax</td>
<td>6.6% (f=3)</td>
</tr>
</tbody>
</table>
The findings of the conceptual programming knowledge showed nine components of such knowledge that were deemed important by the respondents in teaching the subject matter, namely control structure, data structure, variables, arrays, algorithms, functions, constants, logical thinking, and syntaxes, which were based on similar themes of previous studies reported in the literature of programming [16, 18, 19, 20].

B. Second Findings: Pedagogy Knowledge of Programming

The second set of questions of the needs analysis survey focused on the method or approach used by the respondents in teaching programming. More importantly, answers to the questions helped provide the researcher with a clear overview of the method or approach applied in the teaching process by the respondents. Essentially, the respondents' answers assisted the researcher to develop appropriate themes relating to the method of teaching programming. Table 2 summarizes the themes deemed vital in the teaching of programming by the respondents.

Table 2: The themes of pedagogical contents knowledge

<table>
<thead>
<tr>
<th>Themes</th>
<th>Percentage (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encouraging students to work in group</td>
<td>60% (f=27)</td>
</tr>
<tr>
<td>Providing students with training or questions</td>
<td>46% (f=21)</td>
</tr>
<tr>
<td>Providing students with simple examples</td>
<td>42% (f=19)</td>
</tr>
<tr>
<td>Planning effective learning activities for students</td>
<td>28% (f=13)</td>
</tr>
<tr>
<td>Preparing challenging learning activities for students</td>
<td>15% (f=7)</td>
</tr>
<tr>
<td>Assessing students’ learning performance</td>
<td>13% (f=6)</td>
</tr>
<tr>
<td>Identifying students’ learning problems</td>
<td>11% (f=5)</td>
</tr>
</tbody>
</table>

The second part of the survey questionnaire helped the researcher to develop seven specific themes. Nonetheless, the themes were amended slightly to ensure they were aligned with the appropriate elements of pedagogy used in the teaching of programming, as outlined by the objectives and aims of the study, which had been highlighted in the literature.

C. Third Findings: Problem Solving Knowledge

The third set of questions of the survey dealt with the method of problem solving used by the respondents in teaching programming. These questions were posed to the respondents to determine their current knowledge in solving problems associated with the teaching of programming. Table 3 summarizes the themes of this problem-solving construct.

The findings showed that the respondents solved programming problems by analyzing, solving, and interpreting such problems. This particular finding is consistent with other findings such as last research on problem solving [21, 22], indicating the method of solving programming problems begin with interpreting and analyzing such problems accordingly.

D. Fourth Findings: Difficulties in Teaching Programming

The fourth set of questions of the survey helped the researcher to elicit information regarding the difficulties of respondents in teaching programming. The researcher shortlisted six options for the survey questions, however, one more thematic question was added to take into account other difficulties highlighted by the respondents. Table 4 summarizes the difficulties faced by respondents in the teaching of programming.

Table 4: Difficulties in the teaching of programming

<table>
<thead>
<tr>
<th>Type of teaching difficulties</th>
<th>Percentage (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of skills in programming</td>
<td>64% (f=29)</td>
</tr>
<tr>
<td>Lack of knowledge in programming</td>
<td>37% (f=17)</td>
</tr>
<tr>
<td>Lack of confidence in carrying out teaching activities of programming</td>
<td>68% (f=31)</td>
</tr>
<tr>
<td>Lack of enthusiasm in carrying out teaching activities of programming</td>
<td>31% (f=14)</td>
</tr>
<tr>
<td>Lack of support in performing teaching activities of programming</td>
<td>26% (f=12)</td>
</tr>
<tr>
<td>Lack of equipment in performing teaching activities of programming</td>
<td>13% (f=6)</td>
</tr>
<tr>
<td>Lack of interest in programming</td>
<td>11% (f=5)</td>
</tr>
</tbody>
</table>

This part of the survey revealed there were seven types of difficulty faced by the respondents. Such findings seem to concur with other findings [23]. In fact, the same researchers concluded that learning programming entailed strong skills and knowledge to overcome such problems. Similarly, researcher [24] found that teaching programming was challenging, but they noticed that teaching structured programming, in particular, was even more problematic. To overcome such problems, the researchers strongly advocate more training sessions to be carried out in group in the computer laboratory.

E. Fifth Findings: Self-Motivation in Teaching Programming

The fifth set of questions of the survey concerned the method or approach used by the respondents to motivate themselves in the teaching activities of programming. For this self-motivation construct, the researcher identified three themes based on the respondents’ feedback. Table 5 summarizes the three themes of the self-motivation construct.
As unanimously agreed by all educators, motivation plays an important role in developing and nurturing the interest and confidence of learners in their academic pursuits. Especially in learning programming — universally accepted as one of the toughest subjects — such psychological construct exerts a strong affective influence on students’ confidence to learn not only effectively but also persistently [25].

F. Sixth Findings: Knowledge Skill in Programming

The sixth questions of the needs analysis survey entailed respondents to provide either “yes” or “no” response. The main objective of these questions was to reveal the level of skills or competency of respondents in programming. The analysis of responses of such questions showed a majority of the respondents, at more than 90%, did not have any knowledge with regard to their skills in programming. Arguably, a number of constraints might have impeded their efforts to become competent programming teachers. Hence, coupled with a lack of teaching resources, low competency among programming teachers further exacerbates the difficulties in teaching and learning programming. Clearly, such a finding further reinforces the imperative to develop a competency model of programming teachers.

G. Seventh Findings: The needs for the competency model of programming teachers

The final set of questions of the needs analysis survey focused on the needs for the development of a competency model that can help measure the level of skills or competency of programming teachers. Interestingly, all the respondents unanimously registered their strong desire for such a competency model to which they could refer in measuring their level of skills in programming. Even a study by [26] in 2015 explains that there is no model of teacher competence in computer science.

VI. CONCLUSION

Undeniably, a needs analysis can help highlight current issues surrounding the teaching and learning of school subjects. As demonstrated in this study, programming teachers had to deal with a host of teaching difficulties, which would be better understood by having a suitable competency model of programming teachers. As such, the researcher carried out a needs analysis survey involving a group of programming teachers to collect important information that helped determine appropriate components or elements of the competency construct. The findings of the needs analysis suggest that programming teachers in Malaysia urgently need a competency model to help guide them in determining the important competency elements of programming that they need to possess and master. In addition, such a competency model can help determine and measure existing levels of programming competency of such teachers.

REFERENCES


Table 5: Themes of self-motivation in teaching programming

<table>
<thead>
<tr>
<th>Themes</th>
<th>Percentage (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning and making effort to enhance knowledge in programming field</td>
<td>64% (f = 29)</td>
</tr>
<tr>
<td>Discussing with teachers and experts in solving problems related to programming</td>
<td>26% (f = 12)</td>
</tr>
<tr>
<td>Empathizing with students in dealing with their learning problems such as to motivate them to learn programming</td>
<td>6% (f = 3)</td>
</tr>
</tbody>
</table>


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Isolation, Screening, Statistical media optimization, Purification and Structural characterization of bioactive compound from marine derived Streptomyces sp JS-S6.

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Abstract- Exploitation and overuse of antibiotics in the health sectors leads to the development of resistance mechanism in microbes against antibiotics. As a consequence, there is a vital need to develop effective lead compound from natural sources. Compounds derived from marine habitat have a remarkable nature of unique chemical structures and exhibit bioactivity, so it can be used in the treatment against antibiotic resistant clinical pathogens. The present study was mainly focused on isolation and screening of novel Streptomyces species against clinical pathogens from unexplored marine environment. In this study, thirty five actinomycetes isolates were identified. Among these, the isolate JS-S6 exhibits a strong antagonistic effect against the pathogens used. The 16S rRNA gene analysis of the isolate JS-S6 showed that it was similar to Streptomyces viridobrunneus LMG20317 and named as Streptomyces sp JS-S6. The Scanning Electron Microscopy (SEM) studies revealed that the spores were highly abundant, irregular in shape and distributed unequally. One Factor at a time (OFAT) medium optimization revealed that starch, ammonium sulphate and seven days of incubation period as efficient factor to emphasis the maximum biomass production and highest antibacterial activity. Placket Burman method and central composite design of response surface methodology in statistical media optimization disclosed the significant factors were starch, ammonium sulphate and Sodium chloride and their optimum concentration were 1%, 0.2% and 0.1 % respectively for maximum biomass production and antibacterial activity. Mass fermentation was carried out with optimized medium and purification of crude extract was done by silica column chromatography. The UV-Visible spectroscopy analysis showed that the compound has maximum absorption at 260.0 nm and FTIR analysis revealed the presence of methoxy functional group. The GC-MS analysis also strongly suggest that the bioactive metabolite was found to be Methyl N-hydroxybenzenecarboximidate ( Oxime-Methoxy phenyl compound) when compared with mass spectra of Wiley and NIST95 database. The compound exhibited strong antibacterial activity against clinical pathogens without exhibiting cytotoxicity potential against H9C2 cell line. From this study it was clear that the bioactive compound from Streptomyces sp. JS-S6 have antibacterial activity against clinical pathogens. In future, it can be developed as potential lead molecule against pathogens that develop resistance against antibiotics.

Index Terms- Marine Streptomyces, media optimization, Spectroscopy studies.

I. INTRODUCTION

Combating drug resistant bacteria was found to be nightmare scenario for most of the clinicians. In order to overcome this issue, the lead bioactive molecule derived from natural source can be used as an effective drug candidate against the emerging drug resistance pathogens. Currently, most of the available drugs were originated from the microbial source (Singh et al., 2014). Bioactive molecules from marine microbes with unique chemical entity have the ability to tackle the drug resistant bacteria and can be developed as broad spectrum antibiotics in future (Mangamuri et al., 2016). In the marine microbial world, Streptomyces genus of actinomycetales order made headway as the lead bioactive molecule producer in the synthesis of commercially important pharmaceutical products (Manivasagan et al., 2014). Streptomyces are filamentous gram positive bacteria with inimitable and complicated secondary metabolite pathways that synthesize antibiotics, antitumor agents, immunosuppressants and enzyme inhibitors (Khattab et al., 2016). Most of the antibiotics that are currently in usage were obtained from the genus Streptomyces. In Microbial natural product, surplus amount of starting material for the drug candidate can be obtained from the fermentation process (Carter, 2011). In the present study, among 35 isolates, the isolate JS-S6 showed antagonistic effect against the clinical pathogens was selected. It was then subjected to media optimization, mass fermentation, purification and spectral studies of the purified compound. Cytotoxicity of the bioactive compound was verified with the H9C2 normal cell line.

II. MATERIALS METHODS

Isolation and screening for antagonistic isolate:

The sediment sample used in the study was collected at a depth of 2.0 m from the mangrove estuary of Arabian Sea, Kanyakumari district, located in southern part of India (8.083° N, 77.5385° E). The sediment samples were transported to the laboratory in aseptic condition. Isolation was carried out using 1.0 g of marine sediment sample by standard serial dilution and plating method in Actinomycetes Isolation medium that constitutes of Soluble Starch 20 g, KNO₃ 1 g, NaCl 0.5 g, K₂HPO₄ 0.5 g, MgSO₄.7H₂O 0.5 g, FeSO₄.7H₂O 20 µM, Agar 15 g in 1000 ml of brackish water from mangrove habitat (Santhi and Jebakumar, 2011). Nalidixic acid (50.0 µg mL⁻¹) and Ketoconozole (50.0 µg mL⁻¹) were added to inhibit the growth of
gram-negative bacteria and fungi respectively. The plates were incubated at 28ºC for about 10-14 days. Pure cultures were obtained by repeatedly re-streaking the colonies with different morphology from the Actinomycetes Isolation Medium. Antibacterial potential of compounds from the marine isolates were tested against a panel of clinical pathogens.

**Determination of Antibacterial activity for the compound produced by marine isolates**

Clinical pathogens were obtained from Kovai Medical Center Hospital, Coimbatore and they were used to determine the antibacterial activity of compound produced by marine isolates. Clinical pathogens were swapped on molten MHA plates in the Biosafety Level II laminar air flow chamber and then the bioactive compounds impregnated discs were placed on plates inoculated with a test pathogens. The disc loaded with the chloroform was maintained as a negative control. After overnight incubation at 37ºC, the plates were observed for zone of inhibition and measured. The isolate with the antibacterial activity was selected for the further study.

**Morphological characteristics of isolate with antibacterial activity**

Morphological characteristics of the isolate with antibacterial activity were studied in different International Streptomyces Project (ISP) medium. The media used were (ISP-1- Tryptone Yeast Extract agar media), (ISP-2- Yeast Extract Malt Extract agar medium), (ISP-3- Oat-Meal agar medium), (ISP-4- Inorganic Salt Starch agar medium), (ISP-5- Glycerol-Asparagine agar media), (ISP-6- Peptone Yeast extract iron agar media), (ISP-7- Tyrosine agar medium) and Starch casein agar medium (Shirling and Gottlieb, 1966). The culture plates were incubated at room temperature for 5-7 days. The colour of both substrate and aerial mycelia, together with the production of soluble pigments, were determined by comparison with chips from the ISCC-NBS colour charts (Kelly, 1964).

**Genomic DNA isolation, 16S rRNA gene amplification and sequencing**

Genomic DNA was isolated as described by Hopwood et al., 1985. 16S rRNA gene was amplified using specific universal primers 27F 5’-AGA GTT TGA TCC TGG CTC AG-3’ and 1492R 5’-GTT TAC TCA GGT TTA CCA G-3’ (Sigma Genosys, India). The PCR reaction mixture consist of 1X reaction Buffer (10 mM Tris [pH 8.3], 50 mM KCl, 1.5 mM MgCl2), 200 µM dNTPs, 0.05 U of Taq DNA polymerase enzyme (Sigma, USA), 10 pM of each primer and 30 ng template DNA. The conditions for initial denaturation were 94°C , 5 min ; 31 cycles of 30 s at 95°C, 1 min 30 s at 54°C, 2 min at 72°C, and a final extension for 5 min at 72°C. The amplification reaction was performed with a thermal cycler (MyCycler, Bio-Rad, USA). The phylogenetic analysis of 16S rRNA gene was performed by PHYLIP 3.68 (Felsenstein, 2008) using bootstrapping over 1000 replicates.

**Media optimization for the antagonistic isolate**

**Optimization of Carbon and Nitrogen sources**

To determine the effective carbon source, eight different carbon sources such as sucrose, glucose, fructose, mannitol, xyllose, lactose, starch and maltose were supplemented at 1% w/v to the minimal medium. The influence of various nitrogen sources such as sodium nitrate, potassium nitrate, ammonium sulphate, ammonium chloride, ammonium dihydrogen orthophosphate and urea were studied by independently adding nitrogen source at 0.2% w/v to the minimal medium containing optimized carbon source at 1% w/v. Effective carbon and nitrogen source was selected based on biomass production and antibacterial activity of the bioactive molecule synthesized by the antagonistic isolate.

**Optimization of incubation period**

The fermentation medium containing optimized carbon and nitrogen source in the minimal media were incubated for fifteen days. Biomass production and antibacterial activity were recorded to determine the suitable incubation period.

**Statistical Media Optimization**

Statistical approach such as placket Burmann design was acclimatized to identify the factors which persuade the significant effect on the biomass and bioactive compound production in the antagonistic isolate. A total of 11 factors were screened in 12 combinations which consists equal number of high level concentration (coded as +) and low level concentration (coded as -) of media components as indicated in table 1. Response surface methodology mainly central composite design was carried out to optimize the concentration of the significant factors identified by placket burman method. CCD method consists of five concentration (coded as +α, +1, 0,-1 and –α) executed in 20 different experimental runs for three significant factors as shown in table 2. Design-Expert ® Version 8 software (Stat-Ease, Inc., Minneapolis, USA) was used to evaluate response of both placket burmann and CCD method.
Table 1: Eleven factors with its high and low level concentration used in Plackett-Burman design

<table>
<thead>
<tr>
<th>S.No</th>
<th>Code</th>
<th>Name of the Factor</th>
<th>High Level concentration (+)</th>
<th>Low level Concentration(−)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Starch (g/l)</td>
<td>12 g/l</td>
<td>8 g/l</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>K₂HPO₄</td>
<td>1.5 g/l</td>
<td>0.5 g/l</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>MgSO₄</td>
<td>1.5 g/l</td>
<td>0.5 g/l</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>NaCl</td>
<td>1.5 g/l</td>
<td>0.5 g/l</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>CaCO₃</td>
<td>1.5 g/l</td>
<td>0.5 g/l</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>(NH₄)₂SO₄</td>
<td>3 g/l</td>
<td>1 g/l</td>
</tr>
<tr>
<td>7</td>
<td>G</td>
<td>Ferrous Sulphate</td>
<td>22 µg/l</td>
<td>18 µg/l</td>
</tr>
<tr>
<td>8</td>
<td>H</td>
<td>Asparagine</td>
<td>30 µg/l</td>
<td>15 µg/l</td>
</tr>
<tr>
<td>9</td>
<td>J</td>
<td>pH</td>
<td>8</td>
<td>6</td>
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<tr>
<td>11</td>
<td>L</td>
<td>RPM</td>
<td>160</td>
<td>120</td>
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Table 2: Three significant factors with its high and low level concentration in RSM (Central Composite design).

<table>
<thead>
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<th>S.No</th>
<th>Code</th>
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<th>Five concentration coded for CCD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>+α,</td>
</tr>
<tr>
<td>1</td>
<td>A</td>
<td>Starch (g/l)</td>
<td>13.36</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>NaCl (g/l)</td>
<td>3.68</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>(NH₄)₂SO₄</td>
<td>4.68</td>
</tr>
</tbody>
</table>

Mass fermentation and purification of the antagonistic isolate

The isolate with antagonistic activity was cultured in the optimized fermentation medium containing 10.0 g/l Starch, 1.0 g/l NaCl, 2.0 g/l (NH₄)₂SO₄ in the minimal media and incubated at 28°C, 120 rpm for 7 days. The fermented broth was centrifuged at 10,000 rpm for 10 min. The cell-free culture filtrate was then extracted with equal volume of chloroform. The organic phase was collected and concentrated by vacuum drier. Concentrated compound was again dissolved in chloroform and the crude extract was subjected to purification by silica gel column chromatography. The crude compound was purified by silica gel column (mesh size- 60-120) chromatography with gradient elution. Initially, non-polar solvent, Hexane (100%) was used as the mobile phase. Hexane followed by chloroform, acetone and finally polar organic solvent methanol was used for gradient elution of compounds. The Purity of the eluted compound was determined through TLC. The antibacterial activity was tested against clinical pathogens for each fractions eluted through column chromatography. The fractions that exhibit the antibacterial activity were subjected to various spectroscopic studies.

Spectroscopic Studies of the bioactive compound

UV-Visible spectral analysis

The absorption spectrum of the compound from the bioactive fraction was determined in the UV-VIS region (235-650 nm) by using a UV-VIS Spectrophotometer (UV-1800 Shimadzu). Wavelength was plotted in X-axis and absorbance intensity of the compound was plotted in the Y-axis.

FT-IR spectroscopic analysis

The FT-IR spectrum analysis was carried out in between the region (500-5000 cm⁻¹) to determine the functional groups present in the compound obtained from the antagonistic isolate. The FT-IR spectra intensity was measured in X-axis and wavelength was plotted in Y-axis.

GC-MS analysis

The bioactive fraction was subjected to GC-MS analysis in GC-Trace Ultra Ver 5.0, MS DSQ II (Thermo Scientific, MA, USA). The DB35-MS capillary standard non-polar column with a dimension of 30 m, inner diameter of 0.25 nm and film thickness of 0.25 um was used. Electron Bombardment (EI) ion source was performed at 70 ev. Helium was used a carrier gas with a flow rate of 1.0 ml min⁻¹. Initial oven temperature was 50°C and further it was increased to 260°C at 10°C min⁻¹. The spectrum was scanned in the range of 50-650 amu.

Bioassay of the Purified compound

Minimum inhibitory concentration (MIC):

The MIC of the bioactive fraction was determined against clinical pathogens by broth microdilution method as per the
guidelines of Clinical and Laboratory Standards Institute (CLSI) formerly, the National Committee for Clinical Laboratory Standards.

**Cytotoxicity assay:**

The cytotoxic effect of the purified compound was determined by MTT assay in mice cardiomyocytes cell line H9C2. Various concentrations from 10 µg to 80 µg/ml were used along with DMSO as a control. The cell survival was determined by plotting the concentration of compound versus percentage of cell viability (Aliabadi et al., 2010)

### III. RESULTS AND DISCUSSION:

**Morphological characteristics of the antagonistic isolate JS-S6**

Thirty five isolates with different morphology were identified from the marine mangrove sediment sample. Among the thirty five isolates, the crude compound obtained from isolate JS-S6 exhibited strong antibacterial activity against the clinical pathogens shown in table 3. The antagonistic isolate exhibited different morphological pattern on various ISP medium (International Streptomyces Project) were shown in table 4.

#### Table 3: Antibacterial activity of compound produced by the antagonistic isolate JS-S6

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Clinical Pathogen</th>
<th>Zone of inhibition (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MRSA</td>
<td>26.0 ± 0.1</td>
</tr>
<tr>
<td>2</td>
<td><em>Salmonella typhi</em></td>
<td>24.0 ± 0.3</td>
</tr>
<tr>
<td>3</td>
<td><em>Candida albicans</em></td>
<td>11.0 ± 0.2</td>
</tr>
<tr>
<td>4</td>
<td><em>Proteus vulgaris</em></td>
<td>18.0 ± 0.5</td>
</tr>
<tr>
<td>5</td>
<td><em>Pseudomonas sp</em></td>
<td>9.0 ± 0.1</td>
</tr>
<tr>
<td>6</td>
<td><em>E.coli</em></td>
<td>24.0 ± 0.4</td>
</tr>
<tr>
<td>7</td>
<td><em>Klebsiella pneumoniae</em></td>
<td>25.0 ± 0.2</td>
</tr>
</tbody>
</table>

#### Table 4: ISP medium exhibiting different morphological character of isolate JS-S6.

<table>
<thead>
<tr>
<th>Medium</th>
<th>Aerial mycelium</th>
<th>Substrate mycelium</th>
<th>Diffusible pigment</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch-casein</td>
<td>White Powdery</td>
<td>Greenish yellow</td>
<td>Yellow</td>
<td>Elevated</td>
</tr>
<tr>
<td>ISP-1</td>
<td>Halo white</td>
<td>Pale Yellow</td>
<td>Greenish yellow</td>
<td>Elevated</td>
</tr>
<tr>
<td>ISP-2</td>
<td>Grey</td>
<td>Olive</td>
<td>Olive Brown</td>
<td>Elevated</td>
</tr>
<tr>
<td>ISP-3</td>
<td>White</td>
<td>Brown</td>
<td>Olive Brown</td>
<td>Not elevated</td>
</tr>
<tr>
<td>ISP-4</td>
<td>Whitish grey</td>
<td>Grey</td>
<td>No</td>
<td>Centroid</td>
</tr>
<tr>
<td>ISP-5</td>
<td>White</td>
<td>Tangerine</td>
<td>Olive brown</td>
<td>Elevated</td>
</tr>
<tr>
<td>ISP-6</td>
<td>Brown, no spore</td>
<td>Brown</td>
<td>Olive Brown</td>
<td>Not elevated</td>
</tr>
<tr>
<td>ISP-7</td>
<td>Pearl anthracite</td>
<td>Pine green</td>
<td>No</td>
<td>Elevated</td>
</tr>
</tbody>
</table>

The spores were abundant and highly condensed, flexous in a particular region. The spores were irregular, lobulate in shape and the substrate mycelium gives rise to aerial hyphae which is highly branched and consists of spores with smooth surface indicated in figure 1.

![Figure 1: Spore of isolate JS-S6 visualized by SEM](www.ijsrp.org)
Molecular 16S rRNA gene analysis of the isolate

Genomic DNA of the isolate JS-S6 was used as a template for the amplification of 16S rRNA gene with eubacterial universal primers (27F and 1492R). The expected size of 16S rDNA gene with 1482 bp was obtained. The phylogenetic tree analysis from the fig 2 showed that the isolate was similar to *Streptomyces viridobrunneus*\(^T\) LMG20317 (AJ781372), *Streptomyces showdoensis*\(^T\) NBRC13417 (AB184389) and *Streptomyces roseoviridis*\(^T\) NBRC12911 (AB184389). Therefore, the isolate was further named as *Streptomyces* sp. JS-S6. The *Streptomyces* sp. JS-S6 exhibited similarities like grey color and floxous smooth spore surface in the ISP medium (Zhu *et al.*, 2007) as that of the *Streptomyces viridobrunneus* and *Streptomyces showdoensis*, which were closely related and falls in same cluster.

![Figure 2: 16S rRNA phylogenetic analysis of Streptomyces spp JS-S6 revealed that the isolate JS-S6 was similar to Streptomyces viridobrunneus\(^T\) LMG20317(AJ781372), Streptomyces showdoensis\(^T\) NBRC13417(AB184389) and Streptomyces roseoviridis\(^T\) NBRC12911(AB184389).](image)

Media optimization for the antagonistic isolate:
Optimization of carbon and nitrogen source

The bioactive metabolite synthesis in *Streptomyces* species, depend on the nutrients used in the fermentation medium (Yu *et al.*, 2008). Starch is the preferred carbon source for most of the *Streptomyces* species in the production of secondary metabolites (Gupte and Naik, 1998; Jia *et al.*, 2008; Syed *et al.*, 2009). The growth and antibacterial compound production of *Streptomyces* sp JS-S6 were studied using eight different carbon sources. The production medium containing starch exhibited highest antimicrobial activity against different pathogens used, when compared to other carbon sources. Maltose had similar effects as starch but inhibition for MRSA, *Staphylococcus aureus* and *Enterococcus* sp was slightly lower than that of starch. Fructose, Dextrose and sucrose subsequently had comparable inhibition effects. In xylose, MRSA was highly inhibited compared to other carbon sources. Maltose had similar effects as starch but inhibition for MRSA, *Staphylococcus aureus* and *Enterococcus* sp was slightly lower than that of starch. Fructose, Dextrose and sucrose subsequently had comparable inhibition effects. In xylose, MRSA was highly inhibited compared to other carbon sources. Antimicrobial activity was not observed in the medium containing mannitol, lactose and medium devoid of carbon source. In the case of Biomass production, medium containing starch had highest biomass production followed by Maltose and Lactose. In the case of lactose and mannitol, the isolates showed good growth but failed to produce antibacterial compound. Lowest growth was obtained in medium containing fructose and without carbon source. Dextrose, Xylose, Sucrose and Mannitol displayed the analogous growth pattern. Based on the surveillance from fig 3a & 3b, starch with utmost inhibitory property and effective biomass production was selected as the appropriate carbon source. Nitrogen source also play an important role in the production of antibacterial compound. The complex nitrogen sources could increase the production of antibiotic compounds by the *Streptomyces* species. Several studies have shown that nitrogen incorporation is crucial for the regulation of antibiotic production but the mechanisms involved is not clearly understood (Voelker and Altaba, 2001). In case of biomass production, ammonium sulphate had highest antimicrobial compound production. Potassium nitrate, ammonium dihydrogen orthophosphate, urea and ammonium chloride also have a good deed for the biomass production. Moderate growth was obtained in sodium nitrate and ammonium molybdate supplemented medium. In case of antibacterial activity, ammonium sulphate and ammonium chloride only displayed inhibitory effect against tested pathogens. Ammonium molybdate exhibited antibacterial activity against six pathogens excluding *Corynebacterium diptheriae*. Nitrogen sources such as potassium nitrate, ammonium dihydrogen orthophosphate, urea and medium lacking nitrogen does not display inhibition against pathogens. Maximum inhibitory effect against clinical pathogens and maximum highest biomass production were recorded in the presence of ammonium sulphate shown in fig 4a & 4b and thus it was selected as effective nitrogen source.
IV. OPTIMIZATION OF INCUBATION PERIOD

Incubation period also had a major effect on biomass and bioactive compound production. *Streptomyces* spp. VITSVK9 showed the maximum growth with highest biomass at the incubation period of nine days (Sauvrav et al., 2010). From the time course study of *Streptomyces* sp JS-S6, over 15 days period of incubation, 8th day of incubation was found to be ideal for better biomass yield. Biomass production was maximum at the stationary phase. From the 8th day of incubation onwards, there is no increase or decrease in the biomass production was observed. Antibacterial activity was not witnessed until the fourth day of incubation. At the fifth day, inhibition was observed in MRSA, *Staphylococcus aureus*, Corynebacterium diphtheriae and *E. coli*. Antibacterial activity against seven pathogens was progressively increased from the sixth day itself. Beyond 10 days of incubation, there was a slight loss of antibacterial activity. Hence from the experimental investigation, incubation till eight days was found to be suitable incubation period as shown in fig 5a & 5b.
V. STATISTICAL MEDIA OPTIMIZATION

One factor at a time approach leads to the assortment of appropriate carbon, nitrogen source and suitable incubation period respectively. Apart from carbon and nitrogen source various media components and physiological factors also have influence in the antibacterial activity and production of biomass. In placket Burmann method, eleven factors were selected and it was evaluated in twelve experiments with equal number of high and low concentration for each factor. Biomass production and antibacterial activity was recorded as response for each of the experimental runs in placket burman design and indicated in table 5

The Model F-value of 332.64 from the anova analysis of biomass as response in Plackett burmann method implies the model is significant. Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case, the p-value of model was 0.0327, the p-value of the factor A (Starch) was 0.0101, factor D was 0.0374, factor F was 0.0205, factor G was 0.0424 were significant model terms. Values greater than 0.1000 indicate the model terms are not significant. The Pred R-Squared of 0.9567 was in reasonable agreement with the Adj R-Squared of 0.9967. Adeq Precision measures the signal to noise ratio. A ratio greater than 4 is desirable. The ratio of 54.799 indicates that it was an adequate signal.

The Model F-value of 566.60 implies the model was significant. Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case, the p-value of model  was 0.0327, the p-value of the factor A (Starch) was 0.0101, factor D was 0.0374, factor F was 0.0205, factor G was 0.0424 were significant model terms. Values greater than 0.1000 indicate the model terms are not significant. The Pred R-Squared of 0.9746 was in reasonable agreement with the Adj R-Squared of 0.9981. Adeq Precision measures the signal to noise ratio. A ratio greater than 4 is desirable. The ratio of 79.599 indicates that it was an adequate signal.

<table>
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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>Biomass(g/l)</th>
<th>Zone of Inhibition (mm)</th>
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<tbody>
<tr>
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Apart from anova analysis, pareto chart also played a major role in selecting significant factors for maximum biomass production and antibacterial activity. The factors starch (A), ammonium sulphate (F), sodium chloride (D), pH (J), ferrous sulphate (G) was found to be significant factor because of it t-value limit as indicated in the fig 6a & 6b. Among the five significant factors, the factors starch (A), ammonium sulphate (F) and sodium chloride (D) was found to be common in both biomass production and antibacterial activity. The optimum concentration of the significant factors, namely Starch, Sodium chloride and ammonium sulphate was determined by the central composite design of the response surface methodology.

![Figure 6a & 6b: Pareto chart for Antibacterial activity and Biomass production in placket burmann method.](image)

In response surface methodology, the three significant factors were executed in twenty different experimental runs. In Central composite design, biomass and antibacterial activity was recorded as responses as indicated in table 6. Anova analysis were carried out for biomass production and antibacterial activity and listed in the table 7 & 8. In case of Biomass production, the Model F-value 21.09 implies the model is significant. Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case A, A², B², C² are significant model terms. Values greater than 0.1000 indicate the model terms are not significant. The Pred R-Squared of 0.8463 is in reasonable agreement with the Adj R-Squared of 0.9095. Adj R-Squared of 0.9095 is in reasonable agreement with the R-Squared of 0.9547. Adeq Precision measures the signal to noise ratio. A ratio greater than 4 is desirable. The ratio of 13.108 indicates that it is an adequate signal. In case of antibacterial activity, the Model F-value 36.49 implies the model is significant. Values of "Prob > F" less than 0.0500 indicate model terms are significant. In this case A, C, AB, BC, A², B², C² are significant model terms. Values greater than 0.1000 indicate the model terms are not significant. The Pred R-Squared of 0.7759 is in reasonable agreement with the Adj R-Squared of 0.9467. The Adj R-Squared of 0.7759 is in reasonable agreement with the R-Squared of 0.9733. Adeq Precision measures the signal to noise ratio. A ratio greater than 4 is desirable. The ratio of 15.738 indicates that it is an adequate signal.

![Table 6: Central composite design in experimental concentration and its response as Biomass and Zone of inhibition](image)
Table 7 : Anova analysis for biomass production in central composite design of Response Surface methodology

<table>
<thead>
<tr>
<th>S.No</th>
<th>Source</th>
<th>Sum of squares</th>
<th>Degree of freedom</th>
<th>Mean Square</th>
<th>F-Value</th>
<th>p-value prob&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Block</td>
<td>0.12</td>
<td>1</td>
<td>0.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Model</td>
<td>18.13</td>
<td>9</td>
<td>2.01</td>
<td>21.09</td>
<td>&lt;0.0001-Significant</td>
</tr>
<tr>
<td>3</td>
<td>A-Starch</td>
<td>5.33</td>
<td>1</td>
<td>5.33</td>
<td>55.80</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>4</td>
<td>B-Sodium Chloride</td>
<td>0.068</td>
<td>1</td>
<td>0.068</td>
<td>0.71</td>
<td>0.4220</td>
</tr>
<tr>
<td>5</td>
<td>C- Ammonium Sulphate</td>
<td>0.29</td>
<td>1</td>
<td>0.29</td>
<td>3.03</td>
<td>0.1157</td>
</tr>
<tr>
<td>6</td>
<td>AB</td>
<td>0.053</td>
<td>1</td>
<td>0.053</td>
<td>0.56</td>
<td>0.4741</td>
</tr>
<tr>
<td>7</td>
<td>AC</td>
<td>0.018</td>
<td>1</td>
<td>0.018</td>
<td>0.19</td>
<td>0.6764</td>
</tr>
<tr>
<td>8</td>
<td>BC</td>
<td>0.020</td>
<td>1</td>
<td>0.020</td>
<td>0.21</td>
<td>0.6557</td>
</tr>
<tr>
<td>9</td>
<td>A²</td>
<td>6.87</td>
<td>1</td>
<td>6.87</td>
<td>71.94</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>10</td>
<td>B²</td>
<td>4.34</td>
<td>1</td>
<td>4.34</td>
<td>45.44</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>11</td>
<td>C²</td>
<td>3.51</td>
<td>1</td>
<td>3.51</td>
<td>36.77</td>
<td>0.0002</td>
</tr>
<tr>
<td>12</td>
<td>Residual</td>
<td>0.86</td>
<td>9</td>
<td>0.096</td>
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<tr>
<td>13</td>
<td>Lack of fit</td>
<td>0.17</td>
<td>5</td>
<td>0.035</td>
<td>0.20</td>
<td>0.9445-Not signficnt</td>
</tr>
<tr>
<td>14</td>
<td>Pure Error</td>
<td>0.69</td>
<td>4</td>
<td>0.17</td>
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</tr>
<tr>
<td>15</td>
<td>Cor Total</td>
<td>19.11</td>
<td>19</td>
<td>0.45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the 3D response surface plot, the interaction between the three significant factors were clearly studied and indicated in fig 7a-7c & 8a-8c. The optimum concentration of the significant factors starch, ammonium sulphate and sodium chloride was found to be 1%, 0.2% and 0.1% respectively.

Table 8 : Anova analysis for antibacterial activity in central composite design of Response Surface methodology.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Source</th>
<th>Sum of squares</th>
<th>Degree of freedom</th>
<th>Mean Square</th>
<th>F-Value</th>
<th>p-value prob&gt;F</th>
</tr>
</thead>
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<tr>
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<tr>
<td>2</td>
<td>Model</td>
<td>475.35</td>
<td>9</td>
<td>50.82</td>
<td>36.49</td>
<td>&lt;0.0001-Significant</td>
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<tr>
<td>3</td>
<td>A-Starch</td>
<td>32.64</td>
<td>1</td>
<td>32.64</td>
<td>23.44</td>
<td>0.0009</td>
</tr>
<tr>
<td>4</td>
<td>B-Sodium Chloride</td>
<td>5.75</td>
<td>1</td>
<td>5.75</td>
<td>4.13</td>
<td>0.0726</td>
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<tr>
<td>5</td>
<td>C- Ammonium Sulphate</td>
<td>39.12</td>
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<td>39.12</td>
<td>28.09</td>
<td>0.0005</td>
</tr>
<tr>
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<td>AB</td>
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<td>1</td>
<td>26.28</td>
<td>18.87</td>
<td>0.0019</td>
</tr>
<tr>
<td>7</td>
<td>AC</td>
<td>0.78</td>
<td>1</td>
<td>0.78</td>
<td>0.56</td>
<td>0.4730</td>
</tr>
<tr>
<td>8</td>
<td>BC</td>
<td>22.78</td>
<td>1</td>
<td>22.78</td>
<td>16.36</td>
<td>0.0029</td>
</tr>
<tr>
<td>9</td>
<td>A²</td>
<td>195.02</td>
<td>1</td>
<td>195.02</td>
<td>140.04</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>10</td>
<td>B²</td>
<td>68.28</td>
<td>1</td>
<td>68.28</td>
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<td>&lt;0.0001</td>
</tr>
<tr>
<td>11</td>
<td>C²</td>
<td>127.28</td>
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<td>127.28</td>
<td>91.39</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>12</td>
<td>Residual</td>
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<td>9</td>
<td>12.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Lack of fit</td>
<td>10.72</td>
<td>5</td>
<td>1.39</td>
<td>4.73</td>
<td>0.0786-Not signficnt</td>
</tr>
<tr>
<td>14</td>
<td>Pure Error</td>
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</tr>
<tr>
<td>15</td>
<td>Cor Total</td>
<td>470.24</td>
<td>19</td>
<td>0.45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Spectral analysis of the active compound

The maximum absorption range of bioactive compound in UV-Vis spectrum was found to be 260 nm, as indicated in fig 9. The characteristic absorption peak at 260 nm range indicates that the compounds are highly polyene in nature (Slavica et al., 2005).

In the FTIR spectrum shown in fig 10, absorption bands at 3,437.26 cm\(^{-1}\), 3,452.70 cm\(^{-1}\) indicates the presence of Hydroxy group, H-bonded OH stretch, carboxylic group and Heterocyclic amine, with the NH stretching. The absorption peak at 1,633.76 cm\(^{-1}\), indicates the presence of conjugated ketone functional group with the presence of secondary amine and NH bend. The FTIR spectrum of purified compound showed one absorption peak (2922.25 cm\(^{-1}\)) in the region between 3500 cm\(^{-1}\) and 1730 cm\(^{-1}\). The absorption peak between the range 1300 to 700 cm\(^{-1}\) in the FT-IR spectrum indicates the presence of skeletal C-C vibrations. The presence of the absorption peak at 1633.7 cm\(^{-1}\) indicates the presence Alkenyl C=C stretch. The absorption peak that ranges from 1225 to 950 cm\(^{-1}\) in both the FTIR spectrum indicates the presence of Aromatic C-H in-plane bend (John Coates, 2000). The presence of ketone and carboxylic acid group denotes that the compound belongs to polyketide nature.
The bioactive compound at the retention time of 3.99 min in GC-MS spectrum was identified by comparison with the mass spectra of Wiley NIST95 database and Pub chem database. From the Mass spectra of Wiley and NIST95 database, the structure of the bioactive compound from the Streptomyces sp JS-S6 was identified as Methyl N-hydroxybenzene carboximidate (Oxime – methoxy phenyl). The fragmentation pattern due to hard ionization in the spectrum at 68 (15 %), 133 (100 %) and 151 (65 %) with the molecular weight of 151 and molecular formula C₈H₉NO₂ also suggest that it is Oxime-methoxyl-phenyl. Previously, the Oxime-methoxyl-phenyl compound has been reported as a volatile compound from terrestrial Streptomyces globisporus JK-1 produced on 7 day and 14 day old wheat seed culture (Eddy et al, 2012). Oxime-methoxyl-phenyl was also identified in plant source such as Azadirachta indica A.Juss in n-hexane leaves extract with the antifungal activity (Akpuaka et al., 2012). Oxime-methoxyl-phenyl has also been reported in the crude extract of Sedum palladium leaves which exhibited antibacterial activity against pathogens (Rahdary and Sobati, 2012). Hence, in this study, Oxime-methoxy-phenyl compound was first reported in Streptomyces sp JS-S6, derived from the marine environment. The compound also has strong inhibitory effect against clinical pathogens.

Bioassays of the purified compound

The Minimum inhibitory concentration (MIC) of the purified compound was listed in the table 9. The Purified compound was active against Gram-positive and Gram-negative bacteria. The purified compound exhibited low MICs against the tested microorganisms including MRSA.

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Microorganisms</th>
<th>Zone of Inhibition (mm)</th>
<th>Compound MIC (µg mL⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>E.coli</em></td>
<td>24±0.10</td>
<td>15.625</td>
</tr>
<tr>
<td>2</td>
<td><em>Klebsiella pneumoniae</em></td>
<td>25±0.15</td>
<td>15.625</td>
</tr>
<tr>
<td>3</td>
<td>MRSA</td>
<td>26±0.10</td>
<td>31.25</td>
</tr>
</tbody>
</table>

The data shown are mean value of three replicates ± standard deviation

The compound in bioactive fraction does not exhibit cytotoxicity effect against the mice cardiomycetes H9C2 cell line. The cell viability of 99.5 % was observed at 80 µg mL⁻¹ of the purified compound shown in fig 12, indicating the bioactive compound inhibits clinical pathogens but does not have any effect cardiomycetes cell line.
VI. CONCLUSION

The marine environment based *Streptomyces* sp JS-S6 exhibited antagonistic activity against clinical microorganisms including the MDR pathogens. The bioactive compound has high antibacterial activity against a set of clinical pathogens and low cytotoxicity against the normal cell line. From these prospects it can be a lead molecule for pharmaceutical industries for controlling the uncontrolled emergence of pathogens which is becoming resistant to antibiotic which is available currently in the pharmaceutical market.

ACKNOWLEDGEMENTS

We are grateful to University Grant Commission (UGC), New Delhi, India for providing UGC-MRP fund for the project. We thank USIC department Madurai Kamaraj University for providing spectroscopic analysis. We also acknowledge the Central Instrumentation Facility of Pondicherry University for SEM analysis and SITRA, Coimbatore for GC-MS analysis.

REFERENCES


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Specific Problems of Female Entrepreneurs in Northern Province of Rwanda-Musanze District

Domina Hakuzimana

MBA Global business Sustainability Social Entrepreneurship Track, PhD Scholar in Entrepreneurship/JKUAT Kigali Campus

Abstract- To achieve Rwanda’s dream to become a middle-income country by 2020, small and Medium Enterprises (SMEs) have a greater role to play. Rwanda is a land locked resource-limited and overpopulated country with around 10.500.000 people and a growth rate of 3.1% (NISR, 2012). As women constitute more than half of the population (52%), whatever country development plan should consider women involvement, otherwise it can be a kind of underutilization of resources. So, if women are not actively engaged in entrepreneurship, the job creation capacity of half the country’s population will be lost.

Previous studies state that despite their big demographic representation in number women are few in entrepreneurship around the world, Rwanda included (Global Entrepreneurship Monitor 2012 Women’s Report, Rwanda establishment’s census, 2011). All stakeholders interested in sustainable development, Government, Private sector and civil society should invest in women empowerment in order to foster this group of citizens which constitutes more than a half of the country population, so as to support them while creating entrepreneurship awareness, providing to them with business skills, in order to make them self-reliance, able contribute successfully to their own development, development of their families as well as national development.

The current study does not have a comparative concern, the global image of the issue is known as men in entrepreneurship are more than women and business discontinuance is likely to be high to women than to men (Global Entrepreneurship Monitor 2012 Women’s Report). The researcher investigated the problems behind the small number of women in business with Musanze district as case study.

Index Terms- Woman, entrepreneurship, challenges, business, empowerment, development

I. INTRODUCTION

This chapter deals with the background of the study, the statement and exploration of the problem, objectives of the study, significance of the study (stakeholders and relevance) and overview of the structure of the paper.

1.1 Background of the Study

Almost in the whole world, whenever you talk of women people suspect that you are likely going to talk about women inequality, illiteracy, their poverty, their landlessness, their innumerable troubles in domestic violence, their voicelessness in decision making and resource ownership; and a whole list of challenges that women face in their day today lives. However, when it comes to African women in general and Rwandan women in particular, the picture turns the angle to an extreme end as many women are helplessly idle and can not even think of any entrepreneurial activity either because of lack of knowledge and skills or start-up capital among other problems.

Few women in the world, Rwanda inclusive have abandoned their traditional offices “the kitchens” and invaded the board rooms and big offices, the numbers are growing but rather at a very slow pace. In Rwanda, women constitute 52% of the population but the majority of these are still in their “traditional office”. When we look at women in businesses and entrepreneurship, the majority are traditional farm workers and not generally involved in businesses and entrepreneurial development.

A few women involved in entrepreneurship have demonstrated capabilities of doing business; but an overwhelming number of them are still out of the entrepreneurial bracket while only very few of them can gain jobs from public sector employment. For example Musanze district has about 52.5% of its population composed of women; but out of this 52.5%, a big number of these women are unemployed due to lack of means and skills which is mainly due to lack of entrepreneurship culture and awareness of business environment (NISR, 2012). This shows that any attempt to give entrepreneurship skills to this vast number of women would be enabling most families to really be in positions to uplift themselves out of poverty.

Women are on the disadvantaged side and this situation becomes worse when it comes to entrepreneurship and business development and ownership. Since 1994, the Rwandan government has done its best to empower women socially, politically and economically. Among the Rwandan government’s main achievements in the area of women empowerment one can talk about 30% of women representation in all organs of decision making (Rwanda Constitution of 4th June, 2003 as amended to date). The set up of Ministry of Gender & Family Promotion, Gender Monitoring Office, Women’s Guarantee Funds, RDB (Rwanda Development) Office of Women’s Enterprise among others.

Despite Government efforts in empowering women, the journey is still long because the socio-economic discrimination of Rwandan women is deep-rooted in the traditional culture; and inherited from generation to generation. Even today, men are still called chiefs of families even when they are not providing anything to the family. This gives them the superiority feeling mindset that further worsens the already bad socio-economic conditions of women. Indeed in many families, mostly for those where the women did not have the chance to study, and therefore having a limited chance to gain money, the situation is still worse regarding women’s socio-economic and entrepreneurial
development. The current study delved into looking at specific problems of women in entrepreneurship in Musanze and suggested possible and sustainable solutions.

1.2 Statement and Exploration of the Problem

Women are the majority of the population in the world, in Africa and in Rwanda women constitute 52% of the total population (NISR, 2012). They are the least educated in the world, in Africa and in Rwanda; at worst, they are the poorest in the world, in Africa and in Rwanda. In addition to the above predicament of women, they are least represented in business because of their poor and limited entrepreneurship skills as well as lack of entrepreneurship culture. As the majority population yet the least represented in every sector of the world, women are the least advantaged including in entrepreneurship and they cannot maximize the exploitation of chances offered to them in terms of seeking empowerment.

A big number of women in Rwanda are still out of the entrepreneurial bracket. As evidenced by establishments census report (NISR, 2011, P.27), statistics show that at the national level females are managers of about 26.3 percent of all establishments in Rwanda. Then prevalence of female managers is highest in Kigali (43.2 percent) and lowest in Northern Province (19.1 percent). In Rwanda, females own about 26.8 percent of the whole sole proprietorship establishments. The prevalence of female ownership of such establishments is highest in Kigali (44.5 percent) and lowest in Northern Province where we find Musanze District (19.6 percent about an average of 3.9 % per district). Looking at Rwanda’s dream of becoming a middle income country by 2020, to be achieved, women capacity and efforts have to be efficiently exploited. When this study was being carried out Musanze district which is our case study, had about 368, 803 people and 191, 000 out of them are women; but out of those women only around 2,500 women were employed. All above are facts that motivated the researcher to undertake this study.

1.3 Objectives of the Study

This research had one overall objective and two specific objectives as found below.

1.3.1 Main Research Objective

The study has one main research objective which is to investigate problems of women entrepreneurs in Rwanda Northern province, Musanze District.

1.3.2 Specific research Objectives

The specific research objectives were;
1. To investigate the challenges faced by women entrepreneurs in Musanze District;
2. To propose solutions on how to reduce the challenges of women entrepreneurs in order to make them economically and efficiently productive.

1.4 Significance of the Study

The current study was very significant to be carried out because women form the biggest percentage of the population in the whole world including Rwanda (52%) but unfortunately they lag behind in every development effort including entrepreneurship. A study of this nature that brought to the fore the challenges of women entrepreneurs in Rwanda with Musanze district as a case. It is significant to various stakeholders in Government, Local Government, Civil Society Organizations, and the general public as it brought to the open the different challenges that women entrepreneurs face in their quest to fight poverty and gain economic empowerment.

1.4.1 Central Government

Central Government may use the findings from this research in decision making, development planning and resource allocation.

1.4.2 Local Government

As Rwanda adopted the decentralisation policy, a range of decisions are taken on local level and local development planning is made on district level, so the findings from this study will be useful. Note that, this research to be possible the official authorization of the Mayor of Musanze district was of a big contribution underlining its relevance for the future district plans and decision making. From this research, women entrepreneurship gaps are known and it may bring to actions that may be undertaken in order to bridge these gaps.

1.4.3 Civil society organisations

In Rwandan context, NGOs commonly identified as CSO is an organization which is comprised of natural persons or of autonomous collective voluntary organizations whose aim is to improve economic, social and cultural development and to advocate for public interests of a certain group, natural persons, organizations or with the view of promoting common interest of their members (Rwandan, Law N°04/2012 of 17/02/2012, Art. 2, Al. 2). The country counts around 165 registered NGOs, though there are others that are not registered, all those will use this research findings mostly for those advocating for women rights and empowerment as they have “Anti-corruption, Gender equity and Poverty eradication among other values” (Rwanda Focus, February 21st 2013).

1.4.4 Private Sector Federation (PSF)

As the study is dealing with entrepreneurs in their everyday life, the findings from this study will be welcomed and useful for Private Sector Federation. It will use them for planning purposes.

1.5 The structure of the Study

This research paper has five chapters: The first chapter is the general introduction, with a brief description of the background of the study followed by the statement and exploration of the problem, significance of the study where we find stakeholders and relevance, research objectives, brief overview of the structure of the paper and research limitations. The second chapter is the literature review. It insists of what other researchers have written about the area. It highlights the need for the research while reviewing existing related literature. This chapter ends by the formulation of hypotheses. The third chapter is the methodology adopted in the research. It includes the research questions, research design, data collection methods and instruments, population and sampling, data collection procedure, data analysis procedure. The fourth
Entrepreneurship is more than business creation; it is a dynamic process of creating incremental wealth. Entrepreneurship is about seeking opportunity, taking risks, and ability to turn ideas into reality.

Some of the challenges faced by women entrepreneurs are as a result of lack of entrepreneurship spirit. This is mostly due to the patriarchal system; that is greatly embedded in Rwandan culture which gives a privileged position to males over females. This system gives women a subordinate status, renders them docile and dependent; creates a large economic gap between men and women and thereby impacting negatively on their socio-economic and entrepreneurial development and empowerment. As the UN report on women (1999) puts it, human progress if not engendered, is endangered. It is further argued that this situation puts women in a vulnerable state of dependence and powerlessness; and often results in the undevelopment and underdevelopment of their personal capabilities including entrepreneurial capabilities (http://pdf.usaid.gov/pdf_docs/PNADH911.pdf).

2.3 Situation of Women Entrepreneurship

It is argued that real development must take care of the development needs of the majority of the people in a community. Therefore, since the majority of the people in Rwanda are women, any meaningful development agenda must have women at the forefront. Dhillon, (1993) argues that the prosperity of a people depends largely on the economic strength of its nation. Since women comprise of more than 50% of the world’s population; therefore, to obstruct their participation in their participation in dealing with economic problems of their countries is worth giving up half of the countries potentialities. This view is shared by Coughlin & Thomas (2002) who say that entrepreneurship is one of the best tactics within the strategic realm empowering women and elevating them to the equal status they are entitled to.

This view of the inevitability of women in development is shared by Candida, et al., (2010) who contend that women owned and run businesses all over the world are among the fastest growing entrepreneurial populations that have to be reckoned with in any development process. They further argue that whereas women in more developed countries may start businesses out of motivation, their counterparts in less developed countries start businesses out of necessity mainly to supplement the limited family income (Candida et al., 2010). This necessity driving force among women that requires more fuel in terms of providing entrepreneurial skills to overcome the challenges they face in their entrepreneurial efforts.

A multitude of reasons have intertwined to maintain women in situation of dependence and socio-economic passivity that have continued to handicap their progress. Of recent, any development initiative especially among the poor is the acquisition of small start up capital but unfortunately, women cannot take bank loans on their own because of lack of collateral security as they are always depended on their husband for such security which many men don’t always provide. Worth noting is the fact that Rwanda’s Vision 2020 that intends to turn the country’s dream of becoming a middle income country by 2020 rests and depends largely on the development and entrepreneurship efforts of women (http://www.wessociety.com).
Whereas there are special efforts by the Rwandan government to enhance women businesses in the country in form of affirmative action by the provision of funds in National bank of Rwanda for women projects without any collateral security, these funds are not helping many women because of lack of entrepreneurial skills. These funds are locally called “ikigega cy’ingwate cy’abagore in Kinyaranda” literally meaning Women security funds, are ideally meant to uplift the socio-economic and entrepreneurial development of women but unfortunately, this fund is used by a very few women as responsible for gender and family service in Musanze district declares that the recent data shows for example that between 2010-2011 only 55 women from Musanze district accessed those support funds.

In an effort to promote gender equality and women empowerment, the government of Rwanda provides support to genocide widows, children and elderly vulnerable groups with a view to eliminating gender discrimination, initiating development projects for women but still all these efforts haven’t impacted a lot on the economic hardships of women (National Program for Strengthening Good Governance for Poverty Reduction in Rwanda, 2002). As Rwanda has suffered many civil wars and genocide, many families have been left under the management of poor women which has increased poverty and fueled more conflicts. Goodhand, (2001) argues that chronic insecurity increases chronic poverty, but the impacts vary according to a range of factors including age and gender. And since the majority of Rwandans and those hit hardest by war and conflicts are women, they are undoubtedly facing several challenges in their efforts to undertake and do business.

Further efforts of the Rwandan government to empower women are seen by constitutional demands that guarantee a minimum of 30 percent of all parliamentary seats and other leadership positions to women. Always trying to empower women today, Rwanda is one of the countries with the highest number of women parliamentarians in the world (64%).

All these efforts are meant to empower women. More efforts in support of women entrepreneurs and empowerment have been conjoined by banks that have created special products for women. Despite all these efforts aimed at increasing the entrepreneurial capacity of women, Charantimath (2006) asserts that women entrepreneurs on the whole still remain a neglected issue. Therefore any effort in pursuit of empowering women with entrepreneurial skills whether in Musanze, Rwanda or anywhere else is a step in the right direction.

It is sad to note that the vast majority of the world's poor people are women, two-thirds of the world's illiterates are female, in addition, women bear almost all the responsibility for meeting basic needs of the family especially food, yet they are systematically denied the access to resources especially land, time and freedom to exercise their right to employment and entrepreneurship (http://www.wikigender.org). Against all these hurdles, women still spare some time to engage in mainly small scale businesses especially selling of agricultural products as like fruits and food in addition to small handcrafts to supplement family income to pay school fees for the children of buying other basic needs.

Despite all the above efforts to improve women’s entrepreneurial development, a USAID’s (2008) report titled Rwanda’s Agenda for Action, points out that there is both a workforce skills deficit overall and an underutilization of the economic talents of women in Rwanda. This means therefore that a Rwandan women still have untapped into potential that with more entrepreneurial skills, their productivity can increase.

Looking at Rwanda’s dream of becoming a middle income country by 2020, to be achieved, women capacity and efforts have to be efficiently exploited.

All above are facts that motivate the researcher to run the current study. From above literature the following hypotheses have been formulated:

2.4 Research hypotheses

1. The problems of Rwandan female entrepreneurs are linked to the lack of entrepreneurship skills and gender discrimination stereotype.
2. Enhancement of women entrepreneurship capabilities through trainings and workshops is the way to improve their situation.

III. RESEARCH METHODOLOGY

3.0 Introduction

The present research is not about men and women businesses comparative study. It is known that according to previous studies, recent statistics show that women are few in business all over the world and particularly in Rwanda, 26.8% against 73.2% of men (NISR, 2011). It is not the whole story of female entrepreneurship in Rwanda; it is a descriptive study that highlights the challenges of female entrepreneurs and which hinder their success and keeps them outside the entrepreneurship competition.

3.1. Research Questions

This study has two research questions:

1. What are the problems faced by Rwandan female entrepreneurs in Northern Province, Musanze district?
2. What can be done to overcome the challenges of women entrepreneurs in order to improve their situation?

3.2. Research Design

To carry out this research, the inductive approach was used and in such a way, collected data from the research field helped to answer research questions and test research hypotheses.

To correct data from the field, both quantitative and qualitative methods were used. To be able to collect data from a range of respondents, the researcher used the questionnaire for quantitative data and interview technique was used to collect qualitative data. The existing documents were used in this study to review the literature in order to get secondary data and emphasize the relevance of the problem.

3.3 Study population and sample size

About study population, the researcher considered the 2,500 females entrepreneurs Musanze district. With purposive sampling, the researcher used her judgement to select the cases that could give her needed information in responding to the research questions. According Mark, Philip & Adrian (2012), the researcher who uses the purposive sampling has the judgement to select the best cases that are able to answer the research question.
(s) and meet the researcher’s objectives. It is also called judgemental sampling. Thus from 2500 women in business in Musanze district a purposive sample of 50 female entrepreneurs working in Musanze district was drawn.

3.4 Research Tools used

Research instruments used in this study were a questionnaire for quantitative data and interview for qualitative data.

3.4.1 Questionnaire

The researcher used a questionnaire as an information gathering technique that gathers information from the respondents, information susceptible to bring to answer the research questions. It is a set of interrelated questions, which are printed in definite order at collecting information from a respondent which is related to problems of women entrepreneurs in Musanze district.

3.4.2 Interview

Structured interview was used to get information from the Private Sector Federation female representative in Musanze district as well as from woman representative of Women National Council in Musanze district. The qualitative information received from them allowed to the researcher to confirm and clarify the quantitative data collected from the respondents while using the questionnaire.

3.5 Data Analysis Methods

The collected data were analysed using standard statistical package (SPSS) computer programme to analyse quantitative data and qualitative data analysis were to supplement responses of all respondents.

3.6 Sources of Data

The following sources of information were consulted;

3.6.1 Primary Data

The primary data for this study were collected by way of a questionnaire from the 50 respondents who were selected from the female entrepreneurs of Musanze district and by means of interview to Private Sector Federation female representative and representative of women National council in the same district.

3.6.2 Secondary Data

Secondary data were in form of review of related literature from scholarly and academic work form books, journals and databases, internet and government publications and guidelines.

IV. PRESENTATION, ANALYSIS AND INTERPRETATION OF RESEARCH FINDINGS

4.1 Introduction

In this chapter, the data collected from the field was grouped according to their relationships and presented under tables. The analysis was done using SPSS (Statistical Package for Social Sciences). The interpretation of research findings led to answer the research questions, test hypotheses and draw conclusion.

4.2 Data analysis and discussion of findings

In this section data collected from the field are presented and analysed in order to test hypothesis.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>age group of the respondent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-25</td>
<td>6</td>
<td>12.0</td>
</tr>
<tr>
<td>26-30</td>
<td>16</td>
<td>32.0</td>
</tr>
<tr>
<td>31-35</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td>36-40</td>
<td>6</td>
<td>12.0</td>
</tr>
<tr>
<td>41-45</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>46-50</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Background</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>18</td>
<td>36.0</td>
</tr>
<tr>
<td>Secondary education</td>
<td>26</td>
<td>52.0</td>
</tr>
<tr>
<td>Technical and Vocational</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>tertiary education</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital status</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Married</td>
<td>46</td>
<td>92.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>do you have children</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>46</td>
<td>92.0</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>if yes, how many children have less than 5 years</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18</td>
<td>36.0</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>40.0</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>16.0</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Data

From table 1, the biggest percentage of the respondents 32% were of the age group 26-30. From these respondents, 52% had secondary level of education, 92% were married against 8% who were single. Information from the 92% respondents who were married reveals that 92% had children against 8% who do not have children. From these 92% who have children 56% have children of less than 5 years (40% have 1 child and 16% have 2 children) while for 36%, all their children have more than 5 years.

According to the interview with the representative of Women National Council in Musanze district, children of less than 5 years are vulnerable; it becomes a big challenge in business because when a business woman has small children her mind is shared between business preoccupations and care to children. She is so concentrated to the wellbeing of the children and little to the business. According to Rwandan mentality, mostly women mentality, nothing can cost the child and their
bear in mind that whatever their do is for the bright future of their children. So, a child have the first place in Rwandan woman life and for those female entrepreneurs who have small children (represented by 56% in this study) more attention is paid to their children and little to the business and the last risks to fail.

### TABLE 2: Respondent’s attributes regarding business affairs

<table>
<thead>
<tr>
<th>Type of business</th>
<th>What do you do as business</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>8</td>
<td>16.0</td>
</tr>
<tr>
<td>Trade</td>
<td>40</td>
<td>80.0</td>
</tr>
<tr>
<td>Service</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When did you start your own business</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>this year</td>
<td>8.0</td>
</tr>
<tr>
<td>one year ago</td>
<td>4.0</td>
</tr>
<tr>
<td>two years ago</td>
<td>24.0</td>
</tr>
<tr>
<td>Between two and five years ago</td>
<td>36.0</td>
</tr>
<tr>
<td>more than five years ago</td>
<td>28.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How many employees do you have</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From which source did you get funds to start your business</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>bank loan</td>
<td>16.0</td>
</tr>
<tr>
<td>personal savings</td>
<td>68.0</td>
</tr>
<tr>
<td>Friends</td>
<td>4.0</td>
</tr>
<tr>
<td>Leasing</td>
<td>8.0</td>
</tr>
<tr>
<td>Cooparative</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is the factor that motivated you more?</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployment</td>
<td>40.0</td>
</tr>
<tr>
<td>confidence in products</td>
<td>12.0</td>
</tr>
<tr>
<td>restlessness due to termination of my job</td>
<td>8.0</td>
</tr>
<tr>
<td>Need of being self employed</td>
<td>28.0</td>
</tr>
<tr>
<td>making money</td>
<td>4.0</td>
</tr>
<tr>
<td>Others</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Source: Field Data**

Regarding the type of business done, majority of the business women are involved in trade (merchandise) and this stands at 80%, 16% of the business women are dealing with manufacturing while about 4% are providing service business. Majority of businesses were found between two and four years old 36.0% and only about 8% of the respondents have less than one year in operation. As regards the number of employees, 64% are only themselves doing the work (0 employees), 20% have one employee and only 8% had 12 employees and above.

As regards the source of capital to start the business about 68% used their own personal savings to start the business, 16% used loans from banks, 8% used leasing and 4% from friends and cooperatives. Regarding motivating factors, a lot of female in business were motivated by unemployment problem 40% followed by the need of being self employed 28%. Confident in product is represented by 12%, restlessness due to termination of my job is 8%. This can be observed from table 2 above.

**Table 3. State of the business owned.**

<table>
<thead>
<tr>
<th>Is your current business the first that you owned</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>28</td>
</tr>
<tr>
<td>No</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If no, what happened to the previous businesses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>failed and I went out</td>
<td>14</td>
</tr>
<tr>
<td>they are still running</td>
<td>2</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System/Not applicable</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

**Source: Field Data**

Reference made to table 3 reveals that 56% of the respondents are operating business for the first time. About 44% of the respondents had had business before the current one which either failed (63%) or are still running (9%). So the discontinuance growth of female business in Musanze district remains high (63%).

**Table 4: Profits, Registration of the Business, Problems faced in Doing the Business**

<table>
<thead>
<tr>
<th>Does your business make profit?</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>38</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is your present business registered?</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When you were staring your businesses, did you meet any problems? (possible to chose more than one)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>no problem</td>
<td>8</td>
</tr>
<tr>
<td>lack of confidence</td>
<td>9</td>
</tr>
<tr>
<td>financial problems</td>
<td>28</td>
</tr>
<tr>
<td>combining family responsibilities and business</td>
<td>20</td>
</tr>
<tr>
<td>Lack of business information</td>
<td>20</td>
</tr>
<tr>
<td>What are the main problems you are facing (possible to chose more than one)</td>
<td>Percentage</td>
</tr>
<tr>
<td>no problem</td>
<td>8</td>
</tr>
<tr>
<td>combining family and work life</td>
<td>17</td>
</tr>
<tr>
<td>liquidity and other financial</td>
<td>36</td>
</tr>
</tbody>
</table>

**Source: Field Data**

Reference made to table 4 reveals that 56% of the respondents are operating business for the first time. About 44% of the respondents had had business before the current one which either failed (63%) or are still running (9%). So the discontinuance growth of female business in Musanze district remains high (63%).
problems
lack of training to improve business skills 42 84.0
Others 6 12.0

Source: Field Data

Table 4 concerns profits, business registration and problems faced. From 50 respondents surveyed, 76% confessed their business are making profits. This was against 24% who say they don’t realize profits. Concerning formalization of business, 68% of the respondents had their business registered while others 32% had not registered their business. Challenges met in the start-up included; financial problems 56%, combining family responsibilities and business 40%, Lack of business information 40% and lack of confidence 18%. Regarding problems faced in running business, there are mainly lack of business skills 84%, liquidity and other financial problems 72% and combining family affairs with business work life 34%.

Table 5: Current business situation about business accounting, marketing and ICT use

<table>
<thead>
<tr>
<th>Do you have any business bank account?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>40</td>
<td>80.0</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you keep records of your financial transactions?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26</td>
<td>52.0</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>48.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Data

Reference made to table 5 indicates that banks and records keeping do matter in these respondents’ business affairs as 80% of the respondents have bank accounts against only 20% who don’t have bank accounts. Concerning records keeping, almost an equal number of respondents do 52% against 48% who don’t keep business records. In the case of not recording business transactions, female entrepreneur who ignore bookkeeping can fail without knowing how because she does not follow the financial flows of her business.

Table 6: Respondents’ Views Concerning Taxes

<table>
<thead>
<tr>
<th>Do you pay taxes?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>46</td>
<td>92.0</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How much are you informed about taxes payment and process?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not much/ not enough informed</td>
<td>32</td>
<td>64.0</td>
</tr>
<tr>
<td>Enough information</td>
<td>18</td>
<td>36.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Data

Table 6 presents respondents views about taxes and taxation. 92% of the respondents revealed paying taxes to the government against 8% who do not pay them. When the respondents were asked whether they get the right information about taxes payment and process, 64% informed the researcher that the information got is not enough against 36% who have enough information about the taxation and its process.

Table 7: Respondents’ Views Regarding Business Marketing and Strategies

<table>
<thead>
<tr>
<th>How do you include marketing in your business? Possible to chose more than one</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>8</td>
<td>16.0</td>
</tr>
<tr>
<td>Advert on radio/television</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Giving discounts</td>
<td>29</td>
<td>58.0</td>
</tr>
<tr>
<td>Good customer care</td>
<td>47</td>
<td>94.0</td>
</tr>
<tr>
<td>Giving sample to taste</td>
<td>2</td>
<td>4.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you use telephone in your business?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>46</td>
<td>92.0</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you use internet in your business?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6</td>
<td>12.0</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>88.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you have any idea about internet use?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
<td>34.0</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>64.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Data

Regarding respondents’ business strategies as observed from table 7, 94% use customer care to attract, and maintain clients, while 58% of the respondents attract customers by giving discounts on sales. 16% declare not doing anything, but it is lack of awareness about marketing concept. Only 8% use advert. 88% use telephones as a mode of communication, only 12 % of the respondents use internet though 34 % of the respondents have information on internet use.

Table 8: Respondents’ future plans and wishes

<table>
<thead>
<tr>
<th>What is the future plan of your business?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion</td>
<td>38</td>
<td>76.0</td>
</tr>
<tr>
<td>shift to another kind of business</td>
<td>8</td>
<td>16.0</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is your view on what should be done to improve the situation of women entrepreneurs?</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce taxes</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Trainings and Workshops in entrepreneurship</td>
<td>45</td>
<td>90</td>
</tr>
<tr>
<td>Financial assistance</td>
<td>42</td>
<td>84</td>
</tr>
<tr>
<td>Change of customers</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Field Data

Table 8 presents respondents views about what to do in their future and willingness of how to use internet for business. 76% of the respondents wanted to expand their business while 16% wanted to shift to another kind of business against 8%Others. When the respondents were asked what would they do to improve the situation of women entrepreneurs, 46% favored reducing the tax, 90% favored work shops in entrepreneurship and 84% favored financial assistance.
situation, 46% of respondents propose reduction of taxes for expenditure their business but proposal as solution to improve their confidence. collateral when a female entrepreneur wants to apply and get representatives of women, there are other problems like lack of ICT skills and all those impact negatively family responsibilities and business life, insufficient business businesses, lack of business and marketing skills, combining are linked to the financial problem for starting and growing entrepreneurs in Northern province of Rwanda Musanze district as firstly that the problems of Rwandan female entrepreneurs are drawn from 2500 female entrepreneurs in Musanze district using purposive sampling. Analysis from table 8 above, it can be observed that, 76% of the respondents have plan to expand their business in future while 16% have plans to shift to other locations. Among their wishes, they identify reduction in taxes 46%, trainings and entrepreneurial workshops 90, financial assistance 84% and 8% want that customers change their behaviour.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion
The current study was about specific problems of female entrepreneurs in Northern Province of Rwanda, Musanze district as a case study. It aimed to investigate the challenges faced by women entrepreneurs in Musanze District and propose solutions on how to reduce those challenges in order to make them economically and efficiently productive.

Looking at Rwanda’s dream of becoming a middle income country by 2020, to be achieved, women capacity and efforts have to be efficiently exploited.

As Research hypotheses, the researcher was assuming firstly that the problems of Rwandan female entrepreneurs are linked to the lack of entrepreneurship skills and gender discrimination stereotype. Secondarily she was assuming that enhancement of women entrepreneurship capabilities through trainings and workshops can be the way to improve their situation.

To carry out this study the researcher used both quantitative and qualitative research approach, to collect data from the field the researcher used questionnaire for quantitative research and interview to get qualitative data. Secondary data were collected using documentary technique where the researcher reviewed the existing literature related to her topic. The sample of 50 people who are running businesses in Musanze district’s town was drawn from 2500 female entrepreneurs in Musanze district using purposive sampling.

Research findings showed that major problems of female entrepreneurs in Northern province of Rwanda Musanze district are linked to the financial problem for starting and growing businesses, lack of business and marketing skills, combining family responsibilities and business life, insufficient business information, lack of ICT skills and all those impact negatively the success of women businesses. From the interview with the representatives of women, there are other problems like lack of collateral when a female entrepreneur wants to apply and get bank loan and the problem of culture stereotype which most of time makes Rwandan women underestimating themselves and lack self confidence.

Regarding above problems of female entrepreneurs, the majority of respondents 76% are willing to continue trying and expend their business but proposal as solution to improve their situation, 46% of respondents propose reduction of taxes for women in terms of encouragement and Government support, 90% propose trainings and workshops in entrepreneurship development and 84% financial assistance in terms of liquidity.

From the research, the following recommendations which should be taken under considerations by stakeholders in women empowerment matter, decision makers at all levels of administration as well as policy makers.

5.2 Recommendations
This study recommends following measures:

- Female entrepreneurship policy should be set up as one of women emancipation ways, development tools.
- Temporary tax exemption to encourage starting female entrepreneurs.
- Organizing female entrepreneurs business plan competition and give awards to the best in order to raise their entrepreneurship motivation and support the best businesses.
- Allowing a minimum amount of money without collateral for a woman who present a relevant business plan with the will of undertaking a new business but she must pay back the loan.
- Credits programs should be linked with entrepreneurship development training programs to allow efficient use of credits provided.
- Orientation of the Rwanda education systems to emphasize and value, entrepreneurship in order to cultivate an enterprise culture among citizens from basic school education.

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Existence of Arabesque in Islamic Architecture

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Abstract: The Muslim empire has been recognised worldwide due to its genius representation of Art. The artists and craftsmen of Islamic empire put their religious beliefs to induce their creativity in a series of abstract forms and amazing works of art. These art forms were progressive towards establishing a new style substantially deviating from Roman and byzantine art of their time. For these artists, art was the way of transmitting the messages of Islam. This art touched everybody’s heart with its ornamentation, detailing and calligraphy.

The main objective of this article is to emphasise the uniqueness of Islamic art, which was defined by religious beliefs and cultural values prohibiting the depiction of living creatures including humans. This article briefly examines the meaning and character of art in Islamic culture, its implication on architecture and explore about its main decorative form i.e. Arabesque (floral and geometrical). Finally, it looks at the influence of the art developed in the world of Islam in India.

Index Terms- Derivation of Islam, Islamic Art, Islamic Architecture, and Arabesque, floral and geometrical patterns.

I. ISLAM: THE DERIVATION

The name of this religion, Islam, is derived from Arabic word “Salam”, which is often interpreted as meaning "peace". However, specialists call the meaning of the word as "submission", which indicates towards the eternal submission of oneself to God. The holy book Quran states "Islam is to testify that there is no god but Allah and Muhammad is the messenger of Allah", this statement clears the fact that Islam is a monotheistic religion, according to which there is only one God and that is Allah. The Islam religion finds its origin in South Arabia and dates back to 7th Century, which is later to any other major religion existing in the world. Despite its more recent origin, there are around 1.6 billion followers of Islam across the globe, thereby making it the second largest religion in the world after Christians.

"Muslim" is an Arabic word that refers to a person who submits themselves to the will of God. Followers of Islam are called Muslims. "Allah" is an Arabic word which means “The One True God.” (Source: www.wikipedia.com)

II. HISTORICAL GLIMPSES

By 750 CE, Islam had spread to China, India, along the Southern shore of the Mediterranean and got stepped into Spain. By 1550, they had weighed down Vienna. Wars resulted, expelling Muslims from Spain and Europe. Since they were mostly following land routes for their trade activities, they did not develop far-reaching sea trade (as for example the English and Spaniards). As a result, the old world occupation of North America was left to Christians.

Believers are currently concentrated from the West coast of Africa to the Philippines. In Africa, in particular, they are increasing in numbers, largely at the expense of Christianity. Many do not look upon Islam as a new religion. They feel that it is in reality the faith taught by the ancient Prophets, Abraham, David, Moses and Jesus (Peace be upon them). Muhammad's role as the last of the Prophets was to formalize and clarify the faith and to purify it by removing foreign ideas that had been added in error.

III. ISLAMIC ART

Art is the medium which reflects the culture and establishment of a society. Similarly in the case of Islamic art, which reflects its cultural values, the belief toward spirituality, this universe, life and the association of human being with the almighty. For a Muslim, the core reality is “God (Allah)”, the supreme ruler, the one who is pure and the most merciful, the almighty, towards whom, Muslim’s worship and aspiration revolves. All things are bound together under God’s leadership as part of an all-encompassing divine scheme which includes all aspects of being and life -- whatever is both inside and outside of time and space, and embracing both the macrocosm in its most awesome expression and in its most minute forms.

With such a belief system, the Muslim is convinced of the balance and harmony of all things in existence. Because of the strict embargo, Islamic art developed a unique character, utilizing a number of primary forms: geometric, arabesque, floral, and calligraphic, which are often interwoven. From early times, Muslim art has showcased this balance and harmony imbued into their culture.

The early Muslim artists and artisans who derived the intricate
systems of interconnected geometric forms which constitute the bases of Islamic geometric art of course may have no idea of such realities. Nonetheless, the graphic manner in which they conceived God's supreme central place in the cosmos, and the connection of the parts of creation to him and to the whole, reflects a very significant approximation of what can now be documented by science.

IV. EXPRESSIONS IN ISLAMIC ART & ARCHITECTURE

Islamic architecture includes a large variety of both materialistic and spiritual systems from the foundation of Islam to the present day, influencing the design and construction of buildings and structures in Islamic culture. The vocabulary of Islamic Architecture was derived due to two types of Architectural forms:

1. The principal buildings, such as Mosques, Tombs, Palaces, Forts.
2. The buildings of lesser importance, such as public baths, fountains and domestic architecture.

After Muhammad's time (after 632 AD), a specifically recognizable Islamic architectural style emerged, which was a style evolved with the contribution of Egyptian, Persian/Sassanid, Greek and Byzantine models. The Germanic Visigoths in Spain also made a big contribution to Islamic architecture. They invented the Horseshoe arch in Spain and used them as one of their main architectural features. After the Moorish invasion of Spain in 711 AD the form was taken by Umayyad who later emphasized the curvature of the horseshoe. An early example of Islamic architecture may be identified as early as 691 AD with the completion of the Dome of the Rock (Qubbat al-Sakhrah) in Jerusalem. It featured interior vaulted spaces, a circular dome, and the use of stylized repeating decorative patterns (arabesque).

V. ‘INDO’ - ISLAMIC ARCHITECTURE

The ‘Indo’ character in Islamic architecture comes in existence with the rise of Ghurid occupation at the close of 12th century AD. The Muslims were inherited with a good sense of varied designs from the Sassanian and Byzantine empires and being naturally rich with taste for buildings, never failed to adapt to their own requirements, due to the reason, glimpses of the original character of almost every foreign country that they conquered, can be seen throughout. The most important factors common to all the mixed forms of architecture in this era were especially with respect to mosques and temples, wherein the ornamental decoration was playing a vital role into aesthetics and these buildings were having an open court in many cases, which was surrounded by colonnades.

On the contrary, it was equally notable that the prayer chamber of the mosque was spacious rather than the shrine of the temple which was comparatively small. The reason could have been the difference in prayer styles wherein the congregational prayer in Islam requires a spacious a courtyard with a Hall pointed towards Mecca. Muslim invaders of India were merely armed horsemen, who had come to the country to loot and plunder and were having no idea in terms of founding towns, cities or empires. Consequently they were not having architects, masons and craftsmen with them. The building debris was used by those Muslim invaders, for new improvised buildings such as Quwwat-ul-islam(Figure-3) mosque in Delhi and Adhai din-ka-jhonpra (Figure-4) at Ajmer.

The arrival of the Muslims in India therefore did not immediately make a great impact on Indian architecture and as a result, the physical conquest of India actually took more than a thousand years. It was only with the take-over of India by Emperor Babar in 1526 that the Muslims began to think in terms of settling down in the country and in course of time had the satisfaction that they now belonged to the country and that the country belonged to them. As such from the 7th century to the 16th century Muslim architecture in India reflects the unsettled condition of the conquerors who felt that they were living amidst the conquered inhabitants, many of who were hostile to them. As such the accent thus far was on security which could be had only in walled fortifications. It is, therefore, that early Muslim towns and cities, even when they are tombs were made as fortified places which they could easily defend against hostile forces. But after the proper settlement of their requirements in India and
after getting bored with the flat and non artistic features of their buildings they thought to decorate their buildings with some decorative elements. Since their rulers were influenced from the rich Indian art and architecture and have also seen the art patterns which were being used in India, they started taking the elements of decorations from the Indian buildings in their form. Firstly they have started writing the inscriptions of Quran over the exterior and interior facades of the buildings (Calligraphy) and later on the addition of geometrical and floral patterns (Arabesque) have been done for the improvement of elevations.

VI. SIGNIFICANCE OF ARABESQUE IN ISLAM

The arabesques and geometric patterns of Islamic art (Figure-7) are often said to arise from the Islamic view of the world. To Muslims, these forms, taken together, constitute an infinite pattern that extends beyond the visible material world. To many in the Islamic world, they concretely symbolize the infinite, and therefore uncentralized, nature of the creation of the one God (Allah). Furthermore, the Islamic Arabesque artist conveys spirituality without the iconography of Christian art. Arabesque art consists of a series of repeating geometric forms which are occasionally accompanied by calligraphy. Ettinghausen et al. describe the arabesque as a "vegetal design consisting of full and half palmettes [as] an unending continuous pattern in which each leaf grows out of the tip of another (Figure-8). To the adherents of Islam, the Arabesque is symbolic of their united faith and the way in which traditional Islamic cultures view the world. There are two modes to arabesque art.

There are two modes to arabesque art. The first recalls the principles that govern the order of the world. These principles include the bare basics of what makes objects structurally sound and, by extension, beautiful. In the first mode, each repeating geometric form has a built-in symbolism ascribed to it. For example, the square, with its four equilateral sides, is symbolic of the equally important elements of nature: earth, air, fire and water. Without any one of the four, the physical world, represented by a circle that inscribes the square, would collapse upon it and cease to exist. The second mode is based upon the flowing nature of plant forms. This mode recalls the feminine nature of life giving. The basic geometrical shapes used for inlay of geometrical arabesque are majorly constructed through repetition of lines and arcs. The regular repetition of such elements creates a kind of pattern which is then inlaid with different colors or materials and improves the aesthetic value of the surface. Muslim artisans also perfected the technique of creating decorative motifs of flowers, vines, and other graphics in precise geometric patterns. These “arabesque” motifs often cover walls, pottery, and other decorative objects and are governed by geometric and mathematical principles. The vines curve around and split off at very precise angles.

VII. STEPS FOR CONSTRUCTION OF A TYPICAL GEOMETRICAL PATTERN

VIII. CONCLUSION

Looking at past and talking about the achievements may lead one, both, to the risk of getting trapped into the bereavement.
while also romanticizing its bygone charm. This article may be accused of intervening both at the same time, but it also supports the entrenched belief that Islam was enriched with the ways to attain a good and comprehensive living. Of course all can’t be implemented blindly in the modern context, but the extract of those deep-rooted beliefs may guide us to follow the correct path. The modern trends and the traditional forms should come together and should share same platform to showcase the beauty and grace of our glorious past.

In addition, these traditional urban forms should behave as per the concerns of today like climate and energy efficiency, along with their visual aesthetics. These viewpoints of past are relevant today, particularly when almost each aspect of life and every form of production has become aware and sensitive towards the resources and the social concerns. Undoubtedly, the Islamic cities and architecture is not going to replicate itself in the contemporary world by adopting the use of domes and minarets, but adoption of their ethos may help us to find humanity in humans.

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Morphological and Anatomical Variations Seen in *Sida* L., Kanyakumari District, Tamilnadu

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Dept. of Botany, Holy Cross College(Autonomous), Nagercoil -4

Abstract

Macro and micro morphological studies of root and stem of five Sida species, *S. acuta*, *S. cordata*, *S. cordifolia*, *S. rhombifolia* and *S. schimperiana* were carried out and compared, in order to determine the taxonomic relationship between them. Druses, hydropoten cells and trichomes occurred in all the species. Stomata are anisocytic. The foliar trichomes of *Sida* however possessed a remarkable diversity. Epidermal peeling of leaf shows biaxial trichomes. The foliar trichomes of *Sida* however possess a remarkable diversity such as peltate, stellate forked stalked and capitate trichomes. Much variation is noticed in anatomical characters of stem and root also. The present study provides the basic information and the interrelationship between the different plant species of *Sida* which are currently found in Kanyakumari district. The knowledge of taxonomy is a great tool for identification of the different plant species.

Key Words: Micromorphology, Macromorphology, Anatomical, Calcium Oxalate crystals, Trichomes, Stomata

Introduction

The genus *Sida* L., belongs to the family Malvaceae. The family Malvaceae is one of the largest flowering plants and is commonly known as ‘Mallow family'. It has 82 genera and 1500 species distributed widely in tropical and subtropical regions of the world[1]. In India, the family is represented by 22 genera and 93 species. The members are mostly annual or perennial herbs, but in the tropics they are shrubs or rarely soft woody trees. The stem is fibrous and the herbaceous portions are more or less covered with stellate hairs. The plant parts are often mucilaginous. The leaves are stipulated, alternate, simple, entire and often with stellate trichomes. In the recent revision,[2] Malvaceae was divided into five tribes - Abutileae, Decaschisteae, Hibisceae, Malvaceae and Ureneae. The family Malvaceae of Southern Peninsular India was revised by[3].

The name *Sida* L., was validated by Linnaeus in “Species Plantarum”. 20 species of *Sida* occur in India[3, 4, 5]. 13 species are found in Tamil Nadu, along with two sub species[6]. The significance of mericarp morphology of the species of *Sida* has studied by[7, 8], [9, 10,11]. Due to its various ecological, medicinal and economical value, the genus *Sida* is of great interest to botanists, horticulturists and farmers.

Plants represent one of the important elements of biodiversity. Practically Kanyakumari District remains to be explored from the taxonomic point of view considering changes that took place in last few decades owing to heavy agriculture, tsunami, urbanization, industrialization and other such factors. The present study is designed to have a thorough study on the description, macro-morphology, floral characters, microscopic study and preparing an artificial key of *Sida* species.

Materials and Methods

Species of *Sida* were collected from various locations of Kanyakumari District during flowering period. The specimens were identified with the authentic taxonomic literature[13]. From freshly collected specimens, macro-morphological and floral variation studies were done with the help of simple dissection microscope. Microscopic studies were performed based on hand sections of the roots stem and epidermal peel and were observed under compound microscope. Photographs were taken with a Motic microscope camera. Materials for foliar epidermal anatomy were prepared following the technique of [14].

Results

The systematic position of the genus *Sida* L., is Class: Dicotyledoneae,

Sub class : Polypetalae, Series : Thalami Florae, Order : Malvales and Family : Malvaceae.

This genus is easily distinguished from other genera of Malvaceae by the absence of epicalyx, calyx morphology and uniovulate mericarps.

From different parts of the study area, 5 species have been identified authentically[13]. The general characters of *Sida* is as follows: perennial or annual herb or undershrub, erect or prostrate, glabrous or pubescent. Most of the parts are covered with stellate, glandular or simple hairs. Leaves simple, petiolate, leaf blade cordate, elliptic, linear, rhomboid, ovate, serrate. Stipules thread like to lanceolate, foliar nectaries absent. Flowers small, axillary or subterminal, solitary or clustered to racemes, panicles or umbels. Bracteoles absent, pedicel slender, epicalyx absent. Calyx campanulate or cup shaped with 5 fused sepals. Corolla mostly yellow, creamy white, orange or sometimes dark yellow. Petals 5, free, connate at base. Staminal column included, filiment tube pubescent or glabrous with numerous anthers at apex. Capitate stigma ovary 5 to 10 loculed each with one ovule, pendulous. Styles branches as many as carpels. Stigma capitate, fruit schizocarpic. Mericarp differentiated into a lower one seeded indehiscent cell and an upper empty dehiscent part that is often endowed with a pair of awns. Seeds solitary and one per mericarp, smooth glabrous or minute hairs around hilum. Most of them are seen in sunny areas but few are seen in shady places.

Macro and micro morphological study:
The morphological and floral variations seen in the five different species of *Sida* under study are depicted in Table 1 & 2.

1. *Sida acuta* Burm. f.,

Annual, erect herbs or undershrubs, 0.5 - 2 m high; stems pubescent with simple minute stellate hairs. Leaves 1 - 9 x 0.5 - 2.5 cm, lanceolate to linear, elliptic-lanceolate, acute at apex, mostly serrate, 3-nerved at base, hairs simple; petioles 2 - 6 mm long. Flowers axillary, solitary or 2 - 8 in clusters of 3 - 12 mm long. Calyx 5 - 6 mm across, campanulate, Corolla light yellow, 8 - 10 mm across; petals as long as or slightly exceeding calyx lobes. Mericarps 6 - 10, apically awned of equal length; 1-seeded; Seeds dark brown.  
Flowering and Fruiting: July to March  
Distribution: Along roadsides, in wastelands, both shady and open places.

2. *Sida cordata* (Burm. f.) Borss.,

Prostrate herbs up to 1 m high, stems slender; branched throughout or mostly towards base, rarely rooting at nodes in trailing condition; stems, petioles and pedicels pubescent with simple and minute stellate hairs. Leaves 0.5 - 8 x 0.3 - 5.5 cm, ovate to cordate, acute to acuminate at apex, crenate-dentate or serrate, 5 - 7-nerved at base, appressed simple hairy mixed with some stellate-hairs on both surfaces; petioles 1.5 - 30 mm long; Flowers axillary, solitary, 8-10 mm diameter, Calyx 5 x 6 mm across, campanulate, 5-fid, simple and some stellate-hairy outside, glabrous inside except along margin. Corolla orange-yellow, 10 mm across; petals 6 x 5 mm, obovate, ciliate at base. Schizocarps 4 x 3 mm, globose, enclosed in persistent calyx; mericarps 5, awnless. Seeds brownish black.  
Flowering and Fruiting: Throughout the year, mainly during Sept. - Nov.  
Distribution: In waste lands, humid and shady places up to 1500 m.

3. *Sida cordifolia* L.,

Erect undershrubs, up to 1 m high; stems branched with minute stellate hairs mixed with simple hairs. Leaves 6 x 5 cm, ovate to oblong or sub-orbicular, shallowly cordate at base, crenate-serrate, 5 - 7-nerved at base, densely velutinous with minute stellate hairs on both surfaces; petioles 4 - 5 mm long, densely stellate-hairs mixed with some simple hairs. Flowers axillary, solitary; pedicels 2 - 10 mm long, accrescent up to 2 cm, jointed towards apex. Calyx 5 - 9 mm across, campanulate, somewhat accrescent; lobes triangular acute to acuminate, densely tomentose with stellate and simple hairs. Corolla dark yellow, ca 15 mm across; petals obliquely obovate, Mericarps 8 - 10, apex of mericarp with a pair of awns with unequal length, Seeds dark brown or black.  
Flowering and Fruiting: Throughout the year.  
Distribution: In dry waste places.

4. *Sida rhombifolia* L.,

Erect branched herbs or undershrubs up to 1 m high. Stem cinereous with stellate hairs. Leaves obovate to cuneate, often more or less rhomboid, ovoid, or lanceolate, apically serrate to crenate, entire towards base, Leaf blades ca 6 x 3 cm, Flowers axillary, solitary, sometimes in apparent racemes; flowers ca 1.5 cm diameter. Calyx 5 x 6 mm, campanulate, pubescent. Corolla pale-yellow or creamy-white, ca 10 x 7 mm, mericarps 8–10, apex with a pair of short divergent awns of unequal length. Seeds brown or black.  
Flowering and Fruiting: August to January.  
Distribution: In dry waste places.  
5. *Sida schimperiana* Hochst. ex A. Rich.,

Perennial undershrubs or herbs, up to 90 cm high; stems woody, erect or procumbent; Stems, appressed stellate-hairy. Leaves 0.5 - 15 x 3 - 5 mm, wedge-shaped, oblong, cuneate at base, retuse at apex with a small toothlet in the hollow middle, entire. Flowers axillary, solitary, sometimes crowded towards the end of branchlets; pedicels ca 1 mm long. Calyx lobes 3 - 5 x 1 - 2 mm, ovate, acuate, Corolla yellow; petals ca 5 x 2 mm, glabrous; mericarps 5, prominently reticulate,2 minute awns; Seeds brownish.  
Flowering and Fruiting: November to March.  
Distribution: In dry places of Karnataka, Andhra Pradesh, Tamil Nadu and Kerala

**Artificial key to the species of *Sida* L.,**

1a. Plants prostrate, awnless ............................................................... *S. cordata*  
1b. Plants erect, awned ................................................................. 2  
2a. Leaves retuce, margins wedge shaped........................................ *S. schimperiana*  
2b. Leaves cordate, acute, ovate, obovate ................................. 3  
3a. Mericarps 6-10, flowers light yellow, leaf tip acute ....................... *S. acuta*  
3b. Mericarps 8-10, flowers dark yellow, orange yellow ............... 4  
4a. Awns 2, equal length ............................................................ *S. cordifolia*  
4b. Awns 2, unequal length .................................................... *S. rhombifolia*  

**Table 1. Morphological variation seen in *Sida* species**

<table>
<thead>
<tr>
<th>Binomial</th>
<th>Habit</th>
<th>Stem</th>
<th>Leaf Shape</th>
<th>Number of Lateral veins</th>
<th>Petiole Length (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. acuta</em></td>
<td>Erect, Herb or Undershrub</td>
<td>Pubescent with simple stellate hairs</td>
<td>Lanceolate to linear</td>
<td>3</td>
<td>2 to 6</td>
</tr>
</tbody>
</table>

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Table 2. Floral variation seen in Sida species

<table>
<thead>
<tr>
<th>Binomial</th>
<th>Corolla Color</th>
<th>Mericarp number</th>
<th>Awn/Awnless</th>
<th>Seed Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. acuta</td>
<td>Light yellow</td>
<td>6 to 10</td>
<td>2 awned, equal length</td>
<td>Dark brown</td>
</tr>
<tr>
<td>S. cordata</td>
<td>Orange yellow</td>
<td>5</td>
<td>Awnless</td>
<td>Brownish Black</td>
</tr>
<tr>
<td>S. cordifolia</td>
<td>Dark yellow</td>
<td>8 to 10</td>
<td>2 awned, equal length</td>
<td>Dark Brown to black</td>
</tr>
<tr>
<td>S. rhombifolia</td>
<td>Yellow</td>
<td>8 to 10</td>
<td>2 unequal divergent awns</td>
<td>Brown</td>
</tr>
<tr>
<td>S. schimperiana</td>
<td>Yellow</td>
<td>5</td>
<td>2 minute awns</td>
<td>Brownish black</td>
</tr>
</tbody>
</table>

Microscopic studies:
a) Root
Transverse section of root is circular in outline in all the 5 species (Fig1.1 to 1.5). Bark is thin with cork consisting of 4 to 7 rows of thin walled tangentially elongated cells. Cortex is narrow, comprising of 3 to 4 layers in S. acuta and S. cordata, 5 to 6 in S. cordifolia and S. rhombifolia and multi-layered in S. schimperiana. Calcium oxalate crystals and starch grains are frequent in cortical cells. Tannin deposition is characteristic of S. cordifolia noticed in its cortex, xylem vessels and medullary rays. Bast fibre is seen in tangential bands of 3 to 6 rows alternating with thin walled phloem elements. Secondary xylem shows remarkable variations among the 5 species. In S. acuta the vessels are larger in size and more in number. In S. cordata and S. rhombifolia the vessels are smaller in size, lesser in number with more number of tracheids. In S. cordifolia and S. schimperiana the vessels are scanty, however with more tracheids. Xylem parenchyma cells that surround the vessel contain starch grains in all 5 species. Medullary rays are uniseriate or biseriate with deposition of calcium oxalate crystals and starch. Presence of prominent pith is noticed in S. schimperiana and S. cordifolia.

b) Stem
Cross section of stem (Fig2.1 to 2.5) shows circular outline with trichomes in all 5 species. Epidermis is radially elongated, thin walled. Cortex is chlorenchymatous with 4 to 6 layers. Deposition of calcium oxalate and tannin are more in S. cordifolia in comparison to the other 4 species. Conical shaped bast fibre is prominent in S. rhombifolia. Vessels are lesser in number in stem when compared to the root of the same species. Among the 5 species, Sida acuta showed larger vessels. In S. schimperiana, xylem is represented with only tracheids, fibres and parenchyma and very few vessels with narrow lumen. Large pith is noticed in S. schimperiana, S. cordata and S. cordifolia.
Fig. 1 – Root Morphology and Anatomy

Fig. 1.1 Sida acuta

Fig. 1.2 Sida cordata

Fig. 1.3 Sida cordifolia

Fig. 1.4 Sida rhombifolia

Fig. 1.5 Sida schimperiana
Fig. 2 – Stem Morphology and Anatomy

c) Leaf
Epidermal peeling of leaf shows biaxial trichomes. The foliar trichomes of *Sida* however possess a remarkable diversity such as peltate, stellate forked stalked and capitate trichomes (Fig.4.1 to 4.4). Stomata are anisocytic (Fig.3.1 to 3.5).
DISCUSSION

As a part of taxonomic studies on *Sida*, field explorations are conducted in different parts of the district under study. *Sida acuta* and *Sida cordata* are distributed throughout the district and grow on waste lands and along roadsides. *Sida rhombifolia* occurred more or less throughout the district and undergrowth of disturbed forests. *Sida cordifolia* is found to be common mostly in shady and waterfed areas of the district. *Sida schimperiana* is rare and collected only in the dry hilly slopes of the district.

*Sida acuta* differs from other species by having leaves with acute tip. *Sida cordata* showed a peculiar habit of being prostrate while other species are erect. *Sida schimperiana* shows woody habit with repeatedly forked stem. In *Sida cordata*, the leaves are cordate (heart) shaped and in *Sida schimperiana*, the leaves are wedge shaped.

Micromorphological features and the floral variations of the species of *Sida* were examined, in order to determine the taxonomic relationship between them. Druses, hydropoten cells and trichomes occurred in all the species. Stomata are anisocytic. The foliar trichomes of *Sida* however possessed a remarkable diversity.

Features of hairs are broadly regarded as useful for establishing the systematic relations within the Malvaceae[1,16]. *Sida* species shared some common characters like presence of trichomes and stomata. The foliar trichomes may be peltate, stellate or capitiate. Two armed trichomes are seen in *S. acuta*. Hydropoten cells, cited by [15] as structures that facilitate the transport of water and ions into the plants. These cells are more prominent and abundant in leaves of *S. cordifolia* which were collected from muddy roadsides. Leaves of *S. cordata* and *S. rhombifolia* show more undulations in the epidermal cells.[16] observed that cell wall undulation is a reflection of adequate habitat moisture and that undulating walls provide leaves with great tensile strength. The result of the present study is also similar to the results observed by [14,15] in their work. They suggested that the degree of undulation of epidermal cell walls plays a vital role in distinguishing sun and shade morpho types. The undulation pattern is frequently more pronounced in shade than in leaves exposed to sun.

The mericarp structure shows great diversity in different species in *Sida*. It is one of the key characters in identifying the species. This concurs with the suggestions made earlier by [7,8]. In the present study, it is observed that *Sida cordata* is the only species which lacks awns. This feature is used as a taxonomic delimitation of the species from other species.

Some of the morphological, anatomical and floral variations investigated show that some of the species are closely related to each other. Characters like, presence of awns, number of mericarps, leaf tip, leaf shape also help to group the related species together. This present investigation coincides with the observations of [7,8].
S. acuta is a vigorous competitor in degraded pastures, plantation crops, vegetables, road sides and waste lands. An important positive role of S. acuta is its ability to accumulate heavy metals and therefore may serve a phytoremediation role in contaminated sites.

S. cordifolia commonly known as ‘Bala’ attracts the attention of Ayurveda, Sidha, Homeopathy and modern allopathic physicians for its immense medicinal properties. The whole plant is being used for treating diseases such as bleeding piles, leucorrhoea, facial paralysis and rheumatism. S. rhombifolia is widely used in Ayurveda as well as in Indian folklore and traditional medicine. The root of this plant is widely accepted as the source of the renowned Ayurvedic drug. Sida cordata is often used along with ‘Bala’. The juice of the plant is applied to boils and pimples. The juice of the root is used to treat indigestion. It is also used in the treatment of gonorrhoea and other venereal diseases. The juice of the leaves is used to treat cuts and wounds.

CONCLUSION

The present study provides the basic information and the interrelationship between the different plant species of Sida which are currently found in Kanyakumari district. The knowledge of taxonomy is a great tool for identification of the different plant species. Taxonomic knowledge is crucial to meet the challenges of biodiversity conservation in the 21st century. It is of fundamental importance for understanding biodiversity and ecosystem functioning, as it provides us with the data to explore and describe biodiversity through scientific analysis. Since most of the species of Sida are used in Ayurveda, Sidha and Homeopathy, the unscientific and skill-less uprooting of the whole plant results in the deterioration of this genus in the near future. Hence it becomes the role of the local and regional authorities to take proper steps to conserve this precious phyto-diversity for better future use.

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A Field Survey on the Types of Videos and Learning Approaches deemed appropriate for the 21st Century Teaching and Learning

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Abstract- Undoubtedly, rapidly changing technologies have introduced many unprecedented challenges to almost every sphere of the people’s lives. For one, the educational realm has witnessed many changes made to the teaching and learning process to ensure students can learn with greater efficacy. Against this backdrop, this paper discusses the findings of a field study based on an online survey involving 91 students of Sultan Idris Education University, Tanjung Malim, Perak, Malaysia. The researchers used Google Form, which is a free survey development tool, for the development of online questionnaire of the survey. The main aims of this field study are as follows: (a) to determine the type of learning video deemed relevant to the 21st century learning, (b) to determine the teaching approach of lecturers as preferred by students, and (c) to determine the relevant teaching approach for subjects that entail logical thinking. Data collected were analysed descriptively, yielding a number of interesting findings. Firstly, 90% of the respondents (n = 82), which constituted an overwhelming majority, stated that they would prefer voice-recorded video and whiteboard animation as the appropriate learning aids. Secondly, at 60% (n = 55), more than half of the respondents indicated that lecturers should use a whiteboard and a portable visualizer to help improve their teaching process. Finally, a significant number of the respondents, at 81% (n = 74), indicated that the teaching of subjects requiring logical thinking (e.g., programming subject) would be best carried out with the use of software and a portable visualizer. Collectively, these findings suggest that novel interactive learning tools are indispensable in the teaching and learning process, especially for subjects that require higher order thinking skills, in this new millennium.

Index Terms- interactive slides, whiteboard animation, portable visualizer, video recording, 21st century teaching and learning

I. INTRODUCTION

As the world is moving forward, the educational realm is expected to embrace a new paradigm shift. Educators and education need to be responsive to new technological changes that are continually changing unabatedly [1]. More importantly, new teaching and learning styles may need to be developed to help prepare learners with new skills deemed relevant with this 21st century, where they have to be creative, and innovative [2]. In fact, new, novel technologies have spurred many developments in educational realm through the use of an array of media that helps facilitate the dissemination of knowledge creatively. Arguably, the proper and optimal utilization of technologies will be able to improve the quality of teaching and learning that is appropriate in this new century. To realize such effective use is challenging, entailing future educators to carefully and meticulously plan their teaching approaches or strategies in which relevant technologies can be applied to facilitate and heighten student learning. Clearly, the existence of the mobile technology provides a window of opportunity for educators help improve their teaching and learning process such that it becomes more appealing and engaging.

In this regard, the main challenge is to create an optimal computer-based learning environment [3]. Since their inception, computer applications, in particular multimedia learning applications, have been used by educators to present their teaching contents and carry out teaching exercises and to help engage students in learning [4]. For instance, videos have become one of the important computer-based communication tools that is widely used by students of various learning levels, ranging from secondary to tertiary education [3]. Such popular use of these applications is hardly surprisingly assert that students see such technological applications to be indispensable, which can help them improve their learning ability and enhance their learning performance [5].

Scholars have classified products of digital learning materials into two main categories, namely static teaching materials and dynamic teaching materials. The former include the use of word processing applications, such as Microsoft Word and notes converted into pdf files, PowerPoint slides, and others. On the other hand, the latter uses applications that typically contain rich multimedia elements, such as text, animation, audio, video, and graphics. For video, it can be classified into two types, namely teaching video that uses presentation slides and teaching video that uses whiteboard animation.

As such, finding the effective approach to help convey information effectively to learners should never be taken lightly. Such an approach deserves strong emphasis in light of the advancements in Information and Communication Technology (ICT) by which dissemination of information can be efficiently carried out in the teaching and learning process. Certainly, the use of ICT brings a numerous benefits to both teachers and

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students. For example, the use of graphics can help students retain facts or concepts that they have learned the classroom — in short, it helps improve students’ long term memory according to [6]. In addition, ICT applications can help explain complex or abstract concepts to students, which would be otherwise difficult to do without their utilization. Moreover, ICT applications can help teachers and trainers to monitor students’ understanding during the learning process [7]. Interestingly, ICT applications or systems can help creative interactive classes that heighten students’ interest and motivation, thus helping students to remain focused and eager to attend classes [8]. Given these potential educational benefits, the researchers embarked on this study to identify the effective and efficient teaching and ICT-based learning approach through a field survey. For the survey, a set of survey questionnaire was developed to elicit respondents’ opinions and feedback of the best approach for teaching and learning deemed relevant to the 21st century.

III. THE RESEARCH OBJECTIVES

The aim of this study was to examine the difference in students’ perception with regard to two methods of teaching, namely teaching based on recorded video and interactive slides and teaching based on recorded video and whiteboard animation. In addition, this study sought to determine the teaching and learning approach preferred by students and to examine their preference for teachers to select and use appropriate teaching and learning technique in teaching courses that entail logical thinking. As such, the researchers formulated three research objectives to guide this research as follows:

1) To determine the type of video preferred by students for the 21st century teaching and learning.
2) To determine the teaching and learning approach that students deem appropriate for their lecturers to use.
3) To determine the teaching and learning approach that students deem appropriate for their lecturers to use in teaching courses that entail logical thinking.

IV. RESEARCH METHODOLOGY

The research methodology of this study encompassed the study sample, research instrument, and procedures in conducting this undertaking. The proper choice of a research methodology in critical to ensuring a study can be carried out successfully by strict adherence to a set of procedures that helps the researcher collect and analyze data systematically. Specifically, this research employed the quantitative approach, requires numerical data on which statistical analyses will be performed to yield results that can help the researcher to reach an understanding of a phenomenon being investigated [12].

A. Research Design

The research design provides an overview of a research framework, planning, and strategy in determining appropriate research procedure [13]. For this study, a research design based on quantitative and qualitative approaches was used to help the researcher provide appropriate answers the research questions and address the research objectives. The first phase in carrying out this research was the planning stage in which the task of the researcher was to select the respondents and location of the field survey. Selecting appropriate respondents in terms of their demographics is important to ensure the success of such a field study, irrespective of its scale, as being either small or large. As such, this field study involved the participation of undergraduates from Sultan Idris Education University, Tanjung Malim, Perak, who were majoring in ICT and Multimedia.

The second phase was the implementation phase in which an online survey questionnaire was developed by the researcher using Google Form, which is a free online survey development tool. Also in this phase, the researcher developed two types of videos that, albeit having the same contents, were created using different video recording techniques. The first video was developed based on interactive PowerPoint slides embedded with recorded voice; whereas, the second video was developed using VideoScribe that was also embedded with similar recorded voice. Both videos were then uploaded to YouTube channel so as to allow the respondents to view them before responding to the survey questions. The survey form was made available to the respondents by providing them with the Uniform Resource Locator (URL) of the online questionnaire. Figure 1 and Figure 2 show the screenshots of the interfaces of the first and second video, respectively.

II. PREVIOUS STUDIES

In 1991, the use of interactive whiteboards had radically changed the way in which teaching and learning process was carried out. Essentially, the interactive whiteboard is touch screen that works in unison with a computer and a projector. As such, its capabilities far surpass those of conventional whiteboard, overhead projector and flipchart. The use of interactive whiteboard can be further enhanced by integrating it with various digital sources that helps creative compelling presentations for educational purposes [9]. Moreover, this novel whiteboard is capable of transforming the computer into a portent tool for teaching and learning through the amalgam of vivid colors, texts of various designs, integrated websites, presentation software, and scanned images, among others [10]. Today, the use of whiteboard is further emboldened with whiteboard animation, which helps make learning more interactive, motivational, and fun too. Such attainments have been demonstrated in a study by Israeli students became more motivated and engaged in learning assisted with whiteboard animation [11].
The final phase of the study involved the analysis and discussion of results. In this phase, the researchers analyzed all data elicited from the respondents’ responses to all items of the online questionnaire. Later, the researchers discussed and summarized the findings of the analysis before preparing a complete report of the field survey carried out.

The research design is discussed in detail using the framework of activities of the study. Specifically, this framework was developed to help highlight the research process through which the researchers had undergone in completing the field study. As previously discussed, the field study carried out consisted of three phases, namely the planning phase, the implementation phases, and the analysis and discussion phase, as depicted in Figure 3.

### B. The Respondents

The respondents consisted of 91 undergraduates majoring in Information and Communication Technology and Multimedia from Universiti Pendidikan Sultan Idris, Tanjung Malim, Perak, Malaysia, who were randomly recruited from several intact classes.

### C. The Research Instrument

The research instrument used in this field survey was a set of online questionnaire to help the researchers determine the type of learning video that students prefer for the teaching and learning process. In addition, the same instrument also helped determine the teaching method of lecturers that is preferred by the same students. Essentially, this research instrument comprises three main parts. Part A contains items relating to students’ demographics, namely gender, date of birth, and major of study. Part B contains items relating to internet use, duration of use, and blended learning. Part C comprises items relating to the type of preferred learning video, the reason for such preference, and preferred learning style and teaching method of lecturers for courses or subjects requiring logical thinking. In this part of the questionnaire, the URLs of the online videos were also provided to allow the respondents to watch two types of learning video before answering the questions.

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**Figure 3: The framework of activities**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activity</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>• Identifying the respondents and location for the survey</td>
<td>• Undergraduates majoring in ICT and Multimedia from Universiti Pendidikan Sultan Idris, Tanjung Malim, Perak, Malaysia</td>
</tr>
<tr>
<td></td>
<td>• Preparing an online questionnaire using Google Form</td>
<td>• Distributing the URL (address) of the online questionnaire to the respondents</td>
</tr>
<tr>
<td></td>
<td>• Developing two types of video:</td>
<td>• Uploading the videos to the Youtube channel.</td>
</tr>
<tr>
<td></td>
<td>a) voice-recorded video with interactive slides</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) voice-recorded video with whiteboard animation</td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td>• Analyzing the data elicited from responses of respondents</td>
<td>• Preparing a complete report of the field survey.</td>
</tr>
<tr>
<td></td>
<td>• Discussing and summarizing the survey findings</td>
<td></td>
</tr>
<tr>
<td>Analysis and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td></td>
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</tbody>
</table>
V. ANALYSIS AND DISCUSSION

A. The analysis of the type of video preferred by respondents for 21st century teaching and learning.

The findings showed that an overwhelming majority (90.1%) of the respondents selected Video 2 (voice-recorded video with whiteboard animation) as the preferred type of learning video. In contrast, only a small minority (9.9%) of the respondents indicated that they preferred Video 1 (voice-recorded video with interactive presentation slides). This finding suggests, in the context of 21st century learning, a particular technology that can provide greater ease in the learning process will be much preferred. In fact, such preference is hardly surprising contend that students watching hand movements on screen will be able to retain and transfer information more effectively [14].

From the perspective of “cue-summation” learning, learners will be able to learn more effectively and efficiently with more stimuli [15] and will be able to retain verbal information much longer in their minds when such information is complemented with visual information [16]. Moreover, the application of whiteboard animation in the teaching and learning process will help realize the concept of learning that transcends geographical and temporal barriers [17]. In fact, the learning approach used by lecturers in which video recording is employed for teaching is known as blended learning. Such learning is the result of combining face-to-face learning in the classroom with online learning using a variety of mobile devices, such as smartphone, iPad, or tablet [18]. As such, recorded video clips used in blended learning will be able to help students gain a better understanding of the learning contents [19].

B. The analysis of the teaching and learning method of lecturers preferred by respondents

There were eight items that probed respondents’ opinions on the preferred teaching and learning method of their lecturers. The findings showed that more than half (60.4%, n = 55) of the respondents rated the highest the item relating to the teaching method that uses a whiteboard and a visualizer. The next highest item rated by respondents was related to the teaching method that uses a whiteboard and presentation slides, where 37.4% (n=34) of them indicated such a preference. Predictably, only a handful of respondents (2.2%, n = 2) indicated the preferred lectures without any learning aids. These findings are consistent with the assertion that students will be more attracted to teaching methods of lecturers that utilize ICT tools during teaching [20].

From the perspective of “cue-summation” learning, learners will be able to learn more effectively and efficiently with more stimuli [15] and will be able to retain verbal information much longer in their minds when such information is complemented with visual information [16]. Moreover, the application of whiteboard animation in the teaching and learning process will help realize the concept of learning that transcends geographical and temporal barriers [17]. In fact, the learning approach used by lecturers in which video recording is employed for teaching is known as blended learning. Such learning is the result of combining face-to-face learning in the classroom with online learning using a variety of mobile devices, such as smartphone, iPad, or tablet [18]. As such, recorded video clips used in blended learning will be able to help students gain a better understanding of the learning contents [19].

C. The analysis of the teaching and learning method of lecturers preferred by respondents for subjects requiring logical thinking

The findings showed that a substantial majority (81.3%, n = 74) of the respondents indicated that they preferred the teaching method that uses a whiteboard and a visualizer in the learning of subjects requiring logical thinking. Trailing behind was the teaching method that uses a whiteboard and presentation slides, where 13.2% (n=12) of the respondents indicated such a preference. Again, the method that relies solely on lectures without any learning aids received the lowest rating, where only 2.2% (n = 2) of the respondents preferred this method in the learning of subjects entailing logical thinking. These findings are to be expected as teaching using visualizer has several benefits. For example, lecturers can easily change and select appropriate display of learning contents to suit specific students’ learning needs [6][21]. Effectively, such flexibility enables lecturers to discuss learning contents more clearly, especially for courses or subjects that contain many logical concepts, which ultimately leads to better student learning [20]. Likewise, the use of ICT learning applications can assist lecturers explain complex concepts more efficiently to [7] and also help students retain information more lastingly [6].
anytime. Particularly, the use of whiteboard animation can help used in blended learning such that students can learn anywhere, them to do so. In addition, such novel learning application can be interactively. As such, the onus is on lecturers to use novel whiteboard animation, to help them learn more efficaciously and ICT learning applications, such as voice-recorded video and demonstrated in this study, students have a strong proclivity for an integral part of the teaching and learning process. As transformed the learning environment such that ICT has become ICT. Arguably, in the 21st century, these changes have resulting from the constantly changing technologies, especially The educational realm has undergone many evolutionary changes demands of this millennium as virtually all students own mobile

<table>
<thead>
<tr>
<th>Teaching and learning methods of subjects requiring logical thinking</th>
<th>Results (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer give a lecture while using a whiteboard and a visualizer</td>
<td>81.3%</td>
</tr>
<tr>
<td>Lecturer give a lecture while using a whiteboard and presentation slides (PowerPoint/Prezi)</td>
<td>13.2%</td>
</tr>
<tr>
<td>Lectures without any learning aids</td>
<td>2.2%</td>
</tr>
<tr>
<td>Others</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Table 1: The type of teaching methods of lecturers as preferred by the students in the teaching of subjects requiring logical thinking

VI. CONCLUSION

The educational realm has undergone many evolutionary changes resulting from the constantly changing technologies, especially ICT. Arguably, in the 21st century, these changes have transformed the learning environment such that ICT has become an integral part of the teaching and learning process. As demonstrated in this study, students have a strong proclivity for ICT learning applications, such as voice-recorded video and whiteboard animation, to help them learn more efficaciously and interactively. As such, the onus is on lecturers to use novel learning applications in their teaching as students will expect them to do so. In addition, such novel learning application can be used in blended learning such that students can learn anywhere, anytime. Particularly, the use of whiteboard animation can help spur the growth of mobile learning to fulfill new learning demands of this millennium as virtually all students own mobile devices.

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Seismic Strengthening of Heritage Structure in Mandalay

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Abstract - Recent earthquakes in Myanmar have underlined the need for wide monitoring and safety assessment of cultural heritage structures. The study presents the seismic vulnerability evaluation and seismic strengthening of a specific monumental masonry structure: the main stupa of Kuthodaw Pagoda in Mandalay. The required experimental tests were conducted to determine the material properties of the structure. The probabilistic seismic hazard analysis was done to get ground motion data consistent with local seismic conditions. These seismic waves were used for the input of time history analyses. Comparisons of the expected seismic demand and the capacity of the structure were done to determine the weak parts of the structure under earthquakes. The fragility curves of the structure under consideration with and without external steel rings were developed. The results have shown that the use of external steel rings can significantly reduce seismic vulnerability and effectively strengthen the structure against earthquake.

Index Terms - Heritage Structures, Mandalay, Time History Analyses, Fragility Curves

I. INTRODUCTION

Heritage structures perform vital role in nation’s history, culture and signify the richness of it. To augment life and enhance strength, their restoration is very important for the future generations to have knowledge about how mankind lived in past ages. The majority of the main structural systems for historical heritage structures or monuments are masonry elements, composed of stone, bricks and mortar. For all types of old historical masonry structures erected in seismic zones of high seismicity, earthquake is always their number one enemy due to their very bad response to earthquakes. Earthquake is one of natural phenomenon which cannot be accurately predicted where and when it will happen. Since earthquake force intensity changes with time, then its effect to the structure also changes with time. Earthquakes act as non-harmonic, non-periodic and non-stationary dynamic load in the form of wave radiation from the source. The wave is then radiated in all directions with the surrounding soil and rocks medium until approaching earth surface and causing vibration. Ground motion received by foundation is then continued to the upper structure, resulting in oscillation at the building as inertial forces.

Recently, it was observed that the frequency of occurrences of earthquakes along the Sagaing fault has increased. Though an earthquake could not be prevented, the loss of life and damage to property could be minimized. Steps could be taken to reduce the damages to existing structures. The estimation of the seismic vulnerability of a heritage structure is a multi-phased process that ranges from the description of earthquake sources to the characterization of structural response, and to the description of measures for seismic protection.

Myanmar is prone to great earthquakes. In 1917, Bago earthquake hit Bago region causing failure of top portion of the Shwemawdaw Pagoda. Recently, the magnitude of 6.8 earthquake struck Myanmar 25 km west of Chauk with a maximum Mercalli intensity of VI and several pagodas and temples in the nearby ancient city of Bagan were damaged. The failures of the structures exampled above indicate that evaluation for seismic safety and strengthening of heritage structures are extremely needed. In this study, the nonlinear seismic analysis of case study structure is done using finite element software ANSYS [1]. The analysis can check whether strengthening of the existing structure is required or not. The evaluation of strengthened structure by using external steel rings is also illustrated. The purpose of this study is to increase seismic resistance of the structure for future anticipated earthquakes without altering their basic structural system.

II. METHODOLOGY

In this study, the nonlinear seismic analysis of case study structure is carried out to determine whether strengthening for different levels of ground shaking is required or not. The experimental tests are conducted to get the existing properties of the materials. The vibration characteristics of the structure were determined by performing modal analysis. Then transient analysis of the structure is performed considering the appropriate seismic loading and the results before and after strengthening are compared. The general methodology used in this study is illustrated in Figure 1.
III. PROBABILISTIC SEISMIC HAZARD ANALYSIS

The goal of probabilistic seismic hazard analysis (PSHA) is to quantify the rate or probability of exceeding various ground-motion levels at a site given all possible earthquakes. Mostly, the seismic hazard levels are determined by the probabilistic seismic hazard analysis (PSHA) [3]. The following three levels are commonly defined for buildings with a design life of 50 years [2]:

1). Serviceability Earthquake (SE),
2). Design Basis Earthquake (DBE), and
3). Maximum Considered Earthquake (MCE).

The definitions of the SE, DBE, and MCE defined by the ATC-40 are as follows:

The Serviceability Earthquake (SE) is defined probabilistically as the level of ground shaking that has a 50% chance of being exceeded in a 50-year period.

The Design Basic Earthquake (DBE) is defined probabilistically as the level of ground shaking that has a 10% chance of being exceeded in a 50-year period.

The Maximum Considered Earthquake (MCE) is defined probabilistically as the level of ground shaking that has a 2% chance of being exceeded in a 50-year period.

Seismic hazard analysis involves estimation of ground motion hazard at a particular area. The following three steps are generally required in the PSHA:

1). Specification of the seismic hazard source model,
2). Specification of the ground motion model, and
3). The probabilistic calculation

1) Seismic Hazard Source Model: The seismic-hazard source model is a description of the magnitude, location, and timing of all earthquakes. In this study, the estimation seismic hazard levels are based on the seismic hazards assessment for Myanmar developed by Myanmar Earthquake Committee (MEC) and Myanmar Geosciences Society (MGS) [9] and bounded Gutenberg-Richter recurrence law. The cumulative distribution function for magnitude of an earthquake can be described as follows [3].

\[
F_M(m) = \frac{1 - 10^{-b(M-M_{min})}}{1 - 10^{-b(M_{max}-M_{min})}}
\]

where

- \( F_M(m) \) = the cumulative distribution function for M
- \( b \) = seismic constant
- \( M_{\text{min}} \) = minimum magnitude
- \( M_{\text{max}} \) = maximum magnitude

The probabilities of occurrence of discrete set of magnitudes are computed by the following equation [3].
where $m_j$ are the discrete set of magnitudes. Magnitude probabilities for Sagaing fault are tabulated in Table I.

Table I: Magnitude Probabilities for Sagaing Fault

<table>
<thead>
<tr>
<th>$m_j$</th>
<th>$F_M(m_j)$</th>
<th>$P(M = m_j)$</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>0</td>
<td>0.4381</td>
</tr>
<tr>
<td>5.25</td>
<td>0.4381</td>
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<td>5.5</td>
<td>0.6845</td>
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<td>5.75</td>
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<td>0.9009</td>
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</tr>
<tr>
<td>7.5</td>
<td>0.9978</td>
<td>0.0014</td>
</tr>
<tr>
<td>7.75</td>
<td>0.9992</td>
<td>0.0008</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Annual rate of exceedance of certain earthquake magnitude for the Sagaing fault shown in Figure 2 is developed by using the seismic historical data of the Sagaing Fault [9] and magnitude probabilities for Sagaing fault.

![Figure 2: Annual rate of exceedance of certain earthquake magnitude for the Sagaing Fault](image)

2) Ground Motion Model: The ground motion model used in PSHA is referred to as attenuation relationship. The most basic attenuation gives the ground motion level as a function of magnitude and distance, but may have other parameter to allow for a few different site type or style of faulting [11]. Cornell, et al. (1979) proposed the following predictive model for the mean of log peak ground acceleration (in units of g).

$$\ln \text{PGA} = -0.152 + 0.859M - 1.803\ln(R + 25)$$

where,

- $R$ = distance from the source in kilometer

3) Probabilistic Calculation: The return period, $T$ is defined as according to the following equation.
\[ T = \frac{1}{p} \quad (4) \]

For example, a 500 years earthquake has an annual probability of exceedance of 0.002.

The probability of an earthquake with a return period of T being exceeded in n years is given as:

\[ p = 1 - (1 - \frac{1}{T})^n \quad (5) \]

In the UBC code, earthquake codes are based on a probability of exceedance of 10 % in 50 years (i.e., \( p=0.1, n=50 \) years). The return periods of three levels of earthquakes can be calculated by Equation 5.

The probability of occurrence in any year for the SE is, therefore, \( p = \frac{1}{72} = 0.0139 \). The probability of occurrence in any year for the DBE and MCE are 0.0021 and 0.0004 respectively. Then the associated magnitudes for the three levels of earthquakes can be assumed using Fig. 6. Finally, the peak ground accelerations (PGA) can be estimated using Equation 3 with the nearer source distance of 25 km from the major cities such as Yangon and Mandalay. Using those data, the estimated magnitudes for the three seismic hazard levels can be provided shown in Table II.

**Table II: Estimated Seismic Hazard Levels**

<table>
<thead>
<tr>
<th>Earthquake Type</th>
<th>Return Period, T (year)</th>
<th>Probability in any year</th>
<th>Estimated Magnitude, ( M_W )</th>
<th>Peak Ground Acceleration, PGA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE</td>
<td>72</td>
<td>0.0139</td>
<td>6.5</td>
<td>0.2g</td>
</tr>
<tr>
<td>DBE</td>
<td>475</td>
<td>0.0021</td>
<td>7.3</td>
<td>0.4g</td>
</tr>
<tr>
<td>MCE</td>
<td>2475</td>
<td>0.0004</td>
<td>7.8</td>
<td>0.6g</td>
</tr>
</tbody>
</table>

**IV. SEISMIC ANALYSIS AND STRENGTHENING OF MONUMENT**

The case studied structure selected in this study is the main stupa of Kuthodaw Pagoda or MahaLawkaMarazein Pagoda located in Mandalay, Myanmar. It was built by KingMindon in 1857. It is one of the structures listed on the Memory of the World Register of the UNESCO. It is the brick masonry structure. It has five terraces: three are square shaped, one is polygonal shaped and one is circular shaped. Overall height is 30.5 m excluding the height of umbrella. The required experimental tests were conducted to determine the existing properties of the materials. Material properties used in the analysis are tabulated in Table III.

**Table III: Material Properties**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Masonry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit weight (kg/m³)</td>
<td>1679</td>
</tr>
<tr>
<td>Young modulus (MPa)</td>
<td>2344</td>
</tr>
<tr>
<td>Poison’s ratio</td>
<td>0.25</td>
</tr>
<tr>
<td>Ultimate compressive strength (MPa)</td>
<td>3.348</td>
</tr>
<tr>
<td>Ultimate tensile strength (MPa)</td>
<td>0.335</td>
</tr>
</tbody>
</table>
A. Finite Element Model

The three dimensional finite element model of the proposed structure is prepared by using ANSYS software. The model is comprised of 2,389 solid elements with 15,208 nodes. The plan view and the finite element model of the structure are illustrated in Figures 3 and 4 respectively.

Figure 3: Plan View of Stupa

Figure 4: Finite Element Model of Stupa

B. Fragility Curves

Evaluating seismic fragility information curves for structural systems involves information on structural capacity, and information on the seismic hazard. Due to the fact that both the aforementioned contributing factors are uncertain to a large extent, the fragility evaluation cannot be carried in a deterministic manner. A probabilistic approach, instead, needs to be utilized in the cases in which the structural response is evaluated and compared against “limit states” that is, limiting values of response quantities correlated to structural damage.

Fragility curves can be obtained from a set of data representing the probability that a specific response variable (e.g. displacement, drift, acceleration, damage) exceeds predefined limit states for various earthquake hazards on a specific structure or on a family of structures. The fragility curves distribute damage among Slight, Moderate, Extensive and Complete damage states. The conditional probability of being in, or exceeding, a particular damage state, $d_s$, given the spectral displacement, $S_d$, (or other seismic demand parameter) is defined by the following equation.

$$ P[d_s | S_d] = \Phi \left( \frac{1}{\beta_{d_s}} \ln \left( \frac{S_d}{S_{d,s}} \right) \right) $$  \hspace{1cm} (6)

where $S_{d,s}$ is the median value of spectral displacement at which the building reaches the threshold of damage state, $d_s$, $\beta_{d_s}$ is the standard deviation of the natural logarithm of spectral displacement for damage state, $d_s$, and $\Phi$ is the standard normal cumulative distribution function.

C. Transient Analysis

Transient dynamic analysis or time-history analysis is a technique used to determine the dynamic response of a structure under the action of any general time-dependent loads. This is used to determine the time varying displacements, stresses, strains and forces as it responds to any combination of static, transient and harmonic loads [1]. The basic equation of motion solved by a transient dynamic analysis is:

$$ \{M\}\ddot{u} + \{C\}\dot{u} + \{K\}u = \{F(t)\} $$  \hspace{1cm} (7)

where:

- $\{M\}$ = mass matrix
- $\{C\}$ = damping matrix
- $\{K\}$ = stiffness matrix
- $\{\ddot{u}\}$ = nodal acceleration vector
- $\{\dot{u}\}$ = nodal velocity vector
- $\{u\}$ = nodal displacement vector
- $\{F(t)\}$ = load vector

Three methods are available to do transient dynamic analysis: full, mode- superposition and reduced. In this study, full transient dynamic analysis is used. It is the most general of the three methods because it allows all types of nonlinearities to be included. The transient analysis is carried out using as input, the acceleration time data consistent with three seismic hazard levels determined by PSHA. The load combinations according to the ACI codes aseismic regulations [4], shown in Table IV, are used.
In seismic analysis, the structure is divided into eight parts in order to evaluate the stresses subjected to the structure. The eight parts of structure and their respective heights are illustrated in Figure 5.

According to seismic analysis of the structure, it is observed that the stupa can resist the compressive stresses under three levels of ground excitations. However, for tensile and shear stresses, the calculated demand to capacity ratios exceed 1 under DBE and MCE levels. So, the structure need to be strengthened for these two seismic hazard levels. The compressive stresses subjected to each part of stupa and calculated demand to capacity ratios are tabulated in Table V.

<table>
<thead>
<tr>
<th>Loading Case</th>
<th>Combinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>D+L</td>
</tr>
<tr>
<td>3</td>
<td>D+L+(W or E)</td>
</tr>
<tr>
<td>4</td>
<td>D+W</td>
</tr>
<tr>
<td>5</td>
<td>0.9D+E</td>
</tr>
</tbody>
</table>

Where D = Dead load, L = live load, E = Earthquake load

Figure 5: Parts of Structure

According to seismic analysis of the structure, it is observed that the stupa can resist the compressive stresses under three levels of ground excitations. However, for tensile and shear stresses, the calculated demand to capacity ratios exceed 1 under DBE and MCE levels. So, the structure need to be strengthened for these two seismic hazard levels. The compressive stresses subjected to each part of stupa and calculated demand to capacity ratios are tabulated in Table V.

Table V. Demand to Capacity Ratios for Compressive Stresses before Strengthening

<table>
<thead>
<tr>
<th>Parts</th>
<th>Stress(psi)</th>
<th>Strength (psi)</th>
<th>DCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SE</td>
<td>DBE</td>
<td>MCE</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>DBE</td>
<td>MCE</td>
</tr>
</tbody>
</table>
The tensile stresses subjected to each parts of stupa and calculated demand to capacity ratios are shown in Table VI.

Table VI: Demand to Capacity Ratios for Tensile Stresses before Strengthening

<table>
<thead>
<tr>
<th>Parts</th>
<th>Stress (psi)</th>
<th>Strength (psi)</th>
<th>DCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SE</td>
<td>DBE</td>
<td>MCE</td>
</tr>
<tr>
<td>1</td>
<td>12.695</td>
<td>110.69</td>
<td>417.3</td>
</tr>
<tr>
<td>2</td>
<td>12.695</td>
<td>110.69</td>
<td>119.09</td>
</tr>
<tr>
<td>3</td>
<td>12.695</td>
<td>110.69</td>
<td>119.09</td>
</tr>
<tr>
<td>4</td>
<td>12.695</td>
<td>201.58</td>
<td>119.09</td>
</tr>
<tr>
<td>5</td>
<td>12.695</td>
<td>201.58</td>
<td>119.09</td>
</tr>
<tr>
<td>6</td>
<td>24.351</td>
<td>201.58</td>
<td>218.5</td>
</tr>
<tr>
<td>7</td>
<td>24.351</td>
<td>201.58</td>
<td>218.5</td>
</tr>
<tr>
<td>8</td>
<td>12.695</td>
<td>110.69</td>
<td>119.09</td>
</tr>
</tbody>
</table>

The shear stresses subjected to each parts of stupa and calculated demand to capacity ratios are described in Table VII.

Table VII: Demand to Capacity Ratios for Shear Stresses before Strengthening

<table>
<thead>
<tr>
<th>Parts</th>
<th>Stress (psi)</th>
<th>Strength (psi)</th>
<th>DCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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D. Seismic Strengthening of Structure

Strengthening of heritage structure is a difficult compromise between requirements of structural theory and conservation principles. The aim of strengthening is to preserve the historical structure for generations to come. Structural assessment and remedial interventions on structural systems of the historical structure require special considerations to retain the architectural integrity and historical authenticity [6]. Various techniques are available for strengthening of structure. The type and quality of masonry materials and the structural integrity of the structure are the main criteria to be considered when choosing the methods of strengthening. Taking into account these criteria, the use of external steel rings is selected as the most suitable mean for seismic strengthening of the structure. The isometric view of strengthened structure with external steel rings is shown in Figure 6.

Figure 6: Isometric View of Strengthened Structure

In this study, the structure is strengthened to satisfy the acceptance criteria for MCE level of ground excitation, the most severe of three seismic hazard levels. The compressive stresses subjected to each parts of stupa and calculated demand to capacity ratios after strengthening are tabulated in Table VIII.

Table VIII: Demand to Capacity Ratios for Compressive Stresses after Strengthening

<table>
<thead>
<tr>
<th>Parts</th>
<th>Stress (psi)</th>
<th>Strength (psi)</th>
<th>DCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33.661</td>
<td>126</td>
<td>0.27</td>
</tr>
<tr>
<td>2</td>
<td>16.952</td>
<td>126</td>
<td>0.13</td>
</tr>
<tr>
<td>3</td>
<td>16.952</td>
<td>126</td>
<td>0.13</td>
</tr>
<tr>
<td>4</td>
<td>16.952</td>
<td>126</td>
<td>0.13</td>
</tr>
<tr>
<td>5</td>
<td>16.952</td>
<td>126</td>
<td>0.13</td>
</tr>
<tr>
<td>6</td>
<td>16.952</td>
<td>126</td>
<td>0.13</td>
</tr>
<tr>
<td>7</td>
<td>16.952</td>
<td>126</td>
<td>0.13</td>
</tr>
<tr>
<td>8</td>
<td>5.812</td>
<td>126</td>
<td>0.05</td>
</tr>
</tbody>
</table>
The tensile stresses subjected to each part of stupa and calculated demand to capacity ratios after strengthening are shown in Table IX.

Table IX: Demand to Capacity Ratios for Tensile Stresses after Strengthening

<table>
<thead>
<tr>
<th>Parts</th>
<th>Stress (psi)</th>
<th>Strength (psi)</th>
<th>DCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MCE</td>
<td>MCE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>111.5</td>
<td>48.559</td>
<td>2.30</td>
</tr>
<tr>
<td>2</td>
<td>46.259</td>
<td>48.559</td>
<td>0.95</td>
</tr>
<tr>
<td>3</td>
<td>46.259</td>
<td>48.559</td>
<td>0.95</td>
</tr>
<tr>
<td>4</td>
<td>46.259</td>
<td>48.559</td>
<td>0.95</td>
</tr>
<tr>
<td>5</td>
<td>46.259</td>
<td>48.559</td>
<td>0.95</td>
</tr>
<tr>
<td>6</td>
<td>62.57</td>
<td>48.559</td>
<td>1.29</td>
</tr>
<tr>
<td>7</td>
<td>62.57</td>
<td>48.559</td>
<td>1.29</td>
</tr>
<tr>
<td>8</td>
<td>46.259</td>
<td>48.559</td>
<td>0.95</td>
</tr>
</tbody>
</table>

The shear stresses subjected to each part of stupa and calculated demand to capacity ratios after strengthening are described in Table X.

Table X: Demand to Capacity Ratios for Shear Stresses after Strengthening

<table>
<thead>
<tr>
<th>Parts</th>
<th>Stress (psi)</th>
<th>Strength (psi)</th>
<th>DCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MCE</td>
<td>MCE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>62.607</td>
<td>126</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Figure 7 shows the fragility curves of the existing structure for MCE level of ground excitation and Figure 8 shows the fragility curves of the strengthened structure.

The effect of the external steel rings on the response of existing heritage structure can be seen in Fig. 7 and 8. The probabilities of damage are reduced from 81% to 44% for slight damage state, from 57% to 19% for moderate damage state, from 21% to 3% for extensive damage state, and from 7% to 1% for complete damage state.

<table>
<thead>
<tr>
<th></th>
<th>Probability</th>
<th>Damage State</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>12.552</td>
<td>0.10</td>
</tr>
<tr>
<td>3</td>
<td>37.579</td>
<td>0.30</td>
</tr>
<tr>
<td>4</td>
<td>37.579</td>
<td>0.30</td>
</tr>
<tr>
<td>5</td>
<td>37.579</td>
<td>0.30</td>
</tr>
<tr>
<td>6</td>
<td>37.579</td>
<td>0.30</td>
</tr>
<tr>
<td>7</td>
<td>37.579</td>
<td>0.30</td>
</tr>
<tr>
<td>8</td>
<td>12.552</td>
<td>0.10</td>
</tr>
</tbody>
</table>
extensive damage state and from 4% to 0.14% for complete damage state. These are considerable reductions which indicate that the use of external steel rings is effective in strengthening of the structure.

V. CONCLUSIONS

This study has presented seismic vulnerability evaluation and seismic strengthening of a brick masonry cultural heritage structure located in Mandalay by using the finite element analysis. The performance of the structure is evaluated in terms of both stresses limitations and fragility curves. According to the results of the seismic analysis of the existing structure under study, the structural configuration of the stupa satisfies the compressive stress limitations, as is usual for masonry structures and the stresses exceed the strength for tension and shear. The more vulnerable parts of the pagoda are inverted bell shaped portion and top spherical cone. By using external steel rings, the stresses subjected to the structure due to earthquake can be reduced to acceptance criteria and the probabilities of damage states can also be reduced to considerable values. Thus, the use of external steel rings can significantly reduce seismic vulnerability of the structure, leading to an effective method in strengthening of heritage structures against earthquake.

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Investigating the Effect of Teaching Experience on Teacher Knowledge

Sylvester Donkoh
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Abstract- The assumption associated with teaching experience is that, increased teaching experience leads to increased teacher knowledge. To find out if this assumption is true for Junior High School integrated science teachers, and also determine whether the effect of teaching experience on teacher knowledge varies in deprived and non-deprived areas, 57 Junior High School integrated science teachers from deprived and non-deprived areas were sampled from 83 Junior High School integrated science teachers. In the survey, the sampled teachers were asked to complete a 30 item test meant to assess their knowledge of Junior High School integrated science. The study found that teaching experience influences Junior High School integrated science teachers’ knowledge. Junior High School integrated science teachers’ knowledge showed a graphical variation with the number of years they have spent teaching. The effect of experience on Junior High School integrated science teachers’ knowledge in deprived and non-deprived areas was as diverse as the location themselves.

Index Terms- Junior High School, integrated science, teachers’ knowledge, deprived, non-deprived areas, teaching experience

I. INTRODUCTION

Teachers possess knowledge about the subjects they teach. This knowledge is the teachers’ subject-matter content knowledge. Teachers teaching, Junior High School integrated science may have varied levels of conception, and therefore, their knowledge of the integrated science will differ. It is the different levels of conception that make some Junior High School integrated science teachers more effective than others. Effective teachers must, according to [16], possess good understanding of “the content of the subjects they teach, including: knowledge of central facts, concepts, theories and procedures within a given field, knowledge of explanatory frameworks that organize and connect ideas; and knowledge of the rules of evidence and proof” (n. p). Teachers who possess good subject-matter content knowledge are able to teach for better understanding, generate and sustain the interest of students in lessons, recognize misconceptions of students and clear them, understand the needs of the students at any moment, ask question and deal with students’ questions appropriately, and select appropriate materials and methodologies for different topics. To be certain that teachers possess subject-matter content knowledge of integrated science, Ghana Education Service ensures applicants seeking teaching appointments and graduate of universities and Colleges of Education, who are absorbed directly into the teaching service, have the minimum teaching qualification.

As defined by [1], teaching qualification is any one of the academic and professional certificates that is required for teacher registration. In Ghana, teaching qualification includes Teachers’ Certificate ‘A’, which has been phased out, Diploma in Basic Education, Bachelor of Education, Master of Education, Master of Philosophy (with education), Doctor of Education and Doctor of Philosophy. Due to the low teacher status, remuneration and general conditions of service, holder of Master of Philosophy (with education), Doctor of education, and Doctor of Philosophy prefer to be in second cycle and tertiary institutions, where conditions of service are relatively better. The teaching profession is the last option for most Ghanaian youth. Worse still the attrition rate for Ghanaian basic school teachers is very high, creating a shortfall in professional basic school teachers ([4]; [22]). Because of the vacancies in the basic schools, people who do not possess any of the teaching qualifications mentioned are allowed to practice as non-professional teachers. Such individuals use academic qualification beginning from, West African Senior Secondary Certificate (WASSCE) or Senior Secondary School Certificate Examination (SSSCE).

Teachers’ with a particular qualification have received the same training, yet some will possess better subject-matter content knowledge than others. This has already been attributed to differences in intelligence and teacher credentials, but it is too general an explanation. According to [15], teachers gain subject-matter content knowledge from various sources. Some of the sources have been identified by [6] are teachers own primary and secondary learning experiences, experiences from professional and teacher education programs, and the teachers’ teaching experience.

Other than qualification, experience is a factor that accounts for variations in teachers’ salaries ([9]). Just like many employers, Ghana Education Service, understands teaching experience makes a good teacher and so teachers with long service are motivated to stay on the job. As teachers continue to work with the Ghana Education Service, they are promoted to higher ranks, depending on their success in promotion interviews. These higher ranks come with corresponding higher salaries. In other words, long service leads to increased salaries because long service is seen as a predictor of teacher quality. Who would want to part with a quality teacher?
Experienced teachers will continue to receive higher salaries, because the experienced teachers have a better chance of understanding the content they teach, the behavior and attitude of students and the selection and application of methodologies. According to [24], experienced teachers, usually, tend to have a better knowledge of the subject-matter content they teach, and generally acts and behave professionally in their teaching and assessment practices. Such teachers are more confident in their ability to manage classes and prevent incidences and disruptions that can potentially make the teaching and learning process difficult. They are more tolerant and patient than their colleagues with few years of teaching. Novice teachers continue to develop subject-matter content knowledge, and classroom management and teaching skills, required to make them expert teachers. They spend a lot of time learning, trying to understand fully, teaching as a profession. The novice teachers would spend years building the rich store of knowledge the experienced teacher has already gained.

More experienced teachers are usually, relatively, better teachers than their inexperienced colleagues. The experienced teachers have obtained extra training and have also, through direct experience, gained additional subject-matter content knowledge required to be effective in the discharge of their professional responsibilities. The training of teachers does not end after teacher trainees have graduated. After graduation, they attend conferences, workshops, and seminars. Ghana Education Service in collaboration with international organizations like Department for International Development (DFID), United States Agency for International Development (USAID), and local and international non-governmental organizations provides in-service training for basic school teachers. These give them the chance and exposure to refresh their memories of the things they have learned at the initial teacher training level and learn emerging teaching methods. Such workshops, seminars, and conferences, add mostly to teachers’ pedagogical content knowledge. The subject matter content knowledge may not be substantial as [15] wrote, but there are still some gains, even if small.

The novice teacher makes so much impact where there is induction and mentoring programs to augment the teacher’s desire to learn and knowledge need for successful teaching. According to [14], a large part of the subject-matter content knowledge the teacher needs to be effective is acquired while the teacher is on the job, and so by creating a school climate in which new teachers are able to “learn the craft and survive and succeed as teacher” (p. 205), new teachers acquire the subject-matter content knowledge as quickly as they can. The other reason is that, in places where there are induction and mentoring programs, the novice teachers are given the opportunity to learn the subject matter as fast as they can. Because of this, if the teacher’s knowledge of subject matter content knowledge is not measured in the first few days of starting their career, the novice teacher would be seen to possess much subject-matter content knowledge.

Experienced teachers have obtained extra training and have also, through direct experience, gained additional subject-matter content knowledge required to be effective in the discharge of their professional responsibilities. The training of teachers does not end after teacher trainees have graduated. After graduation, they attend conferences, workshops, and seminars. Ghana Education Service in collaboration with international organizations like Department for International Development (DFID), United States Agency for International Development (USAID), and local and international non-governmental organizations provides in-service training for basic school teachers. These give them the chance and exposure to refresh their memories of the things they have learned at the initial teacher training level and learn emerging teaching methods. Such workshops, seminars, and conferences, add mostly to teachers’ pedagogical content knowledge. The subject matter content knowledge may not be substantial as [15] wrote, but there are still some gains, even if small.

The novice teacher makes so much impact where there is induction and mentoring programs to augment the teacher’s desire to learn and knowledge need for successful teaching. According to [14], a large part of the subject-matter content knowledge the teacher needs to be effective is acquired while the teacher is on the job, and so by creating a school climate in which new teachers are able to “learn the craft and survive and succeed as teacher” (p. 205), new teachers acquire the subject-matter content knowledge within a short period. Teachers who are supported by such programs can match, to some extent, the subject-matter content knowledge of those who have taught for several years. In such cases, the new teachers are able to influence students’ learning just like their experienced colleagues. This explains why some research findings suggest that inexperienced teacher hold the same subject-matter content knowledge as experienced one.

This article examines the effect of teaching experience on Assin North Municipal Junior High School integrated science teachers subject-matter content knowledge. The study therefore was to assess the effect of years of teaching on junior high school integrated science teachers’ understanding of the integrated science content they teach. It further investigated whether the effect of years of
teaching on junior high school integrated science teachers’ knowledge integrated science vary with deprived and non-deprived areas. Deprived and non-deprived areas is a classification used by Ghana Education Service. Ghana Education Service uses two factors; the community in which the school is located and general conditions and facilities available in the school, to classify an area as deprived or non-deprived. A deprived area is one that has the following characteristics; not easily accessible, poor general living conditions, high teacher-pupil ratio, poor school population, poor infrastructure, and inadequate teaching and learning resources. The converse of these characteristics is true for non-deprived areas. Though teacher characteristics like qualification, coupled with years of teaching can influence teacher knowledge of integrated science, the study investigated what happens to teacher knowledge of integrated science as the teachers stay on the job, teaching in their respective schools.

II. LITERATURE REVIEW

Studies on teaching experience and teacher knowledge have reported mixed findings. While some studies have reported that teacher knowledge increases over few years ([3]; [17]; [21]) and stagnates, others as indicated by [5] have reported no difference in teacher knowledge between novice teachers and experienced teachers. These mixed reports violate the expected idea that in all cases, teacher knowledge grows with years of teaching. For the rest of this section, a number of such studies have been reviewed.

In a state-wide survey, [17] sort to determine whether gains to teaching experiences differ across schools and individual teachers, and whether teachers in schools with supportive environments improve better than those in less supportive environments. The return to teaching experiences mentioned by [17] was students’ grades at their end-of-grade examination. Though not explicitly mentioned, [17] were studying the effect of experience on teacher knowledge, using test scores. Hence, they matched students’ grades to teachers based on their teaching experience in order to determine whether differences exist in teacher knowledge with respect to their individual teachers’ years of experience and whether the teachers in schools improve in their effectiveness over time. Like this study, [17] sort to find out whether school environment produces variations in the effect of years of teaching on teachers’ knowledge using test scores. However, [17], considered individual teachers instead of an experience profile.

According to [17], they examined the relationship between teacher effectiveness and teacher experience using an education production function in which they modelled student achievement as a function of prior test scores, student and teacher demographics, and school characteristics (p. 484). Since determinants of teacher effectiveness such as certification and motivation were fixed over the period the only variable they measured was the effect of experience on teacher knowledge. They measured this variable for individual teachers on two different occasions and then compared the two results to find out whether they were homogenous or heterogeneous. That is to say whether some teachers do improve rapidly than others in their teacher knowledge over time.

The findings of [17], supported the widely-held view that teacher knowledge improves with time. They found that there were substantial differences in individual teacher knowledge across the teachers and across schools. Relative to each teachers’ initial teacher knowledge, some teachers improved much more than others. On the whole those who improved significantly over time were the novice teachers. But within the novice teachers, some improved more than others. Also, teachers in some schools showed greater improvements than teachers in some other schools. All these improvements, according to [17], ceased after 10 years of teaching. In other words, teacher knowledge improves with time only up to the 10th year and then gains in teacher knowledge stops.

[3], offers an explanation to [17] finding about the stagnation of teacher knowledge after 10 years. The fact that learning is continuous suggests that there is something wrong with [17], assertion that teacher knowledge does not improve after the 10th year, but [3] says the gains in teacher knowledge, including teachers’ subject-matter content knowledge are made only within the first two years of teaching and explained why such phenomena.

[3] used students’ achievement as a measure of teacher effectiveness. They determined students’ achievements and matched them with teacher characteristics such as teaching experience, teacher test scores, and qualification. Of interest to this study is the result they obtained, regarding teaching experience. In their study, [3] found that “most of the gains in achievement associated with teacher experience occur in the first two years of teaching with an effect size of 0.0503” (p. 19). According to [3], although their estimated coefficients rose to 0.0617 for the teachers who have taught for 21 to 27 years, “none of the coefficients for additional years of experience differ statistically from the coefficient for 1-2 years” (p. 19). The conclusion, from this, is that, inexperienced teachers used in the study were less effective than those with some experience. However, after the first two years, teachers with more experience are no more effective than those who had been teaching for about two years. This suggests that either no learning or very little learning occurs after the first few years of teaching. The findings also may be due to the high attrition rate in the teaching service. It could be that teachers learn on the job continually, however, due to high attrition rate, teachers who are less effective remain on the job while those who are more effective leave, and so teachers with more years of teaching who remain are not more effective than the teachers with few years of teaching. These interpretations could account for the rapid gain of teacher knowledge only in the first few years of practicing as teachers.

The observations of [3], could, also, account for the findings of [23]. [23] studied, among other things, the effect of experience on teachers’ explicit knowledge of English grammar in two states randomly selected in peninsular Malaysia. They did not directly assess teachers’ explicit knowledge of English grammar using test. They used a questionnaire which measured teachers’ content knowledge, to gather data from the teachers. Like this, study they created a teaching experience profile and studied variations in the teachers’ knowledge of grammar across the profile. [23] formed Four groups ‘based on the teachers’ years of experience: Group 1 was made up of teachers with 7 or fewer years, Group 2; 8 to 18 years, Group 3;19 to 29 years, and Group 4; 30 and more years. From these groups of respondents came the finding that teachers’ explicit knowledge did not differ significantly across the year groups.

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According to [23], a “repeated measures ANOVA yielded significant differences for two of the four groups of teachers” (p. 262). That is to say, teachers with less than 8 years of teaching, and those with more than seven years of teaching possessed just about the same degree of teacher knowledge. Like [3] found back in 2007, teachers with 4 years of experience would have just about the same knowledge as those with more than ten years of experience, [23] found that, respondents with between 8 to 29 years and those with more than 30 years did not differ in teacher knowledge. As noted earlier, teacher knowledge appears to increase rapidly, only within the first two years, it was therefore not surprising that all three groups had about the same teacher knowledge.

Unlike [3] and [23], [2] found that teachers’ knowledge depreciates as they become more experience. This finding is contrary to commonly held notion that at worse, teacher knowledge would stagnate after some years of teaching. However, like [3], [12] and [23], [2] found that teacher knowledge increases over the first few years of teaching. While [23] confirmed that teacher knowledge is better among inexperienced teachers, their finding disproved the generally held view that experienced teachers have superior knowledge.

According to [2] in order to estimate a teacher’s knowledge, they estimated “the gain or value-added in student performance over the previous year for those students who were in that teacher’s classroom that year” (p. 14). They made an extract containing observations of each student in Florida, who took the state assessment from 1999 to 2009 and their teachers’ demographic characteristics from Florida’s Education Data Warehouse (EDW). The test scores included Florida Comprehensive Assessment Test (FCAT), and the Stanford Achievement Test, which according to [2] is a national norm-referenced test taken by students in addition to the FCAT till 2008 school year. They linked the students to their respective courses and the corresponding teacher and used the students’ scores to measure teacher knowledge of subject matter in reading and mathematics.

The result of the study was somewhat unexpected. They found that there is an initial bump in teachers’ subject-matter content knowledge of mathematics and reading. This suggests that when teachers begin their career they learn a lot within the first few years as reported by [3] and [23] and so they gain much subject-matter content knowledge. Then the teacher knowledge-experience profile begins to diverge after that. For mathematics, they found that knowledge-experience profile diverges only after the first few years while for reading it begins to diverge after 15 years. This suggests that the knowledge-experience relationship becomes negative after a few years in mathematics and after 15 years in reading. This seemingly unexpected result of declined in teacher knowledge was reported seven years earlier by [10].

The majority of literature on the effect of experience on teachers’ knowledge agree, there is a positive correlation between the two. The issue of contention is whether the effect is perpetual or terminate at some point. The positive correlation of experience-teacher content knowledge occurs only in the first few years of teaching. Though many of the studies reviewed were not directly on teachers’ subject-matter content knowledge, their use of test scores in predicting teacher knowledge, findings, and the fact that they investigated the effect of teaching experience on teacher knowledge were relevant to this study.

III. METHODOLOGY

The design used for the study was cross-sectional survey design. The design was used to investigate the effect of experience on Junior High School integrated science teachers’ knowledge of Junior High School integrated science in the Assin North municipality. There are 83 public schools in Assin North municipality. Of these, approximately 29% were in deprived areas with the remaining 59 schools in non-deprived areas. In each school, there was one integrated science teacher, hence there were 24 science teachers in deprived areas and 59 in non-deprived areas. These 83 junior high school integrated science teachers constituted the population for the study.

In this survey, 57 out of 83 Junior High School integrated science teachers from deprived and non-deprived areas in Assin North Municipal, Ghana, were sampled using stratified random sampling. Of the 57 Junior High School integrated science teachers, 17 were teaching in deprived areas. The teachers in the sample were categorized into three, based on their self-reported years of teaching. For the first group, the teachers had taught for less than five years. Group two consisted of those who had taught from 5 to 9 years and the last group is those who had taught for more than nine years. Of the three groups, those who had taught for more than 9 years were classified as the most experience and the first group of teachers constituted the inexperience.

Data was collected from the sample using Science Teachers’ Subject-matter Content Knowledge Assessment Tool. The Science Teachers’ Subject-matter Content Knowledge Assessment Tool was in two parts. Part one was a quasi-questionnaire which sort to collect teachers’ years of teaching, professional and academic qualification, among others. Part two consisted of 30 multiple choice items. The Junior High School integrated science syllabus has been organized according to level (JHS 1, JHS 2, and JHS 3) and sections. For each level, the units are classified under one of five sections. Basic Education Certificate Examination (BECE) questions are set to cover the three levels as well as sections that make up the Junior High School integrated science syllabus. In developing the Science Teachers’ Subject-matter Content Knowledge Assessment Tool to test Junior High School integrated science teachers’ knowledge of integrated science, 30 multiple choice items were selected from BECE questions from 2005 to 2015. To ensure content validity of the instrument, the 30 items were carefully selected, such that they cut across the levels and sections. The sampled teachers were asked to complete the test in the presence of the researcher, at the teachers’ respective schools for a period of 40 minutes. The items were scored dichotomously, and the scores were analyzed using descriptive and inferential statistics.
IV. RESULTS

The respondents were asked to write the number of years they have been teaching. The self-reported year of teaching were put into three groups. Those who have taught for four years or less, between four and 10 years and above 9 years. The mean scores for each of the groups was determined and used as bases for assessing whether or there are differences in means and whether or not these differences are statistically significant.

Table 1: Mean Score for Respondents Based on Teaching Experience

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>17</td>
<td>25.23</td>
<td>2.81801</td>
<td>21.00</td>
<td>30.00</td>
</tr>
<tr>
<td>5 to 9 years</td>
<td>30</td>
<td>23.23</td>
<td>4.68809</td>
<td>13.00</td>
<td>29.00</td>
</tr>
<tr>
<td>Above 9</td>
<td>10</td>
<td>26.70</td>
<td>3.16403</td>
<td>22.00</td>
<td>30.00</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>24.44</td>
<td>4.14047</td>
<td>13.00</td>
<td>30.00</td>
</tr>
</tbody>
</table>

According to Table 1 the minimum score of 13 was obtained by a teacher who had a teaching experience between 4 to 10 years. None of the 30 respondents from this group could obtain the maximum score of 30. It is this group that gave the most varied responses. Without considering, the relatively high standard deviation of almost 5, the minimum and maximum values for respondents who have taught for a period of five to nine years attest to this variation. They had the least minimum value and the least maximum value, and as one would expect had the least mean score, about 2 less than the novice teachers.

The mean scores for the 17 respondents who had taught for four or less years and the nine very experienced teachers were quite good. Though inexperienced, they had a mean score higher than those who have taught for between 4 and 10 years and a shade lower that those who have taught for 10 or more years. Their scores were relatively clustered just like that of the very experienced teachers. These two extreme groups had at least a respondent getting all questions correct and their means were above that of the total mean for all respondents put together. The mean score for respondents in deprived areas and non-deprived areas were computed to see if any of the two groups contributed to the respondents who had taught for less than 5 years getting a high mean than those who have taught for between 4 and 10 years.

Table 2: Mean Scores for Respondents in Non-deprived areas with Respect to Teaching Experience

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>14</td>
<td>24.50</td>
<td>2.37778</td>
<td>.63549</td>
<td>21.00</td>
<td>28.00</td>
</tr>
<tr>
<td>5 to 9 years</td>
<td>17</td>
<td>25.36</td>
<td>3.21988</td>
<td>.78094</td>
<td>16.00</td>
<td>29.00</td>
</tr>
<tr>
<td>Above 10</td>
<td>9</td>
<td>28.11</td>
<td>2.20479</td>
<td>.73493</td>
<td>25.00</td>
<td>30.00</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>25.67</td>
<td>3.00758</td>
<td>.47554</td>
<td>16.00</td>
<td>30.00</td>
</tr>
</tbody>
</table>

The mean scores of respondents, presented in Table 2, shows that teacher knowledge increases with teaching experience. Even though the minimum scores deviate from the general trend seen in the mean scores, it can be seen from the maximum scores that those who have taught for less than five years had the least score of 28 while those who had taught for 10 or more years had a score of 30. With a low of 16 and a high of 29, respondents who have taught for between 4 and 10 years showed varied levels of knowledge of Junior High School integrated science. The respondents who have taught for less than 5 years had a wider spread of responses only after those who have taught for 10 or more years. With a standard deviation of 2.2, a maximum score of 30 and a minimum of 25, respondents who had taught for more than years proved that long service in teacher knowledge.
Responses of respondent in the deprived areas did not follow that of those in the non-deprived areas. It was seen in Table 2 that the respondents in non-deprived areas who have taught for between 4 and 10 years had the least minimum score of 16. However; their maximum and mean scores were higher than that of those who had taught for less than 5 years. The same cannot be said of respondents in deprived areas who have taught for between 4 and 10 years. They had the least mean, the least minimum value and maximum score that is less than that of respondents who have taught for less than five years. It is the mean score of this group that brought the mean score of those who have taught for between 4 and 10 years below those who have not taught for five years and beyond in Table 1. The values can be seen in Table 3

Table 3: Mean Scores for Respondents in Deprived areas with Respect to Teaching Experience

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>3</td>
<td>28.6667</td>
<td>2.30940</td>
<td>1.33333</td>
<td>26.00</td>
<td>30.00</td>
</tr>
<tr>
<td>5 to 9 years</td>
<td>12</td>
<td>19.8333</td>
<td>4.60895</td>
<td>1.33049</td>
<td>13.00</td>
<td>27.00</td>
</tr>
<tr>
<td>Above 10</td>
<td>2</td>
<td>22.0000</td>
<td>.00000</td>
<td>.00000</td>
<td>22.00</td>
<td>22.00</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>21.6471</td>
<td>5.19544</td>
<td>1.26008</td>
<td>13.00</td>
<td>30.00</td>
</tr>
</tbody>
</table>

In deprived schools, Junior High School integrated science teachers’ knowledge of Junior High School integrated science dwindles as teaching experience increases. The maximum and minimum scores of the teachers who had taught for more than 10 years was 22, that is, eight less than the inexperienced teachers. However, it was possible to check whether there was a statically significant difference between the mean scores of the three groups when all respondents are put together. To do that, it was first checked to see if significant differences really exist in the mean scores among the three groups a one-way ANOVA was conducted to ascertain the groups that differed in teacher knowledge of integrated science.

Table 4: Test for Differences between Groups Teachers Based on Teaching Experience

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>124.001</td>
<td>2</td>
<td>62.001</td>
<td>3.959</td>
<td>.025</td>
</tr>
<tr>
<td>Within Groups</td>
<td>829.981</td>
<td>53</td>
<td>15.660</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>953.982</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 4, there is a statistical significant difference in the mean scores of the three groups of categories of respondents at $p < 0.05$, based on their years of teaching: $F (57) = (3.959), p = 0.025$. The result shows that years of teaching have an impact on teacher knowledge, because the different groups showed differences in their level of knowledge of Junior High School integrated science. The difference in mean across the groups was moderate. The effect size calculated using eta squared was 0.11 (11%). However, it is not clear where the differences lie. A test of homogeneity was run in order to know the kind of post-hoc analysis to run.

Table 5: Test of Homogeneity of Variances of Groups Based on Years of Teaching for all Respondents

<table>
<thead>
<tr>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.100</td>
<td>2</td>
<td>54</td>
<td>.022</td>
</tr>
</tbody>
</table>
Table 5 shows that the test of homogeneity was violated, \( p < 0.05 \), since the sig value is 0.022. Equal variances were not assumed, and so a post-hoc comparison was done using Games-Howell.

### Table 6: Post-hoc Analysis of Mean Scores of all Teachers Based on Years of Teaching

<table>
<thead>
<tr>
<th>(I) Years of Teaching</th>
<th>(J) Years of Teaching</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Games-Howell</td>
<td>Less than 5</td>
<td>5 to 9 years</td>
<td>2.00196</td>
<td>1.09532</td>
</tr>
<tr>
<td></td>
<td>Above 10</td>
<td>-1.46471</td>
<td>1.21171</td>
<td>.464</td>
</tr>
<tr>
<td></td>
<td>5 to 9 years</td>
<td>Less than 5</td>
<td>-2.00196</td>
<td>1.09532</td>
</tr>
<tr>
<td></td>
<td>Above 10</td>
<td>-3.46667*</td>
<td>1.31671</td>
<td>.038</td>
</tr>
<tr>
<td></td>
<td>Above 10</td>
<td>Less than 5</td>
<td>1.46471</td>
<td>1.21171</td>
</tr>
<tr>
<td></td>
<td>5 to 9 years</td>
<td>3.46667*</td>
<td>1.31671</td>
<td>.038</td>
</tr>
</tbody>
</table>

From Table 6, the post-hoc comparison conducted using Games-Howell test indicated that the mean score of respondents who had taught for less than five years \( (M = 25.2353, SD = 2.81801) \) was not significantly different from the mean score of respondents who had taught for between 4 and 10 years \( (M = 23.2333, SD = 4.68809) \) and the those who had taught for more than 10 years \( (M = 26.7000, SD = 3.16403) \). The mean score of respondents who had taught for between 4 and 10 years \( (M = 23.2333, SD = 4.68809) \) was not statistically different from the mean score of respondents who had taught for less than five years \( (M = 25.2353, SD = 2.81801) \) was significantly different from those who had taught for more than 10 years \( (M = 26.7000, SD = 3.16403) \). This implies that teacher knowledge of teachers who have taught for four or less years and teachers who have taught for 10 or more years are about the same, teacher knowledge of teachers who have taught for four or less years and teachers who have taught for between four and nine years are also the same. However, teacher knowledge of junior high integrated science of teachers who have taught for between five and 10 years is lower than those who have taught for 10 or more years.

V. DISCUSSION

Professional teacher training institutions in Ghana admit Senior High School graduates into their 3-year Diploma in Basic Education (DBE) or 4-year Bachelor of Education programs. The Colleges of Education run only DBE program in which students spend two years in the colleges and one year in a basic school under the direct supervision of mentors and lead mentors, while the universities run both DBE and Bachelor of Education programs with, at least, 4 weeks of practicum in a basic school. These programs equip pre-service teachers with the subject-matter content knowledge required to be effective as basic school integrated science teachers. When students graduate, training in the area of subject-matter content knowledge almost ceases. In-service training focuses on pedagogical content knowledge. With time, High School integrated science teachers’ knowledge of integrated science become limited to the examples, definitions and explanations provided in the Junior High School integrated science textbook, and so the Junior High School integrated science teachers’ knowledge of integrated science diminishes with time. While this may hold true for the diminishing Junior High School integrated science teachers’ knowledge of integrated, it does not explain why after 9 years, teachers regain their knowledge.

Low teacher status, poor conditions of service and high attrition rate may contribute to the dip in Junior High School integrated science teachers’ knowledge for teachers with five to nine years of teaching experience. Due to the low teacher status and poor conditions of service, teaching has become the last option for Senior High School graduates who could not realize their first choice programs. After the first few years, their attention shift from their core duties as teachers, to how they can make extra money or get into the career they once dreamt of entering. However, if they are not successful after nine years of thinking and trying, they then return fully to teaching integrated science in Junior High School and so they learn to regain their knowledge of integrated science. The effect of attrition has been explained by [3]. Possibly due to high attrition rate, teachers who possess superior integrated science knowledge quit the teaching service after few years of teaching. And so, teachers with more teaching experience who remain teaching are no more knowledgeable in integrated science than the teachers with few years of experience. The combined effect of no or very little training in subject-matter content knowledge for integrated science teachers after graduation on one hand, and low teacher status, poor conditions of service and high attrition rate may contribute to the dip in Junior High School integrated science teachers’ knowledge for teachers with five to nine years of teaching experience.
status, poor conditions of service and high attrition rate on the other, may account for the differences in Junior High School integrated science teachers’ knowledge of integrated science observed in Tables 1 and 6. A number reasons have been attributed to the disparity in knowledge of teachers in deprived and non-deprived areas. [8] blamed inexperienced teachers, [13] says it is because teachers teach multiple classes as a result of teacher shortage, [20] mentioned general conditions of rural areas leading to [19]’s poor job satisfaction, and [18] blamed it on high poverty rates among students in deprived areas. A good number of the teachers in deprived areas who took part in the study had taught for between four to 10 years. Only three had taught for less than five years. These teachers cannot be described as inexperienced besides and so [8]’s reason would not apply to this sample. None of the teachers used in this sample was teaching more than two subjects. The teachers, were, therefore, not overloaded, implying the schools were not understaffed. [13]’s reason too, would not hold because the sample had similar qualification. The only factors left are those related to the general conditions in the environment mentioned by [20]. The disparity is caused by general condition in and around the deprived schools. In other words, the environment, and not teacher demography (like qualification, and age) nor remuneration, that cause the disparity in teacher knowledge. The general conditions in deprived areas, explains, partly, the reason why Junior High School integrated science teachers’ knowledge decreases with increasing years of teaching deprived areas. While investigating the effect of years of teaching, in order words, experience, the effect of teaching experience on teachers in deprived areas was looked at. First, the mean scores presented in Table 3 revealed that teachers begin their teaching career in the deprived areas with very good knowledge of integrated science. However, as the years of teaching increase, their knowledge of integrated science depreciates. This is rather contrary to common sense and what other researchers like [17] found. This finding is inconsistent with [3] and [23]’s finding that the effect of teaching experience on teacher knowledge becomes insignificant after some years of teaching. It is rather consistent with [2] findings that experience-teacher knowledge relationship turns negative after some years and inconsistent with [2] claim that the negative turn is perpetual. If teachers come in with very good knowledge but that knowledge dwindle with time, then the only factor that could account for it is the general conditions of the school in which the teachers are. The analysis of variance indicates that the downward trend is not perpetual but end after 9 years of teaching by which time they had become accustomed to the conditions.

VI. CONCLUSION

Teaching experience influences Junior High School integrated science teachers’ knowledge. Junior High School integrated science teachers’ knowledge shows a graphical variation with the number of years they have spent teaching. Junior High School integrated science teachers’ knowledge of integrated science dips after the fourth year of teaching and then becomes strong again after the ninth year. Because of this, efforts at improving teacher quality in Junior High Schools should not only target novice teachers but the supposedly experienced teachers too. The effect of teaching experience on Junior High School integrated science teachers’ knowledge is dependent on the location of the school in which the Junior High School integrated science teachers teach. The effect of experience on Junior High School integrated science teachers’ knowledge in deprived and non-deprived areas is as diverse as the location themselves.

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Antimicrobial Activity of Leaf extracts of Antidesma menasu Miq.

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Abstract: The present study aimed to evaluate the antibacterial and antifungal activity of the leaf extracts of Antidesma menasu against four bacteria namely, Staphylococcus aureus, Salmonella typhi, Shigella flexneri and Escherichia coli as well as two fungi viz., Candida albicans and Cryptococcus neoformans. The results indicated the maximum zone of inhibition in ethanol extract of Antidesma menasu against Staphylococcus aureus and the results reveals that the leaves have a potential against bacterial activity.

Index terms- Antibacterial, Antidesma menasu, Antifungal, Staphylococcus aureus

I INTRODUCTION

India is rich with wild natural resources and motherland of many herbal plants in which some highly potent and considered as life savings drugs. Medicinal plants are the wealthy source of antibacterial agents and curatives [1]. They have been recognized as a valuable source of therapeutic components for centuries and about 60% of the world’s population are known to use the traditional medicines derived from medicinal plants. In the last few years, plant extracts and phytochemicals with known antimicrobial properties have been investigated by a number of researchers in different countries to understand their properties, efficacy and safety [2]. Natural products of higher plants may give a new source of antimicrobial agents with possibly novel mechanism of action. In recent years, multiple drug resistant has developed due to indiscriminate usage of existing antimicrobial drugs in treatment of infectious diseases. In addition to this, antibiotics are sometimes associated with adverse effects on the hosts like hypersensitivity. Therefore there is a need to develop, alternative antimicrobial drug for the treatment of infectious diseases from other sources such as plants [3]. In addition, in developing countries, synthetic drugs are not only expensive and inadequate for the treatment of diseases but also often with adulteration and side effects. Therefore, there is a need to search new infection-fighting strategies to control microbial infections [4].

The history of infection and infectious diseases is as old as mankind. Medicinal plants have been used for centuries as remedies for human diseases and offer a new source of biologically active chemical compound as anti-microbial agent [5]. The reference of microorganisms is available in the oldest manuscripts of Ayurveda and Vedas as well. Plant derived substances have recently become of great interest owing to their versatile applications [6].

Infectious diseases are the world’s leading cause of premature death, killing almost 50,000 people every day. Morbidity and mortality due to diarrhoea continues to be a major problem in many developing countries, especially amongst children. Infections due to a variety of bacterial etiologic agents such as pathogenic Escherichia coli, Salmonella spp., Staphylococcus aureus are most common [7].

Euphorbiaceae family in the plant kingdom is a complex heterogeneous family consisting of about 322 genera and 8900 species in the world [8]. Various plant members are used in different types of herbal preparations from the ancient to present day. The antibacterial study of the leaf extract of Euphorbia hirta showed highest activity against Escherichia coli and Enterobacter aerogenes [9]. Euphorbia millii also known as crown of thorn and its milky latex is used to treat abdominal oedema, constipation and sprains relieve. Chloroform extract of the leaves of this plant showed positive antimicrobial activity against Aspergillus fumigatus, Staphylococcus aureus, and Bacillus subtilis [10]. Sapium sebiferum plant extract has a broad pharmacological effects such as antibacterial, anti-inflammatory, blood pressure, cholesterol etc. Flueggea leucopyrus is one of the medicinally used bushy weed and it has been used in preparations of traditional medicines for the treatment of cough, hay asthma, bowel complaints, disinfections, laxatives, diarrhoea, gonorrhoea, constipation, mental illness, and kidney stones. An aqueous ethanolic extracts of leaf of Flueggea leucopyrus had shown antibacterial activity against both Gram positive and Gram negative bacteria [11].

Antidesma is a homogeneous genus in the family Euphorbiaceae. There are about 170 different species of Antidesma in the world and many species from this genus have been used traditionally for medicinal purposes. The methanol extract of A. ghaesembilla has been reported to possess antimicrobial, antioxidant and cytotoxic activity while A. madagascariense is reported to have significant antimicrobial activity and the ethanol extract of A. bunius is reported to have cytotoxic activity [12]. Antidesma venosum is used in traditional medicine to treat a diversity of conditions, including hookworm infestation, gonorrhoea, malaria and bilharzias, schistosomiasis, abdominal disorders, dysentery and cut wounds. Extracts of this plant are reported to possess anti-inflammatory activity and have also been used for the treatment of diarrhoea, anaemia and lack of appetite, tuberculosis and
Candida infections. Petroleum ether and dichloromethane fractions of the roots of this particular plant shows a promising activity against Gram positive bacteria and thus support the use of this plant for the treatment of conditions associated with bacterial infections such as cut wounds, chest infections and some types of diarrhoea [13]. Leaves of Antidesma acidum Retz. are used for treatment of stomach ache of children and in case of digestion. In the Western Ghats region leaves are used against dysentery and in case of appetizer [14]. Antidesma madagascarriense is an indigenous and an endemic plant that has always been used in folkloric medicine among the local population of the Mascarene Islands for the treatment and management of various ailments. A decoction of the leaves of A. madagascarriense has been traditionally used to treat dysentery. A bath in the leaf decoction has been reported to alleviate skin infections, rheumatic and body aches. The different crude extracts of A. madagascarriense exhibited potent antimicrobial activity which was found to increase with increasing polarity [15].

Antidesma menasu is a folklore medicinal plant belongs to family Euphorbiaceae. This is a shrub or small tree; leaves of these plants are used by folklore practitioners in joint pains and inflammatory swelling [16][17]. It is found commonly in Belgaum, Chikmagalur, Kodagu, Hassan, Mysore, Uttara Kannada, Shimoga, Dakshina Kannada of Karnataka and Coimbatore, Dharmapuri, Dindigul, Kanyakumari, Nilgiri, Salem, Theni, Tirunelveli, Virudhunagar of Tamil Nadu during rainy seasons.

The objectives of the present study was to predict the antibacterial activity of the leaf extract of A. menasu against few selected bacteria namely Staphylococcus aureus, Salmonella typhi, Shigella flexneri and Escherichia coli as well as antifungal activity against Candida albicans and Cryptococcus neoformans.

II MATERIALS AND METHODS

Collection of plant: The leaves of Antidesma menasu was collected from Alike, Dakshina Kannada district, Karnataka during September 2014 and authenticated from Department of Pharmacognosy, S.D.M Research Center, Udupi.

Preparation of extracts: The leaf samples were cleaned, dried in shade and coarsely powdered using an electric blender and stored in an air tight container. Leaf extracts were prepared by using soxhlet [18].

Fifteen grams of coarsely powdered leaf material was extracted for 24 hours by using soxhlet apparatus with water as well as ethanol separately. The process was repeated until to get required amount of extract. Aqueous extract was obtained by evaporating water from the extract by using boiling water bath. Ethanol was recovered from ethanol extract by distillation and dried. These extracts were stored in air tight containers and preserved at -4°C until further use.

Culture media and strains: The pathological strains used for antimicrobial study were obtained from Alva’s College of Medical Laboratory Technology, Moodbidri, Karnataka, India. They include Staphylococcus aureus, Escherichia coli, Salmonella typhi, Shigella flexneri, Candida albicans and Cryptococcus neoformans. For antibacterial study peptone water and Mueller Hinton Agar and for antifungal study Sabouraud Dextrose broth and Sabouraud Dextrose agar (HiMedia Labs Pvt. Ltd., Mumbai, India) were employed.

Determination of antibacterial activity: The antibacterial activity of the leaf extracts of Antidesma menasu was determined by following agar well diffusion method [19]. The ethanol extract as well as aqueous extract were tested against bacteria and fungi. Bacterial strains were sub cultured overnight at 37° C in peptone water and fungal strains were subcultured to Sabouraud dextrose broth. The cultures were swabbed on to the plates containing Mueller Hinton Agar for bacteria and Sabouraud dextrose agar for fungi. Wells were made by using cork borer and 50µl of each sample with different concentrations were inoculated. Ciprofloxacin (5µg) and Methicillin (5µg) disks were used as standard antibiotic disks (C1) for bacteria and Fluconazole (25µg) disks were used as standard disk for fungi. Distilled water and ethanol served as negative control (C2) with respect of extract types. The plates were incubated at 37°C for 24 hours for bacteria and at 37°C for two days for fungal strains. The diameters of zone of inhibition were measured.

III RESULTS AND DISCUSSION

In the solvent extraction method, 15.29% extract yield was obtained with ethanol and 18% yield with water/aqueous. The ethanol extract has shown zone of inhibition against Staphylococcus aureus. The minimum inhibition concentration (MIC) was observed at the concentration of 300µg (Table 1). Other bacteria have not shown any zone of inhibition against ethanol extract. No antibacterial activity was observed in aqueous extract. The methanolic leaf extracts of Antidesma madagascarriense exhibited inhibitory effects against Enterococcus faecalis, S. aureus , Methicillin-resistant S. aureus (MRSA) and Candida albicans [15]. Similarly, in another study by Hassan et al [8], the methanolic and ethanolic extracts of Sapium sebiferum showed significant antimicrobial activity against Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa and Salmonella typhi. An aqueous ethanolic extracts of leaf of Flueggea leucopyrus had shown antibacterial activity against both Gram positive and Gram negative bacteria [11]. Both aqueous as well as ethanol extracts have not shown any antifungal activity against Candida albicans as well as Cryptococcus neoformans.
**Table 1:** *Staphylococcus aureus* showing different zone of inhibitions at different concentrations of ethanol extract of *Antidesma menasu*

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Test organism</th>
<th>Concentration</th>
<th>Diameter of zone of inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Methicillin(5µg)</td>
</tr>
<tr>
<td>1.</td>
<td><em>Staphylococcus aureus</em></td>
<td>300µg</td>
<td>2cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>350µg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>400µg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>500µg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000µg</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 1:** Petri plate showing zone of inhibition at different concentrations of ethanol extract of *Antidesma menasu*

**Fig. 2:** Petri plate showing Minimum Inhibition Zone at the concentration of 300µg/ml.
IV CONCLUSION

In the present study, crude aqueous and ethanolic leaf extracts of *A. menasu* were tested against four bacterial strains and two fungal strains. Among this, the ethanol extract has got significant antibacterial activity on *Staphylococcus aureus*. The above results proved antibacterial activity of *Antidesma menasu*.

ACKNOWLEDGMENT

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Software Project Planning with Tracking and Oversight

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Abstract- Software project management has been identified as a major determinant factor of software project’s success or failure. Software Project Planning (SPP) and Software Project Tracking and Oversight (SPTO) have equally been identified as two key process areas in software project management at maturity level 2 of the SEI CMMI. Following the need for consistent software process improvement in software industries world-over, especially as it concerns software project management, this study focused on evaluating the current level of performance of the two identified KPAs, SPP and SPTO in the software industry. Besides a broad review of literature, a study was conducted covering 30 software companies in the Nigerian geographical area. The study employed both the survey and the action research approaches with some of the companies selected as case studies for further appraisal. The study revealed some level of strength in the performance of the practices associated with SPP and SPTO in the Nigerian software industry. The results of the study were consistent with findings of earlier studies in enterprises whose maturity levels at the time of study were similar to that of the Nigerian software industry. Several recommendations were given for improving the performance of the practices associated with SPP and SPTO key process areas in particular, and software project management in general.

Index Terms- Software Project Planning, SPP, Software Project Tracking and Oversight, SPTO, Nigeria Software Companies, Software Industry, CMMI, Key Practice Area, KPA, Capability Maturity Model Integration, Software Process.

I. INTRODUCTION

Nan and Harter (2009) described software project management as the art and science of planning, coordinating and providing leadership for software projects. In order to be successful, organizations usually need effective and efficient project plans to help manage and possibly bring down the overall cost of software development. Typically, as a project increases in size, so thus the accompanying complexity, thereby further intensifying the need for thorough planning. A number of studies have shown that a large percentage of project failures were as a result of poor project planning. For instance, Ding and Jing (2003) in their study reported that in China, more than 40 percent of failed software projects were unsuccessful because of ineffective planning of human resources and project tasks. Chang et al. (2008) explained that the main reason for this was that unlike other projects, software project activities were people-intensive and that the related resources were mostly human resources. Meanwhile, the human resource allocation had already been described as a complex task. Kurien and Nair (2014) therefore puts forward that since cost and time are the significant dynamics in software projects, effective tools for managing these factors could create more room for success. An effective planning tool was considered important because an effective plan maximizes the overall cost and time required for a software project. Some of the project management techniques that have been applied in software project planning include the critical path method (CPM), the program evaluation and review technique (PERT), and the resource-constrained project scheduling problem (RCPSP) model (Shtub, Bard and Globerson, 2005). For calculating project workload and cost, as well as deciding project schedule and resource allocation, the COCOMO model (Chen and Zhang, 2013) is the model commonly employed.

Software Project Planning (SPP) and Software Project Tracking and Oversight (SPTO) also known as Project Monitoring and Control are two closely knit key process areas (KPA) at maturity level 2 of the Software Engineering Institute (SEI) Capability Maturity Model Integration (CMMI). The SEI CMMI maturity level 2 (Managed) is the maturity level that lay emphasis on software project management. As has already been described, SPP which is closely knit with SPTO play very pivotal roles in the software project management process. A software development plan, the output from the SPP KPA, is a prerequisite for SPTO (Paulk et al., 1993). The established plans from the SPP KPA are the necessary foundation for managing the software project, as described in the SPTO KPA.

The Software Engineering Institute upgraded their capability maturity model (CMM) with the CMMI in 2001 (CMMI Product Team, 2006). The CMM Integration was designed to address the problem of using multiple CMMs. CMMI is an outstanding process maturity framework, made up of 5 maturity levels, for practical organizations that desire to accomplish higher levels of performance in their activities (Hurst, 2017; Glover and Dennie, 2017; O’Neill, 2017). Although software is excluded from the titles and from the topics within the five levels of the CMMI because the CMMI encompasses a broader process-orientation, the current study is however focused on software and therefore includes software in its titles.

It is expected that findings from the current study will provide insight to software organizations across the globe about the current state of their software development process with regards SPP and SPTO. It is equally expected that these findings would endear software enterprises towards higher levels of performance in trying to achieve significant improvement in their software development processes. In addition, although a number of studies have examined software development processes from different perspectives, none of them have focused on examining the SPP and SPTO KPAs in the Nigerian context. The current study examined the level of performance of the SPP and SPTO practices in the Nigerian software industry based on results.
obtained from some randomly selected software companies within its geographical space.

II. RELATED WORKS

Although a number of studies have focused on software development companies in Nigeria including Soriyan, Mursu and Korpela (2000), Soriyan and Heeks (2004), Akinola, Ososifin and Akinkunmi (2009), Aregbesola and Akinkunmi (2010a; 2010b), Aregbesola et al. (2011), Aregbesola and Onwudebelu (2011), Akinola and Ososifin (2011), Aregbesola and Oluwade (2014), and Aregbesola (2017a; 2017b; 2017c; 2017d), none of them have actually examined the Software Project Planning (SPP) and Software Project Tracking and Oversight (SPTO) key process areas (KPA). This section of the study reviewed similar studies related to SPP and SPTO KPA. This section has been divided into two subsections, one for each of the discussed KPAs, SPP and SPTO.

1.1. Software Project Planning

Software Project Planning (SPP) is aimed at establishing reasonable plans for accomplishing the software engineering goals and for managing of the software project. It involves coming up with estimates for the work to be carried out, establishing the necessary commitments, and outlining the plan to get the work done (Paulk et al., 1993). Typically beginning with the statement of work to be performed, SPP is usually guided by the practices of Requirements Management KPA (Aregbesola, 2017a). SPP involves iterating through a number of activities for estimating the size of the software work products as well as the needed resources. It also involves producing a schedule, identifying possible risks, assessing the risks, and negotiating commitments. The established plan forms the basis for executing and managing the events of the software project's activities and addressing the commitments to the software project's customer on the basis of constraints, resources, and software project capabilities. Paulk et al. (1993) further explained that the established plans are the necessary foundation for managing the software project, as described in Software Project Tracking and Oversight.

Software Project Management (SPM) which is one of the primary factors to software success or failure cannot be effectively implemented without realistic plans. Since SPM has been a bottleneck in software engineering, with software project planning being one of its most critical activities, a number of approaches have been developed and applied with the purpose of improving its project planning practices. For instance, Han et al. (2015) applied an improved Max–Min Ant System algorithm to Software Project Planning to develop an appropriate worker-task assignment in a software project with the aim of maximizing cost and minimizing duration. The resulting model for software project planning made use of three important resources, namely tasks, employees, and skills. While the tasks were the jobs needed to complete the project, the employees were the workers with the requisite set of skills for performing the tasks. The developed model could make a suitable allocation of tasks to employees based on their skill sets. The experimental results from the study with regards selected projects yielded feasible solutions for optimum cost and duration as well as generating the appropriate PERT Graph and Gantt chart of the software project, thus improving the software project management process.

Rosso-Llopart (2005) discussed the goal of SPP to involve the establishment of a pragmatic strategy for controlling, tracking, and monitoring a complex technical project. The established strategy must deal with the project’s complexity which is heavily influenced by past experience of the practitioner and has a strong effect on the project’s overall outcome. It must also address the project’s size which typically increases in parallel with the interdependence of the different project elements. Finally, the established strategy must equally deal with the degree of structural uncertainty, which is the degree to which requirements are solidified, as well as the ease of functional decomposition. The study equally highlighted the need to watch out for “scope creep” which is a concept that occurs when customers change requirements mid-cycle. Putting all these together, the overarching aim of project planning is to guarantee that the final result is finished on time, within budget, and exudes quality.

The software engineers, software managers, and other stakeholders involved in the software project planning are usually trained in the software estimating and planning procedures which are applicable to their assigned tasks. Paulk et al. (1993) identified the three goals of software project planning to include: documenting software estimates used in planning and tracking the software project; planning and documenting software project activities and commitments; and stakeholders agree to their commitments related to the software project. Some of the commitments made in software project planning include: designation of a project manager to be responsible for negotiating commitments and developing the project's software development plan and; The software project follows a written organizational policy for planning a software project. For software project planning to be most effective, it must be initiated at the early stages of the overall project planning process and in parallel with it.

Han et al. (2015) explained that project plan development typically involves activities with tasks; cost estimation and; schedule with a completion finish date. In addition, SPP typically involves Risk Management, which comprises the anticipation of potential problems, mitigating or avoiding the problems, and tracking existing and potential problems. SPP also involves incremental release process model providing periodic demonstrations, reaching short-term goals, and checking progress towards long-term goals. Three general software project planning approaches were equally identified to include past experience, standard guidelines, and support tools. It was observed that experienced managers depended on their past experiences as well as the experiences of successful managers in creating plans. Documentations of past completed projects are usually adopted as models for project plans. A number of studies including those of requirements Alba and Chichano (2007), Chang et al. (2001; 2008), and Xiao, Ao and Tang (2013) reiterated that software project planning among other things consists of establishing a worker-task schedule for a software project. It was emphasized that employee skills and remunerations should be considered in assigning them to project tasks on the basis of task requirements.

1.2. Software Project Tracking and Oversight:
Software Project Tracking and Oversight (SPTO) is aimed at establishing adequate visibility into the projects progress, enabling management to respond effectively when the performance of the software project diverges considerably from the software project plans. A software development plan, the output from the activities of the Software Project Planning KPA, is a prerequisite for Software Project Tracking and Oversight (Paulk et al., 1993). The SPTO at the CMMI maturity Level 2 emphasizes tracking the project and taking necessary corrective actions. This is more or less a reactionary approach on the part of management to the actual problems. This reactionary approach is much unlike the proactive approach of the Integrated Software Management KPA (Arebesola, 2017b) at maturity level 3, a higher maturity level of the SEI CMMI maturity scale. This is because at maturity level 3, the software process of the project is completely defined with well-established relationship among the different activities, tasks and work products of the software project. SPTO involves tracking and reviewing the software achievements and outcomes against documented plans, estimations, and commitments, and making necessary adjustments based on the projects current accomplishments (Nalbant, 2004; Olson, Reizer and Over, 1994; Nair and Annamalai, 2013). Progress is typically determined by making comparisons between the values in the documented plan and the actual software cost, schedule, size, and effort at selected milestones and when selected software work products are completed (Paulk et al., 1993; Hjalmarsson, 2013; Futrell, Shafer and Safer, 2002). Corrective actions are taken when it becomes obvious that the software project's plans are not being met. Such corrective actions may typically include adjusting the software development plan to reflect the actual accomplishments or taking steps to improve the project performance or making adjustments to the remaining tasks (Amid and Moradi, 2013; Alwin, 2001; Dreon, 2000; Paulk et al., 1993; Olson et al. 1993).

The General Accounting Office (1999) in their study of the organization observed that no software quality assurance group existed, and that there were therefore no reviews and/or audits of the activities and work products for SPTO. A weak performance was equally observed for a large portion of the KPAs associated with SPTO. As such, it was further explained that effective SPTO among other things should include: Designation of a project software manager who will be responsible for the project's software activities and outcomes; Establishment of a documented software development plan on the basis of which status monitoring and tracking of software activities are performed; Establishment and adherence to written organizational policy for managing projects; Periodic reviews of current project status and accomplishments against the software development plan; Tracking all risks associated with the software project; Explicit assignment of responsibility for software activities and work products; Keeping track of the sizes of the software work products or accompanying changes and making necessary modifications as required and; Regular review of the SPTO activities with senior management.

As a result of its high level of relevance, SPTO as a process area is common to a majority of the software process improvement models and plays a significant role aimed at delivering quality products within budget and schedule. The work of Baruah, Ashima and Barbarah (2013) discussed various software process models developed to help different software organization compete favorably in the changing market environment and produce quality product. The focus was on exploring the methods commonly employed in SPTO in different small and medium scale enterprises in India. The different software models that were studied included the Capability Maturity Model CMM (Paulk et al., 1993), CMM Integration (CMMI Product Team, 2006), Personal Software Process PSP (Humphrey, 2005), Team Software Process TSP (Davis and McHale, 2003), Six Sigma (Brue and Launsby, 2003; Eckes, 2001), People Capability Maturity Model PCMM (Vakaslihti, 1997), ISO 9000 (Stelzer, Mellis and Herzwurm, 1997), ISO 9001:1994 (TickIT, 1995), ISO/IEC 12207 (Singh, 1996), SPICE (Rout and Terence , 1995), BOOTSTRAP (Kuvaaja, 1994), IEEE 1220 (Doran, 2006), IDEAL model (Gremba and Myers, 1997), Process Improvement for Small to Medium Enterprises PRISMS (Allen, Ramachandran and Abushama, 2003), K-model (Hwang, 2010) and TRISO (Li, 2007).

Although the study of General Accounting Office (1999) revealed that the projects evaluated exhibited some level of SPTO practice strengths (such as the documentation of software development plans and the respective designation of responsibilities to a project software manager), the projects collectively had many weaknesses. One of the significant weaknesses identified was that none of the projects studied followed a written organizational policy for managing the software projects. This increases the risk of key tracking and oversight activities not being performed as effectively as required. As observed in the study, the increased risk was evident in the project manager’s failing to: periodically review project status and accomplishments against the software development plan; track all risks associated with the software project; explicitly assign responsibilities to individuals for software activities and work products; keep track of the sizes of the software work products or accompanying changes and making necessary modifications as required, and regularly review the SPTO activities with senior management. To further buttress the points raised, Table 1 which is from the study of Low and Cox (1996) shows the assessment results from the SPTO KPA at some point in Hewlett-Packard’s journey towards its attainment of the SEI CMM maturity Level 2, a level which it has however since surpassed. The results in Table 1 show a combined average of 54.2% for both full and partial performance of the listed practices.
Table 1: Assessment results for the software project tracking and oversight key process area.

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>Percent of Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the project’s planned activities and deliverables tracked (e.g., schedule, effort, and tests)?</td>
<td>43 24 33</td>
</tr>
<tr>
<td>Are the actual results compared to your estimates throughout the project?</td>
<td>10 19 71</td>
</tr>
<tr>
<td>If there is a variance, does someone take corrective action or explain why the variance has occurred?</td>
<td>14 38 48</td>
</tr>
<tr>
<td>Are changes to the activities, deliverables, and schedule discussed with the people who will be affected?</td>
<td>19 58 23</td>
</tr>
<tr>
<td>Does someone review the project results regularly with your section and lab managers?</td>
<td>18 18 64</td>
</tr>
</tbody>
</table>

Source: Lowe and Cox (1996)

III. RESEARCH METHODOLOGY

A survey on the level of performance of the different practices associated with the Software Project Planning (SPP) and the Software Project Tracking and Oversight (SPTO) key process areas was conducted. The research was performed on 30 software companies within the federal republic of Nigeria using an abridged version of the verified SEI Maturity Questionnaire (Zubrow et al., 1994). The abridged version of the SEI Maturity Questionnaire was adopted as the research instrument for eliciting required information for the study. The questionnaire consisted of two major sections. The first sections comprised of questions regarding software process key practices within the organisation. The second section which was the response section consisted of four response options namely “Yes”, “No”, “NA” for Not Applicable and “DK” for Don’t Know. These four options were the possible responses available to each respondent with regards to the organizations performance of the respective key practices in the given section. A total of twenty six (26) (i.e. 86.67%) of the 30 selected companies eventually participated in the study.

Further studies, using the action research approach, was carried out on some of the selected companies to ascertain the veracity of the collected data. A direct observation and actual participation in the organizational software development activities were adopted as a means of getting firsthand information about the practices of some of the organizations, and thereafter reconciling such information with the collected data. Measurement of process-related phenomena was also performed. Print and electronic documentation were equally explored as sources of useful details about the companies and their operations. Both structured and unstructured interviews were also employed in the information elicitation process.

IV. RESULTS

The results of the current study are as shown in Tables 2 and 3, and equally graphically represented as depicted by Figures 1 and 2. The results are presented in percentages of actual responses. The averages for each response option are shown in bold at the last row of each table. Discussions and resultant conclusions from these results are presented in the subsequent sections.

Table 2: Key Practices of the Software Project Planning (SPP) KPA

<table>
<thead>
<tr>
<th>Key Practices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Are estimates (e.g., size, cost, and schedule) documented for use in planning and tracking the software project?</td>
<td>92.31 7.69 0.00 0.00</td>
</tr>
<tr>
<td>b. Do the software plans document the activities to be performed and the commitments made for the software project?</td>
<td>61.54 19.23 11.54 7.69</td>
</tr>
</tbody>
</table>
c. Do all affected groups and individuals agree to their commitments related to the software project?  53.85  46.15  0.00  0.00  
d. Does the project follow a written organizational policy for planning a software project?  7.69%  65.38  7.69  19.23  
e. Are adequate resources provided for planning the software project (e.g., funding and experienced individuals)?  26.92  57.69  15.38  0.00  
f. Are measurements used to determine the status of the activities for planning the software project (e.g., completion of milestones for the project planning activities as compared to the plan)?  69.23  23.08  3.85  3.85  
g. Does the project manager review the activities for planning the software project on both a periodic and event-driven basis?  80.77  15.38  0.00  3.85  

Average:  56.04  33.52  5.49  4.95  

Figure 1: Performance against Key Practices of the Software Project Planning (SPP) KPA

Table 3: Key Practices of the Software Project Tracking and Oversight (SPTO) KPA

<table>
<thead>
<tr>
<th>Key Practices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Are the project’s actual results (e.g., schedule, size, and cost) compared with estimates in the software plans?</td>
<td>46.15 19.23 15.38 19.23</td>
</tr>
<tr>
<td>b. Is corrective action taken when actual results deviate significantly from the project’s software plans?</td>
<td>69.23 26.92 3.85 0.00</td>
</tr>
<tr>
<td>c. Are changes in the software commitments agreed to by all affected groups and individuals?</td>
<td>53.85 19.23 23.08 3.85</td>
</tr>
<tr>
<td>d. Does the project follow a written organizational policy for both</td>
<td>26.92 57.69 0.00 15.38</td>
</tr>
</tbody>
</table>
tracking and controlling its software development activities?

e. Is someone on the project assigned specific responsibilities for tracking software work products and activities (e.g., effort, schedule, and budget)?

65.38 19.23 15.38 0.00

f. Are measurements used to determine the status of the activities for software tracking and oversight (e.g., total effort expended in performing tracking and oversight activities)?

76.92 15.38 7.69 0.00

g. Are the activities for software project tracking and oversight reviewed with senior management on a periodic basis (e.g., project performance, open issues, risks, and action items)?

73.08 15.38 3.85 7.69

Average: 58.79 24.73 9.89 6.59

Figure 2: Performance against Key Practices of the Software Project Tracking and Oversight (SPTO) KPA

V. DISCUSSION

The results shown in Tables 2 and 3, which are graphically depicted by the charts in Figures 1 and 2 show relatively high degrees of performance of the practices associated with the Software Project Planning (SPP) and Software Project Tracking and Oversight (SPTO) KPAs, with the performance of the practices associated with SPTO being somewhat better than the performance of the practices associated with SPP. These performances are quite remarkable considering that both KPAs are associated with software process CMMI maturity level 2 (Managed) while the Nigerian software industry has been said to be at maturity level 1 according to the studies of Aregbesola and Akinkunmi (2010a; 2010b), Aregbesola et al. (2011), Aregbesola and Onwudebelu (2011), and Aregbesola and Oluwade (2014). Of course, results from the studies never implied that there were no software companies within the country with higher maturity levels. Therefore, software companies within the country with higher maturity levels could have accounted for the high performances experienced in the practices associated with both KPAs despite the industry average. In a similar study carried out by General Accounting Office (1999), it was equally revealed that the projects evaluated exhibited some level of strengths in their SPP and SPTO practices, despite the fact that the organizations were obvious yet to attain the CMMI maturity level 2.

The results obtained in the current study were equally somewhat similar to those of Lowe and Cox (1996) especially with regards to the performance of the practices associated with SPTO. While Lowe and Cox (1996) recorded a 54.2% performance of these practices, the current study recorded 58.8% performance of similar set of practices. The similarities in the results of both studies were quite consistent with expectations because the enterprise under study in Lowe and Cox (1996) were equally on their journey towards the SEI CMMI maturity level 2 at the time.

Establishing and adhering to written organizational policy for planning, tracking and controlling software development activities and projects were major weaknesses for most of the
organizations. Formal documentation of an organizational policy for SPP and SPTO was a major weakness across board. This observation was equally consistent with that of General Accounting Office (1999) which stated that one of the significant weaknesses identified in its study was that none of the projects studied followed a written organizational policy for managing the software projects. It was equally stated that this increased the risk of key tracking and oversight activities not being performed as effectively as required. It is therefore easy to see that although the performance of both KPA considered in this study can be said to be relative okay, the need still exists for significant improvement.

VI. CONCLUSION

Considering that more than 40 percent of failed software projects have been said to be unsuccessful because of ineffective planning of human resources and project tasks, and that the reason for this was that unlike other projects, software project activities were people-intensive and that the related resources were mostly human resources; it therefore becomes imperative that training and retraining of the human resources is given utmost diligence. Also, considering that human resource allocation has been identified as a complex task, it behooves senior management to support the project manager in acquiring effective methodologies and software tools for managing resource allocation along SPP and SPTO, thereby maximizing cost and time.

Proper documentation of the entire software process and securing stakeholder’s commitment have equally been identified as key factors that must be given kin consideration when it comes to SPP and SPTO. Besides the software project following a written organizational policy for SPP and SPTO, another commitment that is an absolute necessity for success in these KPAs is the designation of a project manager to be responsible for negotiating commitments and establishing the project’s software development plan. The appointment of a project manager is an absolute necessity because he would be responsible for the majority of all the other commitments. For software project planning to be most effective, it must be initiated at the early stages of the overall project planning process and in parallel with it.

The current study focused on Software Project Planning (SPP) and Software Project Tracking and Oversight (SPTO). Existing works on the two KPAs were reviewed and research result on the level of performance of both KPAs in the Nigerian software industry was equally presented. By using survey and action research methods, it was shown that the performance of the practices associated with the two KPAs was relatively strong in the Nigerian software industry. There however still exists plenty of room for improvement in the performance of the practices in the KPAs. The industry should therefore endeavor not just to maintain the current performance level, but strive to bring about significant improvements. Considering the pivotal role SPP and SPTO KPAs play in the software development process, it is quite certain that an improvement in the performance of the practices associated with them will result in significant productivity enhancements and improved software process maturity.

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Existence of solutions of nonlinear fractional impulsive delay integro differential equation of Sobolev type

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Abstract- In this paper we prove the existence of solutions of nonlinear fractional delay integrodifferential equations with impulsive conditions.

Index Terms- Delay Integrodifferential, Fractional Impulse, Sobolev.

I. INTRODUCTION

Fractional Calculus deals with the generalization of integrals and derivatives of noninteger order. Fractional Calculus involves a wide area of applications by bringing into a broader paradigm concept of physics, mathematics and engineering. Though the concepts and the calculus of fractional derivatives are few centuries old, it is realized only recently that these derivatives form an excellent framework for modeling experiments for fractional models on population dynamics are discussed in [7]. In [5, 6], the authors have proved the existence of solutions of abstract fractional differential equations by using fixed point techniques.

II. PRELIMINARIES

We need some basic definitions and properties of fractional calculus which are used in this paper. Let X be a Banach space and \(\mathbb{R}_+ = [0, \infty)\). Suppose \(f \in L_1(\mathbb{R}_+).\) Let \(C(J, X)\) be the Banach space of continuous functions \(x(t)\) with \(x(t) \in X\) for \(t \in J = [0, T]\) and \(\|x\|_{C(J, X)} = \max_{t \in J} \|x(t)\|\). Let \(B(X)\) denote the bounded linear operators from \(X\) into \(X\) with the norm \(\|A\|_{B(X)} = \sup \{\|A(y)\| : \|y\| = 1\}\). Also consider the Banach space \(PC(J, X) = \left\{ u : J \rightarrow X : u \in C((t_k, t_{k+1}], X), k = 0, 1, ..., \text{and there exist} u(t_k^-) \text{and} u(t_k^+) \right\}\) with the norm \(\|u\|_{PC} = \sup_{t \in J} \|u(t)\|\). Set \(J' = [0, T] \setminus \{t_1, t_2, ..., t_m\}\).

Definition 2.1:[3]

The Riemann – Liouville fractional integral operator of order \(\alpha > 0\), of function \(f \in L_1(\mathbb{R}_+)\) is defined as

\[
l_0^\alpha f(t) = \frac{1}{\Gamma(\alpha)} \int_0^t (t-s)^{\alpha-1} f(s) \, ds,
\]

where \(\Gamma\) is the Euler gamma function.

Definition 2.2:
The Riemann – Liouville fractional derivative of order \(\alpha > 0, n - 1 < \alpha < n, n \in N\), is defined as

\[
^{(\alpha)}D_0^\alpha f(t) = \frac{1}{\Gamma(n-\alpha)} \frac{d^n}{dt^n} \int_0^t (t-s)^{n-\alpha-1} f(s) \, ds,
\]

where the function \(f(t)\) has absolutely continuous derivatives up to order \(n - 1\).

Definition 2.3:
The Caputo fractional derivative of order \(\alpha > 0, n - 1 < \alpha < n,\) is defined as

\[
C_0^\alpha f(t) = \frac{1}{\Gamma(n-\alpha)} \int_0^t (t-s)^{n-\alpha-1} f^n(s) \, ds,
\]

where the function \(f(t)\) has absolutely continuous derivatives up to order \(n - 1\). If \(0 < \alpha < 1\), then

\[
C_0^\alpha f(t) = \frac{1}{\Gamma(1-\alpha)} \int_0^t \frac{f(s)}{(t-s)^\alpha} \, ds,
\]

where \(f'(s) = Df(s) = \frac{df(s)}{ds}\) and \(f\) is an abstract function with values in \(X\).

We shall state some properties of the operators \(l_0^\alpha\) and \(C_0^\alpha\).

Proposition 2.4. For \(\alpha, \beta > 0\) and \(f\) as a suitable function we have

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Let us denote

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( i \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( ii \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( iii \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( iv \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( v \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( vi \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( vii \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

(\( viii \))

\( I_{0+}^\alpha \int \beta f(t) = I_{0+}^{\alpha+\beta} f(t) \)

We observe from the above that both the Riemann–Liouville and the Caputo fractional differential operators do possess neither semigroup nor commutative properties, which are inherent to the derivatives on integer order. For our convenience, let us take \( C^\alpha \) as \( D^\alpha \).

Consider the nonlinear fractional impulsive delay integrodifferential equation of Sobolev type of the form

\[ C^\alpha (Bu(t)) + Au(t) = f\left(t, u(\alpha(t)), \int_0^t h(t, s, u(\beta(s))) ds\right), \quad t \in [0, T], \ t = t_k \]

\[ \Delta u_{t=t_k} = I_k(u(t_k)), \]  

\[ u(0) = u_0 \]

where

\[ 0 < q < 1, \quad f: J \times X \times X, h: \Delta \times X \times X, \alpha, \beta: J \rightarrow J \] are continuous,

\[ I_k: X \rightarrow X, k = 1, 2, \ldots, m, u_0 \in X, 0 = t_0 < t_1 < t_2 < \cdots < t_m < t_{m+1} = T. \]

\[ \Delta u_{t=t_k} = u(t_k^+) - u(t_k^-), \Delta = \{(t, s): 0 \leq s \leq t \leq T\}. \]

\[ A \text{ and } B \text{ are linear operators with domain and ranges contained in a Banach space } X. \]

It is easy to prove that the Equation 2.1 is equivalent to the integral equation

\[ u(t) = \left\{ \begin{array}{ll}
\left[ u_0 + \frac{1}{\Gamma(q)} \int_0^t (t-s)^q B^{-1} Au(s) ds \\
+ \frac{1}{\Gamma(q)} \int_0^t \left( f\left(s, u(\alpha(s)), \int_0^s h\left(s, \tau, u(\beta(\tau))\right) ds\right) \right) ds, \quad \text{if } t \in [0, t_1] \\
\left[ u_0 + \frac{1}{\Gamma(q)} \sum_{i=1}^{t_1-1} \int_{t_{i-1}}^{t_i} (t_i - s)^q B^{-1} Au(s) ds \\
+ \frac{1}{\Gamma(q)} \sum_{i=1}^{t_1-1} \int_{t_{i-1}}^{t_i} \left( f\left(s, u(\alpha(s)), \int_0^s h\left(s, \tau, u(\beta(\tau))\right) ds\right) dt\right) ds \\
+ \frac{1}{\Gamma(q)} \int_{t_{t_k-1}}^{t_k} (t_k - s)^q B^{-1} \left( f\left(s, u(\alpha(s)), \int_0^s h\left(s, \tau, u(\beta(\tau))\right) dt\right) ds \\
+ \sum_{i=1}^{t_k} B^{-1} (u(t_k^-)), \quad \text{if } t \in [t_k, t_{k+1}] \right. \end{array} \right. \]

By a local solution of the abstract Cauchy problem (2.1), we mean an abstract function \( u \) such that the following conditions are satisfied:

(\( i \)) \( u \in PC(J, X) \) and \( u \in D(A) \) on \( J \);

(\( ii \)) \( \frac{du}{dt} \) exists and continuous on \( J \), where \( 0 < q < 1 \);

(\( iii \)) \( u \) satisfies Equation (2.4) on \( J \) and satisfies the conditions

\[ \Delta u_{t=t_k} = I_k(u(t_k^+)), u(0) = u_0 \in X \] or that is equivalent \( u \) satisfying the integral equation (2.4)

We assume the following hypotheses to prove the existence of solutions

(\( H1 \)) \( A: D(A) \subset X \times X \) and \( B: D(B) \subset X \times X \) are closed linear operators

(\( H2 \)) \( D(B) \subset D(A) \) and \( B \) is bijective

(\( H3 \)) \( B^{-1}: X \rightarrow D(B) \) is compact

(\( H4 \)) \( B^{-1} A: X \rightarrow D(B) \) is continuous. [4]

(\( H5 \)) \( f: J \times X \times X \rightarrow X \) is continuous and there exists a constant \( L > 0 \), such that

\[ \|f(t, s, u) - f(t, s, v)\| \leq L\|x - y\| + \|u - v\|, \text{ for all } u, v \in X. \]

Let us denote \( B_I u(t) = \int_0^t h(t, u(\alpha(s)), u(\beta(s))) ds \).

(\( H6 \)) \( h: \Delta \times X \rightarrow X \) is continuous and there exists a constant \( L_1 > 0 \), such that

\[ \|h(t, u(\alpha(s)), B_1 u(t)) - h(t, v(\alpha(t)), B_1 u(t))\| \leq L_1\|u - v\| \text{ for all } u, v \in X. \]

(\( H7 \)) \( A: D(A) \subset X \times X \) is a continuous bounded linear operator and there exists a constant \( M > 0 \), such that

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\( \|A(u) - A(v)\| \leq M\|u - v\| \) for all \( u, v \in X \).

(H8) The functions \( I_k : X \to X \) are continuous and there exists a constant \( L_2 > 0 \), such that
\[ \|I_k(u) - I_k(v)\| \leq L_2\|u - v\|, \]
for each \( u, v \in X \) and \( k = 1, 2, \ldots, m \).

Let \( B_r = \{u \in X : \|u\| \leq r\} \) for some \( r > 0 \). For brevity let us take \( \gamma = \frac{\tau^q}{\Gamma(q+1)} \) and \( K = \|B^{-1}\| = sup_{x \in X}\{\|B^{-1}x\| : \|x\| \leq 1\} \), \( N = \max_{t \in \mathbb{R}_+} f(t, 0, 0) \), \( N_1 = \max_{(t,s) \in\delta_1} \|h(t, s, 0)\| \)

Further we assume that
\( (H9) \|u_0\| + (m + 1)\gamma K M_0 + mKL_2 r \leq r, \)
where \( M_0 = Mr + Lr + LL_1 Tr + LN_1 T \)

(H10) Let \( p = (m + 1)\gamma KM + (m + 1)\gamma KL_1 + mKL_2 \) be such that \( 0 \leq p < 1 \).

III. MAIN RESULTS

**Theorem 3.1:**

If the hypotheses (H1) – (H10) are satisfied, then the nonlinear fractional impulsive delay integrodifferential equation (2.1) - (2.3) has a unique solution.

**Proof:**

Let \( Z = C(J, B_r) \). Define the mapping \( \phi : Z \to Z \) by
\[
\phi u(t) = u_0 - \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_i} (t_i - s)^{q-1}B^{-1}Au(s)ds - \frac{1}{\Gamma(q)} \int_{t_k}^{t} (t - s)^{q-1}B^{-1}Au(s)ds
\]
\[+ \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_i} (t_i - s)^{q-1}B^{-1}\left(f\left(s, u(\alpha(s)), B_1 u(s)\right)\right)ds
\]
\[+ \frac{1}{\Gamma(q)} \int_{t_k}^{t} (t - s)^{q-1}B^{-1}\left(f\left(s, u(\alpha(s)), B_1 u(s)\right)\right)ds
\]
\[+ \sum_{i=1}^{k} B^{-1} I_i(u(t_i^-)) \]

and we have to show that \( \phi \) has a fixed point, and this fixed point is a solution of the Equation (2.1). First we show that \( \phi B_r \subset B_r \).

From the assumptions we have
\[
\|\phi u(t)\| \leq \|u_0\| + \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_i} (t_i - s)^{q-1}\|B^{-1}Au(s)\|ds + \frac{1}{\Gamma(q)} \int_{t_k}^{t} (t - s)^{q-1}\|B^{-1}Au(s)\|ds
\]
\[+ \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_i} (t_i - s)^{q-1}\left\|B^{-1}\left(f\left(s, u(\alpha(s)), B_1 u(s)\right)\right)\right\|ds
\]
\[+ \frac{1}{\Gamma(q)} \int_{t_k}^{t} (t - s)^{q-1}\left\|B^{-1}\left(f\left(s, u(\alpha(s)), B_1 u(s)\right)\right)\right\|ds
\]
\[+ \sum_{i=1}^{k} \|B^{-1} I_i(u(t_i^-))\|
\]
\[\leq \|u_0\| + \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_i} (t_i - s)^{q-1}\|B^{-1}Au(s)\|ds + \frac{1}{\Gamma(q)} \int_{t_k}^{t} (t - s)^{q-1}\|B^{-1}Au(s)\|ds
\]
\[+ \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_i} (t_i - s)^{q-1}\left\|B^{-1}\left(f\left(s, u(\alpha(s)), B_1 u(s)\right)\right)\right\|ds
\]
\[+ \frac{1}{\Gamma(q)} \int_{t_k}^{t} (t - s)^{q-1}\left\|B^{-1}\left(f\left(s, u(\alpha(s)), B_1 u(s)\right)\right)\right\|ds
\]
\[+ \sum_{i=1}^{k} \|B^{-1} I_i(u(t_i^-))\|
\]
\[\leq \|u_0\| + \frac{1}{\Gamma(q+1)} (m + 1)\gamma K\|u\| + (m + 1)\frac{\tau^q}{\Gamma(q+1)} K\|L\|\|u\| + L\|B_1 u(s)\| + mKL_2\|u\|
\]
\[\leq \|u_0\| + \frac{1}{\Gamma(q+1)} (m + 1)\gamma K [r + Lr + LL_1 Tr + LN_1 T] + mKL_2 r
\]
\[\leq r.
\]
Thus, \( \phi \) maps \( B_r \) into itself.

For \( u_1, u_2 \in X \), we have

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\[
\|\varphi u_1(t) - \varphi u_2(t)\| \leq \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_{i}} (t_i - s)^{q-1} \|B^{-1}A[u_1(s) - u_2(s)]\| ds \\
+ \frac{1}{\Gamma(q)} \int_{t_{i-1}}^{t_{i}} (t_i - s)^{q-1} \|B^{-1}A[u_1(s) - u_2(s)]\| ds \\
+ \frac{1}{\Gamma(q)} \sum_{i=1}^{k} \int_{t_{i-1}}^{t_{i}} (t_i - s)^{q-1} \left\|B^{-1}[(f(s, u_1(\alpha(s)), B_1 u_1(s)) - (f(s, u_2(\alpha(s)), B_1 u_2(s)))]\right\| ds \\
+ \sum_{k=1}^{\infty} \left\|B^{-1}[I_i(u_1(t_i^-)) - I_i(u_2(t_i^-))]\right\|.
\]

Since \(0 \leq p < 1\), \(\varphi\) is a contraction mapping and therefore there exists an unique fixed point \(u \in Z\) such that \(\varphi u(t) = u(t)\). Any fixed point of \(\varphi\) is the solution of (2.1). \(\square\)

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WORK-LIFE BALANCE

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1. Introduction

Work Life Balance is a broad concept including proper prioritizing between "work" (career and ambition) on the one hand and "life" (Health, pleasure, leisure, family and spiritual development) on the other.

The expression "Work-life balance" was first used in the United Kingdom in the late 1970s to describe the balance between an individual's work and personal life.

Over the past decade, a rise in workplace violence, an increase in levels of absenteeism as well as rising workers’ compensation claims are all evidence of an unhealthy work life balance. Employee assistance professionals say there are many causes for this situation ranging from personal ambition and the pressure of family obligations to the accelerating pace of technology. According to a recent study for the Center for Work-Life Policy, 1.7 million people consider their jobs and their work hours excessive because of globalization.

Young Generation Views on Work Life Balance

According to Kathleen Gerson, Sociologist, young people “are searching for new ways to define care that do not force them to choose between spending time with their children and earning an income” and “are looking for definition of personal identity that do not pit their own development against creating committed ties to others”. Young adults believe that parents should get involved and support the children both economically and emotionally, as well as share labor equally. Young people do not believe work-life balance is possible and think it is dangerous to build a life dependent on another when relationships are unpredictable. They are looking for partners to share the house work and family work together. Both men and women believe that women should have jobs before considering marriage; for better life and to be happy in marriage. Young people do not think their mother’s generations were unhappy. They also do not think they were powerless because they were not economically dependent.

Consequences of an Imbalance

Mental health is a balancing act that may be affected by four factors: the influence of unfavorable genes, by wounding trauma, by private pressures and most recently by the stress of working. Many people expose themselves unsolicited to the so-called job stress, because the "hard worker" enjoys a very high social recognition. These aspects can be the cause of an imbalance in the areas of life.

Responsibility of Employers

Companies have begun to realize how important the work-life balance is to the productivity and creativity of their employees. Research by Kenexa Research Institute in 2007 shows that those employees who were more favourable toward their organization’s efforts to support work-life balance also indicated a much lower intent to leave the organization, greater pride in their organization, a willingness to recommend it as a place to work and higher overall job satisfaction.
Employers can offer a range of different programs and initiatives, such as flexible working arrangements in the form of part time, casual and telecommuting work. More proactive employers can provide compulsory leave, strict maximum hours and foster an environment that encourages employees not to continue working after hours.

According to Stewart Friedman, professor of Management and founding director of the Wharton School’s Leadership Program indicates that the solution lies in approaching the components of work, home, community, and self as a comprehensive system.

2. Objectives

The objective of this article is to study the factors which are responsible for work life balance. As many OB theorists have suggested that a person has certain needs. Amongst these needs physiological and social needs and self actualization needs can be termed as the most important needs. So, in today’s fast and unstoppable world where people has to work hard continuously for long hours to earn their living and realize their true potential it becomes increasingly difficult for them to fulfill their needs and responsibilities towards their families and to fulfill their other social needs. This in turn affects their job and mental satisfaction and raises the issue of work-life balance. This motivated us to determine: what are the factors that are responsible for balancing work and life? How is work-life balance different amongst males and females? Is there is any difference in the perception on work-life balance amongst different age groups etc. Along with this it gives us a good platform to determine what policies should be adopted by a company to help and support its employees in striking a right balance in their life and work.

3. Literature Review

(a) INFLUENCES OF THE VIRTUAL OFFICE ON ASPECTS OF WORK AND WORK/LIFE BALANCE

E. JEFFREY HILL, BRENT C. MILLER, SARA P. WEINER, JOE COLIHAN (2006)

Millions of employees now use portable electronic tools to do their jobs from a “virtual office” with extensive flexibility in the timing and location of work. However, little scholarly research exists about the effects of this burgeoning work form. This study of IBM employees explored influences of the virtual office on aspects of work and work/life balance as reported by virtual office teleworkers (n = 157) and an equivalent group of traditional office workers (n = 89). Qualitative analyses revealed the perception of greater productivity, higher morale, increased flexibility and longer work hours due to telework, as well as an equivocal influence on work/life balance and a negative influence on teamwork. Using a quasi-experimental design, quantitative multivariate analyses supported the qualitative findings related to productivity, flexibility and work/life balance. However, multivariate analyses failed to support the qualitative findings for morale, teamwork and work hours. This study highlights the need for a multi-method approach, including both qualitative and quantitative elements, when studying telework.

(b) Predictors of Physician Career Satisfaction, Work-Life Balance, and Burnout

Keeton, Kristie MD, MPH1; Fenner, Dee E. MD1; Johnson, Timothy R. B. MD1; Hayward, Rodney A. MD2

OBJECTIVE: To explore factors associated with physician career satisfaction, work-life balance, and burnout focusing on differences across age, gender, and specialty.

METHODS: A cross-sectional, mailed, self-administered survey was sent to a national sample of 2,000 randomly-selected physicians, stratified by specialty, age, and gender (response rate 48%). Main outcome measures included career satisfaction, burnout, and work-life balance. Scales ranged from 1 to 100.

RESULTS: Both women and men report being highly satisfied with their careers (79% compared with 76%, P<.01), having moderate levels of satisfaction with work-life balance (48% compared with 49%, P=.24), and having moderate levels of emotional resilience (51% compared with 53%, P=.09). Measures of burnout strongly predicted career satisfaction (standardized β 0.36-0.60, P<.001). The strongest predictor of work-life balance and burnout was having some control over schedule and hours
worked (standardized β 0.28, \( P < .001 \), and 0.20-0.32, \( P < .001 \), respectively). Physician gender, age, and specialty were not strong independent predictors of career satisfaction, work-life balance, or burnout.

**CONCLUSION:** This national physician survey suggests that physicians can struggle with work-life balance yet remain highly satisfied with their career. Burnout is an important predictor of career satisfaction, and control over schedule and work hours are the most important predictors of work-life balance and burnout.

(c) **The relation between work–family balance and quality of life**


We examined the relation between work–family balance and quality of life among professionals employed in public accounting. Three components of work–family balance were assessed: time balance (equal time devoted to work and family), involvement balance (equal involvement in work and family), and satisfaction balance (equal satisfaction with work and family). For individuals who invested substantial time in their combined work and family roles, those who spent more time on family than work experienced a higher quality of life than balanced individuals who, in turn, experienced a higher quality of life than those who spent more time on work than family. We observed similar findings for involvement and satisfaction. We identified the contributions of the study to the work–family balance literature and discussed the implications of the findings for future research.

4. **Recommendations**

The following points should be considered by the employer to maintain the work-life balance for the employees:

1. Provide regular and valuable increment in employees’ salaries. It has already been proved in the survey that employees of this company have enough autonomy. So, well-paid employees with greater autonomy are more satisfied with their work.

2. Provide benefit programs for families of the employees like insurance, some discount on holiday at certain location etc.

3. Organize different types of functions for employees as well as their families on quarterly basis. This will increase the interaction amongst the employees as well as within families.

4. Organize small informal get-togethers in the respective department on monthly basis this will fulfill the social needs of the employees.

5. Organize various competitions within the company like employee of the year, employee with best behavior, employee who got the most valuable deal etc. this will encourage employees to use their true potential.

6. Encourage a healthy relationship among employees so that they can support each other in the time of need. This will help everyone in the organization to strike a good balance between work and life.

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ASEAN ECONOMIC COMMUNITY AND ITS IMPLICATIONS ON TRADE LAWS AND GROWTH IN INDONESIA

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Abstract- The enactment of the ASEAN Economic Community (AEC) in 2015 no doubt becomes an opportunity as well as a major challenge for Indonesia, especially in increasing economic growth. However, such expectation seems to be difficult to be achieved as the socio-economic and political conditions in each ASEAN country are different. For this reason, this study aims at discussing three aspects. The first is to discuss the international trade laws that are relevant to be given attention toward the establishment of AEC. The second highlights policies that relate to the international trade. The third is to address the implication of AEC to economic growth in Indonesia. Note that, throughout this study, the data and information used to discuss the above aspects are based on literatures and other secondary sources including international trade laws and regulations, and international trade textbooks and journals relevant to the study. The study found that the problems associated with legal issues in the international trade in principle is not much different from the legal issues faced by the parties in domestic business transactions. This is regulated in the international trade law as a guideline in international trade. In international trade practice, however, International Chamber of Commerce (INCOTERM) has determined INCOTERM 1990 as the guidance towards "sale-contract" abroad. This suggests that an international trading activity cannot be separated from all actions of government, either directly or indirectly. It was argued that the AEC will have positive as well as negative impacts on the economy. These positive impacts include the community will more easily meet the needs of goods and services that are not available domestically at cheaper prices, whilst the negative impacts include an intense competition between Indonesian local products and overseas products. Thus, much remain to be done by the government and the people of Indonesia in optimizing the benefit of AEC.

Index terms- ASEAN Economic Community, International Trade, International Law, economic growth.

1. INTRODUCTION

ASEAN (Association of Southeast Asian Nations) was firstly formed based on Bangkok declaration on 8 August 1967 by five countries in Southeast Asia. These five countries were Indonesia, Malaysia, Philippines, Singapore, and Thailand. In relation to international trade, the establishment of ASEAN aimed at least for two main objectives. The first is to increase economic growth, economic progress, social progress, and cultural development through joint efforts for the prosperous and peaceful Southeast Asian communities. The second is to improve more effective ways to achieve greater utilization in agriculture, industry, international trade, and improve the social welfare of the ASEAN communities (Muhammad Sood, 2012: 91).
In strengthening the economic cooperation of the ASEAN members, it was agreed to establish the first economic instrument, namely, Preferential Trading Agreement (PTA) that was signed on 24 February 1977 in Manila-Philippines. This PTA is an agreement in ASEAN to reduce the tariff of number of products with the aim to enhance the growth of intra-ASEAN trade.

Unlike the ASEAN Economic Community (AEC), the AEC originally formed in the Summit forum held in Kuala Lumpur in 1997. In this summit, the ASEAN leaders decided to make the ASEAN transformation by becoming a prosperous, stable and highly competitive region in just and fair economic development that could reduce the gap and the poverty incidence in ASEAN countries (ASEAN 2020). This summit was further continued in Bali in October 2003. In the Bali summit, the ASEAN leaders committed to have regional economic integration in Southeast Asia by 2020.

There were two declarations by the ASEAN leaders on November 22, 2015. These two declarations were the Kuala Lumpur 2015 Declaration on the enactment of the ASEAN Economic Community (AEC) on 31 December 2015 comprising the ASEAN Political Security Community, ASEAN Economic Community and ASEAN Socio-Cultural Society and The Kuala Lumpur Declaration on ASEAN 2025, Forging Ahead Together. In this later declaration, the heads of ASEAN member states agreed to have vision of the ASEAN Community by 2025, the blueprint of the Political Security Society 2015, the ASEAN Community 2025 and the Socio-Cultural Society 2025.

The ASEAN Economic Community (AEC) is a form of regional economic integration planned to be achieved by 2015. The main objective of the AEC in 2015 was to make ASEAN as a single market and production base where there will be free flow of goods, services, investments and skilled labor and capital flows. Leaders of the ASEAN countries have agreed to realize AEC 2015 with 4 main pillars, namely, a single market and international production base, to become competitive economic region, equitable economic development region, and to become regions integrated to the global economy.

To anticipate the progress in the economic field and the continued advance of trade traffic at the international level under AEC, it is necessary to observe the rules of international law governing international trade issues, called "International Trade Laws". International Trade Law is a code of international law governing the exchange of goods, services, or capital between residents of a country with another country, or that occurs between two or more citizens.

The reason why the international trade law important to be established is simply because there will be an intensive transactions within ASEAN countries that further will need dispute settlements. For this reason there have been dispute resolution institutions to solve international trade disputes through mediation, conciliation or arbitration. One of these international institutions is the United Nations Commission on International Trade Law (UNCITRAL). This institution was established on December 17, 1966 through UN General Assembly Resolution No. 2205 (XXI), with the aim of enabling the United Nations to play a more active role in reducing or eliminating the legal constraints of international trade flows.

In line with this, Indonesia, consequently, must adapt and at the same time run a strategy to make the most of it. It is hoped that its membership in the WTO and the AEC can bring domestic economic growth by doing things as efficiently and effectively as possible. As Posner (1994) specifically stated that the international trade law is important to improve the social welfare and maximizing the state resources allocation.
in conducting international trade efficiently. If the winner's profit exceeds the loser's and the winner can compensate losses for the losers so that the losers remain better (Mercuro and Medumo, 1999, pp. 58-59).

Further, Posner (1994) defined efficiency as a condition in which resources are allocated so that the value is maximized. In economic analysis, efficiency in this case is focused on the ethical criteria in the framework of social decision making regarding the regulation of social welfare. This suggests that efficiency is related to increasing one's wealth without causing harm to others. In economics such laws is known as the idea of wealth maximization or "Kaldor-Hicks" conditions in which changes to the rule of law may increase efficiency if the winning party's profits outweigh losses of the losers and the winner can compensate losses for the losers so that the losers remain better. In this context, Posner sees one aspect of justice that includes not just distributive and corrective justice. Posner suppresses "Pareto improvement" in which the objectives of the rule of law can provide valuable input to justice and social welfare (Mercuro and Medumo, 1999, Pp. 58-59).

This paper aims at discussing three aspects. The first is to discuss the international trade laws that are relevant to be given attention toward the establishment of AEC. The second highlights policies that relate to the international trade. The third is to address the implication of AEC to economic growth in Indonesia. Note that, throughout this study, the data and information used to discuss the above aspects are based on literatures and other secondary sources including international trade laws and regulations, and international trade textbooks and journals relevant to the study. However, before detail discussion on the implication of AEC on the economic growth in Indonesia, the following section 2 discusses briefly definition and the nature of the international trade laws. Section 3 then deals with the economic policy instruments of international trade. Section 4 deals with the implication of AEC to international laws and economic growth in Indonesia. Finally, concluding remarks are drawn in section 5.

II. DEFINITION AND THE NATURE OF INTERNATIONAL TRADE LAWS

As mentioned at the outset that Posner's efficiency theory emphasized the importance of increasing one's wealth without causing harm to the other. The efficiency in this case is focused on the ethical criteria in the framework of social decision making concerning the regulation of the welfare of the community. This is known as the idea of wealth maximization.

However, in terms of the international trade law, the UN secretary defined it as the entire civil rules governing trade relations and encompassing various countries. In other words, the international trade laws is the body of rules governing commercial relationship of a private law nature involving different countries (see also, Sudargo Gautama, 1997: 24).

The above definition indicates that the term of international trade or trade between nations reflects to international trade activities that were formed in General Agreement on Tariff and Trade (GATT). This GATT is further organized in an international trade organization that is now better known as the World Trade Organization (WTO). However, there are many other definition on the international trade definition as follows.

Schmitthoff in Adolf (2014), for instance, defined the international trade law as the body of rules governing commercial relationship of a private law nature involving different nations. This definition suggests two things. The first is that international trade law is a set of rules governing commercial relationships of a civil
nature. The second is that the law consists of rules that regulates transactions between different countries. Islam in Adolf (2014) however defines broadly international trade law as a wide ranging, transnational, commercial exchange of goods and services between individual business persons, trading bodies and states.

Further, Sanson cited in Adolf (2014) divides international trade law into two main parts, namely, public international trade law and private international trade law. Whilst Booyse in Adolf (2014) suggests that the elements of the definition of international trade law consist of three elements. These three elements are international trade law can be regarded as a special branch of international law, international trade law as the rules of international law applicable to trade in goods, services and protection of intellectual property rights, and international trade law as the international regulations.

In terms of the detail of the sources of law, there six of law sources in forming international trade law. These are international Agreement consisting of multilateral, regional and bilateral agreements, international customary law, principles of general law, decisions of the Court and Doctrines, Contracts and National Law. The basic principles of international trade law consist of the basic principles of contracted freedom, the basic principles of Pakta Sunt Servanda, the basic principles of dispute settlement by Arbitration and the basic principles of communication freedom (navigation).

One of the most important legal sources in international trade is the General Agreement on Tariffs and Trade (GATT), which regulates inter-state trade and trade policies among employers, such as the arrangement of counterfeit goods or customs. GATT was formed in October 1947 with 4 (four) important objectives to be achieved GATT, namely, to improve the living standards of mankind, to increase employment opportunities, to increase the utilization of the world's natural wealth and to increase production and exchange of goods.

Since the establishment, GATT has sponsored various main / principal negotiations which are usually called round. The purpose of this round or negotiation is to accelerate the liberalization of international trade. At the end of the Uruguay round of 1994, there was an agreement reached to establish the World Trade Organization (WTO), which brought significant changes to GATT. These changes are that the WTO takes over the GATT and makes it one of the attachments of the WTO rules. Secondly, GATT principles become the regulatory framework for new areas of the WTO agreement, in particular the Agreement on Services (GATS), the Capital Investment agreements (TRIMs), as well as the agreements on trade Related to Intellectual Property Rights (TRIPS).

The legal principles of international trade set out in GATT-WTO, according to Muhammad Sood (2012: 41-48) include the non-discrimination principle consisting of the most favored nation (MFN) principle and the principle of national treatment (NT), the principle of Reciprocity, the prohibition of quantitative restriction Principle, the fairness principle and the binding tariff principle.

In case if there are cases associated with international trade, there are institutions handling the cases. These institutions are called as the International Arbitration Agencies. Some International Arbitration Board, among others, are the UNCITRAL Arbitration Rules, The London Court of Arbitration, the ICC Court of Arbitration, the Japanese JETRO Model Arbitration. In Indonesia, the Arbitration Board which takes part in the settlement of disputes in the field of international trade is the Indonesian National Arbitration Board (BANI). See Soedjono Dirdjosiswooro (2006: 105-108).
III. THE ECONOMIC POLICY INSTRUMENTS OF INTERNATIONAL TRADE

As mentioned at the outset, economic progress, including international trade, has recently improved enormously. However, before detailing the policy instruments of international trade, it is necessary to discuss the meaning of international agreement. The international agreements or often called treaties, conventions, pacts, declarations, charters, charters, etc are written agreements binding on more than two parties (the states) and these countries should be subject to the rule of international law. This international law may be defined as the whole of the rules and legal principles governing relations or issues that cross the boundaries of a non-civilian state. The similarity between International Law and International Civil Law is that both regulate the relations or problems that cross the boundaries of the state territory, whereas the difference lies in the nature of the laws governing and the subjects of law performing legal acts (Indien Winarti, 2017: 5).

The problems associated with legal issues in the trade International in principle is not much different from the legal issues faced by the parties in domestic business transactions. This is regulated in the international trade law as a guideline in international trade. In international trade practice, however, International Chamber of Commerce (INCOTERM) has determined INCOTERM 1990 as the guidance towards "sale-contract" abroad. This suggests that an international trading activity cannot be separated from all actions of government, either directly or indirectly. International trade policy has far-reaching implications not only in volume and composition of imports and exports, but also in investment patterns and development direction, competitive conditions, cost conditions, business attitudes, consumption patterns and so on. Therefore, international trade policy is very important in economic policy decisions of a country and this policy is only one part of macro-economic policies that should be combined and encouraging economic development of a country (Www.kemendag.go.id).

According to the Bank of Indonesia (2008), there are at least seven policy instruments in the area of international trade commonly used in various countries. These policy instruments are as follows. The first is the import tariff. This is a tax instrument imposed by the government on imported goods. Tariff adoption has been applied by many countries for centuries since the mercantilist era and has become one of the most common, simple and easy methods to collect government revenues. Until World War (PD) I tariff is deemed to protect against international trade and be subjected without discrimination. Protection or protectionism can be felt from any increase in tariffs imposed because tariffs raise the cost of imported products from abroad so that domestic companies that compete with imported products become protected. There are two types of import tariffs, namely the specific rates and the ad valorem rates. Although it is unlikely, the government can basically charge both types of rates for the same goods simultaneously. This is known as the imposition of two-part tariff.

The second is import quota. This is an instrument limiting the quantity of goods that can be imported within a certain time. Import restrictions (quotas) aim to limit imported goods, prevent essential goods in the hands of other countries, ensure the availability of domestic goods in sufficient proportion, and to control production and price controls to achieve price stability in the country. Gandolfo (1998) adds that the government usually issues import licenses / licenses related to the application of import quotas to directly regulate international trade.
The third is voluntary exports restraints (VER). This is a limiting instrument imposed by the government of the exporting country on the quantity of goods exported within a certain period of time. VER emerges as a reaction after importer countries, generally with large and strategic markets, seek to protect themselves from imports from certain export countries.

The fourth is export duties. This is a tax instrument imposed on exported goods. As with import tariffs, the export tax may be either a special tax or an ad valorem tax. In general, export taxes are imposed to protect consumers or producers of domestic users. For example, Indonesia imposes an export tax on cocoa exports to protect domestic producers.

The fifth is subsidy. This is a government policy to help cover part of production costs per unit of production, so that domestic producers can sell their goods cheaper and can compete with imported goods. Nowadays the imposition of export subsidies is done by developed countries for agricultural products, although this violates one of the WTO rules.

The sixth instrument is voluntary import expansion (VIE). This is an instrument of international trade policy arising from an agreement between two trading partner countries to increase the quantity of certain imports originating from one of these countries. This agreement is much motivated by the desire to better balance the flow of bilateral trade between the two countries. Finally, it is dumping. This is an international trade policy aims to hold price discrimination, that is, producers sell goods abroad cheaper than at home. The strength of domestic monopoly is cleaner than abroad and there is a strong enough obstacles as a requirement that must be met in dumping policy (www.kemendag.go.id/2014/01/06/kajian).

According to the law No. 7/1994, Indonesia has ratified the Agreement of World Trade Organization (WTO). This agreement was established in Marrakesh, Morocco in 1994, as a result of the Uruguay Round negotiation series which began in force in 1986, which contains approvals on textiles and apparel, provisions in the field of investment related to trade, pre-shipment inspection, provision of goods, import licensing procedures, security measures. In the international agreement, it was also approved the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) which is part of the WTO Agreement. As a member of the WTO, most countries including Indonesia are required to take steps to harmonize the National Intellectual Property Policy in accordance with the substance, norms and regulatory standards of the TRIPS Agreement. Thus, Indonesia has been the country that binds with the above WTO agreement.

IV. THE IMPLICATION OF AEC ON INTERNATIONAL LAW AND GROWTH

Towards the formation of AEC 2015, the government of Indonesia has issued Presidential Instruction (Inpres) No. 11/2011 on the implementation commitment of the AEC Blue Print. In this Blue Print the priority sectors were integrated by the government. Note that, there are 12 priority sectors that are integrated by the Government in the AEC blue print. These sectors consist of 7 sectors of goods, including agro industry, automotive, electronics, fisheries, rubber-based industries, wood-based industries and textiles, and the rest comes from five services sectors, namely air transportation, health, tourism, logistics and information technology. These sectors under the AEC will be implemented in the form of the flow of goods, services, investment and labor.

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The establishment of AEC, however, will also raise disputes between countries, countries with individuals, or countries with international organizations. When that happens, international law plays a crucial role in the settlement. The role of international law in dispute settlement is to provide ways in which the parties to the dispute settle disputes under international law.

The Permanent International Court of Justice in the Mavrommatis Palestine Consessious (Preliminary Objections) (1924) defines the dispute as disagreement on a point of law or fact, a conflict of legal views or interest between two persons. The International Court of Justice reveals its advisory opinion in the case of the Interpretation of Peace Treaties (1950, ICJ Rep.65) that to state whether or not an international dispute should be determined objectively (Indien Winarti, 2017: 71).

Arbitration is a widely dispersed way of dispute resolution. Today the role of arbitration institutions is increasingly important in resolving international commercial disputes. Greenberg in Adolf (2016) argues that "arbitration is the most popular dispute resolution mechanism in resolving international trade disputes. One of the International Arbitration Bodies, namely, the UNCITRAL Arbitration Rules. The main task of this body, in accordance with UN General Assembly Resolution 21202 (XX) of 20 December 1965, is to promote harmonization and unification progressively of the international trade law (Sudargo Gautama, 1997: 6).

In line with the world's progress and the implementation of the trade globalization program, it is necessary to create a harmonization and legal unification that supports world trade in order to run smoothly. To that end, the UN established a commission that has tasks to form and develop international trade law. This institution as has been mentioned previously as UNCITRAL. The UNCITRAL sees legal differences between countries as a major obstacle to solving existing problems. The UNCITRAL also creates international legal norms applicable to all countries. This rule is known as UNCITRAL ARBITRATION RULES (U.A.R) accepted on 28 April 1976 and this rule is recommended by the United Nations to be generally accepted in international trade.

The detail authority of UNCITRAL is as follows:

a. Coordinate with any organizations conducting activities in the field of international commercial law and seek cooperation among them;
b. Conduct promotion in order to create international Conventions more widely and may also be accepted as Model Laws and Uniform Laws that have been made by various international organizations;
c. Conduct preparations and promotions in order to be admitted to new International Conventions, Model Laws and Uniform Laws and to promote for codification and acceptance more extensively than international trade terms (international trade terms) Provisions, customs and practices in international trade in this field;
d. Conduct promotions to ensure uniform unity of international Conventions and Uniform Laws in the field of international commercial law;
e. Collect information on national legislation and modern developments in the field of law as well as jurisprudence on the field of international commercial law;
f. Organize and maintain close cooperation with UNCTAD (United Nations Conference on Trade and Development);
g. Maintaining links with other UN agencies and the specialized agencies of the United Nations relating to international trade law;
h. Take other actions that may be deemed useful in order to fulfill these duties.
In terms of the impacts of AEC on economic growth, there have not only been the positive, but it also negative ones. The positive impact of the AEC on the economy will be as follows. First, the community will more easily meet the needs of goods and services that are not available domestically at cheaper prices. Second, the Indonesian products can compete in the international market, thus allowing Indonesian entrepreneurs to create products that Quality that can be accepted by the world market. This will increase exports abroad, and will gain foreign exchange which is one source of state revenue. With the increase of state appropriation, the development can be done well.

Third is that the entrepreneurs will be more creative because of the tight competition. The micro, small and medium enterprises increasingly will improve the quality of domestic products and provide SNI label for the domestic products, so that the products in the country will be the host in their own country. Fourth, the workforce will increasingly improve the level of professionalism and skill ability or improve the quality of his skills. Fifth, there will be easy to access foreign capital investment, so that there will be rapid economic growth through technological development, job creation, development of human resources and easier access to world markets. Sixth, the AEC will also open the employment opportunity. For Indonesian workers, access to foreign countries in ASEAN member countries in order to find employment is increasingly easier in accordance with their skills, vice versa. Finally, the AEC can stabilize the country's economy in a better condition as the AEC is able to create free market. This condition will further encourage market expansion on the Indonesian goods and services. It also stimulates foreign investors to invest without any limitations of space in ASEAN member countries.

Apart from the above positive effects, there will also negative effects. These negative include as follows. First, there is intense competition between Indonesian local products and overseas products. Second, Strict competition between Indonesian local products and overseas products with more advanced and modern manufacturing processes and much higher quality will sell and dominate market share, which will undermine local producers if not accompanied by improved product quality. Third, foreign workers will be easier to enter Indonesia resulting in intense competition in the field of employment. This will be problems if the Indonesian workforce does not improve the quality of its expertise. Fourth, Indonesia's natural resources are very rich and extensive, so outsiders will be more free to exploit if not properly guarded. Fifth, due to the abundance of overseas products circulating in Indonesia at cheaper prices and the greater number of people who favor products imported from abroad, this will have an impact on the production of domestic goods that are less competitive, thus causing harm to the industry in country. Sixth, the unemployment rate will increase due to the increasing competitiveness of labor among countries. Seventh, changes attitude and lifestyle of the younger generation towards non-Indonesian products. Finally, it can increase foreign debt if our country's exports are smaller than imports. Thus, the AEC is not problems free for Indonesian social economy.

V. CONCLUDING REMARKS

The ASEAN Economic Community (MEA) is one form of an international economy that has a pattern to integrate the economies of countries in the ASEAN region by way of establishing a free trade system or Free Trade between ASEAN member countries. This certainly has a very big influence on the Indonesian economy. The influence of this AEC is partly s able to provide encouragement or accelerate to economic growth in the field of industries in Indonesia. The AEC will also able to develop the economic business activities so as to
accelerate the economic growth in the country. The formation of AEC will also increase demand and supply of a product in the ASEAN countries.

However, the detail of the effects of AEC on the Indonesian economy so far has not been studied. The fact is that currently the AEC has made a range of state-made products widely marketed to international markets through exports, including, train production of PT Industri Kereta Api (INKA) which is exported to Bangladesh, Singapore and Australia. Also, a heavy equipment and rail components by PT Barata (Persero) exported to Canada, Mexico, USA. Strategic Sealift Vessel (SSV) warships by PT PAL Indonesia (Persero) exported to Philippines, and PT Dirgantara Indonesia (Persero) in the form of NC212i propeller aircraft and as a supplier of components to the world's aircraft manufacturers, Airbus and Boeing and others.

The main task of UNCITRAL is to reduce the legal differences among member states that may be a hindrance to international trade. UNCITRAL holds annual meetings in New York or at the United Nations office in Wina alternately. Thus, much remain to be done by the government and the people to optimize the establishment of AEC for increasing the social welfare.

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Web Service Message Security in Applications Integration
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Abstract-In today’s e-business era, organizations are more focusing on Web Services for system integration. Transactions of Web Service are done mainly through plain-text XML formats like SOAP and WSDL, altering them is not a big task. XML Signature and XML Encryption is one way to secure XML documents up to certain level as well as retain the documents structure. Web Service message security cannot be taken as granted. When implementing a web service message security one should know the life cycle of web services and how it is implemented. Also, XML Encryption is described in detail followed by XML Signature. Web services provide us Integrity, privacy, confidentiality, authentication which makes up the building block for web service security. In this, Web services message attacks are discussed and how they can be minimized using different techniques. Web services message security is utmost important in any enterprise application integration and if they are not looked upon seriously then they can bring massive disappointment to the company and to their data as well. We have conducted a survey on Web Service Message Security and our target audience was those people who have some knowledge about Web Services and based on their results we presented our analysis.

Index Terms- Authentication; Authorization; Digital Signature; Integration; SOAP;WSDL;WS Security;XML Signatures; XML Encryption;

1. INTRODUCTION
Concept of web services is not new and since its advent in IT sector it has quickly become the backbone of the IT industry. Web services functionality is to give a response to request over a network and its interface is in a form of XML [1]. Web Service can be used by using SOAP, REST and JSON. Its popularity among the technology industry has led different organizations to amalgamate their software and services from different companies and location into one integrated service which can streamline important process. [2]. They are internet based enterprise applications that are based on XML related standards and communications. All the messages request and response are done using HTTP with XML serialization among other web related standards and all this is governed by SOAP protocol.

To implement the web service, it is necessary to know the life cycle of web service which includes; Definition phase, Service selection phase, Deployment phase and Execution phase[3]. There are many risks associated in XML communication and a valid XML document can still cause troubles like Dos-attack, Buffer overflow, Replay attack, Common injection flaws etc.[4] due to this web service security became an important part as it has become easy for hackers to breach the protocol, so to avoid that, necessary security measures have to be taken which introduces the two standards for XML security - XML signature and XML encryption[5] By doingXML encryption it ensures users authentication, integrity and confidentiality as there were numerous records which needed to be secure like medical records, bank statements and other classified information. XML signature are digital signatures which are obtained by applying digital operation to XML structure and they are not limited to signing XML resources only, they can also be used for signing JPEG file. Though XML signature and XML encryption are the standard which must be taken but there are many other techniques also which can counterfeit the attacks like using SSL protocol, Transport Layer Protocol (TLP) and many others.

Web services can work without a WSDL file but it will not be convenient enough, as it will be to use web services with WSDL. These days there are so many XML encryption algorithm available which has redefined the security mechanism for XML security and most of them fall under symmetric and asymmetric encryption algorithms. Advanced Encryption Algorithm (AES) which is a successor of DES, is a symmetric algorithm and it uses 256 bit key for encryption and its main issue is that they can't decrypt the message until all the parties exchange the keys for encryption. RSA which is an asymmetric algorithm uses two independent keys, one for encryption and the other for decryption. RSA is much slower than symmetric algorithm but it can be implemented to 4096 bit keys which is a more secured cryptographic hash function than symmetric algorithm but it will be expensive to run this encryption technology.

In this research, we are going to discuss web service message security and how to cater those security risks in
application integration which is going to be a questionnaire based, in which we are going to ask series of closed questions related to web service message security.

II. BACKGROUND

In early 90’s when a new technology of web service was introduced there was no concept of message securities[6]. The only security measure that was considered was the point-to-point transportation securities through transportation protocols like https that is using SSL for data or information transportation. At that time, it was required to have a SOAP-level or end-to-end security. The need of this web service message security is fulfilled by developing a protocol in 2006 by IBM, Microsoft and VeriSign named as Web Service Security (WS-Security).

The building blocks of Web service security include[5]

<table>
<thead>
<tr>
<th>Identification &amp; Authentication</th>
<th>Allow the access to known and verified requester only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorization</td>
<td>Allow only those users who have the permission.</td>
</tr>
<tr>
<td>Integrity</td>
<td>Do not allow to modify the data in unauthorized manner</td>
</tr>
<tr>
<td>Non-repudiation</td>
<td>Assurance that either sender or receiver cannot deny about information status.</td>
</tr>
<tr>
<td>Confidentiality</td>
<td>Saving agreed restrictions and access levels</td>
</tr>
<tr>
<td>Privacy</td>
<td>Confined access to subscribers</td>
</tr>
</tbody>
</table>

**TABLE 1 : WEB SERVICE SECURITY BUILDING BLOCKS**

The following table will summarize the web service security standards[5]

<table>
<thead>
<tr>
<th>XML Encryption</th>
<th>Process of encrypting the data and saving in XML (Confidentiality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XML Signature</td>
<td>Using the public and private key the sender and signing entities are verified (Integrity, Authenticity)</td>
</tr>
<tr>
<td>WS-Security</td>
<td>For SOAP security enhancements XML Signature and Encryption technologies are used.</td>
</tr>
<tr>
<td>Username Token</td>
<td>For basic authentication</td>
</tr>
<tr>
<td>X.509 Certificate</td>
<td>Public Key Infrastructure is used for verification purpose</td>
</tr>
<tr>
<td>WS-Policy</td>
<td>Policies or conditions may be applied by web service providers</td>
</tr>
<tr>
<td>WS-Addressing</td>
<td>XML Framework for standard specification of message</td>
</tr>
</tbody>
</table>

**TABLE 2 : WEB SERVICE SECURITY STANDARDS**

The basic XML Signature structure[7] is shown in Figure 1, which is as follows:

**FIGURE 1 : XML SIGNATURE STRUCTURE**

The basic XML Encryption structure[7] is shown in Figure 2, which is as follows:

**FIGURE 2 : XML ENCRYPTION STRUCTURE**

The above Web services securities defined are not enough as there are lot of new attacks registered shows the complexity of XML security have large potential vulnerabilities like XML Signature Wrapping[8].
III. LITERATURE OVERVIEW

Web services are used to provide a Web Application Programming Interface easier which has resulted many loop holes in their security. They come with few issues of their own which can be problematic to someone who doesn't handle them correctly and in the right manner. Web services provide information about all the requests which are offered to the interface by an incoming application and based on that information which is being provided, nature of attack is decided by the hacker to steal the information hidden in the web service message.

There are many attacks on XML messages that can possibly affect the building blocks of Web Services such as confidentiality, integrity and availability. The most common attacks per[4] and [1] are as follows:

**Denial of service** is commonly known as DOS-attack. This type of attack is an ancient type of attack in which a web server receives an overwhelming number of requests which causes the web server to be hanged up. Due to the overwhelming number of requests, the target doesn't know how to deal with them and the web server chokes. This type of attack is mostly intended attack but DOS-attack can also occur unintended. DOS attack also has a sibling which is known as DDOS (distributed denial of service) which is a same type of attack as DOS attack but in this attacker targets number of servers until they are choked.

**Replay attack** is like DOS attack but in this attack, attacker capture and copies the data and replays the same message to a web service. This is the most basic type of attack in which the user does not require to know the contents of the data, also this type of attack is easier to detect since the pattern of the message are repeating over again and again which makes this attack easier to detect.

**SQL Injection** is a type of attack; attacker inject SQL queries through input of web page which can alter and modify the contents of database. This type of attack is done to get access of the database where the data of the application resides[9]. Attackers can retrieve any important information which can harm the integrity of the database so preventing this type of attack is very important as it can harm your database and your application as well.

**Cross-site Scripting Flaw** attack is also known as XSS. This type of attack occurs when an attacker transport an infected code to a different end user using web service. Mostly these types of attacks are done through tags which includes `<script>`, `<body>`, `<img>`, `<input>` etc. where attacker can give reference of external JavaScript or can embed the code within those tags. A successful cross-site scripting attack can expose user's session token.

SOAP messages confidentiality and integrity are provided by XML encryption and signature standards are. XML signature includes two mandatory elements which are `<Signed Info>` and `<Signature Value>`. When an attacker who is listening the SOAP, messages moves the original SOAP body to SOAP header and attaches a new SOAP body and enforces the new service removing the original one. **Signature wrapping attack** per [1]:

```
<soap:Envelope>
  <soap:Header>
    <ds:Signature>
      <ds:SignedInfo>
        ...
      </ds:SignedInfo>
      <ds:Signature>
        <soap:Body wsu:Id="body">
          <deleteUser>
            <user>John</user>
          </deleteUser>
        </soap:Body>
      </ds:Signature>
    </ds:Signature>
  </soap:Header>
  <soap:Body>
    <soap:Body wsu:Id="attack">
      <setAdminRights>
        <user>John</user>
      </setAdminRights>
    </soap:Body>
  </soap:Body>
</soap:Envelope>
```

**FIGURE 3: SIGNATURE WRAPPING ATTACK**

To minimize the security risks to get struck by any of these threats many secure mechanisms has been developed to cater those risks. The two main standards for XML security are XML Signature and XML Encryption.

**XML Signature** are also known as XML Digital Signature (XDSIG). XML was jointly developed by the W3C and Internet Engineering Task Force (IETF) to optimize digital signature for XML documents, to ensure integrity of XML data [5]. Since XML signature supports other types of data as well so it is also known as "XML aware digital signature"[4]. Capturing of digital signature operation results for other XML data is also done by XML signature and it defines its schema as well. XML signature not only provides us to sign the whole document but it can also be used to sign the partial document and to have multiple signatures in a document which is an important feature in distributed environment. XML signature represents the encrypted data in the document not the primary data. There are three types of XML signatures per[5] which are: Enveloped Signature, Enveloping Signature and Detached Signature.

**Enveloped XML Signature** is the signature in which XML signature is present in the document and is the child element of the object in the document being signed. Enveloped
signature must make sure that their own content of signature element must remain aloof from the data digest and signature value calculations[7]. Basic structure of Enveloped XML Signature per [5]

![FIGURE 4: ENVELOPED XML SIGNATURE](image)

In **Enveloping XML Signature**, the data which is being signed is closed in the `<signature>` and `</signature>` tags. `<document>` and `</document>` tags are included in the XML Signature as the child element. Basic structure of Enveloping XML Signature per [5]

```xml
<document>
  ...
  <signature>
    ...
    Contains reference to the data being signed
  </signature>
  ...
</document>
```

**FIGURE 5: ENVELOPING XML SIGNATURE**

In **Detached XML Signature**, XML Signature is in separate document which is most likely to be non-xml format. Reference of Signed XML Document's location is given in the XML Signature as the child element. Basic structure of Enveloping XML Signature per [5]

```xml
<signature>
  ...
  Contains reference to the data being signed
  ...
</signature>
```

**FIGURE 6: DETACHED XML SIGNATURE**

The contents covered in the digital signatures must be identical on the signature application otherwise a digital signature gets invalid. However, this is not the case of digital signatures on XML document where minor alteration can affect the signed XML fragments if the contents are same to the XML Parser. White spaces which are included in the XML document are of no importance now as they are not being considered during XML Parser. By using XML Signatures, it can help in removing many security problems such as spoofing, falsification.

**XML Encryption** is a W3C recommendation. It is a mechanism to encrypt data and then to decrypt that encrypted data and eventually showing the results using syntax of XML. It can be used to hide sensitive information in an XML by using cryptographic algorithm. Like XML signature, XML encryption allows the encryption of specific parts of XML document rather than doing all the encryption of that document, it also supports multiple encryption of the data which is an important feature in business sector where different parties must cooperate on certain things[7]. XML encryption and signature both uses Key Info element which provides information regarding what key to use in validating a signature to a recipient or to decrypt the encrypted data. Ciphered data element contains the secret value and it also contains the data reference which needs to be ciphered as shown in Figure 2. To encrypt an XML document usually RSA or triple DES is used. XML encryption ensure that users data is authenticated, remains confidential and integrated but it is practically unimportant to encrypt the data if the same data is sent to a lot of people so for this purpose XML signature ensures the data integrity and user authentication among the group of people where the same data is shared [5].

To resolve Signature Wrapping Attack which is shown in Figure 3, per [1] schema should be hardened and then it should be used for validating the SOAP message. [1] Shows how to counter the **Signature Wrapping Attack** which is shown in Figure 7.

```xml
<x:sf:complexType name="Envelope">
  <xs:sequence>
    <xs:element ref="tns:Header" minOccurs="0" maxOccurs="1"/>
    <xs:element ref="tns:Body" minOccurs="0"/>
  </xs:sequence>
  <xs:schema namespace="#other" processContents="lax"/>
</xs:complexType>
```

**FIGURE 7: SOAP MESSAGE VALIDATION**

To counter SQL injections in web Service, per [10], different tools should be used to prevent and check SQL injections like WAVES which is a black box technique and it is very efficient in testing for SQL injection, it also can monitor the application using machine earning technique. SQLDOM can also be used which can protect the database.
from un-trusted authorization to databases. SQLDOM uses an API for all the systematic query building. Another tool, which can be used to prevent SQL injection is to use SQL Prevent, it uses an HTTP request interceptor and it modifies the original dataflow when it is deployed on web server making the application more secure and securing the database from infected SQL statements.

XML message security issues are not only limited to enterprise applications but they are also very much involved in cloud computing as well where many issues occur like malware attacks in which hackers inject their malicious codes into their cloud service and can remotely access their commands like Sony’s PlayStation was a victim of malicious code attack. Wrapping attacks also occurs in cloud.

To protect your Web Services in cloud, your cloud should be private where only limited users can access it. Also, other countermeasures should be taken like enhancing the cloud security policy which can reduce the risk of abuse in cloud. Data should be protected from insiders which can cause the main threat to web services message in cloud by using the tools which include user behavior profiling and decoy technology [11].

IV. SURVEY

A survey is circulated to analyze the Web Service Message Security in Applications Integration. Survey is circulated in software Houses and Financial institutions. Participants were selected among the categories; Software Engineers and IT Professionals and organization’s management.

Survey is circulated in such a way that a questionnaire is given to the participants with a short overview about the concerned terminologies. Appendix A is attached for the questionnaire.

FIGURE 8: WEB SERVICE SECURITY THREATS

As per our survey results from Figure 8, majority of them choses SQL Injection as the most common web service security threats they were aware of probably because this is the most common attack that happen in enterprise applications.

FIGURE 9: CRYPTOGRAPHIC STANDARDS

As per our survey results from Figure 9, majority of them choses RSA as the most common cryptographic standard used in their web service message integration followed by others.

FIGURE 10: XML SIGNATURES

As per our survey results from Figure 10, Enveloped signature was the most frequently used XML signature by everyone in their web service security where signature is a child element of the data.

FIGURE 11: TECHNOLOGIES FOR APPLICATION INTEGRATION

As per our survey results from Figure 11, web service was a clear winner when it comes to application integration.
because it provides easy access to the application and provides standards too. It was followed by RSS and adapters.

![Figure 12: Importance of Security in Web Services](image)

As per our survey results from Figure 12, everyone considers the importance of web security as a major part in their application integrations and they can’t compromise on it.

![Figure 13: Commonly Used Security Standards](image)

As per our survey results from Figure 13, XML Encryption and WS Security was the commonly used security standards in their application integration because XML encryption allows the encryption of specific parts in XML messages and you don’t have to provide encryption to whole XML which makes it the most favorable web service security standard.

![Figure 14: Security in Application Integration](image)

As per our survey results from Figure 14, majority of them choses both end to end and transport level security are important from application integration which is followed by the transport security.

V. ANALYSIS

The following results have been concluded based on responses of the questionnaire.

<table>
<thead>
<tr>
<th>Question</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Service Security Threat</td>
<td>Most of the threats are aware out of which SQL Injection is most known threat.</td>
</tr>
<tr>
<td>Cryptographic Standards</td>
<td>RSA is the most common standard in Pakistan</td>
</tr>
<tr>
<td>XML Signature</td>
<td>Enveloped XML Signature is widely used</td>
</tr>
<tr>
<td>Technologies for Application integration</td>
<td>Web Service Technology is the mostly used for application integration</td>
</tr>
<tr>
<td>Importance of security in Web Services</td>
<td>Security is a part and parcel of web services</td>
</tr>
<tr>
<td>Commonly used security Standards</td>
<td>XML Encryption, XML Signatures and WS Security are commonly used security standards</td>
</tr>
<tr>
<td>Security in Application integration</td>
<td>Both end to end and transport level security is in practice</td>
</tr>
</tbody>
</table>

VI. CONCLUSION & FUTURE WORK

From the above literature overview and questionnaire analysis we have come to the point that in Pakistan, web service is the most successful and frequently used technology for the data interchange among the enterprise applications. However, security concerns are there that are to be resolved using different techniques. A lot of new techniques are coming to cater these security concerns including XML Signatures and XML Encryptions. The awareness about these security concerns and their counter techniques is increasing making the web service more and more robust technology for enterprise application integration. Potential Future work will be to extend all the work which have been done currently in XML message security where it can support encryption in multiple files and it can also be able to define multiple receiver of that XML file which is encrypted. It can also be further improved in cloud computing as well where better security
policy and data management can be done for XML security like for countering XML signature wrapping attack FastXPath can be used which is a subset of XPath to resist all the attacks that are being injected into XML SOAP message

Bibliography


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VII. APPENDIX A

4/12/2017

Web Service Message Security in Application Integration

A short survey about the importance of web services securities and standards in software industry of Pakistan

*Required

1. Emailaddress*

2. What are the web service security threats you are aware of?

   Tick all that apply.

   - [ ] Denial of service
   - [ ] Replay Attack
   - [ ] SQL Injection
   - [ ] Cross site scripting flaw
   - [ ] Signature wrapping
   - [ ] Other:

3. What are the cryptographic standard used?

   Tick all that apply.

   - [ ] RSA
   - [ ] Triple DES
   - [ ] Other:
4. What are the XML signature most frequently used?

Tick all that apply.

☐ Enveloped Signature

☐ Enveloping Signature

☐ Detached Signature

☐ Other:

5. Which type of Organization you are working in

Mark only one oval.

☐ Software House

☐ Bank

☐ Research and Development

☐ Educational

☐ Service Provider

☐ Other:

6. What are the technologies you used for Application data exchange or Applications integration?

*Tick all that apply.

☐ Web Service

☐ RSS

☐ Adaptors

☐ Other:

7. Web Service for Enterprise Integration
8. Importance of security in web service

Mark only one oval.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Factors you are using in web service security

Tick all that apply.

- Authentication
- Authorization
- Integrity
- Confidentiality
- Privacy
- Other: ____________________________
10. Standards you are using for web service security

Tick all that apply.

- XML Encryption
- XML Signature
- WS Security
- Username Token
- X.509 Certificate
- WS Policy
- WS Addressing
- WS Trust
- WS Secure conversion
11. Most important factor/standard of WS security

Mark only one oval.

- Authentication
- Authorization
- Integrity
- Confidentiality
- Privacy
- XML Encryption
- XML Signature
- WS Security
- Username Token
- X.509 Certificate
- WS Policy
- WS Addressing
- WS Trust
- WS Secure conversion
12. Which type of security is more important in application integration *

*Mark only one oval.*

- Transport security like SSL
- Message Security like Digital Signatures
- Both

☐ Send me a copy of my responses.
MIGRATION AS NON TRADITIONAL SECURITY THREAT: A CASE STUDY OF SIKKIM

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Department of Peace and conflict Studies and Management
Sikkim University

ABSTRACT: Migration is a simple word with relatively extensive meaning. Migration is a process which had started since time immemorial and will continue till lives exist in this world. Migrations possess very real dilemmas for the regions, countries and states. Sikkim, a tiny Himalayan state in the north eastern region of India, is a place where no record of any violence has been recorded as such till date. But the indigenous people of Sikkim are likely to find some kind of human security threat in near future if not now. Sikkimese of/in Sikkim is recognized by the Sikkim Subject Certificate/Certificate of Identification given by the King of Sikkim then in 1961, provided with special privileges by the Government of India when became a part. Today, the SSC/COI holder is being outnumbered by the migrants from other parts of the country, while leaving the Sikkimese, minority in their own land.

KEY WORDS: Development, Demand, Identity, Influx, Local, Migration, Migrants, Threat

INTRODUCTION

The concept of security traditionally, has been interpreted as security of territory from external aggression, or as protection of national interests in foreign policy. In this process, the legitimate concerns of common people and their quest for individual security in their daily lives- protection from the threat of diseases, hunger, unemployment, crime, social conflict, political repression and environmental degradation were not given due consideration. In the post-Cold War period it is increasingly becoming clear that many conflicts and their causes are within nations rather than between nations. For most people, a sense of insecurity come not so much from the traditional security concerns such as military aggression of another nation, but from the concerns about their survival, self-preservation and well being. The Human Security concept evolved at a time of great international shifts, the disintegration of the Soviet Union ended the Cold War, but it gave way to the recognition of new threats and conflicts. The origins of the idea of “human security” can be related (if not traced back) to the growing dissatisfaction with the prevailing notion of development and security in the 1960s–1980s (Acharya, 2011). The United Nations Development Programme (UNDP) in its Human Development Report of 1994 first articulated this dimension of non-traditional security, which has come to be known as Human Security. The term ‘Human Security’ has been used in many different contexts to justify certain course of action. Human Security is a condition or state of being characterized by freedom from pervasive threats to people’s right, their safety or even their lives. It is an alternative way of seeing the world, taking people as its point of reference, rather than focusing exclusively on the security of territory or governments. There are many factors that led to Human security threat. The 1994 UN Human Development Report identified drug trafficking, migration, terrorism and Weapons of Mass Destruction (WMD) as major threats to human security. While talking about such threats ‘Migration’ is now considered one of the new security threats and Myron Weiner has treated population flows as an independent rather than dependent variables in his security analysis (Datta, 2004). Migration generally refers to the movement of people from one place of the world to another for the purpose of taking permanent or semi-permanent residence. Migration is the fact that has been going on since time immemorial, but in today’s world it tends to become a major problem in the way of development. Migrants have increasingly become a feature of the global economy as
globalization has opened up opportunities for an unprecedented movement of people, ideas and investments (Fink, 2007). The influx of the migrants and consequent undermining of the economic interest of the native population gradually change the demographic composition of the host region, eventually leading to political tensions. This kind of tensions manifest in different forms ranging from political agitations, violent struggle, militant activities and insurgencies. Insurgencies of various types have cited unchecked migration as the prime reason for their struggle against the established order.

SIKKIM AND THE HUMAN SECURITY THREAT

In case of Sikkim, it is a tiny hilly northeastern state of India with only 7,096 sq. kms of area. It is the 22nd state of India which came into existence with effect from 26th April, 1975. Sikkim was an independent state ruled by the Namgyal monarchy. But even though it was an independent state, before Sikkim became a unit of India in 1975, it was an Indian Protectorate. Under the Indo-Sikkim treaty of 1950, India had exclusive control over Sikkim’s defence, external affairs, and communications. The internal running of the country was left to the people themselves (Kazi, 2009). In 1975, a referendum was held which brought about an end to the absolute monarchy and the state ushered in a democratic government within the constitution of India.

First authentic information regarding Sikkim’s population composition is available in the census of 1891, which explains that the total population was 30,458 of which 5,762 were Lepchas, 4,894 Bhutias, 3,356 Limbus and 15,458 Nepalis. The Lepchas are believed to be the original inhabitants of Sikkim. Today indigenous people of Sikkim consist of the Lepcha, Bhutia (People who migrated from Kham province of Tibet), and Nepali (People who migrated from Nepal). But it is believed that Limbus who essentially are part of a Nepali community have inhabited west Sikkim since the time immemorial. The Limbus inhabited the western part of Sikkim which was contiguous to an ancient Limbu Kingdom, Limbuwan, in East Nepal (Subba, 1988).

The Sikkimese identity came into existence particularly after the Durbar recognized the earlier settlers as legal settlers who had been given the status of subjects of Sikkim which referred to as “Sikkimese” by Sikkim Subject Regulations, 1961. The Sikkim Ruling Durbar maintained a register of all such legal settlers who were recognized as Sikkim subjects. When Sikkim became the 22nd state of India, the Indian Constitution was extended to Sikkim and the Sikkim Citizenship Order 1975 was issued by the Indian Government. According to this order, every person who immediately before the 26th day of April, 1975 was a Sikkim subject under the Sikkim Subject Regulations, 1961 shall be deemed to have become a citizen of India on that day. Sikkim has been given a special status along with special provisions i.e Article 371-F.

There were numerous clashes in between the three groups in the past. But in spite of bit confusion and clashes in the past, they (Bhutia, Lepcha, Nepalis) together became the indigenous people of this part of India. Whatever may be the reasons for the growth and development of these three ethnic groups in Sikkim, the most important fact is that these three communities have lived together for a long time and have many things to share in common.

But when the British connection with Sikkim began in the early 19th century, it was during this time that some people from the places like Bengal, Bihar, Haryana, Rajasthan, UP and other places of India, who are generally referred to as ‘plainsmen’ began to migrate to Sikkim. They were essentially traders participating in the then famous trans-himalayan trade (Sarma, 1994).

The plainsmen are usually called ‘Madishey’ by the local people. The word Madishey has been derived from the word ‘Madesh’. The word ‘Madesh’ in Sikkim’s local Nepali language means plains. Thus ‘Madishey’ literally mean people who are originally from the plains. These people mainly consist of people who have migrated to Sikkim from the states of Bengal, Bihar, UP, Rajasthan etc. These people migrated to Sikkim as traders, teachers, office clerks, businessman, skilled labourers etc. But even if the person is a Bhutia, Lepcha or

1During the regime of Chogyal or the King
2Madishey is a local term used by the Sikkimese people to refer to plainsmen.
Nepali from the plains he/she is not considered/called as Madishey. So, Madishey is a typical term used by the Local people for mainland Indians.

Amongst all the madisheys, the Marwaris came initially for the wool business in the Indo-Tibetan trade. There were a few from Bengal serving as tutors to the royal family members. The trade and business was dominated by the Biharis and Marwaris. Bhutias used to be the only trading community before Marwaris came in Sikkim, but after those migrated people started migrating and engaging in trade activities, it had affected the Bhutia traders of Sikkim at that time. Plainsmen came almost together with the British basically for trade purpose. The Marwaris were mainly cloth merchants though earlier they were actively engaged in trade across border and Cardamom business. The Bengalis, who began coming here with the British administrators, remained as clerks, officers, administrators and teachers (Subba, 1988). Along with that educated unemployed began to enter into Sikkim and get the job within a week or a month. After the merger of Sikkim with India highly educated and professionally trained people started to enter into the state and started occupying some of the key positions in service sectors.

The Marwaris in particular have exploited the ignorant and illiterate people by resorting to various clandestine methods. Since there were groups of such Marwaris in every town or township in Sikkim from the very beginning of the 19th century, it is quite likely that the local people were subjected to the exploitative prowess of the seasoned traders from the plains of India. The plains traders, particularly the Marwaris, were holding advantageous position vis-à-vis the local people throughout the state. It was always the local people who were at the receiving end, not the other way around (Sarma, 1994).

In today’s scenario of the state, the number of outsiders in the state has increased enormously along with the plainsmen. By term “Outsider” in the context of Sikkim we mean those people living/working in Sikkim without the possession of “Sikkim Subject Certificate/Certificate of Identification”. Today we can see a wide range impact on the indigenous people of Sikkim due to migration of the outsider. The trade and business in Sikkim is almost completely dominated by them. The local people are lacking behind. If we look into the past in terms of business as a means of livelihood, Bhutias were the most affected, but now the same can be said about the other Sikkimese ethnic groups like Lepchas and Nepalis. If we look at today’s business scenario in Sikkim it is completely dominated by the migrated businessmen from the plains. Not only that, but if we look at other private sectors, more number of outsiders are involved and have been working efficiently as compared to the local people.

So, it has now become important to explore the primary reason behind the backwardness of the indigenous people of Sikkim as compared to the migrated people, especially in the field of business. Along with that it has turned out to be essential to analyze the probability of conflict that may occur in the future. Considering the likelihood of changes in the rights and privileges which is being enjoyed by the Sikkimese ethnic group so far, it has become imperative to consider the potential conflict between the indigenous people and the migrated population. Even though the Sikkimese people are not completely vocal about the ever increasing domination of the migrated business community in Sikkim, but we can foresee the rising tension among the ethnic groups and the migrated workers or the so called old settlers. There is always a hidden tensions or weirdness in relationship between the Sikkimese ethnic group and migrated people, to take an example the state have recently witnessed a kind of discontent in Sikkimese people ruptured because of the writ petition filed for Income Tax exemption by the Association of Old Settlers of Sikkim. Thus, the petition has led to the debate between insider and outsider. It is possible that it could lead to more radical turn in future. This type of debatable issues may give way to the rise in conflict between the two groups in some other matters as well. We can see and feel that outsiders are outnumbering the Sikkimese people which may lead to various problems. As local indigenous population is being outnumbered by the migrated ones we are bound to consider this fact seriously as these issues have already been faced by some other states of the country which in turn has resulted into several unprecedented conflicts.

In the present scenario Sikkim has emerged as one of the best place to visit in the world with organizations like Lonely Planet declaring Sikkim as the best place to visit in 2014. Sikkim
has been able to get to this level owing to its reputation of cleanliness, scenic as well as natural beauty and political stability. The state of Sikkim is not only a paradise for the tourists but it has also served as a destination where people have come and made a good living. Sikkim has been a peaceful state until now and the Sikkimese people peace loving who welcomed each and everyone with an open heart but now it is being felt that the outsiders have started dominating the indigenous Sikkimese.

THE MYTH AND THE REALITY

Analyzing Sikkim, being a small state lying in one corner of the country, it has no doubt developed a lot. It has been one of the most visited states of India. Owing to its natural beauty, peace and cleanliness, people love to visit Sikkim time and again. But at the same time people from other states of India finds the place apt for business. The outsiders in this sense eventually start dominating the private sectors in Sikkim. Gangtok, being the capital of the state, a huge number of business communities from outside are settled here. The findings show that both insider and outsider have their own respective perceptions. The local people feel that they are being deprived of economic opportunities and the importance of Sikkim Subject Certificate/COI is decreasing day by day while the outsiders are of the view that the local people lack the potential to grasp the lying opportunities. The outsiders do not find any kind of threat to the local from outsiders. While the indigenous people of Sikkim express that the actual Sikkimese are those who possess the Sikkim Subject Certificate/COI while particularly the Old Settlers of Sikkim deny it. They are of the view that even though they do not possess the COI but they are living here since last 100 years and have contributed a lot in the development of the state. So, the Old Settlers particularly feel that they should also get equal rights and privileges as do the other Sikkimese ethnic group. Despite the fact that they have contradicting views, there have been no severe incidents as such but whenever these incidents thus take place in the state, it would be a great disaster for the peaceful state of Sikkim. Among the insider and outsider there is no unanimity as who should be considered as the authentic Sikkimese in today’s context. Although there are several historical evidence and documentation to confirm oneself as the citizen of the state but all these might not hold much value if the central government decides to make some changes in the near future. As Sikkim is in the phase of transformation, the indigenous communities remain ever more confused and apprehensive about this gradual change, the change, which is unavoidable. As a part of my research it was found out that the local Sikkimese people consider mainly the Old Settlers and the Plainsmen/Madisheys as threat more than other Nepalis, Bhutias and Lepchas from neighboring Darjeeling and Kalimpong. It may also be due to the fact that historically Darjeeling district was a part of Sikkim and also due to the fact that many Nepalis, Bhutias and Lepchas of Sikkim have blood relatives in these regions. There are people from Darjeeling and Kalimpong in Sikkim who have been living here and doing their respective jobs, but they never fail to mention that they belong to their respective places and have not interest to be called as Sikkimese. But on the other hand while conducting surveys it was observed that Old Settlers prefer to call themselves as Sikkimese. Though it has been also found out that the Old Settlers denied to accept the Sikkim Subject Certificate/COI when Chogyal offered it because they said that they have their own ‘Desh’/country and they do not want to be subjects of Sikkim. When Sikkim became a part of India, Sikkim was given a status of Special Category State and was given many concessions. Likewise, various benefits were extended to Sikkim as per Article 371-F which guaranteed special rights and privileges to the subjects of Sikkim. These privileges are being enjoyed by the local people so far but with the recent demand of Old Settlers about the IT exemption and calling Nepalis as foreigners, it seemed the local people have started feeling insecure. The concern for non-traditional security threat has increased somehow in the mind of the people. The local people think that the outsiders are grasping every little opportunity that has to be theirs. The Government is also helpless as per the locals, because the outsiders are playing a greater role in forming the Government, thus Government is compelled to work for their benefit too and give less preference to locals. The locals think the Sikkimese citizenship is for the Sikkimese people and should not be abolished as it is the only hope which is giving some opportunities to local at least in the Government sector. It has been found out that the Old Settlers and other outsiders do
not think that they are threat to the local as such. They have a
notion that the local people themselves are incompetent and lazy.
In their opinion the locals need to be more skilled and try to
grasp the readily available opportunity and stop running after the
Government jobs. As per the outsiders the local people should
instead take migration of outsiders positively and are suggestive
that it is due them only the people of Sikkim are getting
opportunities outside. They prefer to call themselves Sikkimese
and everyone who have been staying here since many years
should be called Sikkimese or should be regarded as a local.
They are against the Sikkimese citizenship because they think it
is bringing discrimination amongst people.

While conducting surveys it has been found that the
main problem with the local indigenous people is their
impracticability. The local people think that the opportunities
that are supposed to acquire by the locals but at the same time
they find themselves incompetent in front of the outsiders. They
think that the outsiders are skilled but they do not seem to work
on making themselves the same. It is also true that while the
ancestors of outsiders/madisheys were into the same profession
on the other the ancestors of local Sikkimese people were
agriculturists. Thus, it made them difficult to be sure about that
profession. It has also been felt that the local Sikkimese people
tend to prefer Government jobs as it is more secure compared to
unparallel waters of commercial or business activities. Local
people are unconfident and unsure about themselves. Even
though the Sikkimese people are educated but they lack practical
knowledge.

CONCLUSION

Migration is a simple word with relatively extensive
meaning. It is something which has always been in this world
since the creation of humankind. Migration may not be regarded
as threat as long as it is not hampering the sentiments of the
locals. Migration is a necessity as local people themselves are
unable to fulfill the demands which are highly necessary for the
development of the state. It is acceptable to some extent to give
more preference to the local people in the opportunities available
but it cannot be done at the cost of quality work required. This is
one of the reasons why many of the government as well as
private sectors in Sikkim are compelled to hire outsiders to
remain competitive. The outsiders could be regarded as a threat,
if their demands similar to IT exemptions increase. If similar
demands are claimed by the new as well as old outsiders of
Sikkim there is a high possibility of conflict in Sikkim. With time
the outsiders may even demand special rights and privileges
similar to the ones enjoyed by the SSC/COI holders. In such a
situation the center government may extend the provisions to the
outsiders as well or may completely abolish these provisions.
The conflict scenario till now is hidden in the state but if the
system continues to remain the same then the problem will erupt
in future. As research have found out that there are many
weaknesses of Sikkimese people which gave way to the
migration into the state, thus it should be taken as a matter of
concern. The Sikkimese people are still backward and unskilled
as compared to the outsiders. The people should develop a
positive attitude on migration and thus should work on making
themselves more skilled, competitive and capable of replacing
the outsiders. The Government should also provide schemes and
professional training to make local people self reliable and
competitive. The people should also try to recognize their talents
and work on to it. If the local people become skilled and
competitive then they will be in a position to replace the
outsiders, the migration rate will automatically decrease. Number
of migrants increases where there are more opportunities
available. If Sikkimese are able to see or rather foresee such
opportunities they can make good progress in tackling the
unemployment issues in the state. This will also result in higher
level of competition; ultimately decreasing the dependency on
the outsiders. The subjects of Sikkim may not forever get the
special provisions such as the 371F or 26AAA. The
Sikkimesehave to accept that these provisions are here
temporarily. These special privileges extended to Sikkim will
one day come to an end. Hence, the Sikkimese subject should
always be prepared to compete at any level. The Sikkimese
subjects also have to accept the fact that Sikkim is no longer a
separate kingdom. It is now a part of a democratic Indian union.
This means that an Indian citizen from any part of the country is
in equal terms with the citizen of Sikkim as both are part of the
same constitution. These facts support the thought that one day
Sikkim will be treated as any other state in the country. The
Sikkimese society should understand that it’s a globalized world where people are moving across countries and continents. It can be said that the outsiders have also contributed a lot in the development of the state. There is no doubt about it. Though the locals may find the outsiders as threat for them but it should also be taken into account that internal migrants contribute cheap labour for manufacturing and services and in doing so contribute to national GDP. Thus, it would be wrong to say that migration is always a threat to Sikkimese people. The outsiders too should always respect the local people, their unique culture, tradition and religious values. Irrespective of how long the outsiders have been into the state and for whatever purpose, their success would not have been possible without the ever hospitable attitude of the Sikkimese people. Outsiders in Sikkim may argue that Sikkim is a part of India and outsiders being an Indian citizen should get the same rights in Sikkim as they get in rest of India. But outsiders in Sikkim should also consider that the merger of Sikkim, an independent Kingdom into Indian Union was accepted with pain by the Sikkimese Subjects as they lost their identity as subjects of an independent kingdom nonetheless they accepted it amicably. Sikkimese people co-operated with the Indian Union and have accepted themselves as Indians first and Sikkimese later. Thus in order to provide due respect to the sacrifice of their Independent Country and merger with India, Article 371F of the Indian constitution was inserted preserving the OLD LAWS (Sikkim Income Tax Manual 1948, Sikkim Companies Registration Act 1961 etc) and Sikkim Subjects were promised their identity. Sikkimese society is very small as compared to many other states of India. The population of Sikkim is not even equivalent to populations of small districts in West Bengal, UP, Bihar etc. As per the 2011 census the total population of Sikkim was mere 6,07,688 and when we talk about the Sikkim Subject or COI holders in Sikkim the numbers become even less. This population can easily be outnumbered by the migrants from other states of India where the population count is in crores or billions. This makes Sikkimese people even more important as they are in minority in India. There is always a threat that the entire Sikkimese can be dominated by the outsiders if no proper measures are taken. For the outsiders they may play a greater role in the development of the state of Sikkim but this cannot at a cost of hurting sentiments of the Sikkimese people. Overall Sikkimese society have accepted outsiders whether newly settled or old settlers as their prized guests but at no point in time Sikkimese society would want to give the keys of Sikkim to the outsiders, at no point in time they would want the guests to become the owners of their home.

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Intertrochanteric Fractures of Femur by Proximal Femoral Nailing and Dynamic HIP Screw

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I. INTRODUCTION

Intertrochanteric fractures are one of the most common injuries sustained predominantly in patients over fifty years. They are two to three times more common in osteoporotic women; trivial fall being the most common mode of injury. Earlier, for many, this fracture had high morbidity, resulting in death due to cardiac, pulmonary or renal complications. Approximately 20 to 30% of patients die within one year due to intertrochanteric fracture.

The goal of treatment of an intertrochanteric fracture is the restoration of the patient to his or her pre-injury status as early as possible. This led to internal fixation of these fractures to increase patient comfort, facilitate nursing care, decrease hospitalization and reduce complication of prolonged recumbency.

The type of implant used has an important influence on success of surgery and complications of fixation. Sliding devices like the dynamic hip screw have been extensively used for fixation. However, if the patient bears weight early, especially in comminuted fractures, these devices have high rate of failure due to penetration of head.

Intramedullary devices like the proximal femoral nail have been reported to have an advantage in such fractures as their placement is closer to the mechanical axis of the limb, thereby decrease the lever arm and bending moment on the implant. They can also be inserted faster, with less blood loss and allow early weight bearing with less resultant shortening on long term follow up.

The purpose of the present study is to evaluate the surgical management of intertrochanteric fractures of femur by proximal femoral nailing and dynamic hip screw technique and also whether it actually alters the eventual functional outcome of the patient.

II. AIM OF THE STUDY

To evaluate the surgical management of intertrochanteric fractures of the femur with the proximal femoral nail and dynamic hip screw device, with respect to:
- Fluoroscopic time
- Duration of surgery
- Blood loss
- Fracture union and
- Functional outcome.

III. MATERIALS AND METHODS

The study was conducted in the department of Orthopedics, Maharishi Markandeshwar Institute of Medical sciences and Research, Mullana (Ambala). 30 patients diagnosed with Intertrochanteric fractures of femur were considered for study.

IV. INCLUSION CRITERIA

All patients above 18 years of age with fresh intertrochanteric fractures who were able to walk prior to the fracture were included in the study.

V. EXCLUSION CRITERIA

Patients with pathological fractures.

Patients with active infections, unstable medical conditions.

An informed consent was taken from the selected patients after explaining the procedure, its outcomes, complications and the prolonged rehabilitation protocol to be followed subsequently. Patients were assessed as per attached proforma. Routine investigations were done. All life threatening injuries were evaluated. Pre-operative X-rays were taken in both AP & Lateral views to classify the fractures according to BOYD & GRIFFIN classification.

VI. FUNCTIONAL ASSESSMENT

The functional outcome was assessed based on the HARRIS HIP SCORE which includes three sections. The statistical data was carried out using Statistical package for social sciences (SPSS Inc., Chicago, IL). Mean and standard deviation is...
calculated for all quantitative variables for description and measures of dispersion.

VII. RESULTS AND ANALYSIS

PRE OPERATIVE VARIABLES

Table – 1 Age Distribution

<table>
<thead>
<tr>
<th>Age (Yrs)</th>
<th>Method of Fixation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DHS</td>
<td>PFN</td>
</tr>
<tr>
<td>21-40</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>41-60</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>61-80</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>81-100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Mean</td>
<td>59.66±14.64</td>
<td>59.13±14.47</td>
</tr>
</tbody>
</table>

The most common age group was in the range of 61-80, with a mean of 59.35 yrs.

Table – 2 Type of Fracture

<table>
<thead>
<tr>
<th>Type of Fracture</th>
<th>Method of Fixation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DHS</td>
<td>PFN</td>
</tr>
<tr>
<td>T1</td>
<td>1(6%)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>T2</td>
<td>7(46%)</td>
<td>9(60%)</td>
</tr>
<tr>
<td>T3</td>
<td>5(33%)</td>
<td>3(20%)</td>
</tr>
<tr>
<td>T4</td>
<td>2(13%)</td>
<td>3(20%)</td>
</tr>
<tr>
<td>T5</td>
<td>0(0%)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>T6</td>
<td>0(0%)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>Total</td>
<td>15(100%)</td>
<td>15(100%)</td>
</tr>
</tbody>
</table>

All fractures were classified as per Jensen and Michealsen’s41,57 modification of Evans classification.

VIII. DISCUSSION

The goal of the study was to compare the functional outcome of patients with intertrochanteric fractures treated by two different fixation devices, the extramedullary dynamic hip screw fixation and the intramedullary proximal femoral nail. Our study consists of 30 patients with intertrochanteric fractures out of which 15 was treated with DHS and 15 with PFN.

The age of the patient ranged from 27 to 80 years with an average of 59.35 years. In case of Dynamic hip Screw fixation it was 59.66 years and in cases of proximal femoral nailing it was 59.13 years.

In our study there were 24 males and 6 females showing male preponderance.

Dahl and colleagues65, in their study 65% of patients were females, explained by the fact that female are more prone for the osteoporosis after menopause.

Sex distribution in our study not correlates with that of other studies.

Commonest mode of injury is trivial fall which was noted in 17, RSA in 9 patients and history of fall from height in 4 patients.

Our series consisted of 17 stable and 13 unstable intertrochanteric fractures as classified according to Jensen and Michealsen’s modification of Evans classification. The distribution of stable and unstable fractures in both groups was similar. Out of the 17 stable fractures, 8 were in the DHS group and 9 in the PFN group. Out of the 13 unstable fractures, 7 were in the DHS group and 6 in the PFN group.

The preinjury walking ability was similar in both groups of patient with DHS or PFN. 66 percent of patients in the DHS group and 73 percent of the patient in the PFN group were walking without support prior to the injury. 30% of patients in the study had grade 2 walking ability prior to fall. This is explained in the fact that intertrochanteric fracture occurs in elderly patient.

The length of the incision in the DHS group ranged from 13cm to 17cm with a mean of 15.01 cm as compared to mean of only 9.98cm in the PFN group. The smaller incision in the PFN group meant that there was less intra operative blood loss. This was comparable to the study conducted by Baumgaertner et al.35.

The duration of surgery in the DHS group ranged from 90 minutes to 100 minutes with a mean of 94.15 minutes. The duration of surgery in the PFN group ranged from 70 minutes to 80 minutes with a mean of 74.20 minutes. The difference in the operative times in both groups was found to be highly significant and we attributed this difference to the smaller incisions in the PFN group. Baumgaertner et al.35 also found that the surgical times were 10 per cent higher in the DHS group in their series.

Saudan and colleagues40 found that there was no significant difference between the operative times in the two groups in their series.

The fluoroscopy time in the PFN group (average 76.66 sec) was significantly higher as compared to that of the DHS group (average 56.13 sec). This was similar to the series by Baumgaertner and associates35 who also found a significant difference in the fluoroscopic times in their series, with 10 per cent higher times for the PFN group. However in their study Saudan et al.40 found no difference between the fluoroscopy times in both the groups.

The DHS patients had significantly more blood loss intraoperative compared to PFN group. This is similar to the series by Baumgaertner and associates35 who also found a significant difference in the intra operative blood loss in their series, with 150ml higher for the DHS group.

Results of treatment of stable and unstable fracture have usually been reported together in the literature, and it is generally accepted that with increasing security of fracture pattern (stable to unstable), there is a higher risk of complication and poor outcome.
The occurrence of femoral shaft fractures does not seem to be a major problem with the PFN due to a narrower distal diameter as compared to other intramedullary nails. Also, rotational control is inherent in the nail design and is not dependent on multiple parts that are likely to increase the risk of mechanical failure. Due to the smaller diameter lag screws in these intramedullary nails, the proximal aspects of the nail do not need to be flared to prevent mechanical failure of the nail and hence requires less reaming of the proximal femur, thereby reducing the risk of iatrogenic proximal femoral fracture. This was similar to the findings of Saudan et al. in their study. Other studies have also reported femoral shaft fracture rates of 0.2-1 per cent. We did not encounter any intraoperative complication in this study.

The only complications we encountered in this series were malunion, screw back out and wound infection. There was no significant difference between the two groups with regards to time of fracture union as all fracture united at 12.06 weeks in case of DHS and 12.15 weeks in case of PFN.

3 patients (20 percent) in the DHS group had malunion whereas 1 patient (6%) in the PFN group had malunion. There was statistically significant difference between the two groups regarding malunion.

In our series 2 patients of the DHS group had wound infections as compared to single patient in the PFN group, which was not statistically significant. We attributed the higher number of wound infections in the DHS group to the longer incisions and was not statistically significant. We attributed the higher number of wound infections in the DHS group to the longer incisions and was not statistically significant.

In our study we found there was significant difference in the post-operative pain in the two groups. Even though 14 of DHS and 12 of the PFN patient had post-operative pain but 4 out of 14 patients in DHS had severe pain compared to none in PFN patients. It was noted that in PFN patient who had moderate pain had wound infection post operatively.

Saudan and colleagues also did not find any significant difference between the infection rates in the two groups in their series.

In this study the average limb length shortening of patient in DHS group was 1.22 cm as compared to 0.52 cm in PFN group which was significant. This could be due to sliding of the lag screw in the DHS group, allowing greater fracture impaction, as compared to the PFN78.

One patient (3.33 percent) in our study had a hip screw back out. This was seen in the DHS group involving an unstable intertrochanteric fracture. However these patients were relatively mobile and hence re-operation was not necessary. There was no implant cut out in the PFN group which was similar to the series by Menezes and co-workers (0.7 per cent).

In our study we found there was significant difference in the post-operative pain in the two groups. Even though 14 of DHS and 12 of the PFN patient had post-operative pain but 4 out of 14 patients in DHS had severe pain compared to none in PFN patients. It was noted that in PFN patient who had moderate pain had wound infection post operatively.

Saudan and colleagues also found that the amount of persistent pain was similar in both groups in their series.

IX. CONCLUSION

We conclude that in stable intertrochanteric fractures, both the PFN and DHS have similar outcomes. However, in unstable intertrochanteric fractures the PFN has significantly better outcomes in terms of earlier restoration of walking ability. In addition, as the PFN requires shorter operative time and a smaller incision, it has distinct advantages over DHS even in stable intertrochanteric fractures. Hence, in our opinion, PFN may be the better fixation device for most intertrochanteric fracture.

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Concept of Peace in Islam: A Study of Contributions of Maulana Wahiduddin Khan to Peaceful Coexistence

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Abstract

Peace has been a long cherished dream of humanity since times immemorial; but its relevance and scope in the modern world has increased manifolds. The term "peace" has innumerable connotations. The oldest understanding of peace is that synonymous to equilibrium and stability. Peace is the greatest concern of man; all religions attach much importance to it. But Islam’s concept of peace needs to be studied in more detail as, in the present times; violence is mostly spoken of with reference to Islam. The primary texts of Islam; the Holy Quran and the Hadith of Prophet (PBUH); are replete with instructions and exhortations for peace.

An escalation of violence in recent years and its attribution to Islam in the name of Jihad has drawn attention of religious scholars all over the world. Many western and Muslims scholars have taken to study of primary Islamic texts afresh, to make an analysis to sift facts from fiction and suggest remedies for this malaise.

Maulana Wahiduddin Khan (b. 1925) is a noted Islamic scholar, scholastic theologian, philosopher and peace activist. He has developed his own, in some ways unique, understanding of Islam and its place in the modern world. Having made significant contributions to the cause of Islam particularly in form of his scientific theology and response to modern challenges, he for the past few decades has focused his efforts on Spirituality, Peace and Dialogue with other communities. This paper, tries to analyze with scientific objectivity, his perspective of peace in Islam and the ways and means for achieving this goal. The paper concludes with the argument that taken in right perspective, the recommendations made by Maulana are both practicable and result oriented making it possible for Muslims to reap the dividends of peace with patience and wisdom.

Key words: Islam, jihad, Maulana, Peace, Religion

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Introduction

Islam is the youngest revealed religion of the word. It is in fact not a new religion, but a revised and enlarged edition of eternal Divine religion based on Unity of God (Tauheed), medium of Prophets (Risalah) and the concept of After-life (Akhirah). Islam shares these three fundamentals with the other living Abrahamic faiths i.e. Judaism and Christianity. This is explicit from the Quranic text itself as:

“The same religion has He established for you as that which He enjoined on Noah—that which We have sent by inspiration to thee—and that which We enjoined on Abraham, Moses, and Jesus.”

The relationship between religion and peace in general is quite controversial. Some scholars, such as Asghar Ali Engineer, argue that Islam as a religion is all peace and does not allow for violence. On a wider scale, Engineer generally rejects drawing any integral relationship between any religion, including Islam, and violence. Rather, he sees violence as a social phenomenon that takes place as a result of certain negative conditions in specific societies where religion may be manipulated as a result. What a religion teaches can, therefore, be different from how its followers hold it to be in practice, due to the influence of “self-justifying groups” such as religious or political institutions or cultural traits.

The very word Islam (from the Arabic silm) connotes peace. One of the attributes of Allah described in the Quran is ‘As salaam’, which means peace and security. In the Quran, divine guidance is likened to the path of peace.

According to Islam, paradise is the ideal human abode, and is thus called ‘home of peace’. It is also mentioned that people of paradise will greet each other with the word, ‘salaam’ (peace).

When the Messenger of God (PBUH) explained Islam’s potential to contribute to safety and peace in society, he specified one goal in his time as the following:

“A rider will travel from Sana’a (in Yemen) to Hadhramaut (a region in the southwest of the Arabian Peninsula) fearing none but God, and will not fear a wolf as regards his sheep.”
The root of the word Islam, *Silm*, refers to "making peace, being in a mutually peaceful environment, greetings, rescue, safety, being secure, finding peace, reaching salvation and well being or being far from danger, attaining goodness, comfort and favor, keeping away from troubles and disasters, submitting the self and obeying, respect, being far from wrong.

Though Islam promises the ideal world of peace only in the hereafter; the efforts for establishing order in the human world carries great reward in the next world irrespective of the outcome of these efforts in this world. The Islamic concept of peace encompasses whole range of human sphere may it be political, social, family or personal life. Peaces being the greatest concern of man, all religions attach much importance to it. But Islam’s concept of peace needs to be studied in more detail as, in the present times; violence is mostly spoken of with reference to Islam.

**Concept of Peace in Quran and Hadith**

There are many verses in the Qur’an that prefer peace to war and forgiveness to hatred. This is evidenced by the fact that only some 60 verses out of 6,666 verses in the Qur’an deal with the rules of war and armed jihad(0.6%), while the rest deal with faith and moral issues.

Islamic primary texts the Holy Quran and the *Hadith* of Prophet (PBUH) are replete with instructions and exhortations for peace. Let’s have a look at few *Ayahs* from the Quran:

“*Allah calls to the home of peace*”.7

“Do not by your oaths make Allah a hindrance to your being righteous and observing your duty to Him and making peace among mankind.”8

“Disturb not the peace of the earth after the fair ordering thereof by God”9

“Do no mischief on earth”10

“Killing one human being is akin to killing all of mankind”.11

Now let’s turn to precedence from the Sunnah of Holy Prophet of Islam (PBUH):

The prophet of Islam (PBUH) was a man of peace and reconciliation. He urged his companions to ask God for peace. For the prophet’s main task was the communication of divine message to the people and an atmosphere of peace and good will was essential to perform this duty.
“God grants to peace what he doesn’t grant to violence”\(^{12}\)

“A Muslim is one from whose tongue and hands people are safe.”\(^{13}\)

“Do good to those who harm you”\(^{14}\)

“One, who betrays, harms, or deceives a Muslim, is not of us.”\(^{15}\)

He describes the ideal Muslim as thus:

“A Muslim is one from whose hand and tongue people are safe. A believer is one from whom people know that their wealth and lives are safe.” \(^{16}\)

It becomes thus amply clear that Islam is primarily a religion of peace having nothing to do with violence. Or the violence prevalent in the contemporary world has no sanction from the Quran or the life of prophet of Islam.

**Jihad in Islam and War Ethics**

The word jihad is derived from the Arabic ‘Juhd’ which actually means to struggle, to strive, to exert oneself to the utmost to achieve one’s goal. Therefore, in the Islamic sense, Jihad means to struggle or strive in the way of God. \(^{17}\)

Al-Farabi (874-950), a renowned Muslim philosopher, maintained a clear distinction between “war” and “jihad” in his writings. War is only one form of jihad, which refers to military action. The true essence of jihad for al-Farabi is the internal struggle within one’s soul between the forces of reason, on the one hand, and one’s desires on the other, with the aim of the first to control or moderate the second so that virtue may prevail. \(^{18}\) More important is that the jihad for justice is grounded on the moral concept of responsibility to Allah.

Like other major religions of the world, Islam does have a place for this minor jihad or the armed struggle, but its scope and indications carry certain riders before embarking on such an important campaign. Granting permission for Jihad the Quran clearly indicates its purpose:

“Permission is granted to those who are fighting because they have been oppressed…those who have been expelled from their homes without any just cause…” \(^{19}\)
“And what is the matter with you that you do not fight in the way of God for [the sake of] the oppressed men, women, and children who pray: ‘Our Lord, take us out of this town whose people are oppressors, and appoint for us from Thee a guardian and give us from Thee a helper…’”

“If you encounter [the enemy], fight them until there is no more strife. If you achieve peace, then fight them until there is no more rivalry. This is why Allah has made you victorious over the children of those who were oppressors of the people, for the sake of Allah and of [the cause of] justice. Allah does not love the unjust.”

“Fight in the way of God those who are fighting against you; and do not exceed (the limits). Verily Allah does not love those who exceed (the limits).”

“Prepare against them (i.e., the enemy) with whatever force and trained horses you can in order to frighten thereby Allah’s enemy, your enemy, and others besides them who you do not know but Allah knows them.”

“We can infer from these verses that Islam allows armed struggle in certain situations with specific aims and proper discipline. E.g. Oppression (22:39, 4:75) & religious persecution (22:39-40); consolidation of military might to frighten the enemy; (8:60) and self defense. (2:190). A focused study of the minor wars in early phase of Islam reveals that almost each one of these falls under a specific category.

Further there are rules to be followed by armed men, even during jihad differentiating it from the indiscriminate use of violence. Islam teaches that Muslims should be strong in order to defend themselves, but that does not mean they have to become aggressive and unjust. Few points in these War Ethics are as:

Islam is the religion of peace. It, therefore enjoins peace. It enjoins peace even in war when the enemy is inclined to peace.

“If the enemy is inclined towards peace you should also incline towards peace and trust in God.”

The truth is that Islam in the full sense is a religion of peace. In no way it is a religion of war. In Islam peace is the rule and war is only a rare exception. Further any stray acts of aggression are not enough for Muslims to rush into war.
Some writers and speakers quote the Quranic verses out of context and try to blame Islam for promoting violence and terrorism. They take a “text” and use it outside its “context”. E.g. they quote only the highlighted part of a verse to malign Islam as a violent and tyrant religion:

“And fight in the way of God those who are fighting against you, and do not exceed the limits, surely God does not love those who exceed the limits. And kill them wherever you find them, and drive them out from whence they drove you out—persecution is severer than slaughter.”

The context clarifies that the Quranic verses 2:191 & 9:36, are allowing Muslims of Madina to defend themselves against the aggression of the unbelievers of Makkah. It surely does not say that Muslims should go around the world killing any infidel or the polytheists that they find. The context clearly gives the right of defense to the Muslim but, in no way, does it promote aggression.

Just because the term “Jihad” is misused by some Muslims for their political agenda, Muslims don’t have to abandon this noble concept of their faith. Many Muslims describe only the major (spiritual) jihad and shy away from the jihad in the sense of armed struggle for defense. As Muslims, we stand by our teachings and don’t need to apologize for it even if some misguided souls hijack the terms of faith for their own political ends.

It is quite clear that Islam is not talking about the jihad for the sake of aggression; rather it is allowing the Muslims to physically defend their lives, properties, and lands against any aggression, and also to fight for ending tyranny against the oppressed men, women and children. It may be of interest to many that like concept of just war, Jihad or Dharm yudh the United Nation's Charter does explicitly discuss legitimacy of resisting or fighting aggression.

**Maulana Wahiduddin on Peace**

Maulana Wahiduddin Khan (Born January 1, 1925) is a noted Indian Islamic scholar, scholastic theologian, philosopher and peace activist. Maulana Wahiduddin Khan has made it his mission to present Islamic teachings in the style and language of the post scientific era. Rediscovering Islam from its original sources, he has authored over 200 books on Islam including “Prophetic wisdom”, “Islam Rediscovered”, Islam and Peace, The Prophet of Peace etc. He has received many national and international awards in recognition of his contribution to world peace. Some
of the other awards presented to him are the Demiurgus Peace International Award, the Padam Bhushan, the Rajiv Gandhi National Sadbhavna Award, the National Integration Award, the Communal Harmony Award, the National Amity Award, the Dilli Gaurav Award, the Urdu Academy Award, and the National Citizen’s Award, presented by Mother Teresa. He has also been awarded the title of Ambassador of Peace by the International Federation for World Peace, Korea.

From his early years, he showed a voracious appetite for modern knowledge, spending entire days in the library. He remained associated with Maulana Maududi’s Jamat-i-Islami for about 15 years till 1962. Khan was particularly concerned with developing an understanding of Islam that would appeal to the modern mind while at the same time remaining firmly grounded in the original sources of Islam.  

Disillusioned with what he calls the ‘political oriented religion’ of the Jama’at, Maulana parted his ways with Jamaat-i-Islami and was now attracted to what he saw as the ‘God-oriented religion’ preached by another Islamic revivalist movement, the Tablighi Jamaat, but finding the environment not conducive for intellectual growth he started his own independent institution Islami Markaz in 1970. As a prolific writer he went on to present Islamic teachings in the style and language of the present day.

Subsequently, the organ of the Centre, Al-Risala – the monthly magazine – was launched in Urdu in 1976. This journal, consisting entirely of his own articles, has done much to make people understand the peaceful face of Islam.

**Centre for Peace and Spirituality International**

To spread spiritual wisdom based on peace to mankind across the globe, Maulana Wahiduddin Khan established CPS International, i.e. Centre for Peace and Spirituality in January 2001. As is apparent from its name, the organization aims to promote and reinforce the culture of peace through mind-based spirituality. The goal of CPS is to bring about an intellectual revolution in the individuals and reveal their true, positive personalities so that they become peaceful members of society. Maulana believes that when individuals such as these are collected in sufficient numbers, it results in a peaceful society. The sphere of action of CPS International is global.
Maulana, throughout his literary carrier has endeavored to present Islam before the modern world in the scientific and objective perspective. Educated youth all over the world have widely benefitted from his ideas and writings. Maulana is particularly concerned with developing an understanding of Islam that would appeal to the modern mind while at the same time remaining firmly grounded in the original sources of Islam. He recommends rediscovery of Islam from Holy Quran and Prophet’s Sunnah in the light of contemporary Scientific and technical knowledge. He firmly believes, argues and proves that Science and religion are compatible with each other and science, rather, helps in explaining many obscurities imbedded in interpretations by earlier scholars. Having made significant contributions to the cause of Islam in the modern world, particularly his scientific theology and response to modern challenges, he, for the past few decades has focused his efforts on spirituality, Aakhirat oriented life, & peace and dialogue with other communities.

While reinterpreting Islam Maulana has endeavored to re-fix the priorities in Islam, suggesting an Aakhirat Oriented Life for all Muslims and making Islamic Dawah as basic Prophetic mission for every Muslim. Since peaceful environment is a must for Islamic Dawah, Maulana argues that creating such an environment is primarily a responsibility of Muslims all over the world. Maulana propounds a scientific and ideological interpretation of Islam and recommends a concept of ‘Peaceful Jihad’ and need for interfaith dialogue, time and again referring to contemporary relevance of Hudaibiya pact. The Hudabiyah treaty is infact the bedrock on which Maulana builds the whole edifice of Peace.

Maulana’s Books on Peace

- The True Jihad
- Islam and Peace
- The ideology of Peace
- The Prophet of Peace: Teachings of the Prophet Muhammad
- Jihad, Peace & Inter-community Relations in Islam
- Islam Rediscovered
- A Manifesto of Peace
- Islam: Creator of the Modern Age
- Indian Muslims
Peace in Islam According to Maulana

Peace according to Maulana is the greatest good or *summum bonum* which is an end itself and at the same time contains all other goods and no negative results. Most people hold that freedom is the greatest good but that can’t be so described. The unchecked freedom leads to anarchy, with all its attendant problems. Peace brings normalcy. That is the best thing about it, for all developments and progress can take place only in a normal atmosphere. Maulana talking about his mission writes:

“I want to re-engineer the minds of those who think in terms of violence. They must realize that it is entirely possible to successfully achieve by peaceful means what they are unable to achieve by violent means.” 30

Peace for justice and violence for justice

The constitution of international labor organization affirms that,

“Universal and lasting peace can be established only if it is based on social justice”

But this assumption is unrealistic according to Maulana. Peace is not desirable for the sake of justice but for the sake of normalcy. Setting justice as a precondition for peace is unnatural according to Maulana. The correct approach he suggests is first of all to establish peace on a unilateral basis. The fact is that in this world one can have only a working justice but not the ideal justice. Working justice is possible in all situations whereas ideal justice is not. Maulana concludes that peace can be achieved by the acceptance of *status quo* or *qana’at* in Islamic terms. Through peace the opportunities open up and it is by availing these opportunities that justice can be achieved.

According to the law of nature peace can be attained only on a unilateral basis, without confrontation with others. One example of this peace strategy is *Hudaibya* treaty entered into by
prophet of Islam in 628ce. This entailed the prophet having to agree to all of the conditions laid down by his opponents. That has a universal and eternal relevance. 31

The peace can be attained only on a unilateral basis, without confrontation with others. But when we want to establish social justice and human rights, it becomes a bilateral issue because we have to fight other groups that we think are responsible for injustice and violation of human rights. Therefore peace for social justice is not a practicable formula. The only workable formula is peace for normalcy. Normalcy gives us the opportunity to achieve over goal through wise planning.

Maulana on peaceful Jihad

Maulana takes the term jihad in literal meaning of struggle for spreading the divine message to the remotest corner of the world. He argues that it is just possible to achieve this goal utilizing the modern advancements in the field of science and technology. According to Maulana when the modern developments in information and communication have turned the vast world into a global village, nothing should prevent Muslims from spreading the word of God which is obligatory on them being *khair ul ummah*, after the *khatm e nabuwwat*. Having lost their political empires they are still in a position to establish a *Dawah* empire in the modern world; argues Maulana. And there is a reason to believe that based on his vast knowledge, experience and analysis of contemporary world view, Maulana concludes that presently humanity is experiencing an ideological vacuum that can only be filled by Islam. The man made ideologies and –isms like materialism, Marxism, socialism and communism have all been rejected with the passage of time while it is only Islam that stands the test of history.

The Jihad in terms of war or war tactics forms one of the major obligatory duties on Muslim *ummah* with precedence in the early period of Islam and unequivocal predictions of its lasting value till the Day of Judgment. It also finds favor with traditional *Ulama* and political ideologues many of whom exploit it for political gains rather than upholding and propagating the word of Allah. Maulana points out a subtle distinction and clarifies that ultimate aim of Islam is to spread the word of God (*Izhar-i-Din*) and not as *Iqamat-i-Din* or establishment of political empire as being attempted unsuccessfully throughout the world for past many centuries.32
Whereas Maulana debates the place and relevance of armed struggle in present world full of opportunities for *Dawah* work; his opponents blame him for pacifist preaching and blunting the martial acumen of Muslim youth.

**Maulana on violence and terrorism in Islam**

According to Maulana, Muslims all over the world are said to be engaged in violence whether active or passive. Just thinking in extremist terms may be described as passive violence while adopting the gun culture may be described active violence. This phenomenon pertains to Muslim practices and has nothing to do with Islamic teachings. Jihad literally means ‘utmost struggle’. The true interpretation of this word is ‘a peaceful struggle for the dissemination of the message of God to mankind.’

But the problem has assumed enormous volume through its association with Islam, in the name of jihad. Those engaged in violent acts have adopted it as an ideology through sanction from some ideologues who justify it for establishment of divine rule. Today the armament industry is one of the most flourishing enterprises in the world. But this problem can’t be tackled through use of superior or more deadly weapons. In fact it needs a counter-ideology. They legitimize their actions through wrong interpretations of the religious scriptures. We have to delegitimize it by replacing it with right interpretation and giving them a peaceful alternative. No other strategy will work. 33

Modern terrorism in the name of Islam is based entirely on misinterpretation of Islamic texts. It can be eradicated only by a right interpretation of the text being universally publicized. Giving a correct picture of Islam is undoubtedly the greatest need in the contemporary world. It is better to have recourse to education than to guns if present day terrorism is to be countered. 34

Violence is absolutely not an option for Muslims, nor should struggle to achieve political gain be their goal. Muslims have only one choice before them that is to engage in peaceful *Dawah* work to gain God’s favor as promised in the Quran:

‘God will surely help him who helps his cause-God is indeed powerful and mighty.’ 35

Muslims should therefore stop dichotomous thinking in terms of *Darul Islam* and *Darul Harb* keeping in mind the possibility of a *Darul Dawah.*
There has always been a discrepancy between essence and manifestations of all religions and the symptom is probably not going to disappear in near future. Though the phenomenon is not unique to Islam, it, in recent times has been bracketed with Islam by world media, for some vested interests. Of course the misinterpretation of Islam and ignorance of the Muslim youth is another important factor. It calls for a clear distinction between principles of Islam and the practices of Muslims and judging the latter by former and not vice versa.

On the concept of peace, Tolerance and non violence in Islam, Maulana, Summarize his viewpoint as:

It is no exaggeration to say that Islam and violence are contradictory to each other. The concept of Islamic violence is so unfounded that prima facie it stands rejected. The fact that violence is not sustainable in the present world is sufficient indication that violence as a principle is quite alien to the scheme of things in Islam. Islam claims to be an eternal religion and as such, could not uphold any principle which could not stand up to the test of time. Any attempt to bracket violence with Islam amounts, therefore, to casting doubt upon the very eternity of the Islam. Islamic terrorism is a contradiction in terms, much like ‘pacifist’ activism. And the truth of the fact is that, all the teachings of Islam are based directly or indirectly on the principle of Peace.\(^\text{36}\)

**Islam and west**

According to a Sahih al-Bukhari the prophet of Islam (PBUH) once observed: God will strengthen this religion through the wicked as well as good.\(^\text{37}\)

If we could extricate ourselves from the rigid pattern of dichotomous thought, we would find that western civilization was neither friendly nor hostile to Islam, but rather-in the words of Hadith-a potential supporter of Islam.

It is undisputable fact that many political and economic policies of west are detrimental to the collective good of Muslims; but in reality this has nothing to do with any enmity towards Islam. According to Maulana the Hadith which mentions Dajjal appearing close to doomsday is doubtless correct but certainly it doesn’t apply to modern western civilization.
Another Hadith of the prophet predicts that close to the doomsday the message of Islam will enter every hut or mansion (Idkhal-i-kalima). This in fact has been made possible in the modern world, truly speaking only with the help of west.\textsuperscript{38}

The pre-conditions for Idkhal-i-kalnia include a system of global communication, complete religious freedom, unbounded resources, free enquiry into knowledge including religious, and all these factors are now a reality – thanks to the west. It has thus produced all the means and resources essential to the successful carrying out of Islamic Dawah, all over the world. Further it is west that scientifically unraveled the nature’s secrets, testifying to the veracity of the Quran:

“We will show them our signs in the universe, and in their own selves, until it becomes manifest to them that this is the truth”.\textsuperscript{39}

**Dawah the Contemporary Counterpart of Jihad**

Drawing on original sources of Islam, Maulana has devised a pacifist ideology of Islam for world peace. He believes that it can be achieved through individual reform by making man spiritually conscious of his status. Towards this end he established a CPS in 2001 at Delhi which undertakes various spiritual and missionary Dawah activities at international level. He denounces the political interpretation of Islam that has, according to him, defamed Islam and has proved futile, counterproductive and rather a mirage for beleaguered Muslims all over the world.\textsuperscript{40}

The modern world at present is having all material strength and facilities of life but lacking in the most essential one ‘an ideology for life’ that according to Maulana can be provided by Islam only. Thus need of the hour is making whole mankind aware of the Creation Plan of God; that is, the present world is temporary and a testing ground for man with a limited lifespan whereas the life in the hereafter would be everlasting. That will be an ideal world (Jannah) for those who complete the test of this life successfully but a failure to envisage beyond present with an ‘eat, drink and be merry’ attitude is sure to land him in an abode of perpetual suffering (The Hellfire).

It is our firm belief that Islam offers guidance at all times and in all situations. Therefore, it must certainly offer us clear guidance on the present state of affairs.

The first guiding principle can be drawn from the famous Hudaibyah treaty in the early phase of Islam. This meant a creating an atmosphere conducive to peaceful Dawah work. This peace
treaty changed the area of encounter between Islam and its rivals from battlefield to the Dawah field.41

The Power of Dawah: The Mongols, barbarous and bloody in the methods of warfare and invincible as they looked devastated the mighty Muslim empire at Baghdad in 1258 CE. But then, miraculously Dawah power of Islam emerged and the Mongols were conquered. They had all worldly powers but no ideology, which was provided by Islam through peaceful Dawah work at their domestic levels. Referring to this event P.K. Hitti the well known historian remarks, in his famous book, ‘The History of The Arabs’:

“The religion of the Muslims had conquered where their arms had failed”.42

Maulana Wahiduddin Khan recommends a Japanese model of development for Muslim nations. In 1945 America dethroned Japanese from its political pinnacle but they didn’t complain, protest or take to arms. Rather they shifted their focus to technology and soon with a little wise planning became world leaders in that field. The Muslims after a long spell of rule for over 100 years lost their political empire; which they are trying all over the world to regain through armed struggle, in the name of Islamic jihad. According to Maulana if they are not averse to modern education and plan wisely they have a fairly good chance of building a ‘Dawah empire’; as the contemporary world is looking for a viable ideology which only Islam can provide.

**Inter-religious dialogue**

One of the ironies of this era is that although the means of communication have greatly advanced, people still have difficulty in a meaningful communication and dialogue with other cultures and religions. There is a lot of misinformation and misunderstanding of the Islamic faith. It is essential that Muslims be judged in the light of Islamic ideals: Islam should not be judged in the light of what Muslims do in the name of Islam.43

Religious differences have always existed between people. That is why the history of dialogue is also as old as that of mankind. Drawing lessons from the life of Prophet of Islam (PBUH) we come across the events of *Hudaibyah* and the *Mithaq-i-Madinah* or the first written constitution of the world. This was the first religious conference involving Jews, Christians and Muslims; in
modern terms a triologue, to exchange views on religious issues. It had a divine sanction in the form two principles described in the holy Quran.

i) Finding a common ground

“Say O People of book, Let us come to a word common to us and you that we will worship none but God”

While referring to above Maulana infers that subjects of common interests are in abundance in modern secular fields for creation of peaceful and congenial atmosphere of mutual understanding and to engage others in dialogue. It also ensues from this that even if we have nothing in common with a group still we can live peacefully by lesson of tolerance vide infra.

ii) Pragmatism or religious tolerance

“To you your religion and to me mine”

**Some Lessons from prophets life**

It is a well known fact that the prophet of Islam (PBUH) was a supremely successful man in the entire human history. But he was not just a hero as Thomas Carlyle has called him. According to the Quran, he was a good example for all mankind. *Uswah Hassna.* He has shown us the way of achieving supreme success in this world. By studying the life of the prophet we can derive those principles which were followed by the prophet.

i) To begin from possible Aisha (RA) “whenever the Prophet (PBUH) had to choose between two options, he always opted for the easier choice.

ii) See advantage in disadvantage (with every hardship there is ease.

iii) To change the place of action as exemplified in Hijrah

iv) Make a friend out of foe (return good for evil) “you will see your direst enemy has become your closest friend.

v) Turn minus into plus. Seventy unbelievers taken prisoners after Badr were asked to teach 10 Muslim children each as a ransom for their release.

vi) Power of peace is stronger than power of violence. After conquest of Makkah no revenge was taken by the Prophet (PBUH).

vii) Not to be dichotomous thinker.
viii) Bring battle in one’s favorite field as exemplified in Hudaibya which changed meeting place from battlefield to dialogue
ix) Gradual not abrupt implementation of Shariah laws as was implemented in Madina after many years of Quranic ayah on Jannat and Jahanum
x) Be pragmatic in controversial matters. It is greatest wisdom to be content with pragmatic goals when the ideal goal is not achievable, e. g. omitting word prophet in Hudaibya.52

Conclusions

Islam is a monotheistic religion and according to the Quran all people are children of Adam. Satan is considered the enemy of humanity, causing enmity among all people. The series of prophets and messengers coming from God throughout the ages is to call the people again towards their innate identity of love and friendship. The good life according to Islam is in submitting to God and in worshiping Him as The Creator and The Master and to recognize the innate nature of man. The individual who will recognize his true nature on which every person is created will be able to live together in society with peace and affection to each other. In his Last Sermon, the Prophet Muhammad admonished believers:

- "Hurt no one so that no one may hurt you."
- “None of you [truly] believes until he wishes for his brother what he wishes for himself.”
- "The most righteous of men is the one who is glad that men should have what is pleasing to him, and who dislikes for them what is for him disagreeable."

In Quran (2:256), God said “Let there be no compulsion in religion: Truth stands out clear from Error...” There are many other verses in the Quran that deals with the nature of spreading God’s message. One of these is Verse 10:99 “If it had been thy Lord's Will, they would all have believed, all who are on earth! Wilt thou then compel mankind, against their will, to believe?” The peace spirituality and Dawah are the values that occupy a place very close to the heart of Maulana. These in fact form the very core of his religious philosophy. Peace according to Maulana is the essential law of nature encompassing the whole known universe and is imbedded in the very nature of man. According to Maulana education is the panacea of all ailments of
Ummah and he thus exhorts Muslims to reorient their energies from battle fields to education, science, technology, welfare activities and Islamic Dawah. Maulana writes:

“The need of the hour is, therefore, the adoption of Dawah work as our most important programme and the diversion of all our strength and resources towards this end.”

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Anticarcinogenic and Chemopreventive effect of *Andrographis Paniculata* extract in Swiss albino mice

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*Abstract-* An *Andrographis Paniculata* leaf and stem extract was studied against 7, 12 - dimethylbenz (a) anthracene (DMBA) induced papillomagenesis in Swiss albino mice and Hela cells by In Vitro methods. *Andrographis Paniculata* methanolic leaves and stem extracts were analyzed for anticarcinogenic activity. It was evaluated using a two stage protocol consisting of initiation with a single topical application of a carcinogen (7, 12 - dimethylbenz (a) anthracene (DMBA) followed by a promoter (croton oil) twice a week. Tumor incidence, tumor burden and papillomas numbers reduction were observed, along with an increase in the average latent period for in mice treated topically with *Andrographis Paniculata* extract compared to the control group treated with DMBA and croton oil alone. The prevention of bone marrow micronucleus formation by *Andrographis Paniculata* leaves and stem extract was also observed. The glutathione level was increased in the animals which received the treatment of Andrographis extract along with DMBA + Croton Oil. The revealing information about the anticancer and antimutagenic of an *Andrographis Paniculata* extract was observed.

*Key words:* Papilloma, DMBA, Micronucleus, Bone marrow, Glutathione, Hela cells
**Introduction:** Recently there has been a growing awareness that dietary non-nutrient compounds can have important Chemopreventive effects. Considerable work examining the cancer Chemopreventive effects of such compounds in animal models has been undertaken. A number of common medicinal plants have antioxidant properties and therefore may act as chemoprotector or radioprotectors. There is worldwide scientific interest in herbal based medicines to boost immune cells against cancer. By understanding the complex synergistic interaction of various constituents of anticancer herbs, herbal formulations can be designed to attack the cancerous cells without harming normal body cells. *Andrographis paniculata* is known as “Kalmegh”. It has been used for centuries in Asia to treat gastrointestinal (GI) tract and upper respiratory infections, fever, herpes, sore throat, and a variety of other chronic and infectious diseases. It appears in the *Indian Pharmacopoeia* and is prominent in at least 26 Ayurvedic formulas. Studies have confirmed that *Andrographis*, properly administered, has a broad range of pharmacological effects, some of them are beneficial. The stem and leaves of the plant, used medicinally, contains a large number of chemical constituents, including lactones, diterpenoids, diterpene glycosides, flavonoids, and flavonoid glycosides. Controlled clinical trials report suggest its safe and effective for use in reducing symptoms of uncomplicated upper respiratory tract infections. A hydroalcoholic extract of *Andrographis paniculata* possesses antioxidant activity against oxidative alterations in the myocardium and confer significant cardio protection by facilitating normal cardiac function. Compounds were isolated from chloroform and methanolic extract of *Andrographis paniculata* possesses cytotoxic activity against cancer cell lines Hep G2, HCT-116 with MTT assay. Antimicrobial activity against eleven bacterial strains by ethanol extract of the aerial part of *Andrographis paniculata* have been reported. A purified extract and andrographolide have been reported to decrease blood glucose, triglyceride, and LDL levels when compared to controls. No changes were observed in the serum cholesterol or body weight of rats. Metformin has also shown similar effects in these parameters. *Andrographis paniculata* Antiulcer activity was reported in cyst amine induced duodenal ulcer model in rats. *Andrographisp confiscata* antioxidant and hepatoprotective effect on acetaminophen (Paracetamol) induced hepatotoxicity in albino rats are also reported. An andrographolide was reported to induce apoptosis in TD-47 human breast cancer cell line in a time and concentration-dependent manner by increase expression of p53, bax, and caspase-3 and decrease expression of bcl-2 determined by immune histochemical analysis. *Andrographispaniculata*, dry leaf powder when fed orally to male albino rats, at a dose level of 20 mg per day for 60 days was reported to spermatogenesis cessation, cessation of degenerative changes in the seminiferous tubules, Leydig cells regression and regressive and/or degenerative changes in the epididymis, seminal vesicle, ventral prostate and coagulating gland. An intraperitoneal injection of an ethanol extract of the aerial parts (25 g/kg body weight) in to mice poisoned with cobra venom delayed respiratory failure and death. These data suggest that extracts of the aerial parts do not modify the activities of the nicotinic receptors but produce significant muscarinic activity, which accounts for its antivenom effects. Many of the conditions commonly treated with *Andrographispaniculata* in traditional medical systems are considered self-limiting, which requires purported benefit in cancer treatment.

**Materials and Methods:**

1. **Chemicals**

The croton oil, 7, 12 - Dimethylbenz (a) anthracene (DMBA), purchased from Sigma Chemicals Co. (St. Louis, MO. USA). Other chemicals were obtained from local firms and were of the highest purity. DMBA was dissolved in acetone at a concentration of 100μg /100μl. Croton oil was diluted in acetone to give a 1% dilution.

2. **Animals**

Random bred male Swiss albino mice (7- 8 weeks old), weighing 24 ± 2gm were used. These animals were housed in polypropylene cages at temperatures of 24 ± 3°C. animals and animals were provided with standard mice feed and tap water ad libitum.

3. **Preparation of *Andrographispaniculata* leaves and stem extract**
Plant material (Andrographis paniculata) was collected and the specimen was authenticated by the botanist of Deendayal Research Institute, Chitrakoot (MP), India. Leaves and stem was washed, air dried, powdered and extracted separately using 50% methanol in a separating funnel. Extract thus obtained were vacuum evaporated into powder. These extract was again dissolved in DDW immediately prior topical application.

2.4 Experimental design for Skin Carcinogenesis
The dorsal skin on the animal’s back was shaved 1 day before the experiment commenced. Only animals in the hair cycle resting phase were chosen. Two stage protocol initiated by a single topical application of a carcinogen (7, 12-dimethylbenz (a) anthracene (DMBA) and then followed by a promoter (croton oil) twice in a week were employed per Berenblum as standardized by Agrawal et al. used to induce tumors. Animals were randomly allocated into 7 groups of comprising six mice each. The treatment was provided topically to the shaved area.

2.4.1 Treatment Groups

Group 1 (Untreated control): No treatment
Group 2 (Vehicle control): Twice a week administration of 100 μl acetone up to 16 weeks
Group 3 (DMBA Alone): Single administration of 100 μg DMBA dissolved in 100 μl acetone.
Group 4 (Croton Oil Alone): Twice a week application to skin of 1% Croton oil up to 16 week.
Group 5 (Andrographispaniculata leaves extract Alone): Twice a week application to skin of 1% Croton oil up to 16 week.
Group 6 (DMBA + Croton Oil): Single application to skin of 104 μg DMBA in 100 μl acetone afterwards the 100 μl dose of Andrographispaniculata extract at the dose of 500 mg/kg b. wt. was given one hour before the each application of 1% croton oil twice a week up to 16 weeks.
Group 7 (DMBA + Andrographispaniculata leaves extract + Croton Oil): Single application to skin of 100 μg DMBA in 100 μl acetone afterwards the 100 μl dose of Andrographispaniculata extract at the dose of 500 mg/kg b. wt. was given one hour before the each application of 1% croton oil twice a week up to 16 weeks.
Group 8 (Andrographispaniculata stem extract Alone): Twice a week application to skin at the dose of 500 mg/kg b. wt up to 16 week.
Group 9 (DMBA + Andrographispaniculata stem extract + Croton Oil): Single application to skin of 104 μg DMBA in 100 μl acetone afterwards the 100 μl dose of Andrographispaniculata extract at the dose of 500 mg/kg b. wt. was given one hour before the each application of 1% croton oil twice a week up to 16 weeks.

All animals groups were observation for gross and microscopic skin changes weekly during the 16 weeks of experimentation period. All mice were weighed and examined for skin papillomas and results were recorded. The following parameters were considered

2. 4.2 Tumor study:
Body weight: Mean body weight changes were measured weekly.
Tumor incidence: The number of mice at least one tumor expressed as percent incidence.
Cumulative number of papillomas: Total number of tumors bearing mice.
Tumor yield: The average number of papillomas per mouse.
Tumor burden: The average number of tumors per tumor bearing mouse.
Average latent period: The lag between the application of the promoting agent and the appearance of 50% tumors was determined. The average latent period was calculated by multiplying the number of tumors appearing each week by the time in weeks after the application of the promoting agent and dividing the sum by total number of tumors

\[
\text{Average latent period} = \frac{\sum fx}{n}
\]
where f is the number of tumors appearing in each weeks, x is the numbers of weeks and n is the total number of tumors.

2.4.3 MTT Assay
The extract of whole plant and leaf of Andrographispaniculata on Hela cell line was determined by MTT assay as described earlier (Mosmann, 1983). For MTT assay, Hela cells were cultured and treated with different concentrations of extract (0-1000 μg/ml, 5 μl/100 μg of cell suspension)
for 24 hours. 2 hours prior to the termination of experiment, MTT was added to cell culture at 0.25 mg/ml (5 µl of 5 mg/ml in 100 µl of cell suspension) concentration. At the end of the experiment, culture supernatant was removed and cell layer was dissolved in DMSO and further read in a plate reader at 550 nm and 660 nm.

2.4.4 Micronucleus Assay:
For the micronucleus assay, the extract at the volume of 0.2 ml at different doses level such as 500, 1000 and 1500 mg/kg body weight was injected 24 hours before the treatment of Cyclophosphamide, to three animals. The positive control group received single ip.injection of 50 mg/kg Cyclophosphamide in 0.9% saline the animals were sacrificed by cervical dislocation and bone marrow cells were harvested. The slides were prepared essentially as described by Schmid (1975) and preston et al. and standardised by Agrawal et al. After staining with May-Gruenwald and Giemsa, a total 1000 cells were scored at the magnification of x1000 (100 x 10x) for each group. The data are expressed as the average number of micro nucleated cells/thousand polychromatid erythrocytes cells (PCE) cells/animals (±SE) for a group of six animals. The results were compared with the vehicle control group using Student’s ‘t’ test with significance determined at p<0.05.

3. RESULTS:
The study’s findings depicted in Tables I. Animals of Group- V (control) in which a single topical application of DMBA, followed by croton oil produced skin papillomas, which began appearing in 5th week. Papilloma incidence in DMBA/croton oil treated mice (carcinogen control) reached 100% by the end of the experiment (16 weeks).

The significant tumour prevention was observed in the Andrographispaniculata extract treated experimental groups (25 % and 0 % in group VI & VII) compared to the carcinogen control (100 %) group. Papillomas cumulative number was also reduced in the Andrographispaniculata leaves and stem extract treated with DMBA + Croton Oil groups ( 5 and 0 in group VI & VII) compared to carcinogen control group. Tumor burdens and tumor yields were also decreased (0.5) compared to DMBA + Croton Oil treated 1 (3.5) group.

The induction of glutathione was also measured in the groups which was studied in papillioma models. Table 2 shows the induction of Glutathione levels in DMBA + Croton oil + AP extract leaves and stem extract treated groups as compared to DMBA + Croton Oil treated groups. The induction of glutathione level was significant in liver. The anticarcinogenicity/ cytotoxicity of the plant was also studied using Hela Cell lines in Vitro models. Graph 1 & 2 shows that whole plant extract of Andrographispaniculata had cytotoxic activity from lower concentration 10 µg/ml after 24 hour. However, leaf extract of Andrographispaniculata had cytotoxic activity from lower concentration 250 µg/ml after 24 hour.
In the micronucleus assay CP has been used as a clastogen and anticlastogenic effect of *A. panniculata* (AP) has been observed in mice bone marrow cells (Table 3 & 4). A significant reduced number of micronuclei were found in AP along with CP as compared the CP alone. The result of Micronucleus assay showed that single application of *A. panniculata* Hydromethanolic leaves extract (i.p.) at the dose of 500 mg/kg, 1000 mg/kg and 1500 mg/kg body weight, 24 hours prior to the single i.p. administration of Cyclophosphamide (50 mg/kg) showed the reduction of micronucleus formation in PCE cell of bone marrow. The significant reduction of micronucleus formations was observed in all the dose of in micronucleus formation in AP leaves extract treated group in bone marrow cells of mice when compared to Cyclophosphamide whereas the protection was observed in AP stem extract treated group but these were not significant as compared to positive control group. The PCE/NCE ratio was comparable in all treated group as compared to CP which showed no toxicity of the extract in bone marrow cells of mice. While CP dose of 50mg/kg body wt. caused bone marrow toxicity as evidenced by a decrease in the proportion of PCE/NCE ratio.

### 4. DISCUSSION

Chemoprevention is currently an important strategy for controlling of cancer induction. There is a need to explore medicinal plants or other natural agents that may be work as chemopreventive agents. The current study demonstrates anticarcinogenic potential for andrographispaniculata extract for DMBA-induced skin tumorigensis in male Swiss albino mice and Hela cells in Vitro models. The antimutagenic activity of AP extract was also observed in bone marrow micronucleus assay in Swiss mice. Skin carcinogenesis model in experimental animals has been found to be a useful when for investigating the chemopreventors influences both mechanistically and operationally [17]. The present study demonstrates that a topical application of andrographispaniculata leaves and stem extract (500 mg/kg body weight) at the pre promotion phase shows a significant reduction in tumor incidence, tumor burden, tumor weight, tumor size, and cumulative number of papillomas in andrographis treated groups relative to the carcinogen treated control. In our previous study the anticarcinogenic activity of androgrphispaniculata leaves has been reported [18]. The methanolic extract of leaves of AP was more effective than stem extract in both Papilloma and micronucleus assay. Evidence has accumulated suggesting that this may be due to a reactive oxygen species which play an important role in tumor initiation/promotion by enhancing or facilitating the metabolic activation and/or initiating effects of carcinogens [22]. The plant extract may have inhibited the DMBA metabolism to its active form, delayed the carcinogenesis promotion phase or down regulated reactive oxygen species formation [19-21]. There are few reports on the cytotoxic and antiproliferative effects of Andrographis.paniculata up on in vitro cell lines [8, 13, 14]. It also increased expression of p53, bax and caspase-3 and decreased bcl-2 expression as shown by immunohistochemical analysis was observed [8]. The present study suggests the anticarcinogenic and antimutagenic activity of Andrographis panniculata which is an important drug in traditional medicine and may be used to treat cancer..

### Acknowledgements:

The authors are thanking to the M.P.Council of Science and Technology, Bhopal for its financial assistance.

### REFERENCES


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**Graph 1**: Effect of leaf extract of *Andrographis Paniculata* on HeLa cell line for 24h by MTT Assay

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Graph 2: Effect of whole plant extract of Andrographis Paniculata on HeLa cell line for 24h by MTT Assay

Table 2. Showing the level of Glutathione (GSH) in Blood and Liver of Papilloma bearing Swiss albino mice receiving treatment of A. paniculata extract.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Groups</th>
<th>Treatment</th>
<th>Glutathione level</th>
<th>Blood (µg/ml)</th>
<th>Liver (µg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>Normal mice</td>
<td></td>
<td>4.58±.0.65</td>
<td>53.8±.8.34</td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>Carcinogen control (DMBA+CO)</td>
<td>2.7±0.06</td>
<td>14.95±9.75</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>III</td>
<td>DMBA+A.pan +CO</td>
<td>2.12±0.42</td>
<td>46.33±28.36</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>IV</td>
<td>(Leaves) DMBA+A.pan +CO</td>
<td>3.07±2.07</td>
<td>30.54±14.62</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 Effect of A. paniculata leaves extract on Micronucleus (MN) formation induced by Cyclophosphamide (CP) in bone marrow cells of Swiss albino mice.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Groups</th>
<th>Treatment Doses (mg/kg body wt)</th>
<th>MNPCE ± SEM</th>
<th>PCE/NCE Ratio ±SEM</th>
<th>% reduction in the frequency of CP induced DNA damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>Cyclophosphamide Alone (50mg/kg b.wt)</td>
<td>3.5±1.1</td>
<td>0.99±0.08</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>III</td>
<td>A. paniculata (500mg/kg b.wt)</td>
<td>2.2±1.3</td>
<td>0.61±0.14</td>
<td>37.2%</td>
</tr>
</tbody>
</table>
Table 4  Effect of *A. paniculata* stem extract on Micronucleus (MN) formation induced by Cyclophosphamide (CP) in bone marrow cells of *Swiss albino* mice.

<table>
<thead>
<tr>
<th>No.</th>
<th>Groups</th>
<th>Treatment Doses (mg/kg body wt)</th>
<th>MNPCE ± SEM</th>
<th>PCE/NCE Ratio ±SEM</th>
<th>% reduction in the frequency of CP induced DNA damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I</td>
<td>Cyclophosphamide Alone (50mg/kg b.wt)</td>
<td>3.5±1.1</td>
<td>0.99±0.08</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>III</td>
<td><em>A. paniculata</em>(500mg/kg b.wt) + CP (50mg/kg b.wt)</td>
<td>2.5±1.22</td>
<td>0.62±0.20</td>
<td>28 %</td>
</tr>
<tr>
<td>3.</td>
<td>IV</td>
<td><em>A. paniculata</em>(1000mg/kg b.wt) + CP (50mg/kg b.wt)</td>
<td>2.6±0.89</td>
<td>0.587±0.12</td>
<td>25 %</td>
</tr>
<tr>
<td>4.</td>
<td>V</td>
<td><em>A. paniculata</em>(1500mg/kg b.wt) + CP (50mg/kg b.wt)</td>
<td>2.6±1.14</td>
<td>0.68±0.12</td>
<td>25 %</td>
</tr>
<tr>
<td>5.</td>
<td>II</td>
<td><em>A. paniculata</em>alone (1500mg/kg b.wt)</td>
<td>0.82 ±0.66</td>
<td>0.53 ±0.054</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>VI</td>
<td>Vehicle alone (DDW)</td>
<td>0.16±0.16</td>
<td>0.44±0.08</td>
<td>-</td>
</tr>
</tbody>
</table>

**PCE** – Polychromatic erythrocytes  
**NCE** – Normochromatic erythrocytes  
**MNPCE** – Micronucleated Polychromatic erythrocytes
Table 1. Showing Cumulative No. of Papilloma in the animals treated with *Andrographis paniculata* extract

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Dose</th>
<th>Time of 1&lt;sup&gt;st&lt;/sup&gt; appearance of Papilloma</th>
<th>Cumulative No. of Papilloma</th>
<th>Tumour yield</th>
<th>Tumour incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Vehicle alone</td>
<td>100μl/animal</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>II</td>
<td>DMBA alone</td>
<td>100μg/animal</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>III</td>
<td>Croton Oil alone</td>
<td>1% per animal</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>IV</td>
<td>Andrographis Extract alone</td>
<td>mg/kg per animal</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>V</td>
<td>DMBA + CO (Control)</td>
<td>100μg + 1% per animal</td>
<td>58&lt;sup&gt;th&lt;/sup&gt; Day</td>
<td>21</td>
<td>21/6 (3.5)</td>
<td>6/6 (100%)</td>
</tr>
<tr>
<td>VI</td>
<td>DMBA + Andrographis (Leaves) Extract + CO</td>
<td>100μg + 1% + 500mg/animal</td>
<td>–</td>
<td>0</td>
<td>0/3</td>
<td>0/6</td>
</tr>
<tr>
<td>VII</td>
<td>DMBA + Andrographis (Stem) Extract + CO</td>
<td>100μg + 1% + 500mg/animal</td>
<td>61&lt;sup&gt;st&lt;/sup&gt; Day</td>
<td>5</td>
<td>5/4 (1/4)</td>
<td>1/4 (25%)</td>
</tr>
</tbody>
</table>
RURAL OUT MIGRATION AT THE HOUSEHOLD LEVEL

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Department of Statistics, Udaipur Pratap Autonomous College, Varanasi, Uttar Pradesh, India

ABSTRACT:
Migration, conventionally, being an important part of demography, is least studied as compared to fertility and mortality. Due to decreasing birth and death rate, migration (internal or international) has become a more important concern for demographers and other social scientists. Since probability models provide concise and clear representations of extensive data sets in a better way (Aryal, 2010), in recent years increased attention has been paid to the proposition and derivation of probability models for the movement of human population at micro level. The aim of the paper is to study the pattern of rural out migration with the help of a probability model. The data for the study have taken from two different places. The study shows that the logarithmic series distribution is a well approximation for the rural out migration in the given area.

Key-Words: Rural out migration, logarithmic series distribution, maximum likelihood estimation.

INTRODUCTION:
Migration, conventionally, being an important part of demography, is least studied as compared to fertility and mortality. Due to decreasing birth and death rate, migration (internal or international) has become a more important concern for demographers and other social scientists. Most of the studies in past (Greenwood 1971; Isbell 1944; Lee 1966; Singh et al., 2012; Singh 1986; Stouffer 1940, 1960 and Ziff 1946), depending upon the conceptualization of migration process and the scale of investigations, used macro approach by operating on highly aggregate data for countries, districts, states and the nation as a whole. These types of studies are unable to provide sufficient explanation for the tremendous regional and local heterogeneity. They also ignore the decision making process of migrating individuals (Singh and Yadava 1981). Thus a study of environment in which migration takes place and the migration decision process at the micro-level is more important. Studies of migration at the micro-level i.e. at the levels of individuals, families or households have important implications for housing policies and also for the development of other sociological models related to families and communities (Pryor, 1975; Rossi, 1955).

It is seen that a migrant household (with one or more persons involved in the process of migration in relation to do some job outside the village) may have different socio-economic and cultural characteristics through remittances besides ideas, awareness and environments than a non-migrant household. It is worth mentioning here that rural-urban migration in India is of chain type at least in the beginning of the migration process before finally they settled in the urban areas or returned back to the villages.

A useful way of addressing the diversity of migration system is to treat the major contemporary cases in a general comparative framework (Simmons & Piche, 2002). There is need to put more emphasis on using models to analyse and explain important demographic issues and to predict demographic futures (Singh et al., 2016). One of the important property of micro level models is that a researcher can introduce individual heterogeneity-measured (accounting different rates for individual with different characteristics such as age, sex, social class, cohort, etc.) and unmeasured (choosing for each individual an adjusting factor each being the transition rate).
Many Studies have been done to apply and/or formulate probability models in natural as well as social sciences (Afsar, 1995; Aryal, 2003; Wintle, 1992). Since probability models provide concise and clear representations of extensive data sets in a better way, in recent years increased attention has been paid to the proposition and derivation of probability models for the movement of human population at micro level (Yadava, 1977). Singh and Yadava (1981) have introduced the negative binomial distribution to study the pattern of rural-out migration at household level. Sharma (1984) applied this model on a different data set and found that this model is not suitable for the total number of migrants (including females and children) from a household. Since migrated females are more likely to affect the socio-cultural characteristics of households in comparison to other females of household, it is important to study the pattern of total number of migrants from a household.

Sharma (1984) proposed a probability model under the assumption that (i) the number of male migrants aged 15 years and above follows negative binomial distribution and (ii) the distribution of alive children to a couple be known. However, the distribution of alive children to a couple has not yet been derived theoretically; the prior knowledge about these two distributions is difficult.

Singh (1985) proposed a probability model under the assumption that there are two types of households – first in which only male aged 15 years and above migrate and second – in which the male migrate with their wives and children. Several authors have proposed models in the same line to describe the distribution of household according to the total number of migrants including wife and children (Singh et. al., 2014, 2015; Yadava and Yadava, 1988; Yadava et. al., 1989, 1991).

The aim of the paper is to study trends in rural-out migration at the household level through some probabilistic models and also to do some modification in the exiting estimation procedure.

**DATA:**

The above discussed model is verified by the data set collected in a primary survey entitled “Migration and its Impact in Rural Varanasi” has been conducted during September -October 2015 in four villages of two blocks of Varanasi District by the Department of Statistics, U. P. Autonomous College, Varanasi. Apart from this the data set collected during October 2009 to June 2010 in Northeastern Bihar.

**A PROBABILITY MODELS FOR RURAL OUT MIGRANTS**

A probability model for describing the variation in the number of rural out-migrant households has been derived on the basis of following assumptions:

(i) At the survey point, the household is either exposed to the risk of migration or it is not exposed to the migration risk. Let \( \alpha \) and \((1-\alpha)\) be the respective probabilities.

(ii) The probability of migrating one male from a household is greater than the probability of migrating two males, and probability of two males migrating is greater than that of three males from a household and so on. Thus, the pattern of migration from a household is a decreasing function and follows a logarithmic series distribution with parameter \( \lambda \).

Let \( x \) represent the number of rural out-migrants from a household, then under the assumptions (i) and (ii), the probability function of \( x \) is given by

\[
P(x = k) = \begin{cases} 
1 - \alpha, & \text{for } k = 0 \\
\alpha \left(\frac{-\lambda}{k \ln (1-\lambda)}\right)^k, & \text{for } k = 1, 2, 3, \ldots; 0 < \lambda < 1; 0 < \alpha < 1
\end{cases}
\]  

(1.1)

The log-series distribution has a long positive tail and the shape of the tail is similar to that of geometric distribution for large values of \( k \). However, the log-series distribution has the advantage that it has only one parameter instead of two parameters of Negative Binomial Distribution.
Estimation

Consider a sample consisting of \( n \) observations of the random variable \( x \) with probability function given by expression (1.1). Suppose that \( n_k (k = 0, 1, 2, \ldots, m) \) represents the number of observations of \( k \)’th cell and \( \sum_{k=0}^{m} n_k = n \). The likelihood function for the given sample \((x_1, x_2, \ldots, x_n)\) can be expressed as:

\[
L[\alpha, \lambda \mid (x_1, x_2, \ldots, x_n)] = (1 - \alpha)^{n_0} \prod_{k=1}^{m} \left[ \alpha \left( \frac{-\lambda}{k \log(1-\lambda)} \right) \right]^{n_k} \quad \ldots \quad (1.2)
\]

\[
= (1 - \alpha)^{n_0} (-\alpha)^{n - n_0} \frac{\sum_{k=1}^{m} n_k x_k}{\lambda^{\sum_{k=1}^{m} n_k}} \quad \ldots \quad (1.3)
\]

where \( x_k \) represents the value of \( k \).

Taking logarithms of (1.3) and differentiating with respect to \( \alpha \) and \( \lambda \) respectively and equating to zero gives the following equations:

\[
\frac{\partial \log L}{\partial \alpha} = -\frac{n_0}{1 - \alpha} + \frac{n - n_0}{\alpha} = 0 \quad \ldots \quad (1.4)
\]

\[
\frac{\partial \log L}{\partial \lambda} = -\sum_{k=1}^{m} \frac{n_k x_k}{\lambda} + \frac{n - n_0}{(1 - \lambda) \log(1 - \lambda)} = 0 \quad \ldots \quad (1.5)
\]

The equation (1.4) yields the estimator of \( \alpha \) as

\[
\hat{\alpha} = \frac{n - n_0}{n}
\]

The estimating equation for \( \lambda \) is obtained by solving equation (1.5) as:

\[
(1 - \lambda) \log (1 - \lambda) \sum_{k=1}^{m} n_k x_k + (n - n_0)\lambda = 0 \quad \ldots \quad (1.6)
\]

This equation can be solved numerically and the numerical solution of (1.6) is the desired maximum likelihood estimate for \( \lambda \).

Using the fact that \( \text{E} (n_0) = n (1-\alpha), \text{E}(n-n_0) = n\alpha \)

\[
\text{E} (x_k) = \frac{-\alpha \lambda}{(1 - \lambda) \log(1 - \lambda)} \quad \text{and} \quad \text{E} \left( \sum_{k=1}^{m} n_k x_k \right) = -\frac{n \alpha \lambda}{(1 - \lambda) \log (1 - \lambda)}
\]

The expected values of second partial derivatives are obtained as

\[
-\frac{E(\frac{\partial^2 \log L}{\partial \alpha^2})}{(1 - \alpha)^2} = -\frac{E(n_0)}{\alpha^2} \quad \text{and} \quad \frac{E(n-n_0)}{\alpha(1-\alpha)} = \frac{n}{\varphi_1} \quad \text{(say)} \quad \ldots \quad (1.7)
\]
\[-E\left(\frac{\partial^2 \log L}{\partial \alpha \partial \lambda}\right) = - \frac{E\left(\sum_{k=1}^{m} n_k x_k\right)}{\lambda^2} + \frac{[1 + \log(1 - \lambda)]E(n - n_0)}{[(1 - \lambda) \log (1 - \lambda)]^2}\]

\[= n \alpha \left[ \frac{1}{\lambda(1 - \lambda) \log(1 - \lambda)} + \frac{1 + \log(1 - \lambda)}{[(1 - \lambda) \log(1 - \lambda)]^2} \right] = \phi_{22} \text{ (say)} \ldots \ (1.8)\]

The covariance between \(\alpha\) and \(\lambda\) is zero since \(E\left(\frac{\partial^2 \log L}{\partial \alpha \partial \lambda}\right) = 0\) and hence the variance of \(\alpha\) and \(\lambda\) can be obtained as

\[\nu(\hat{\alpha}) = \frac{1}{\phi_{11}} \quad \text{and} \quad \nu(\hat{\lambda}) = \frac{1}{\phi_{22}}\]

**Conclusion:**

The Study indicates that the present model is a reasonable approximation to describe the distribution of households for the rural out migrants and at least at the micro-level. Both the data set shows that the model used describes the phenomenon satisfactorily well. The exact variance and covariance of the estimator for the model have also been computed.

**Table-1. Distribution of observed and expected frequency of number of households according to the number of rural out migrants (Varanasi district data 2015)**

<table>
<thead>
<tr>
<th>Number of Migration</th>
<th>observed</th>
<th>Expected</th>
<th>(\chi^2) (d.f. =3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>395</td>
<td>395</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>141</td>
<td>149.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>54</td>
<td>53.1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>23.7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>11.72</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>5.61</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td></td>
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\(\alpha = 0.39, \ p = 0.53, \ \lambda = 0.6, \ var(\alpha) = 0.00034, \ Var(l) = 0.00074\)

**Fig.1. Expected and Observed Frequency of Number of Migrants (Varanasi district data 2015)**
Table-2. Distribution of observed and expected frequency of number of households according to the number of rural out migrants (Data set of Northeastern Bihar)

<table>
<thead>
<tr>
<th>No of Migrants</th>
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<td>var($\alpha$)</td>
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</table>
Fig. 2. Expected and Observed Frequency of Number of Migrants (Data set of Northeastern Bihar)

References:


Yadava, K. N. S., and Yadava, G. S. (1988): On some probability models and their applications to the distribution of the number of migrants from a household, Janasankhya, Vol. 6(2), 137-158.


Evaluation of Antioxidant profile of *Labeo rohita* in stress condition after exposure to phenolic compounds

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**Abstract:** Phenolic compounds may be part of the oils, hydrocarbons and different types of insecticides, herbicides, pesticides and industrial effluents which are released in the fresh water bodies knowingly harming the aquatic life in terms of flora and fauna. Relatively little is known about the effects of low concentrations of phenolic compounds on the normal physiological functions of freshwater fishes. Phenolic compounds present in sub-lethal concentrations in water might enter into the blood stream of these fishes through the gills or the mucus epithelium of the mouth and finally be distributed in different organs of the body which in turn creates the stress-like conditions in these fishes, thus leads to disturbances in the antioxidant enzymes concentration and levels within their body. The present study was performed artificially in a separate pond having the healthy fishes numbers of *Labeo rohita* (Rohu), a common edible fish. The 50 % lethal concentration (LC₅₀) of the doses were determined for both o-cresol and m-cresol Then after, 2440 mg/ml of phenol and 2464 mg/ml of m-cresol were dosed separately in L. rohita fishes groups. Fishes were transferred to tanks containing no toxicants were utilized as control. Water in the control tanks and water and toxicant in the experimental tanks were renewed daily to remove the debris, taking care to give minimum disturbance to the fish. The fishes were not fed during the entire exposure period. Fishes were checked for mortality at every 24 hours interval. The tissue specific increase in SOD activity showed the following trend for fishes treated with phenol: kidney > gills > liver whereas the muscle showed a significantly decreased SOD activity compared to control while on exposure to m-cresol, the results of increased activity of SOD enzyme was: liver>gills>kidney>muscles. Changes in the levels of superoxide dismutase have been detected in fishes exposed to various degrees of oxygen tension. CAT activity was observed in gills, liver and kidney of fishes treated with both the phenolics whereas muscle showed a significantly decreased CAT activity compared to control in both phenol and m-cresol treated groups. The significant increase in catalase and superoxide dismutase activities in gills, liver and kidney examined may represent an adaptive response to protect the fish from free radical toxicity induced by phenolic compounds. GST activity was found liver and muscle showed elevated GSH level when treated with phenolics. Among the tissues, GSH level was found to be highest in liver compared to other tissues which may be due to an adaptive mechanism to slight oxidative stress through an increase in its synthesis which can be provided for the increased GST activity. The conjugated diene level was found to be elevated in liver, kidney and muscle of both the treated groups and also in gills treated with phenol. The study suggested that, under stress conditions such as on exposure to phenolic compounds or death causing chemicals, fishes such as *Labeo rohita* have elevated and variable activity in different body tissues of antioxidant markers which makes them adaptive to fight against stressful conditions.

**Keywords:** Stress, phenolic compounds, antioxidant profile, markers, *L.* rohita.

1. **INTRODUCTION**

Pollution of water sources due to chemicals plays a primary role in the destruction of ecosystems but chemical analyses alone may not suffice to describe the adverse effects of the complex mixtures of chemicals present at contaminated sites. The potential utility of biomarkers for monitoring both environmental quality and the health of organisms inhabiting in the polluted ecosystems has received increasing attention during the last years [1-3]. The aquatic environment is particularly sensitive to the toxic effects of contaminants since a considerable amount of the chemicals used in industry, urbanization, and in agriculture enter marine and other aquatic environments. The stressors in the environment exert their adverse effects at the organismal level leading to impaired physiological functions in aquatic organisms. Xenobiotics are potentially harmful to fish by inducing tissue damage in gill, kidney and liver [4] growth retardation [5], genotoxicity [6], reproductive disturbances [7], tissue bioaccumulation [8-9]. Since the second half of the last century, the environment has been contaminated by numerous xenobiotics; amongst these phenolics are of special concern. Phenolic compounds are environmentally important due to their extensive use in various industries, presence in wastewaters and their potential toxicity. These lipophilic compounds have numerous industrial applications, which enhance the risk to the environment and to human health [10]. Phenolic compounds are used in the manufacture of many agricultural pesticides [11]. They can also be
introduced into the environment through degradation of natural substances [12] and industrial activities (e.g., dyes, plastics, pharmaceuticals and explosives) [13, 14]. Phenolic compounds can cause toxicity, with bioaccumulation effects in animals and plants [15]. The present study is describing the changes in antioxidant markers in *Labeo rohita* after exposure to phenolic compounds.

II. MATERIALS AND METHODS

**Chemicals and Reagents used for the study**

The chemicals and reagents used for the study were of analytical grade and The diagnostic kits used in the study for biochemical testing were from standard diagnostics company.

**Experimental design**

(i) **Collection and maintenance of test fish**

*Labeo rohita* (20-25g) were collected from the culture ponds of Yamuna river of Delhi region, India and were brought to artificial small ponds/aquarium in Institute of Transgene Life Sciences, Dehradun/Lucknow units. Further, these fishes were kept in large tanks where a continuous and gentle flow of fresh water was maintained. They were fed on a commercial diet *ad libitum* and were acclimated in tanks for a month before the experiment.

(ii) **Experimental design for lethal toxicity study**

LC₅₀ determinations were carried out by following semi-static acute toxicity test. For the experiment, 6 fishes were transferred to large experimental tubs, each containing 18 liters of dechlorinated tap water. The 50 % lethal concentrations (LC50) of the doses were determined for both o-cresol and m-cresol. Fishes transferred to tanks containing no toxicants were utilized as control. Water in the control tanks and water and toxicant in the experimental tanks were renewed daily to remove the debris, taking care to give minimum disturbance to the fish. The fishes were not fed during the entire exposure period. Fishes were checked for mortality at every 24 hours interval. The LC₅₀ levels and 95% confidence limits were calculated using Probit analysis (Finney, 1971). The lethal toxicity experiments were repeated wherever necessary.

(iii) **Experimental design for sub-lethal toxicity studies**

For conducting the biochemical study, fishes were taken in two separate tanks which contained desired concentrations of toxin, 1/10th of LC₅₀ value of phenol and m-cresol. Six replicates were kept for each experiment. The experimental fishes were dosed for 21 days. Daily the contents in the tanks were replaced with the same concentrations of toxicant so as to avoid any possible degradation of constituents of toxicant. During the experimental period of 21 days the fishes were fed on the same diet so as to avoid the effects of starvation on normal physiological processes. Any other factors likely to influence the toxicity were nullified by maintaining suitable controls in tanks that contained no toxicant.

**Preparation of tissue samples for the study**

After the experimental period (21 days), the fishes were killed by pithing (by damaging the brain and severing the spinal cord between the head and trunk region using a sharp needle) and the tissues such as liver, gills, kidney and muscle were removed from its body, wiped thoroughly, using blotting paper to remove blood and other body fluids. Further were washed in ice cold 0.33 M sucrose and again blotted dry and the desired amounts of the tissue were weighed and used.

**Preparation of serum samples**

Blood were drawn from the common cardinal vein using 1 ml syringe. The blood collected was kept at room temperature for 30 minutes to separate the serum. The serum thus obtained was subjected to centrifugation at 3000 rpm for 3 minutes. The serum separated was stored at -20°C until assayed.

**Assay of superoxide dismutase (SOD) (E.C.1.15.1.1)**

Superoxide dismutase in different tissues was determined using the method [16].

**Assay of Catalase (CAT) (E.C.1.11.1.6)**

Catalase level in different tissues was determined using the method [17].

**Assay of Glutathione peroxidase (GPxs) (E.C.1.11.1.9)**

Glutathione peroxidase in different tissues was estimated by the method [18].

**Assay of Glutathione-S-transferase (GST) (E.C.2.5.1.18)**

Glutathione-S-transferase in different tissue were determined using the method [19].

**Estimation of total reduced glutathione (GSH)**

Total reduced glutathione were estimated by the method [20].

**Estimation of Conjugated dienes (CD)**
The concentration of conjugated dienes was estimated according to the method [21].

**Estimation of Hydro-peroxides (HP)**
Hydro peroxide was estimated by method [22].

### III. RESULTS AND DISCUSSION

It was observed that, the malfunctioning of different organs in *Labeo rohita* occurs due to the alterations in different parameters and enzymes. The results thus show the abnormal and lethargic effect of phenolic compounds as pollutants on *Labeo rohita*.

#### Acute toxicity range

The acute toxicity doses of phenol and m-cresol were found to be 3212 and 2957 mg/l respectively. The results are shown in Table 1 and Figure 1.

**Superoxide dismutase (SOD)**

Between the treated groups, both phenol and m-cresol treated groups showed significant variation in SOD activity and also with the control. SOD activity was found to be significantly (P<0.05) elevated in gills, liver and kidney of *Labeo rohita* treated with phenol compared to control and among these tissues liver showed the maximum activity, whereas the fishes treated with m-cresol showed significantly elevated activity in liver, kidney and muscle compared to control. A significantly (P<0.05) decreased activity compared to control was shown by gills treated with m-cresol and muscle treated with phenol. The results are shown in Table 2 and Figure 2.

**Catalase (CAT)**

In the present study catalase activity in different tissues of *L. rohita* treated with different phenolic compounds showed significant variations (P <0.05), compared to control group. Tukey's test showed significant difference between phenolic compounds treated groups and also with the control. Highest CAT activity was found in the liver of fishes treated with m-cresol. On treatment with both phenol and m-cresol gills, liver and kidney showed significantly elevated CAT activity compared to control. Comparison between groups treated with different phenolic compounds revealed that there was significant increase (P<0.05) in CAT activity in all tissues compared to control except in muscle. Muscle showed a statistically significant decreased activity compared to control. The results are shown in Table 3 and Figure 3.

**Glutathione peroxidase (GPx)**

Glutathione peroxidase activity showed an overall significant change (P<0.05) in experimental groups of animal compared to control. Turkey's test showed significant difference between phenolic compounds treated groups and also with the control. Statistical analysis between tissues showed that GPx activity was found to show a statistically significant (P<0.05) decreased activity in liver and kidney of the treated groups compared to control. Whereas gills treated with phenol showed a decreased GPx activity compared to control. On treatment with both phenol and m-cresol muscle showed a significantly (P<0.05) elevated activity compared to control. The results are shown in Table 4 and Figure 4.

**Glutathione S- transferase (GST)**

In the present study, Glutathione-S-transferase activity in different tissues of *Labeo rohita* treated with different phenolic compounds showed significant variations (P<0.05), compared to control group. Among the tissues treated with different phenolic compounds highest GST activity was seen in liver. Both kidney and muscle showed significantly (P<0.05) decreased GST activity compared to control. Significant differences were found in GST activity between the phenol and m-cresol treated groups and also with the control. The results are shown in Table 5 and Figure 5.

**Total reduced glutathione (GSH)**

Two-factor ANOVA followed by Turkey's test showed that there was significant (P<0.05), variation in total reduced glutathione content between treated groups and between tissues treated with different phenolic compounds. There was statistically significant (P<0.05) different changes in the GSH level among the treated groups and between the treated groups and the control. Among the tissues, gills, liver and muscle showed significantly (P<0.05) elevated activity compared to control but the kidney in both the treated groups showed statistically significant (P<0.05) reduced activity compared to control. The results are shown in Table 6 and Figure 6.

**Conjugated dienes (CD)**

Conjugated diene level in all the phenolic compounds treated groups was significantly (P<0.05) different when compared to control. Among the tissues gills, liver and muscle showed a statistically significant elevated CD level in both the treated groups compared to...
control whereas the kidney in both the treated groups showed a statistically significant (P<0.05) reduced level compared to control. The results are shown in Table 7 and Figure 7.

Hydrogen peroxides (HP)

The level of hydrogen peroxides in the groups treated with both the phenol and m-cresol showed statistically significant (P<0.05) difference between them and also with the control group. Tissues such as gills, liver, kidney and muscle showed statistically significant (P<0.05) elevated levels compared to control. Among the tissues the highest level of hydrogen peroxide was seen in liver. The results are shown in Table 8 and Figure 8.

IV. CONCLUSION

In the present study, almost all the tissues treated with phenol and m-cresol for 21 days in *Labeo rohita* showed significantly elevated SOD and CAT activity compared to control. The tissue specific increase in SOD activity showed the following trend for fishes treated with phenol: kidney > gills > liver whereas the muscle showed a significantly decreased SOD activity compared to control. On treatment with m-cresol, tissues such as liver, kidney and muscle showed a significantly elevated activity whereas gills showed a significantly decreased activity compared to control. For the detoxification of increased H2O2 generated a significantly elevated CAT activity was observed in gills, liver and kidney of fishes treated with both the phenolics whereas muscle showed a significantly decreased CAT activity compared to control in both phenol and m-cresol treated groups. Considering the results for each tissue in both treated groups, it was found that liver showed the highest SOD and CAT antioxidant activity, both enzymes appearing to have an important role in to be highly elevated in liver on exposure to phenolics, since liver plays an important role in the detoxification of xenobiotics and in elimination by conjugating them with glutathione. Increased GST activity indicates the role of this enzyme in protection against the toxicity of xenobiotic-induced lipid per oxidation. Increased GST activity indicates the role of this enzyme in protection against the toxicity of xenobiotic-induced lipid per oxidation. Some studies analyzing GST in liver of fish exposed to different inorganic compounds showed an enzymatic induction. The significant increase in catalase and superoxide dismutase activities in gills, liver and kidney examined may represent an adaptive response to protect the fish from free radical toxicity induced by phenolic compounds. GPx glutathione peroxidase activity, a seleno-enzyme that neutralizes ROS such as organic and hydrogen peroxides activity in gills, liver and kidney of fishes treated with phenol and m-cresol showed a significantly decreased activity compared to control. Whereas muscle in both treated groups showed a significantly enhanced activity compared to control. The low GPx activity might be due to a direct phenol inhibition of enzyme synthesis or due to increased generation of hydrogen peroxide which may have inhibited the enzyme activity. Also catechol toxicity is mainly associated with damage to the protein and generation of hydrogen peroxide, which is capable of causing further damage. Significantly elevated GPx activity in muscle shows that an induction in glutathione peroxidase activity has occurred in this tissue. Among the tissues, GSH level was found to be highest in liver compared to other tissues which may be due to an adaptive mechanism to slight oxidative stress through an increase in its synthesis. The conjugated diene level was found to be elevated in liver, kidney and muscle of both the treated groups and also in gills treated with phenol (CD is the initial per oxidative product and is an accurate indicator of lipid per oxidation and its elevated level indicated that lipid per oxidation has been initiated). An increased hydro peroxide level was observed in liver, kidney and muscle of both the treated groups which may be due to decreased GPx activity observed in these tissues. This maybe because GPx catalyzes the reduction of H2O2 derived from oxidative metabolism as well as peroxides from oxidation of lipids and is considered the most effective enzyme against lipid per oxidation.

V. REFERENCES


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Table 1: Acute toxicity range of phenol and m-cresol in *L. rohita*

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<thead>
<tr>
<th>Phenolic Compound(s)</th>
<th>Acute Toxicity Range (mg/l)</th>
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<td>Phenol</td>
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<tr>
<td>m-cresol</td>
<td>2957</td>
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Figure 1: Acute toxicity range (LC50 values) of phenol and m-cresol in *L. rohita*

Table 2: Effect of phenolic compounds on SOD activity in different tissues of *L. rohita*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>SOD activity</th>
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<td>Groups treated with phenolic compounds</td>
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<td>Control</td>
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<td>Gills</td>
<td>12.76±2.73</td>
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<td>Liver</td>
<td>12.70±1.10</td>
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<td>Kidney</td>
<td>13.53±0.25</td>
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<tr>
<td>Muscles</td>
<td>3.06±0.15</td>
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</table>
Figure 2: Effect of phenolic compounds on SOD activity in different tissues of *L. rohita*

Table 3: Effect of phenolic compounds on CAT activity in different tissues of *L. rohita*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>CAT activity</th>
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<tr>
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<td>Groups treated with phenolic compounds</td>
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<td>Control</td>
</tr>
<tr>
<td>Gills</td>
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<td>Liver</td>
<td>13.56±1.10</td>
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<td>Kidney</td>
<td>4.93±0.25</td>
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<td>Muscles</td>
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</table>
**Figure 3:** Effect of phenolic compounds on CAT activity in different tissues of *L. rohita*

**Table 4:** Effect of phenolic compounds on GPx activity in different tissues of *L. rohita*

<table>
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<th>Tissue</th>
<th>GPx activity</th>
<th>Groups treated with phenolic compounds</th>
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<tbody>
<tr>
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<td></td>
<td>Control</td>
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<tr>
<td>Gills</td>
<td>12.45±2.18</td>
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<tr>
<td>Liver</td>
<td>13.57±1.10</td>
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<tr>
<td>Kidney</td>
<td>11.21±0.27</td>
<td>5.56±0.57</td>
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<tr>
<td>Muscles</td>
<td>3.06±0.25</td>
<td>8.56±0.24</td>
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</table>
Figure 4: Effect of phenolic compounds on GPx activity in different tissues of *L. rohita*

Table 5: Effect of phenolic compounds on GST activity in different tissues of *L. rohita*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Glutathione S-Transferase activity</th>
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<td>Control</td>
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<td><strong>Gills</strong></td>
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<td><strong>Liver</strong></td>
<td>35.34±1.18</td>
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<td><strong>Kidney</strong></td>
<td>23.45±0.56</td>
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<tr>
<td><strong>Muscles</strong></td>
<td>7.34±0.35</td>
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</table>
Figure 5: Effect of phenolic compounds on GST activity in different tissues of L. rohita

Table 6: Effect of phenolic compounds on GSH activity in different tissues of L. rohita

<table>
<thead>
<tr>
<th>Tissue</th>
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<td></td>
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<td>Gills</td>
<td>15.23±2.5</td>
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<tr>
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<tr>
<td>Kidney</td>
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<td>9.56±0.26</td>
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<td>Muscles</td>
<td>8.34±0.37</td>
<td>7.75±0.28</td>
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</table>
Figure 6: Effect of phenolic compounds on GSH activity in different tissues of *L. rohita*

Table 7: Effect of phenolic compounds on Conjugated dienes in different tissues of *L. rohita*

<table>
<thead>
<tr>
<th>Tissue</th>
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<tr>
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<td>Liver</td>
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<td>Muscles</td>
<td>23.43±0.25</td>
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</table>
**Figure 7:** Effect of phenolic compounds on Conjugated dienes in different tissues of *L. rohita*

**Table 8:** Effect of phenolic compounds on Hydrogen peroxides in different tissues of *L. rohita*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Hydro-peroxides (HP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
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<tr>
<td>Gills</td>
<td>13.85±2.75</td>
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<td>Liver</td>
<td>30.34±1.10</td>
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<td>Kidney</td>
<td>15.02±0.25</td>
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<tr>
<td>Muscles</td>
<td>10±0.24</td>
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</table>

**Figure 8:** Effect of phenolic compounds on Hydrogen peroxides in different tissues of *L. rohita*
The Dimension-Stone Potentials of The Rocks In Mahanga, North Central Nigeria

Joyce Ayuba Ramadan*, Mamuda Isiaka**, John Pam Chongs**

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** Department of Minerals & Petroleum Resources, Plateau State Polytechnic, P.M.B 02023, Barkin Ladi.

Abstract- Dimension stone can also be defined as any rock that has been removed from its natural place of origin for ultimate use in construction or monuments where three dimensions of size together with shape and other elements of appearance, such as colour, grain texture and pattern and surface finish, are normal requirements; it is usually quarried for the purpose of obtaining blocks or slabs that meet specification of size and shape. The availability of Porphyritic Older Granites and Charnokite rocks within the study area in abundance stimulated the examination of the rock samples in various capacities to ascertain their suitability for the purpose of dimension stone quarry. The structural disposition of these rock types were observed, recorded and analysed which reveal a general orientation in the NE-SW directions concurring with the regional structural trend of the area as well as the mineral compositions. In addition, the structures were well spaced in such a way as to optimize block exploitation. Physical properties, such as strength, porosity estimation, aesthetic value test and oxidation tests were carried out on fresh samples. The results displayed satisfactory abilities to be quarried as dimension stones which could be cut, trimmed and polished for tiles and block production or even used without polish.

Index Terms- Dimension stones, Quarry, Rocks, Granites, Charnockites

I. INTRODUCTION

The study area forms part of Ririwai sheet 126 SW, it is located in Lere Local Government Area (LGA) of Kaduna state. It is underlain by rocks of the Crystalline Basement which is indicative of the several episodes of deformation specifically the Pan African orogeny.

Dimension stone is a natural stone or rock that has been selected and fabricated (trimmed, cut, drilled, ground) to specific sizes or shapes[1]. Colour, texture, pattern, and surface finish of the stone are normal requirements. Another important selection criterion is durability, the time measure of the ability of dimension stone to endure and to maintain its essential and distinctive characteristics of strength, resistance to decay, and appearance. Natural stones are sophisticated materials that add dimension and style to architecture and structural designs. Highly polished to rustic, natural stones can add a creative element that embodies the essence of traditionalism to the most contemporary designs[2]. Most of the developed countries like Italy, Spain, Germany, Brazil, China etc engage in large scale exploitation of natural rocks for the production of polished products like slabs, blocks and tiles. In addition to aesthetic beauty, the glossy surfaces, Granitic rocks offer great advantages to the end user as it is dense, making it durable and weather/water resistant, great for outdoor as well as indoor use with beautiful colour combination due to the mineral content.

Nigeria is blessed with an abundance of rock outcrops which form part of its natural resources. These resources have, no doubt, contributed meaningfully to the economic growth and development of the country in terms of tourism, however, most of the outcrops have not been harnessed to their full potential probably due to the lack of the technical know-how, awareness etc. In the same vain, the Nigerian government has identified dimension stone production as the gem of the solid minerals industry, and a sure route to the creation of millions of jobs and wealth for Nigerians[3]. However most of the granitic outcrops are quarried manually by local inhabitants or by construction companies into aggregate stones to meet their immediate demands while tiles, slabs and polished blocks are imported into the country for use. This research was done to investigate the outcrops in Mahanga and surrounding areas with the sole aim of determining the suitability of the rocks for dimension stone cutting and lapidary purposes.

II. LOCATION AND PHYSIOGRAPHY OF THE STUDY AREA

The investigated area is located in the north central part of Nigeria as shown in figure 1 below. It is bounded by longitudes 8° 39' and 8° 42'; and latitudes 10° 33’ and 10° 35’. It encompasses a total area extent of approximately 23.1Km². The study area is accessible through a major tarred road from Dan Alhaji town penetrating the south eastern part of the study area, passing through Mahanga in the central part, to Sabon Kaura and then out of the study area through the northern part to other towns. However, several untarred road and footpaths connect to the surrounding villages and towns.

Generally the rock outcrops within the study area are low lying with contour values ranging from 2500 m- 2750 m, with the settlements situated on the gently undulating terrain in the central section of the study area. Furthermore, the tributaries of river Galma flow in to the study area from the northern part through the eastern and extreme south eastern part of the study area (Fig. 2); and the extreme north western part towards the southern part of the study area.
III. MATERIALS AND METHODS

A. Geological and Structural Mapping

The instruments used to achieve results here are the compass for orientation, the Global Positioning system (GPS), the geological/sledge hammer for sample collection, the magnifying hand lens, and a base map of the area. The study area forms part of the Basement Complex rocks of north central Nigeria and a detailed sampling of the rocks within the study area revealed two major rock types, the Porphyritic Older granites and the Charnockites, these were critically studied with the hand lens for the obvious mineral composition. They were evidently metamorphic.

The structures observed on the rock outcrops were joints and veins which were measured in terms of orientation and frequency.

B. Petrographic Studies

Fresh rock samples of the two rock units discovered within the study area were collected, taken to the laboratory for thin sectioning. Rock slides were produced and further observed using the petrographic microscope under Plane Polarized Light (PPL) and Cross Polarized Light (XPL).
C. Engineering Properties

For the rocks to be more useful other than quarrying aggregates, the following engineering properties of the representative samples were investigated:

I. Physical Properties – The physical variables of importance here are the strength, porosity and aesthetic lustre. And these were determined on the rock samples collected, in order to evaluate the cutting and polishing qualities of the rock types within the study area.

The strength of the various rock types were determined based on the point load test. The standardized equipment in the point load test is a pair of 60° conical point loading platens installed on a loading frame. The rock samples were compressed one after the other to failure, the load at failure was recorded for the strength calculation.

The porosity estimation was calculated based on the liquid absorption capacities, water and oil were used to achieve results. And these were determined on the rock samples collected, in order to evaluate the cutting and polishing qualities of the rock types within the study area.

The structures observed on the rock outcrops were analysed such a way as to optimize the block exploitation, and thus, the orientation, both the orientation and the respective distances of discontinuities have a significant influence on the prospective shapes and volumes of primary blocks. In general, wider distances result in large-sized blocks, if the orientation of discontinuities does not diverge decisively from orthogonality [4]. It was observed keenly that the structures were well spaced in such a way as to optimize the block exploitation, and thus, positively influence the profitability, in addition the general structural trend of the area

III. Polish Stone Value (PSV) Test – The PSV test was conducted on the rock sample to determine the display of good abrasiveness and yielding of attractive colour tints. The following stages were done to achieve results:

- Fresh rock samples were cut into manageable slab sizes.
- The rock slabs were then pre-polished using abrasives of different size grades starting with the coarsest and finishing with the finest; in order to remove uneven surfaces.
- The pre-polished slabs were then immersed into accurate manufactured moulds and then placed on a”road wheel” of accelerated polishing machine.
- The completed polished slabs are removed from the machine and washed with distilled water to remove contaminants and thereafter dried using pressurized air.
- The dried slabs are viewed under a Vicker-misa microscope fitted with micro hardness testing equipment in order to rate the suitability of the rocks for use as slabs, tiles and monuments.

IV. RESULTS AND DISCUSSIONS

The results of the investigations carried out on the rocks within the study area are discussed and displayed to be able to conclude on the lapidary potential of the area.

The geology of the study area is basically of two rock types( the Older Granites and the Charnockites). The porphyritic Older Granites evidently lacked foliations, though metamorphic (Pan African); they consists of felsic and mafic minerals. The felsic minerals comprise plagioclase feldspar, muscovite and quartz. The mafic minerals comprise of the black coloured biotite. The charnockites are generally semi circular massive outcrops, dark-greenish in colour with medium to coarse grained texture. The mineral composition of the charnockitic rocks are quartz, feldspars and orthopyroxene.

The structures observed on the rock outcrops were analysed and rose diagrams plotted for each to establish the trend. (Fig. 4a, 4b, and 4c below)

Excavation of dimension stones can be achieved, however, when an ideal coordination of the mining procedure takes the elements of the joint system structure into account [4]. The complexity of a joint system can clearly generate problems concerning the opening of a quarry and defining the direction of ongoing mining[5]. However, these structures were taken into consideration by paying attention to the spacing distribution and the orientation, both the orientation and the respective distances of discontinuities have a significant influence on the prospective shapes and volumes of primary blocks. In general, wider distances result in large-sized blocks, if the orientation of discontinuities does not diverge decisively from orthogonality[4]. It was observed keenly that the structures were well spaced in such a way as to optimize the block exploitation, and thus, positively influence the profitability, in addition the general orientation of the structures are in the NE-SW trend as shown on Figs. 4a, 4b and 4c below which obviously does not deviate from the general structural trend of the area

Fig. 4a. Joints on Charnockite
Dominant Trend  NEE-SWW
Strength as a mechanical feature is one of the significant parameters that influence the selection of the most practical method for block cutting. The strength of a rock depends on some interior rock characteristics such as resistance and configuration of the texture and minerals with the exterior forces effect[6]. The results of the strength test carried out on the rock samples within the study area revealed that both rocktypes could be used for lapidary purpose, though the Charnockite exhibited better strength quality (Table 1).

The porosity of a rock is the fraction of the volume of space between the solid particles of the rock to the total rock volume. The space includes all pores, cracks, vugs, inter- and intra-crystalline spaces. Spaces

The engineering properties of the two rock units within the study area are summarized in Table 1. Below.

between the individual mineral crystals of crystalline rocks are microscopically small, few, and generally unconnected; therefore, porosity is insignificant [7] from the display of results in table 1 above, the Charnockite sample is less porous as compared with the Older granite which makes it a better rock for lapidary use.

Oxidation is a type of chemical weathering, it could be likened to rusting whereby the rock minerals lose one or more ions or atoms in the presence of oxygen. When minerals in the rock oxidize, they become less resistant to weathering [8]. Oxidation test conducted on the samples of rocks within the research area exhibit low and very low rates on the Older granite and Charnockite respectively.

PSV is a standard laboratory measurement of skid resistance and it has been a key aspect of quarrying over time. Experience has proven that certain rock types give higher values as compared with others. Obviously Charnockite has a higher PSV as compared with Older granite (Table 1)

V. CONCLUSION

This piece of work concludes by drawing attention to the need to consider the holistic properties of different rock types in selection for lapidary purposes. The results conducted on the rock samples would definitely predict their performances if considered potentials for use monuments, tiles etc. Interestingly, all the rock units within the study area qualify which in turn makes the area a potential site for dimension stone production.

<table>
<thead>
<tr>
<th>S/n</th>
<th>Rock Units</th>
<th>Strength</th>
<th>Porosity (%)</th>
<th>Oxidation</th>
<th>PSV (%)</th>
<th>Aesthetic comment</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>oil</td>
<td>water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Charnockite</td>
<td>9.15</td>
<td>0.10</td>
<td>0.25</td>
<td>Very low</td>
<td>Beautiful display</td>
<td>Excellent for dimension stone</td>
</tr>
<tr>
<td>2</td>
<td>Older Granite</td>
<td>8.65</td>
<td>0.21</td>
<td>0.30</td>
<td>Low</td>
<td>Beautiful display</td>
<td>Good for dimension stone</td>
</tr>
</tbody>
</table>

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Quality Monitoring System In Agriculture Using Image Processing

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Abstract- Agriculture is very essential for human existence on this world. These days with growing population we need the productivity of the agriculture to be increased to meet the demands of larger population. In earlier days formers used natural methods of farming to increase the productivity, such as using the cow dung as a fertilizer. That resulted increase in the productivity enough to meet the requirements of the population. But later they started thinking of earning more profit by getting more production of crops. So, there came “Green Revolution”. After this period usage of deadly poisons as herbicides has increased to a drastic level. With the usage of chemicals the productivity increased but more damage was done to the environment., which will arise a doubt in our sustenance on this beautiful earth. So, in this paper we implemented some methods Which actually reduce the usage of herbicides by spraying them only in the areas where weed is found . we implemented image processing techniques using MATLAB to detect the weed areas in an image taken from the fields

Keywords: Image Processing, Agriculture, edge detection ,weed detection, patch spraying, Aurdino UNO.

I. INTRODUCTION

In earlier days detection of weed was done by employing some labour. especially for that purpose. They used to detect the weed by checking each row and column of the crop. Then they used to pluck weed out manually using their hands. Later with the advancement in the technology they started using the chemicals such as herbicides to remove the weeds.

In this paper we used image processing techniques to detect the weed. Then weed detected areas will be given as input to the automatic sprayer which is the robotic vehicle and it sprayer the weedicide only in weed detected areas .To get good accuracy we need to take a better picture of the field. The camera can be attached to tractor to take a image of the field in aerial view. The image is then processed using MATLAB with different image processing techniques. There are two types of weed detection we implemented, they are
1. Inter row weed detection
2. Inter plant weed detection

The weed detected blocks are given as input to the automatic sprayer which is implemented by using arduino uno micro controller, which spray the chemicals only in the weed detected areas.

II. WEED DETECTION

Weed is an undesirable plant . It has no specific botanical classification. Since it competes with plant of our interest for nutrients, water, sunlight, it is a major issue in the field of agriculture .Classification of weeds based on physical appearance can be made in so many ways but There are two types of weed based on the frequency of the edges present in them. They are:
1. Weed with narrow leaves (have less edge frequency).
2. Weed with wide leaves (have more edge frequency).

In Figure 1 and Figure 2, you can see examples of weeds with narrow and wide leaves, respectively.
The edge frequency is the key parameter in weed detection. Edge frequency is nothing but the count of number of edge pixels. If the weed and crop edge frequencies are nearly same then we should be careful about the value of the threshold. The accuracy of weed detection depends on the value of the threshold that is selected. Since we have chosen maize, the edge frequency of maize was less and the edge frequency of the weed was more.

All the colour information is in the 'a*' and 'b*' layers. The difference between two colours can be measured using the Euclidean distance metric. Colour segmentation helps here to remove all the other colours except green.

III. INTER PLANT WEED DETECTION

Inter plant weed detection is nothing but detecting the weeds present between the plants. Using image processing techniques it can be carried out this manner:

- RGB Image from camera
- Green color detection
- edge detection
- RGB to gray conversion
- Filtering
- Detection of the weed affected block

Figure 3: Algorithm showing steps followed in inter plant weed detection

This part of the algorithm prepares an image for further advanced processing and consists of: Loading the image from source, color segmentation and edge detection.

Figure 4: Input Image

Color segmentation is one of the image segmentation method used to separate the crop (which also include weed) from the background. This is done through Kmeans clustering. The method helps in separating all the visually distinguishable colors from one another. The L*a*b* color space (also known as CIELAB or CIE L*a*b*) enables to quantify these visual differences. The L*a*b* space consists of a luminosity layer 'L*', chromaticity-layer 'a*' indicating where color falls along the red-green axis, and chromaticity-layer 'b*' indicating where the color falls along the blue-yellow axis.

Clustering helps in grouping the pixels with the same colour. The output image after the colour segmentation will have only two colours, the black (indicates the background) and green (indicates the crop and weed). The image is then used for next level of processing which is edge detection.

Figure 5: Output image after color segmentation

Edge detection is also a method of image segmentation. It gives the number of edge pixels of the image. It uses the fact that the edge frequencies of veins in both the crop and the weed have different density properties to separate the crop from the weed.

The image after both color segmentation and edge detection is left with the edges and veins of both the crop and the weed in white and the remaining part completely black.

Figure 6: Output image after Canny edge detection.
There are several methods of edge detection in image processing. But many of them are not applicable in real time. Canny edge detection is the best one because of its accuracy. The edge detected image is then given to the next stage that is Filtering.

Filtering process helps in recognizing regions in which the edge frequency appears in the specific range. Before filtering the image must be divided into blocks. There is an inverse relation between the block size and the accuracy. If the block size is more than the accuracy will be less.

Choosing the threshold value of edge frequency depends mainly on two factors they are:

1. Type of weed
2. Type of crop

The above factors affect the threshold value in this way: if we have narrow crop leaves and wide weed leaves then we can say that weed has more edge frequency than the crop, so here the threshold value will be more. Otherwise threshold value will be less. In this paper we take the case of maize crop where the edge frequency of weed is more than that of crop. For knowing the value of the edge frequency here, first we took a image which contains pure weed and calculated the number of edges in it by using “for” loops and then we have calculated the number of edges per block for pure weed. That turned out to be approximately 900. Then we did the same by taking pure plant image and its edge frequency is approximately 400. So in this paper we took 600 as threshold value so that all weed can be detected.

IV. AUTOMATIC SPRAYER

Our ultimate aim is to spray the pesticide only in the weed detected areas. To do this we need to give the weed detected block number as input to the sprayer. The working of the sprayer is summarized in the following block diagram

The Arduino Uno is a microcontroller board based on the ATmega328 chip. It contains everything needed to support a microcontroller, simply connect it to a computer with a USB cable or power it with a AC to DC adapter or abattery to get started.

First we will check the first row of the filtering output to find any weed blocks. If any blocks are found we will give inputs to the controller in a way that the sprayer goes to that block and sprays the herbicide. The only input we need to give to the sprayer is the time for which the motor has to move to get to the weed block site. This can be given to the sprayer by using the function “delay” available in the arduino UNO.

Time delay is the time motor travels in a direction

V. CONCLUSION AND FUTURE WORK

In this paper we have implemented a method in which weed in the maize crop can be detected using the image processing and the weed detected block is given as input to the sprayer which sprays the pesticides only in those areas thus saving environment from harmful chemicals

The idea can be further improved like setting different threshold values in order to detect more types of weeds. Instead of computers the image processing DSP’s can be used.

VI. REFERENCES


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Improved Green Method for Synthesis of Irbesartan, an Antihypertensive Drugs

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Abstract- An improved green method for synthesis of the antihypertensive drug irbesartan, based on the Bromination by green method and Suzuki coupling reaction, has been described.

Index Terms- Antihypertensive drug, Irbesartan, synthesis

I. INTRODUCTION

Hypertension is the serious medical condition which is mainly responsible for cardiovascular diseases. Renin-Angiotensin-Aldosterone System (RAAS) is the basic system in humans, which is used to regulate the blood pressure as well as the related values such as sodium levels. Targeting the Angiotensin1 (AT1) receptors of Angiotensin-II with nonpeptide based drugs which are otherwise called as Angiotensin Receptor Blockers (ARB’s), led to the control of hypertension, ultimately controlling its associated heart related ailments such as coronary heart disease and stroke. Irbesartan, is a non-peptide angiotensin II receptor antagonist used in the treatment of hypertension, heart strokes, diabetic neuropathy and congestive heart diseases. Irbesartan is currently available in the market as an antihypertensive drug under the brand name of Avapro. The metabolism of Irbesartan, a highly selective and potent nonpeptide angiotensin II receptor antagonist, has been investigated in humans. Irbesartan inhibits the activity of angiotensin II (AII) via specific, selective non-competitive antagonism of the AII receptor subtype 1 (AT1) which mediates most of the known physiological activities of AII. Our present work describes an improved green method for synthesis of Irbesartan. This paper is divided into four sections, the first section deals with the discussion of the chemicals involved, the second section deals with the experimental analysis, the third gives the conclusion.

II. DISCUSSION

The reported synthetic approach starts with 4-Bromo toluene. The bromination of 4-Bromo toluene by green, efficient ultrasonic method to give 4-Bromo benzyl bromide. 4-Bromobenzyl bromide can subsequent condensation with 2-Butyl-1,3-diaza-Spiro [4.4] non-1-en-4-one and then the key intermediate efficiently catalysed the homogeneous catalyst the new Suzuki–Miyaura cross-coupling conditions to give the phenyl–phenyl bond. The final steps are tetrazole formed, formed from the organic nitriles and azide, to give irbesartan as a final product.

III. EXPERIMENTAL

The 1H NMR spectra were recorded on Bruker Advance II 400 spectrophotometer using TMS as internal standard, and the chemical shifts were reported on δ ppm relative to TMS.

1. 4-Bromobenzyl bromide (2)

The reaction was carried out under ultrasound waves by using a probe ultrasonicator. In a typical reaction 0.32 gm (3.0 mmol) of p-Bromo toluene (1) and 0.54 gm (3.0 mmol) of N-Bromo succinamide (NBS) in 15 ml of water were syndicated at 40 °C for 40 min. After that, hexane was added and the reaction mixture was cooled and poured into a separatory funnel. The organic layer was washed 3 times with 15 ml of water and the combined organic extract was dried over anhydrous sodium sulfate to get the white solid of 4-Bromobenzyl bromide (2,0.42gm,77.7%). The product was crystallized with ethanol [1]. 1H NMR (CDCl3): δ=7.82-7.86(d,2H), 7.05-7.12(d,2H),4.30-4.56(s,2H).

2. 3-[4-Bromobenzyl]-2-butyl-1,3-diazo Spiro [4,4] non-1-en-4-one (3)

A mixture of N, N-dimetyl formamide (DMF) 9.36 ml, 2-n-butyl-1,3-diazo Spiro [4,4] -non-1-ene hydrochloride (1.97 gm, 0.36 mol) and potassium hydroxide (1.33 gm, 1 mol) was stirred at room temperature for 30-40 min. After that, a solution of 4-bromobenzyl bromide (2.38 gm, 0.4 mol) in DMF was added.
dropwise, into the reaction mixture. The reaction was stirred at room temperature for 18 hours. After completion of the reaction, 100 ml of water was added over a period of 30 min and extracted with n-heptane (25 ml). The organic layer was washed with water, dried, and concentrated under reduced pressure to get the product [2]. The product (3, 2.12g, 90.6%), which was used in the next stage.

\[ \text{1H NMR (CDCl}_3\text{): } \delta=0.7-0.9 \text{ (t, 3H, CH}_3\text{), 1.1-1.4 (sextet, 2H, CH}_2\text{), 1.4-1.6 (quintet, 2H, CH}_2\text{), 1.6-2.0 (m, 8H, CH}_2\text{), 2.1-2.3 (t, 2H, CH}_2\text{), 4.4-4.6 (s, 2H, Ar–CH}_2\text{), 6.8-7.0 (d, 2H, Ar–H), 7.3-7.5 (d, 2H, Ar–H).} \]

3. 2-n-butyl-3-[(2-cyano biphenyl-4-yl) methyl] 1,3-diazo Spiro [4,4] non-1-en-4-one(4)

A 50 ml round bottom flask was charged with Pd(PPh\textsubscript{3})\textsubscript{3} (3.46 gm, 0.3 mmol), benzene (10 ml), 3-[4-bromobenzyl]-1, 3-diazo Spiro [4, 4] non-1-en-4-one (3.64 gm, 10 mmol) and 10 ml aqueous solution of sodium carbonate (2 M) under nitrogen atmosphere. Next 2-cyano phenylboronic acid (1.616 gm, 11 mmol) in ethanol (5 ml) was added slowly with continuous stirring. Then, the mixture was refluxed for 8 hours. After the reaction completion, H\textsubscript{2}O\textsubscript{2} (0.5 ml) was added and the mixture was stirred for 1 hour to oxidize the remaining phenylboronic acid. The product was extracted with ether, washed with saturated NaCl solution and then dried over anhydrous sodium sulfate obtained yellow liquid of 2-n-butyl-3-[(2-cyano biphenyl-4-yl) methyl] 1,3-diazo Spiro [4, 4] non-1-en-4-one(4, 2.52gm, 71%) [3].

\[ \text{1H NMR (CDCl}_3\text{): } \delta=0.7(t,3H), 1.3(sextet,2H), 1.5(quintet,2H), 1.7(m,8H), 2.3(t,2H), 4.7(s,2H), 7.0-7.8(m,8H). \]

4. 2-Butyl-3-[|2-(1H-tetrazol-5-yl)|1,1\textsuperscript{8}-biphenyl-4-yl|methy|l]-1,3diao Spiro[4,4] non-1-en-4-one (5)

A mixture of 2-n-butyl-3-[|2-(cyano biphenyl-4-yl) methyl] 1,3-diazo Spiro [4,4] non-1-en-4-one (734mg, 2.0 mmol) and sodium azide (65mg, 3.0 mmol) in DMF (5ml), iodine (0.03mg) was stirred at 120 °C for 10 hours. After completion of the reaction, the mixture was treated with ethyl acetate (30 ml) and 4M HCl (20 ml) and stirred vigorously. The organic layer was separated and the aqueous layer was extracted with ethyl acetate (2*10ml) [4]. The combined organic portion was washed with a saturated sodium thiosulfate solution (2*10ml) and water (2*10ml). Recrystallization using methyl isobutyl ketone afforded butyl-3-[|2-(1H-tetrazol-5-yl)| [1,1-biphenyl]-4-yl|methyl][1,3-diazo spiro [4,4] non-1-en-4-one , (5,595mg, 81%) as a yellow solid.

\[ \text{1H NMR (CDCl}_3\text{): } \delta=0.7(t,3H), 1.3(sextet,2H), 1.5(quintet,2H), 1.7(m,8H), 2.3(t,2H), 3.0-3.6(s,1H), 4.7(s,2H), 7.0-7.8(m,8H). \]

IV. CONCLUSION

Many methods are available for preparation of Irbesartan drugs (for antihypertensive drugs) in the market, however there is a need to develop an ideal commercial process, which should be safe, ecologically sound, economically viable and meets the required quality specifications. This experiment aims to achieve an advanced technique, which is still not reported yet in the research world.

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CONTRIBUTION OF COMMUNITY BASED TRAINING COMPETENCIES ON YOUTH EMPLOYMENT IN RWANDA

A CASE OF KIGALI INTEGRATED POLYTECHNIC REGIONAL CENTRE (IPRC)

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Department of Entrepreneurship, Technology, Leadership and Management

Abstract- This study seeks to establish the contribution of community based training projects on youth employment in Rwanda. The specific objectives of this study are; to establish the training competence acquired through CBT program/projects content; to find out the youth employability after graduating from CBT program and to assess the social welfare status of CBT graduates resulting from their employment. The study was guided by the following specific objectives: to establish the effect of Carpentry CBT competencies on Youth Employment in Rwanda, to establish the effect of Masonry CBT competencies on Youth Employment in Rwanda and to establish the effect of Hairdressing CBT competencies on Youth Employment in Rwanda. The study employed a descriptive survey design based on a census design. The target population of 100 was used. A sample size of 80 was drawn by Morgan-Kreljice method. Data was collected using structured questionnaires and document reviews. The reliability and validity of the data collection instruments was tested by Cronbach’s Alpha coefficient at an index of 0.70 and based on a 5-point Likert Scale for multiple items obtained from a pilot survey. The content validity of the questionnaires was done by supervisors from the University. Multiple regression analysis, correlation and content analysis were used to establish the effect of CBT competencies on Youth Employment in Rwanda. The findings indicate that there was a significant effect of CBT competencies on Youth Employment in Rwanda. The study recommends that vocational CBT players should ensure that the extent
of integration of CBT Competencies is enhanced in Rwanda.

**Index Terms**- Community based, integrated polytechnic regional center, Rwanda, Training competencies, Youth employment

1. **INTRODUCTION**

More than seventy eight percent (78.7%) of Rwanda’s population is below 35 years of age, 57% are youth above 16 years and Unemployment Rate in Rwanda stood at 13.2 percent in February 2016 and averaged 4.70 percent from 2001 until 2016, reaching an all-time high of 13.20 percent in 2016 and a record low of 1.00 percent in 2001 (Trading economic, 2017). This situation in Rwanda is connected to a UNESCO report on youth and skills, working below the poverty line is a much more widespread phenomenon than not working at all (UNESCO, 2012). The second economic development and poverty reduction strategy (EDPRS 2) set out target of creating 200,000 off-farm jobs annually to speed up employment growth (EDPRS, 2013). Realizing the untapped potential of youth, with increasing high unemployment levels among this group, it is critical to create employment opportunities, to foster social desirable changes for the youths which will enhance self-reliance (UNFPA, 2014).

Active labor force in Rwanda is at 63% of the whole population, underemployment stands at 65% with unemployment youth at 8% and 3% in urban and rural areas respectively. This alone meant that there was a stiff competition between the youth with formal training and those without (RBOS2012). In order to address the rampant youth unemployment, young people would derive considerable benefit from Community Based Training (CBT) programs by acquiring various vocational skills (Barab & Hay, 2001). CBT in part, was also described as apprenticeship because it involved the learner within an actual physical context of practice to learn side by side with an expert to master a specific skill or task (Pratt, 1998). The proponents of the Community Based Training worldwide believed it enhanced the innovations in both government and non-government policies and programs (Barab & Hay, 2001). In support of the above, Ghazala and Rao, (2003), asserted that Community Based Training Program was primarily targeted to the poor and marginal groups. The technical experts mostly from vocational and technical institutes go to the communities with youth organized groups mostly who couldn’t access formal training institutions and train them according to the local tailored needs.
The International Monetary Fund (IMF, 2010) observed that; Community Based Training is one of the ways of developing human resources and essential if Rwanda was to be transformed from predominantly peasant-based economy to just a peaceful and prosperous middle-income country. In 2008, IPRC took up a social responsibility of training the communities by providing vocational skills and life skills knowledge through Community Based Training Programs (CBT) by mainly targeting the unskilled unemployed youth in various communities from the districts of Kicukiro, Huye, Rwamagana, Musanze and Muhanga (IPRC, 2012). The goal was to empower people in these communities with market driven skills especially through the youth to enable them improve their livelihood through outreach programs. This has enabled many youth graduates and alumni of IPRC to create jobs and become self-reliant (IPRC, 2012).

The vocational and technical skills offered by the institute have enabled the youth to benefit from gainful employment opportunities which is promoting self-reliance among them (IPRC, 2012). IPRC has trained and certified a considerably huge number of people since inception in 1988. The institute was specialized in providing training that is production oriented with emphasis in practical work, which takes seventy percent (70%) of the course content (IPRC, 2012). The institutes’ vocational education was benefiting the youths of various educational levels and backgrounds including mainly Primary Leavers among others with knowledge and practical skills in Bricklaying & concrete practice, Wood curving, Carpentry and Joinery, Electrical Installation and Basic Electronics, Plumbing and sheet Metal works. Other disciplines included Motor vehicle mechanics, Business Studies, Catering and hotel management, Textile technology and nursery teaching, with emphasis on promoting HIV/AIDS awareness among others (IPRC, 2012). Under the Vocational Community Based Training (CBT) program, IPRC has a follow Up Program (FUP) that acts as a link to the industry for employment opportunities to the old students to coordinate and placing students for industrial training. Under this program, 200 old students are visited, serviced, encouraged and assisted to form associations, access microfinance services, and a tool lease scheme at the institute or any other established credit institution in their areas of
operation. Seminars and workshops are also organized for their additional training and sensitization. CBT directly responded to community needs (IPRC, 2013).

According to the International Labor Organization (ILO, 2012), Rwanda’s measured unemployment rates were relatively low for the region but steadily growing as the percentages of youth population increased. Unemployment varied across regions and settings: urban to rural, very high in urban centers than rural in the country. The female youth’s unemployment levels were as twice high compared to their male counterparts. Surprisingly, ILO noted that unemployment increased with the level of education attained in Rwanda: Unemployment was lower among persons with no education and primary education, and higher among those with secondary education and above. More educated youth were biased towards wage-paying formal jobs, (white collar jobs) which were harder to find. This was partly due the mismatch between what was taught and what the community needed or demanded. Hence the researcher was motivated to establish the contribution of vocational Community Based Training (CBT) programme to youth employment.

Rwanda’s population is largely youthful, presenting both opportunities and challenges (UNFPA, 2014). If all the stakeholders such as government, communities, religious institutions, among other did not give due attention to the problem of high youth unemployment levels in the country which stood at 75% (RBOS, 2012), against the world’s 40% (Global Agenda, 2013), UNSCO argued that youth were to remain a barrier to the region's development (UNESCO, 2012). Today young people need not only a job, but training such as CBT that enables them to be absorbed into the labour market and to make meaningful contributions to their country as workers, citizens and agents of change (ILO, 2008).

Statement of the Problem

According to 2012 Action Aid Report “gaps in youth policy programming in Rwanda”. Poverty, unemployment and underemployment are the major problems affecting the Rwanda’s youth accounting for 65%. The report attributed this to low level of employable skills, poor access to resources such as land and capital, negative attitudes towards work and gender discrimination among others. Apparently Unemployment for Rwandan youth is currently at
4.1% (Rwanda job desk, 2015) but still going higher. This figure can be reduced, if the youth acquired relevant strategic skills and training. Vocational Community Based Training (CBT) is one of the recommended ways to achieve this (World Development Report 2013). Related training was introduced in Rwanda by IPRC in 2000 as a social responsibility to addresses the mismatch between what is formally taught and what is demanded in the communities. Under this program, the youth are trained and provided with market demanded vocational life skills and knowledge through outreach/field based program to improve their livelihoods (IPRC, 2012). Hence this research’s interest was to examine the contribution of vocational community based training offered by IPRC to youth employment.

Objectives of the Study

Main Objective

The broad objective of the study seeks to assess the contribution of Community Based Training Competencies on Youth Employment.

Specific objectives

1. To analyze the effect of Carpentry CBT competencies on Youth Employment in Rwanda
2. To determine the effect of Masonry CBT competencies on Youth Employment in Rwanda
3. To determine the effect of Hairdressing CBT competencies on Youth Employment in Rwanda

Research Questions

The researcher will be guided by the following research questions:-

1. What is the effect of Carpentry CBT competencies on Youth Employment in Rwanda?
2. What is the effect of Masonry CBT competencies on Youth Employment in Rwanda?
3. What is the effect of Hairdressing CBT competencies on Youth Employment in Rwanda?
Scope of the Study

This study seeks to establish the contribution of vocational community based training to youth employment at IPRC-Kigali. The institute was chosen for the study because it is a pioneer institute of the vocational CBT program in Rwanda. Great emphasis is to find out how the vocational BT program had enabled the youth attain employable skills, create, access and manage employment opportunities by examining the youth graduates with various practical and employable skills such as masonry, hairdressing and carpentry, among others hence the research’s interest. The study was carried out at IPRC Headquarters and the neighborhood where some of the graduates were located. The Institute is situated in Kigali. The study took a period of seven months from 15th May to December 15th 2016. Vocational CBT is an outreach programme conducted by the Institution to the vulnerable youth from communities surrounding the institute with an approach of equipping them with appropriate Skills based on their identified needs in order to improve their livelihood (IPRC, 2013).

Significance of the Study

The study findings provide empirical data that would explain the contribution of vocation community based training to youth employment. The empirical data shall inform policy makers at the same time assist them to formulate appropriate youth employment policies for the governments, organizations, agencies, and departments. The generated data shall contribute to the already existing knowledge and literature about youth unemployment hence benefiting JKUAT University students, academicians and researchers as reference literature. The study would provoke further research for more detailed information with further development as regards youth employment.
2. LITERATURE REVIEW

The Human Capital Theory

Developed by Smith (1776) and re-invigorated by Schultz (1961) postulates that education and training are a form of investment in human beings. The underlying belief then is that education and training creates assets in the form of knowledge and skills, which in turn increases the productivity of the worker. Schultz argued that skilled human resource has been able to acquire these skills as a result of community support and training programs or investment in the existing human resource through appropriate on-the-job training. According to Flamholtz& Lacey (1981), human capital theory proposes that people's skills, experience, and knowledge are a form of capital (employment) and that returns are earned from investments made by the employer to develop these attributes. The human capital theory holds that employees should invest in specific training to enhance employees' career path prospects. Thus, the human capital perspective at the level of the Institute such as IPRC vocational the emphasis is on relevant and strategic skills’ development for the youth to enable them access employment opportunities.

Davenport (1999) suggests that the human capital perspective is also illustrative of the employee’s point of view. He contends that employees are not costs, factors of production, or assets, but rather investors in a business and market. They invest their own human capital, and they expect a return on their investment. Davenport further indicates that the predisposition for an employee to invest their time in an organization is based on sense of commitment. Vocational community Based training programs may be viewed as generalized investments in human capital particularly for the youth. Such investments can reassure employees that the expenditure of their time in the community led intervention to curb youth unemployment has contributed to their development and thus improved their livelihoods. Vocational Community Based Training (CBT) for the youth increases their competitive advantage to access employment which is a strategic interest for development (Ginn& Terrie, 2001). For the youth graduates, human capital theory justifies the importance of relevant skills acquisition to enable them improve their lives. CBT has thus, added value to human resource hence become skilled hence the
program is perceived to contribute to youth’s employment.

**CBT Competences**

Youth unemployment in Rwanda is the highest in Africa. A recent study, “Lost opportunity: Gaps in Youth Policy and Programming in Rwanda”, published by Action Aid, put youth unemployment at 62%, although the African Development Bank says it could be as high as 83%. Rwanda had the world's largest percentage of young people under 30 years of age, they made up to 78% – according to the to the 2012 State of Rwanda Population Report and by the United Nations Population Fund. Worldwide, there were about 1.2 billion 15- to 24-year-olds, this is about 200 million are in Africa.

The youngest population in Africa of young women and men represented the continent’s best hope for getting on a sustainable development path. However, the number of youth that were entering the labour market far outpaced existing job opportunities for them, with youth’s unemployment at double the average unemployment rate in the region, the continent was at the risk (AfDB, 2012). Worst of all, there was a severe mismatch between the skills possessed by young workers and those demanded by employers. Despite the increased enrollments in most sub-Saharan African countries especially at the primary level – the out-of-school population had very low educational attainment and lacked skills to enable them access employment opportunities (World Bank, 2008).

Lack of skills was a global problem (ILO: 2012) said, training institutions continued producing graduates whose skills did not match what the market wanted. This mismatch made it harder to tackle youth unemployment. As much as two-thirds of the young population is under-utilized in some developing economies, meaning they are unemployed, in irregular employment, most likely in the informal sector or neither in the labour force nor in education or training," says the ILO (2013)

La Paz, M. C. and Macey, C. (2007), found out that projects focused on employment linkages recognized that there were two client groups that required attention – firstly, young unemployed people who often lacked appropriate knowledge, skills and attitudes required for today’s job market and secondly, employers who required employees with both
appropriate hard and soft skills and attitudes. Also, there was often a perception gap that needed to be bridged in the comprehension that each group had of each other.

In 2000, IPRC took up a social responsibility of training the communities by providing vocational skills and life skills knowledge through Community Based Training Programs (CBT). This program mainly targeted the unskilled unemployed youth in various communities. The goal was to empower the youth from within their communities to enable them improve their livelihood. The institutes move their skilled personnel to various communities and assess the needs of the community and later design courses tailored to community needs such as; Wood curving, Carpentry, Hairdressing, Cookery & flying, Childcare training, Bricklaying & building, Motorcycle repairs, Radio repair, Tailoring, and Painting courses and later train them (IPRC, 2013). These skills are designed for nine (9) months to two (2) years, awarding certificates and diploma.

**Youth Employability**

Since the inception of CBT program at Institute in 2001, 500 students have graduated every year with various vocational skills training programs of the Institute. Over 100 youth have specifically been followed under the follow-up CBT programs, (IPRC, 2013). ILO, (2006) noticed that, creating decent work for young people is a challenge. ILO estimates that at least 400 million decent and productive employment opportunities are needed. ILO, (2006). Today young people need not only a job, but a training that enables them to be absorbed into the labour market and to make contributions as workers, citizens and agents of change.

The worldwide journal: Youth employment (2014), writes that the youth are challenged with starting up a business or work, lack of shared solutions to their problems and lack of shared best practices both for private and public sectors because they have not been prepared with enough skills, information and opportunities to address these challenges. The reality is that there are too few employers and employment opportunities to meet global youth employment requirements.

The worst working conditions and lack of opportunities in rural areas have encouraged the youth to migrate to urban centers. But because Rwanda has
not yet immersed her transition to industrialization, urban centers cannot create a massive number of jobs. Modern agriculture has considerable potential for job and wealth creation and may absorb large number of youth. However, making well balanced choices for employment-intensive investments in agriculture and rural nonfarm activities through Vocational Community Based Training can create immediate short term employment opportunities which can be more easily tapped by the youth group. (Innovations Journal - Special Edition on Youth Economic Opportunities-2013).

Besides expanding rural job opportunities, it is also necessary to improve the investment and macro-economic environments; encourage and support entrepreneurship and the informal sector; improve access to education and skills; address the demographic issues, including early motherhood; tackle the problem of youth in violent and post conflict settings; and improve the labor market conditions. These are the most needed policy responses to tackle youth employment issues in a sustainable manner in Africa. (Youth and Employment in Africa: The Potential, the Problem, the Promise journal (2014)

Manpower group, (2013) Concludes: That the rationale for employer initiatives to promote youth employability was simple: Businesses that can strategically source, manage, and create needed talent for the long term will be able to seize emerging economic opportunities, while those that failed to address this challenge will be outperformed by their competitors. Individuals who are given access to learning opportunities and who can cultivate the right skills will thrive in the labor market and contribute to the organizations that employ them. Manpower Group identified four key barriers to youth employability as below: lack of information, networks, and connections, lack of relevant skills, lack of experience credentials, and lack of available entry-level jobs with career potential.

Five groups of solutions were identified that can be adopted by employers and youth employment policy implementers as below: Provide career guidance to youth and participate in information systems and programs, engage with training-to-employment programs for youth, engage with apprenticeship and experience programs such as CBT, commit to hiring, training and mentoring young people and Promote youth entrepreneurship.

www.ijsrp.org
The key to reducing unemployment and informality the youth is rapid growth of good jobs through skills development. These are employment places capable of paying good wages and building skills. If the history of those countries that have successfully sustained growth, job creation and poverty reduction is any guide, creating such good jobs will require significant structural change and education special skills training. Economies that have made the transition from low income to high income status typically have experienced significant such changes in their economic structure (Kuznets, 1955; Chenery, 1986).

**The Social Welfare of CBT Graduates**

With the exceptions of Botswana, Nigeria and South Africa – all of which have high youth unemployment rates – less than 20 percent of Africa’s young workers find places in wage employment. Most of these jobs offer low wages, few benefits and few opportunities to build their employment career. Over 70 percent of young workers in Congo, Congo DRC, Ethiopia, Ghana, Malawi, Mali, Rwanda, Senegal, and Uganda are either self-employed or contributing to family work (AfDB, 2012).

Pezzullo, S. (2006), acknowledges that, an important message from CBT was that while young people have needs and deficiencies, they also come with unique strengths, contributions and creativity. Starting with this “full half” as opposed to the “empty half” view of their life experiences was a strong philosophical direction. For example, “Youth Opportunities Unlimited in Canada” strongly focused on “what is it that the young person brings to the table and what can we do to strengthen those contributions and assets.”

Equally, most projects highlighted the need for young people to be seen as active and creative partners in any youth development initiative.

The proponents of the Community Based Training targeting the youth worldwide believe that this program enhances the innovations in both governmental and non-governmental policies and programs (Barab & Hay, 2001). In comparison with the hundred thousands of young men and women yearly entering the labour market, only an infinitely small part has access to a Vocational Training Centre. The livelihood of the youth who have been trained under CBT continue to progress because of the “on the job experience” in form of informal enterprise. (Katharina Engels, Doris Bremm & Thomas Gerhards:
Community Based Training has a proven track record of success. Success comes easy because the program benefits everyone involved. This program offers youth the opportunity for success while helping the employer with filling high turnover, hard to fill positions with trained employees.

In Uganda, BRAC (2013), through similar initiatives of CBT have supported more than 1,305 clubs in youth livelihoods trainings. This program has reached 55,000 adolescents both female and male in Karamoja region. Youth have been supported with apprentice training, vocational trainings, and savings knowledge, and many youth have been able to create opportunities vital to work on social and economic empowerment simultaneously.

Globally, the World Bank works with a group of five closely associated institutions – the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA) and the International Centre for Settlement of Investment Disputes (ICSID). To provide loans and grants as well as policy advice, technical assistance and knowledge-sharing services to low and middle income countries to foster employment creation for youth (World Bank, 2013).

**Global perspective on vocational CBT**

The UN, youth and education journal of 2015 states that Education and knowledge are central to development and to the improvement of the lives of young people globally, and as such has been identified as a priority area in internationally agreed development goals, including the Millennium Development Goals and the World Programme of Action for Youth. Skills acquisition is important in eradicating poverty and hunger and in promoting sustained, inclusive and equitable economic growth and sustainable development. Despite significant improvements in increasing primary school enrolment in different parts of the world, particularly Africa, the Millennium Development Goal of achieving universal primary level education by end 2015 is unlikely to be met.

In addition, at the World Education Forum (Dakar, Senegal, 2000), 164 governments pledged to achieve “Education for All” (EFA) by launching a world movement to meet the basic learning needs of all
children, youth and adults. Participants at the Forum identified six goals to be met by 2015, with young people being the focus of Goal 3: ‘Promote learning and life skills for young people and adults’. The goal commits countries to ensure that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programs. However, the realization of all six goals provides the best opportunity and environment for youth to benefit from education and training particularly the training that addresses their needs.

Surprisingly, many education and training systems do not provide young people with the basic skills needed to escape poverty and unemployment, even when they continue to receive formal education. Non-formal education programs such as CBT seek to fill this gap by providing learning and skills development opportunities that are relevant to the context in which young people live and seek their livelihoods. Often provided through youth and community based training programs as a non-formal education, facilitates the learning of life-relevant knowledge and skills, especially for disadvantaged and marginalized groups (UN, 2015).

UN data on youth indicates that from 2011, the developing countries’ percentages of non-literate youth is 12.1%, with Sub-Saharan Africa’s percentage standing at 29.6%, and South and West Asia standing at 18.5%. In 2013, about 225 million youth, or 20% of all youth in the developing world, are “idle” – not in education, employment or training by 2015. Greater focus on universal access to education, quality education, human rights education and learning, as well as increased access to the complementary nature of vocational community formal and informal education practices in a non-discriminatory manner - particularly for young women is key for young people to be able to address their aspirations and challenges, fulfill their potential, and influence current and future social and economic conditions and opportunities. United Nations and Education Knowledge and education are key factors to the full and effective participation of youth in the processes of social, economic and political development. Increased attention to improving participation rates of young people, particularly marginalized youth, is needed to ensure that they acquire the knowledge, capacities, skills and ethical values needed to fulfill their role as
agents of development, good governance, social inclusion, tolerance and peace (UNESCO, 2015).

ILO (2005) states that knowledge-based technology is driving globalization, many countries such as Thailand, China, and other regional countries have transformed, or are in the process of transforming, their economic base from commodity or manufacturing to knowledge and technology-based. This process of change is bringing into question the quality of existing workforces and the way in which governments and enterprises are responding to human resource development, particularly in knowledge-based economies. It raises the question of whether education and vocational training systems are able to meet the enormous demands to train and retrain workers quickly enough and with the required skill adaptability to meet the challenge of knowledge-based, market-driven economies. As a consequence, young people today are expected to acquire a much higher level of knowledge and skills than was required 20 or 30 years ago. However, the question today is; how well does education and training systems prepare young people with the ability to access knowledge, assimilate it and adapt and apply it in today’s technology-driven workplace and in society as a whole. Dr. Sam Ian Ward (2015) states that Skilling Youth for Employability through vocational community based training is part of the solution to empower the vulnerable youth who live in the developing countries. Accounting that more than 1 billion people today are between 15 and 25 years of age and nearly 40 per cent of the world’s population is below the age of 20.

At the 62nd session of the General Assembly in 2007, the critical role of both formal and non-formal education in the achievement of poverty eradication and other development goals was reiterated. Also emphasized was the need for basic education and training for eradicating illiteracy; the importance of commitment in striving for expanded secondary and higher education, especially for girls and young women; and the creation of human resources and infrastructure capabilities and the empowerment of those living in poverty (UNESCO, 2015).

It is clear that many education and training systems are not adequately preparing students to meet the demands of a globalized world. The EFA Global Monitoring Report 2011 indicates that despite progress towards the EFA goals, millions of children...
are graduating from primary school with reading, writing and numeracy skills far below expected levels. Too often, the quality of secondary education is weak and the content is not relevant for young people and is not connected with the world of work. The persistence of youth unemployment and under-employment suggests that mechanisms for anticipating and developing skills relevant to the world of work are not functioning to the level necessary.

Increased efforts are needed to ensure that education at primary, secondary and tertiary level is respondent to the needs of young people and the realities in which they live, so as to adequately equip them for participation in social and economic life. Scaled up efforts to ensure quality teacher training, the development of appropriate and gender sensitive learning materials, safe educational environments, including efforts to eliminate bullying, and delivery of education in an equitable, gender sensitive and violent free manner are the cornerstones of providing an education for all. The development of policies and programmes to increase the use of ICT in education should be strengthened and recognized for its importance in the provision and evaluation of education, as well as an invaluable skill for young people. Non-formal education should not be seen as an alternative to formal education, but rather recognized for its complementariness in providing a more fully rounded and skills based approach, equipping youth to meet the competing demands of work and personal life. Non-formal education should not be seen as an alternative to formal education, but rather recognized for its complementariness in providing a more fully rounded and skills based approach, equipping youth to meet the competing demands of work and personal life (The UN youth and education journal of 2015).

Programmes to equip young people with the skills for the world of work must provide technical and vocational education and training (TVET), combining classroom education with workplace training, and technical training with communication, problem solving and entrepreneurship awareness. Otherwise, young people will find it difficult to find a job, to stay in employment, to move on in the workplace, and, more broadly, to succeed in lifelong learning. TVET programmes frequently provide training for a specific job, yet employment opportunities and the fast changing technology require adaptability and permanent skills development. Hence, increasing
employability requires consideration of both short- and long-term perspectives, enabling young people to seize immediate employment opportunities while also equipping them with the ability to continue learning and be able to adjust to changes in the workplace and career opportunities. There is an urgent need to transform TVET so that more young people and adults have opportunities to develop the skills they need for work and life. This transformation calls for putting TVET in a lifelong learning perspective and supporting deeper linkages between different policy areas such as youth policies, rural development, industrial development, poverty reduction, etc. At the same time, it emphasizes the need for broad partnerships which involves national stakeholders. The past twenty years have been marked by the emergence of new and innovative forms of collaboration between public and private actors in the area of education. For instance, the private sector has both a key role to play, and a great interest, in providing youth with the relevant knowledge, skills and attitudes they need, for example through work-based learning including apprenticeships, alternative training and internships (UN 2015).

Governments in developing countries must play their responsibility of creating enabling socio-economic and political environment by employing interventions geared to the attainment of quality Technical and Vocational Education and Training (TVET) output at the same time creating a friendly climate for investment by industries. This will encourage investors to invest and thereby create jobs in order to absorb the unemployed youths from our TVET institutions. Some recommended interventions to ensure quality TVET output that fulfills requirements for productive youth employment and decent work is achieved through collaborative key stakeholders include: a) To raise the public profile and attractiveness of TVET among learners, families and all other stakeholders, including through the media, and inform them on the possibilities for progression, employment and self-fulfillment that TVET can offer (Thomas, 2014)

3. METHODOLOGY

Research Design

This study used a cross-sectional research design because it was best suited to gather data from a sample of a population at a particular time as for the
The design was also appropriate for collection of quantitative and qualitative data. In this case, both quantitative and qualitative methods were used. The qualitative data described the knowledge, perception and attitude of the CBT graduates and other stakeholders about how the vocational community-based training contributed to youth employment. Whereas quantitative methods allowed the selection of representative sample and cross-tabulation of the findings, all the study objectives would benefit from both qualitative and quantitative research methods as indicated in the findings.

**Target Population**

This study was conducted in Kicukiro district at IPRC Institutes Headquarters and the respective surrounding communities. This was purposively selected for three reasons; 1). The institute is known for offering outreach Vocational Community Based Training Programme in Rwanda. 2). The Institute was accessible by road means of transport so it was easy to locate and reach, 3). Kicukiro being a growing town council in Kigali city had a dual characteristic of urban and rural settings which benefited the survey. The study population included the IPRC principal, CBT graduates those on the follow-up programme were 100, including the coordinators, the trainers and artisans, community members around the institute, government education officials at the ministry, district and town council levels, and members of Civil Society Organizations (CSOs) especially those supporting CBT programs in various ways. The parent population (CBT graduates whom IPRC kept a truck record of, in their respective communities) was one hundred (100) including, managers and other stakeholders. Taking a representational participation perspective, the target youth graduates were fifty (50), the IPRC principal, two (2) CBT coordinators, eight (8) instructors, seventeen (17) members from the community and two government officials.

**Sample Size and Sampling Technique**

The researcher used a sample size of eighty (80) basing on R.V. Krecije and D.W. Morghan sample tables as represented in table 3.1 below. All participants had engagements with the activities of vocational Community Training of IPRC Institute. The key informant interviewees besides qualitative provided quantitative information.
Table 3.1: Category of Sample Population

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal IPRC Kigali as Key Informant Interviewee (KII)</td>
<td>1</td>
</tr>
<tr>
<td>Coordinator of CBT at IPRC Kigali as KII</td>
<td>2</td>
</tr>
<tr>
<td>CBT instructors/Trainers as KIIs</td>
<td>8</td>
</tr>
<tr>
<td>Community Members/CBT Committee Members as KIIs</td>
<td>17</td>
</tr>
<tr>
<td>CBT graduates</td>
<td>50</td>
</tr>
<tr>
<td>Government Education Officials as KIIs</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

**Sampling Method**

The researcher divided the study population into six strata; principal, coordinators, instructors of CBT programme, community Members, CBT graduates, government officials and CSO’s. For each stratum, a proportionate and simple random sampling technique was employed to get the sample. Samples from different strata were added to give the total sample size of eighty (80) respondents particularly the graduates and other stakeholders of CBT program. A purposive technique was applied to select the principal of IPRC Kigali, the coordinators, and government officials, Community officials. The employed technique was effective in terms of cost and time. However, the researcher other than the stated technique employed other techniques such as observation to increase the validity of the research findings.

**Data Collection Methods**

The study expects to employ a triangulation approach in which different methods were combined. Data will be collected using qualitative and quantitative methods. According to Sarantokos (2013) the quantitative methods involves use of structured techniques of data collection that allow quantification, measurement, and operationalization using quantitative methods of analysis like statistics, on the other hand, the qualitative method of analysis is based on theoretical and methodological principles of symbolic interaction as stated by Bryman (2004). The combination of the two methodologies increases the validly of the research study. The main methods that will be used for data collection included administering of questionnaires to the CBT graduates, coordinators and facilitators. The questionnaires shall provide data that catered for the variables required for analysis with statistical procedures (Creswell, 2003). The checklists shall provide qualitative data and information
expressed in non-numerical terms that explains the analysis from the Key Informant Interviews (Amin, 2005).

**Questionnaire**

A structured questionnaire with both open ended and pre-coded questions were employed. Data was collected from CBT graduates and the facilitators. A total of eighty (80) questionnaires were administered respectively. All the questions were adhered to the research objectives, and the three (3) sections corresponded with the objectives of the study.

**Face to Face Interviews**

Besides the questionnaires, six face to face individual interviews were also held with the principal, community members, facilitators/trainers, government education officials and graduates. The interviews took place in their offices using the structured checklist with guiding questions. Where necessary the researcher and participants at outside their offices. The researcher paused a guiding question the participant expressed themselves about the community based training and in relation with the study.

**Procedure for Data Collection**

The researcher after pre-testing the tools from the Candle Light Institutes for validity and accuracy, the instruments were refined. The researcher was granted an introductory letter from faculty of social sciences of JKUAT (see appendix IV) for the purpose of introducing him to IPRC Institute and other respondents and the purpose of his research. He was given access to the CBT graduates under the follow-up program to proceed with the research study.

**Validity**

Validity is the extent to which research instruments measure what they are intended to measure (Oso&Onen, 2008). The researcher used the expert judgment of his different experts to verify the validity of the instruments. To assess this, the two judges were contacted to evaluate the relevance of each item in the instruments to the objectives. The experts rated each item as either relevant or not relevant. Validity was then determined using Content Validity Index (C.V.I). C.V.I=Items rated relevant by both judges divided by the total number of items in the questionnaire as shown hereinafter.

\[
CVI = \frac{\text{No. of items rated relevant}}{\text{Total no. of items}} = \frac{80}{100}
\]
As recommended by Amin (2005), for the instrument to be valid, the C.V.I should be at least 0.7. Therefore, the tools were valid at 0.8.

**Reliability**

Reliability is the extent to which a research instrument yields consistent results across the various items when it is administered again at a different point in time (Sekaran, 2003). To establish reliability, the instruments were pilot-tested twice on the same subjects at a time interval of four weeks. According to Amin (2005), test-retest reliability was used to measure the extent to which the instrument could produce consistent scores when the same group of individuals was repeatedly measured under same conditions. The results from the pretest were used to modify the items in the instruments.

To ensure reliability of quantitative data, the Cronbach’s Alpha Reliability Coefficient for Likert-Type Scales test was performed. In statistics, Cronbach’s alpha is a coefficient of reliability. It is commonly used as a measure of the internal consistency or reliability of a psychometric test score for a sample of examinees. According to Sekaran (2003) some professionals as a rule of thumb, require a reliability of 0.70 or higher (obtained on a substantial sample) before they use an instrument. Upon performing the test, the results that was 0.8 and above was considered reliable.

**Data Processing**

Completed questionnaires were edited and cleaned at the end of each day to check for consistency, completeness, and accuracy of the information given. Errors were eliminated and then data was entered in the computer with a special programme for social scientist known as Statistical Package Software for the Social Sciences (SPSS) which was appropriate for the study. Transformation/processing of raw data into meaningful data required that data was disaggregated into meaningful and related categories then re arranged systematically (Saunders M et al 2000).

**Data Analysis**

After the user defining the variable from a set of variables, data was entered and a number of cases created. Each variable was coded differently with a number. The system defined all cases entered by variables. Quantitative techniques such as descriptive statistics and inferential statistics (regression analysis) were used to understand relationships between
dependent and independent variables. Qualitative data was analyzed using thematic and content analysis. For qualitative data, coding of responses will be done to create and explain large segments of the data and identify categories. Then themes were identified such competencies, employability, courses under CBT among others to lend form to the focused codes or themes and help to conceptualize relationships and explanations among the substantive codes then illustrated by quotation or descriptions. Simple descriptive statistics was employed to analyze quantitative data into frequency counts and percentages besides regression modeling. Finally, conclusions were drawn and recommendations were made. The following regression model was used:

\[ P = \alpha + \beta_1 \sum_{i=1}^{n=3} X_i + \varepsilon_i \]

\[ \text{Eq. (1)} \]

Where; \( P \) is the Youth Employment, \( \alpha \) is Model Constant, \( \beta_i(i=1,2 & 3) \) are the Model Gradients, \( X_i(i=1,2 & 3) \) are Carpentry CBT Competencies, Masonry CBT Competencies and Hairdressing CBT Competencies while \( \varepsilon_i \) is Random Error Term assumed as Normally Distributed, \( \varepsilon \sim \mathcal{N}(0, \sigma^2) \).

**Data Presentation**

Analyzed data from SPSS software was presented in comprehensive frequencies and percentages tables, correlation tables as well as direct quotes all showing the responses of each category of variables as presented in chapter four.

**Ethical Consideration**

The introductory letter given to the researcher was used as evidence that the research study was purely academic and the outcomes would be confidential. The research study was based on the research plan which protects the rights and welfare of the individuals researched. The informed consent obtained in advance encouraged voluntary participation of the respondents. Care and securely was put into consideration while storing the data. Against this background confidentiality and anonymity issues were taken into consideration during the cause of this research.
RESEARCH FINDINGS AND DISCUSSION

4.1 Profile of the Respondents

Under profile of the respondent’s data about gender, age, educational background and length of job search of the respondents were analyzed.

Table 4.1 Gender of the Respondents

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>57</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
</tr>
</tbody>
</table>

From table 4.1, 71% were males while 29% were females. This implies that research is free from gender biasness since both male and female were interviewed. However, the findings indicate that the vocational CBT industry is dominated by males.

Table 4.2 Age of respondents

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid 14 - 18</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>19 - 24</td>
<td>40</td>
<td>50.0</td>
</tr>
<tr>
<td>25 - 29</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>30 &amp; Above</td>
<td>05</td>
<td>06</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

Age of the Respondents

Majority of the respondents 50% were aged 19 to 24 years. This was followed by 28% of the respondents being between 14 to 18 years. There were 16% of the respondents between the ages of 25 to 29 years, while 6% were 30 years and above. A total 78% of the respondents were within 14–24 years. This implies that the research finding is reliable since the findings shows that the majority of the respondents were mature in thinking.

Table 4.3 Education of the Respondents

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Never Attended Secondary</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Secondary</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Certificate</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>Diploma</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>08</td>
<td>10</td>
</tr>
<tr>
<td>Post-Graduate</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
qualification. The finding presented by the respondents was reliable since the majority was educated.

**Table 4.4 Length of Job Search by the Respondents**

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 year</td>
<td>40</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>2 - 5 Years</td>
<td>08</td>
<td>16</td>
<td>96</td>
</tr>
<tr>
<td>6 - 8 Years</td>
<td>02</td>
<td>04</td>
<td>100</td>
</tr>
<tr>
<td>8 Years &amp; above</td>
<td>00</td>
<td>00</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Most of the respondents (80%) had less than 1 year of length of job search. This was followed by 16% of the respondents having between 2-5 years’ length of job search and 4% of respondents having between 6-8 years length of job search. There was however none of the respondents having 8 years and above length of job search. This indicated that the research findings were reliable since majority of the respondents had got enough length of job search in the vocational CBT sector.

Presentation of Descriptive on CBT Competencies & Youth Employment in Rwanda

Descriptive Statistics

The data presented here are those collected from the field survey on the Contribution of Community Based Training Projects on Youth Employment in Rwanda. The data were collected in response to 80 copies of questionnaire distributed to the respondents which were fully completed and returned. Respondents were asked to indicate their respective opinion regarding the Contribution of Community Based Training Projects on Youth Employment in Rwanda. Descriptive analysis was then done on the responses. The results were then summarized in Table 4.5 and 4.6.

**Table 4.5 Descriptive Statistics for CBT Competencies on Job Assignments**

<table>
<thead>
<tr>
<th>CBT Competencies</th>
<th>N</th>
<th>Job Assignments</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpentry</td>
<td>80</td>
<td>63</td>
<td>78.75</td>
<td>2.136</td>
</tr>
<tr>
<td>Masonry</td>
<td>80</td>
<td>55</td>
<td>68.75</td>
<td>2.377</td>
</tr>
<tr>
<td>Hairdressing</td>
<td>80</td>
<td>61</td>
<td>76.25</td>
<td>2.451</td>
</tr>
</tbody>
</table>

Source: Survey Data (2016)
Table 4.5 indicates that of the 80 respondents, 78.75% of the respondents agreed that CBT in carpentry competencies do affect the youth employability in terms of job assignments in Rwanda. The mean response was 2.136 (SD=0.672) indicating not all respondents agreed with this fact. 68.75% of the respondents agreed that CBT in masonry competencies do affect the youth employability in terms of job assignments in Rwanda. The mean response was 2.377 (SD=0.458) indicating not all respondents agreed with this fact. 76.25% of the respondents agreed that CBT in hairdressing competencies do affect the youth employability in terms of job assignments in Rwanda. The mean response was 2.451 (SD=0.615) indicating not all respondents agreed with this fact.

Table 4.6 indicates that of 80 respondents 71.25% of the respondents agreed that carpentry competencies do affect the youth daily income in Rwanda. The mean response was 2.325 (SD=0.081) indicating not all respondents agreed with this fact. 78.75% of the respondents agreed that masonry competencies do affect the youth income in Rwanda. The mean response was 2.259 (SD=0.217) indicating not all respondents agreed with this fact. 83.75% of the respondents agreed that hairdressing competencies do affect the youth income in Rwanda. The mean response was 2.299 (SD=0.217) indicating not all respondents agreed with this fact.

<table>
<thead>
<tr>
<th>CBT Competencies</th>
<th>N</th>
<th>Daily Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Carpentry</td>
<td>80</td>
<td>57</td>
</tr>
<tr>
<td>Masonry</td>
<td>80</td>
<td>63</td>
</tr>
<tr>
<td>Hairdressing</td>
<td>80</td>
<td>67</td>
</tr>
</tbody>
</table>

Table 4.6: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.923</td>
<td>.852</td>
<td>.851</td>
<td>.156</td>
</tr>
</tbody>
</table>

Table 4.7: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>76.331</td>
<td>1</td>
<td>76.331</td>
<td>14.409</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>4.291</td>
<td>96</td>
<td>.066</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80.622</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.8: Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.934</td>
<td>.155</td>
</tr>
<tr>
<td>Carpentry CBT</td>
<td>.329</td>
<td>.015</td>
</tr>
</tbody>
</table>
agreed with this fact. 83.75% of the respondents agreed that hairdressing competencies do affect the youth income in Rwanda. The mean response was 2.532 (SD=0.053) indicating not all respondents agreed with this fact.

**Presentation of Inferential Statistics on CBT Competencies & Youth Employment in Rwanda**

4.3.1 Carpentry CBT and Job Assignments

The study sought to establish the effect of Carpentry CBT Competencies & Youth Employment (Job Assignments) in Rwanda. An $R^2 = .851$, indicates that 85.1% of variation in Youth Employment in terms of Job Assignments can be explained by the variance in Carpentry CBT Competencies leaving only 14.9% of the variation in Youth Employment being explained by the error-term or other variables other than Carpentry CBT Competencies. The results indicate that Carpentry CBT Competencies have statistically significant effect on Youth Employment in terms of Job Assignments in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Job Assignments in Rwanda. The beta of Carpentry CBT Competencies is 0.329 with a statistically significant ($p=0.000$) t-statistic of 3.464. Therefore, the model equation derived was:

$$P_{JA} = 1.394 + 0.329X_1 + e$$

The positive coefficient further demonstrates that a 1% improvement in Youth Employment in terms of

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.845$^a$</td>
<td>.714</td>
<td>.711</td>
<td>.311</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>63.123</td>
<td>1</td>
<td>23.123</td>
<td>9.082</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>7.285</td>
<td>96</td>
<td>.097</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80.408</td>
<td>97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Job Assignments in Rwanda is attributed to a 0.329% improvement in Carpentry CBT Competencies and the high t-statistic value (3.54) indicates that the effect is statistically significant at 95% confidence level.

4.3.2 Masonry CBT and Job Assignments
The study sought to establish the effect of Masonry CBT Competencies & Youth Employment (Job Assignments) in Rwanda. An $R^2 = .845$, indicates that 84.5% of variation in Youth Employment in terms of Job Assignments can be explained by the variance in Masonry CBT Competencies leaving only 15.5% of the variation in Youth Employment being explained by the error-term or other variables other than Carpentry CBT Competencies. The results indicate that Masonry CBT Competencies have statistically significant effect on Youth Employment in terms of Job Assignments in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Masonry CBT Competencies and Youth Employment in terms of Job Assignments in Rwanda. The beta of Masonry CBT Competencies is 0.432 with a statistically significant ($p=0.000$) $t$-statistic of 4.157. Therefore, the model equation derived was:

$$P_{JA} = 2.141 + 2.432X_2 + e$$

The positive coefficient further demonstrates that a 1% improvement in Youth Employment in terms of Job Assignments in Rwanda is attributed to a 0.432% improvement in Masonry CBT Competencies and the high $t$-statistic value (4.157) indicates that the effect is statistically significant at 95% confidence level.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.141</td>
<td>.227</td>
</tr>
<tr>
<td>Masonry CBT</td>
<td>2.432</td>
<td>.0435</td>
</tr>
</tbody>
</table>

Table 4.11: Coefficients
4.3.3 Hairdressing CBT and Job Assignments

The study sought to establish the effect of Hairdressing CBT Competencies & Youth Employment (Job Assignments) in Rwanda. An $R^2 = .806$, indicates that 80.6% of variation in Youth Employment in terms of Job Assignments can be explained by the variance in Hairdressing CBT Competencies leaving only 19.4% of the variation in Youth Employment being explained by the error-term or other variables other than Hairdressing CBT Competencies. The results indicate that Hairdressing CBT Competencies have statistically significant effect on Youth Employment in terms of Job Assignments in Rwanda.

The positive coefficient of determination indicates that there is positive correlation between Hairdressing CBT Competencies and Youth Employment in terms of Job Assignments in Rwanda. The beta of Hairdressing CBT Competencies is 0.225 with a statistically significant ($p=0.000$) t-statistic of 5.085. Therefore, the model equation derived was:

$$P_{JA} = 1.585 + 3.229X_3 + e$$

The positive coefficient further demonstrates that a 1% improvement in Youth Employment in terms of Job Assignments in Rwanda is attributed to a 3.225% improvement in Hairdressing CBT Competencies and the high t-statistic value (5.085) indicates that the effect is statistically significant at 95% confidence level.

### Table 4.12: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.899$^a$</td>
<td>.808</td>
<td>.806</td>
<td>.275</td>
</tr>
</tbody>
</table>

### Table 4.13: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>70.432</td>
<td>1</td>
<td>30.432</td>
<td>14.422</td>
<td>.000$^b$</td>
</tr>
<tr>
<td>Residual</td>
<td>10.242</td>
<td>96</td>
<td>.075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80.673</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 4.14: Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>.585</td>
<td>.201</td>
</tr>
<tr>
<td>Hairdressing CBT</td>
<td>3.225</td>
<td>.011</td>
</tr>
</tbody>
</table>

4.3.3 **Hairdressing CBT and Job Assignments**
4.3.4 Carpentry CBT and Daily Employment Income

The study sought to establish the effect of Carpentry CBT Competencies & Youth Employment (Daily Employment Income) in Rwanda. An $R^2 = .811$, indicates that 81.1% of variation in Youth Employment in terms of Daily Employment Income can be explained by the variance in Carpentry CBT Competencies leaving only 18.9% of the variation in Youth Employment being explained by the error-term or other variables other than Carpentry CBT Competencies. The results indicate that Carpentry CBT Competencies have statistically significant effect on Youth Employment in terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. The beta of Carpentry CBT Competencies is 3.205 with a

Table 4.15: Model Summary$^b$

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.901$^a$</td>
<td>.811</td>
<td>.809</td>
<td>.266</td>
</tr>
</tbody>
</table>

Table 4.16: ANOVA$^a$

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>69.108</td>
<td>1</td>
<td>29.108</td>
<td>12.145</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>6.780</td>
<td>96</td>
<td>.071</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75.888</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.17: Coefficients$^a$

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>2.881</td>
<td>.172</td>
<td>3.111</td>
</tr>
<tr>
<td></td>
<td>Carpentry CBT</td>
<td>3.205</td>
<td>.010</td>
<td>.201</td>
</tr>
</tbody>
</table>

The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. The beta of Carpentry CBT Competencies is 3.205 with a
Therefore, the model equation derived was:

\[ P_{DEI} = 2.881 + 3.205X1 + e \]

The positive coefficient further demonstrates that a 1% improvement in Youth Employment in terms of Daily Employment Income in Rwanda is attributed to a 3.205% improvement in Carpentry CBT Competencies and the high t-statistic value (5.501) indicates that the effect is statistically significant at 95% confidence level.

**4.3.5 Masonry CBT and Daily Employment Income**

The study sought to establish the effect of MasonryCBT Competencies & Youth Employment

Daily Employment Income can be explained by the variance in MasonryCBT Competencies leaving only 35.1% of the variation in Youth Employment being explained by the error-term or other variables other than MasonryCBT Competencies. The results indicate that MasonryCBT Competencies have statistically significant effect on Youth Employment in terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Masonry CBT Competencies & Youth Employment (Daily Employment Income) in Rwanda. The beta of MasonryCBT Competencies is 2.891with a statistically significant \( p=0.000 \) t-statistic of 3.870.
Therefore, the model equation derived was:

\[ P_{DEI} = 1.761 + 2.891X^2 + \epsilon \]

The positive coefficient further demonstrates that a 1% improvement in Youth Employment in terms of Daily Employment Income in Rwanda is attributed to a 2.891% improvement in Carpentry CBT Competencies and the high t-statistic value (3.870) indicates that the effect is statistically significant at 95% confidence level.

4.3.6 Hairdressing CBT and Daily Employment Income

The study sought to establish the effect of Carpentry CBT Competencies on Youth Employment (Daily Employment Income) in Rwanda. An \( R^2 = .708 \), indicates that 70.8% of variation in Youth Employment in terms of Daily Employment Income can be explained by the variance in Carpentry CBT Competencies leaving only 29.2% of the variation in Youth Employment being explained by the error-term or other variables other than Carpentry CBT Competencies.

The results indicate that Carpentry CBT

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>1.353</td>
<td>.221</td>
</tr>
<tr>
<td>Hairdressing CBT</td>
<td>2.838</td>
<td>.012</td>
</tr>
</tbody>
</table>
Competencies have statistically significant effect on Youth Employment in terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. The beta of Carpentry CBT Competencies is 2.838 with a statistically significant \( p = 0.000 \) t-statistic of 4.558. Therefore, the model equation derived was:

\[
P_{DEI} = 1.353 + 2.838X_3 + e
\]

The positive coefficient further demonstrates that a 1% improvement in Youth Employment in terms of Daily Employment Income in Rwanda is attributed to a 2.838% improvement in Carpentry CBT Competencies and the high t-statistic value (4.558) indicates that the effect is statistically significant at 95% confidence level.

### 4.3.7 CBT Competencies and Daily Employment Income

#### Table 4.24: Model Summary\(^b\)

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the</th>
<th>Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.946(^a)</td>
<td>.896</td>
<td>.892</td>
<td>.235</td>
<td>1.353</td>
</tr>
</tbody>
</table>

#### Table 4.25: ANOVA\(^a\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>78.096</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>2.526</td>
<td>94</td>
</tr>
<tr>
<td>Total</td>
<td>80.622</td>
<td>97</td>
<td></td>
</tr>
</tbody>
</table>
The study sought to establish the effect of CBT Competencies on Youth Employment (Daily Employment Income) in Rwanda. \( \text{AnR}^2 = .896 \), indicates that 89.6% of variation in Youth Employment in terms of Daily Employment Income can be explained by the variance in CBT Competencies leaving only 11.4% of the variation in Youth Employment being explained by the error-term or other variables other than CBT Competencies. The results indicate that CBT Competencies have statistically significant effect on Youth Employment in terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. Therefore, the model equation derived was: 

\[ P = 2.243 + 2.412X_1 + 4.696X_2 + 6.759X_3 + e \]

The positive coefficients demonstrate that a 1% improvement in the Youth Employment in terms of Daily Employment Income in Rwanda would be attributed to a 2.412% increase in improved carpentry CBT competencies, 4.696% increase in masonry CBT competencies and 6.759% increase in hairdressing CBT competencies. All the coefficients of the CBT competencies have t-statistics which were positive and relatively high value indicating that their effect is on Youth Employment in terms of Daily Employment Income in Rwanda is statistically significant at 95% confidence level. However, the model indicates that increasing hairdressing CBT competencies (\( \beta = 6.759 \)) contributes more, followed by increasing masonry CBT competencies (\( \beta = 4.696 \)), and lastly increasing...
carpentry CBT competencies ($\beta=2.412$) respectively in increasing the Youth Employment in terms of Daily Employment Income in Rwanda. The positive correlation coefficients tend to reflect the findings of Macharia and Ngugi (2014) in which hairdressing CBT competencies, masonry CBT competencies, and carpentry CBT competencies were found to have statistically significant effect on Youth Employment in the vocational training industry. Indeed, the vocational training sector need to improve CBT competencies in the youth throughout its operational structure, not only because of the youths existing social vulnerabilities but also because competitive business environment pointing to the increasing Youth employment which would have a significant impact on the country’s economic growth.

4.3.8 CBT Competencies and Job Assignments

The study sought to establish the effect of CBT Competencies on Youth Employment (Daily Employment Income) in Rwanda. An $R^2 = .931$, indicates that 93.1% of variation in Youth Employment in terms of Daily Employment Income can be explained by the variance in CBT Competencies leaving only 6.9% of the variation in Youth Employment being explained by the error-term or other variables other than CBT Competencies. The results indicate that CBT Competencies have statistically significant effect on Youth Employment
in terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. Therefore, the model equation derived was: 

\[ P = 2.942 + 2.552X_1 + 5.462X_2 + 6.334X_3 + e \]

The positive coefficients demonstrate that a 1% improvement in the Youth Employment in terms of Daily Employment Income in Rwanda would be attributed to a 2.552% increase in improved carpentry CBT competencies, 5.462% increase in masonry CBT competencies and 6.334% increase in hairdressing CBT competencies. All the coefficients of the CBT competencies have t-statistics which were positive and relatively high value indicating that their effect is on Youth Employment in terms of Daily Employment Income in Rwanda is statistically significant at 95% confidence level. However, the model indicates that increasing hairdressing CBT competencies \((\beta=6.334)\) contributes more, followed by increasing masonry CBT competencies \((\beta=5.462)\), and lastly increasing carpentry CBT competencies \((\beta=2.552)\) respectively in increasing the Youth Employment in terms of Daily Employment Income in Rwanda. The positive correlation coefficients tend to reflect the findings of Macharia and Ngugi (2014) in which hairdressing CBT competencies masonry CBT competencies and carpentry CBT competencies were found to have statistically significant effect on Youth Employment in the vocational training industry. Indeed, the vocational training sector need to improve CBT competencies in the youth throughout its operational structure, not only because of the youths existing social vulnerabilities but also because competitive business environment pointing to the increasing Youth employment which would have a significant impact on the country’s economic growth.
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

The study sought to establish the effect of CBT Competencies on Youth Employment in Rwanda. Regarding socio-demographic characteristics of the respondents, 71% were males while 29% were females indicating that the vocational CBT industry is dominated by males. Majority of the respondents 50% were aged 19 to 24 years, followed by 28% of the respondents being between 14 to 18 years while 16% of the respondents were between the ages of 25 to 29 years, and 6% were 30 years and above. A total 78% of the respondents were within 14–24 years. This implies that the research finding is reliable since the findings shows that the majority of the respondents were mature in thinking. 25% of the respondents had not attended secondary education at all with 35% having secondary certificate qualification. Also, another 17% had some certificate level qualification. Only 13% of the respondents were having diploma qualification while 10% had undergraduate qualification. However, none of the respondents had a post-graduate qualification. Lastly, most of the respondents (80%) had less than two years of length of job search. This was followed by 16% of the respondents having between 2-5 years’ length of job search and 4% having 6-8 years length of job search. A cumulative 96% of the respondents had between less than 1–5 years’ length of job search indicating that the research findings were reliable since majority of the respondents had got enough length of job search in the vocational CBT sector.

Regression analysis was conducted to investigate the statistical significant effect of CBT Competencies on Youth Employment in Rwanda.

Objective One

The study sought to establish the effect of Carpentry CBT Competencies & Youth Employment (Job Assignments) in Rwanda. The results indicate that Carpentry CBT Competencies have statistically significant effect on Youth Employment in terms of Job Assignments in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Job Assignments in Rwanda with the following model equation: $P_{JA} = 1.394 + 0.329X_1 + e$
The study then sought to establish the effect of Carpentry CBT Competencies & Youth Employment (Daily Employment Income) in Rwanda. The results indicate that Carpentry CBT Competencies have statistically significant effect on Youth Employment in terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. The model equation derived was: \( P_{DEI} = 2.881 + 3.205X_1 + e \)

Objective Two

The study sought to establish the effect of Masonry CBT Competencies & Youth Employment (Job Assignments) in Rwanda. The results indicate that Masonry CBT Competencies have statistically significant effect on Youth Employment in terms of Job Assignments in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Masonry CBT Competencies and Youth Employment in terms of Job Assignments in Rwanda. Therefore, the model equation derived was: \( P_{DEI} = 2.141 + 2.432X_2 + e \)

The study then sought to establish the effect of Masonry CBT Competencies & Youth Employment (Daily Employment Income) in Rwanda. The results indicate that Masonry CBT Competencies have statistically significant effect on Youth Employment in terms of Daily Employment Income in Rwanda. The model equation derived was: \( P_{DEI} = 1.761 + 2.891X_2 + e \)

Objective Three

The study sought to establish the effect of Hairdressing CBT Competencies & Youth Employment (Job Assignments) in Rwanda. The results indicate that Hairdressing CBT Competencies have statistically significant effect on Youth Employment in terms of Job Assignments in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Hairdressing CBT Competencies and Youth Employment in terms of Job Assignments in Rwanda. Therefore, the model equation derived was: \( P_{JA} = 1.585 + 3.229X_3 + e \)

The study then sought to establish the effect of Carpentry CBT Competencies on Youth Employment (Daily Employment Income) in Rwanda. The results indicate that Carpentry CBT Competencies have statistically significant effect on Youth Employment (Daily Employment Income) in Rwanda.
Employment terms of Daily Employment Income in Rwanda. The positive coefficient of determination indicates that there is positive correlation between Carpentry CBT Competencies and Youth Employment in terms of Daily Employment Income in Rwanda. Therefore, the model equation derived was:

$$P_{DEI} = 1.353 + 2.838X_3 + e$$

**Conclusions of the study**

Considering the significant role that vocational CBT sector plays in Rwanda’s economic growth, the study sought to establish the effect of CBT Competencies on Youth Employment in Rwanda. The study therefore concludes that CBT Competencies have statistically significant contribution on Youth Employment in Rwanda. It also concludes that improving the various CBT Competencies would eventually increase Youth Employment in Rwanda in the order of hairdressing CBT Competencies, masonry CBT Competencies and lastly carpentry in Rwanda.

**Recommendation of the study**

The study sought to establish the effect of CBT Competencies on Youth Employment in Rwanda. Since there was a positive and significant relationship between CBT Competencies on Youth Employment, vocational CBT players should ensure that the extent of integration of the three CBT Competencies is enhanced.

### 5.5 Suggestions for further Studies

The study suggests that future research should be conducted using a longitudinal design like panel design or time series instead of cross-sectional survey to bring a more dynamic result. The study also suggests future research should be expanded in scope to cover other developing countries for comparative analysis and hence more conclusive results in multi-dimensional and cross-cultural setups in developing countries.
ACKNOWLEDGMENT
A study of this nature is not only tiring, but also its success is as a result of the collective efforts. I thank God who has enabled me get this far and May He blesses and extends His loving hand to all the people who have rendered a hand in this project.

In the course of this study, I received invaluable support from various people mostly family members,

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A systematic review on pancreatic cancer stem cells as a novel paradigm for curing pancreatic cancer

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Abstract - Pancreatic cancer remains one of the deadliest cancers, which is usually diagnosed in an advanced state for which there are little or no effective therapies. In this perspective, efforts have been made to identify specific subset of cells that have the capability of producing differentiated progeny of cells. There are three major types of cancer stem cells (CSCs), but the most important type of CSCs nowadays are chemo-resistant and radio-resistant CSCs that are resistant from both - chemotherapy and radiotherapy. Hence, these chemo-resistant and radio-resistant CSCs were identified, which may provide some novel therapeutic approach to treat pancreatic cancer. Increased numbers of CD44+CD24−ESA+ cells were needed to generate tumors when injected into the pancreas. Identified CD44+CD24−ESA+ pancreatic CSCs showed the stem cell properties i.e. self-renewal, the ability to produce differentiated progeny. Several signaling pathways are upregulated in the pancreatic CSCs. Sonic Hedgehog (SHH) signaling molecule expression was very high in CD44+CD24−ESA+ cells compared to other normal pancreatic epithelial cells. Cyclopamine, a steroidal alkaloid, which has both teratogenic and anti-tumor activities, inhibited Hh signaling thereby inhibited pancreatic cancer growth in vitro and in vivo, suggesting that this signaling pathway has an early and critical role in the development of pancreatic cancer. Inhibition of Hh signaling by cyclopamine indicates that in the near future cyclopamine can be used as a drug to show some promising effect in the treatment of pancreatic cancer.

Index Terms - pancreatic cancer, adenocarcinoma, sonic hedgehog, stem cell, stem cell markers

I. INTRODUCTION

Pancreatic cancer is the fourth most frequent cause of cancer-related deaths; it also represents one of the most aggressive cancer types, with a high incidence of distant metastasis and mortality [1]. The detection of pancreatic cancer at early stage and/or the response to therapy are the major challenges in improving the clinical outcome of pancreatic ductal adenocarcinoma (PDAC) [2]. The main issue against successful therapy is represented by the absence of early diagnostic and prognostic markers as well as the unresponsiveness to radiation and chemotherapies [3]. Cancer stem cells (CSCs) appear to have a major role among other factors that contribute to the lack of success in the therapy of pancreatic malignancies. Cancer is characterized by cellular heterogeneity; CSCs, which represent a distinct subpopulation of cells, seem to be responsible for tumor initiation and persistency due to their properties of self-renewal [4] and multilineage differentiation. CSCs are considered as best candidates responsible for tumorigenesis, metastasis, and chemo- and radio-resistance as showed in the Figure 1 [5-7]. Understanding and properly addressing the challenge represented by CSCs appears as a logical, yet difficult task in anti-cancer strategies.

Figure 1: The schematic diagram shows various hierarchical populations of CSCs (After Liu et al. 2011).
II. PANCREATIC CSC AND THEIR SUBSETS

Emerging evidence suggests that the capability of a tumor to grow and propagate is dependent on a small subset of cells within a tumor, termed CSCs [8]. Although data have been provided to support this theory in human blood, brain and breast cancers, the identity of pancreatic CSCs has not been determined. After using a xenograft model in which primary human pancreatic adenocarcinomas were grown in immunocompromised mice, it was found that a highly tumorigenic subpopulation of pancreatic cancer cells expressing the cell surface markers CD44, CD24, and epithelial-specific antigen (ESA) [8]. Pancreatic cancer cells with the CD44⁺CD24⁺ESA⁺ phenotype (0.2–0.8% of pancreatic cancer cells) had a 100-fold increased tumorigenic potential compared with non-tumorigenic cancer cells, with 50% of animals injected with as few as 100 CD44⁺CD24⁺ESA⁺ cells forming tumors that were histologically indistinguishable from the human tumors from which they originated [8]. The enhanced ability of CD44⁺CD24⁺ESA⁺ pancreatic cancer cells to form tumors was confirmed in an orthotopic pancreatic tail injection model [8]. The CD44⁺CD24⁺ESA⁺ pancreatic cancer cells showed the stem cell properties of self-renewal, the ability to produce differentiated progeny, and increased expression of the developmental signaling molecule SHH. Identification of pancreatic CSCs and further elucidation of the signaling pathways that regulate their growth and survival may provide novel therapeutic approaches to treat pancreatic cancer, which is notoriously resistant to standard chemo- and radio-therapy [8].

III. CELL SURFACE MARKERS RELATED TO PANCREATIC CSC

A subpopulation of highly tumorigenic cancer cells within human pancreatic adenocarcinomas was identified using a xenograft model in which primary human pancreatic adenocarcinoma cells were implanted in immunocompromised mice. These cells displayed both self-renewal ability and ability to generate differentiated progeny, the ability to differentiate to recapitulate the phenotype of the tumor from which they were derived, and activation of developmental signaling pathways which are among the several features typically seen in stem cells. It was found that CD44, CD24, and ESA expressing cells represented the most highly tumorigenic population of pancreatic cancer cells compared with non-tumorigenic cells. After injection of only 100 CD44⁺CD24⁺ESA⁺ cells, resulting in tumor formation in 6 out of 12 of animals, indicating a 100-fold enhanced tumorigenic potential [8]. There was a remarkable similarity between the patients’ primary tumors with that of the tumors derived from the pancreatic cancer cells. When 500 CD44⁺CD24⁺ESA⁺ cells were injected into a NOD/SCID (Non-obese diabetic/severe combined immune-deficient) mouse model, they showed development of tumor and H&E staining of the tumor (developed in the NOD/SCID mouse) exhibited phenotypically indistinguishable epithelial cancer cells when compared to H&E stained epithelial cells of the patient’s primary tumor (Figure 2). On the contrary, no such tumor formation was observed after 500 CD44⁻CD24⁻ESA⁻ cells injection in a mouse model. [8].

Figure 2: Tumor formation occurred at the injection site of 500 CD44⁺CD24⁺ESA⁺ cells and no tumor was formed at the injection site of 500 CD44⁻CD24⁻ESA⁻ cells (After Chenwei et al. 2007).

IV. PANCREATIC CANCER

Pancreatic cancer is an aggressive malignancy with one of the worst outcomes among all cancers. It is the fourth leading cause of cancer death in the United States with less than 5% five-year survival rate. The lifetime risk of developing pancreatic cancer in both men and women is about 1 in 79 i.e. 1.27% [9]. The American Cancer Society (ACS) estimated that new cases of 42,470 Americans (21,050 men and 21,420 women) would be diagnosed with pancreatic cancer during 2009. The ACS also estimated that 35,240 Americans (18,030 men and 17,210 women) would die of pancreatic cancer in 2009 [10]. Despite advances in molecular pathogenesis, problems such as drug resistance and susceptibility for metastasis make pancreatic cancer a major unsolved health problem in the
United States [11]. Unfortunately, pancreatic cancer is a rapidly invasive, metastatic tumor that is resistant to standard therapies [12,13]. At present, single agent based chemotherapy (e.g. Gemcitabine) is the key treatment for metastatic pancreatic adenocarcinoma. Recent data indicate that in addition to Gemcitabine, 5-FU plus a platinum agent such as oxaliplatin could be used as a therapeutic paradigm for early stage cancer patients [14]. However, none of the available current chemotherapeutic agents have objective response rates of over 10% [15]. The magnitude of this problem mandates the need for novel therapeutic agents. Recently, CSCs and epithelial-mesenchymal transition (EMT) type cells, which share molecular characteristics with CSCs, have been postulated to play critical roles in drug resistance and cancer metastasis in pancreatic cancer [16,17]. Recent studies suggest that CD44+CD24+ESA+ and ALDH1 could potentially be pancreatic CSC markers [5,18]. In addition, it is found that the recently identified intestinal stem cell marker DCAMKL-1 is also expressed in a small proportion of cells in the pancreas and in pancreatic CSC marker [19]. However, the role of DCAMKL-1 as a bona fide stem maker remains to be elucidated.

Pancreatic adenocarcinoma is a highly lethal disease, which is usually diagnosed in an advanced state. There are very few of effective therapies. It has the worst prognosis of any major malignancy (3% 5-year survival). It is the fourth most common cause of cancer death in the United States, with an annual death rate of 31,000 people per year [20]. Although there are many advances in surgical and medical therapy, but it has less effect on the mortality rate of this disease. Identification of pancreatic CSCs and then exposition of the signaling pathways regulating pancreatic cancer cell’s growth and survival may provide an interesting therapeutic approach to treat pancreatic cancer [8].

V. ROLE OF DIFFERENT SIGNALING PATHWAYS IN PANCREATIC CANCER

Although in normal stem cells the self-renewal pathways are tightly controlled but in tumor initiating cells they may be activated constitutively. They may have an improper regulation through some epigenetic or genetic changes which ultimately lead to uncontrolled growth. Several studies reveal that during pancreatic cancer many signaling pathways are activated that ultimately regulate the uncontrolled self-renewal and proliferation of different CSCs. There are some specific signaling pathways that play a major role in the self-renewal of CSCs such as Wnt, Notch and Hedgehog (Hh) signaling pathways [21,22]. It has been found that CSCs in pancreatic cancer are involved in the epithelial to mesenchymal transition (EMT). This process involves phenotypic changes of epithelial cells towards mesenchymal cells. Although EMT is usually activated during embryogenesis by the signaling pathways, many EMT-activating transcriptional signals are up regulated (Figure 3) [23].

\[Figure 3: \text{Epithelial-to-mesenchymal transition process (After Cristiana et al. 2004).}\]

A. Wnt signaling pathway

It was found that nuclear β-catenin is necessary for EMT. \textit{In vitro} and \textit{in vivo} studies shows that when activated β-catenin increase self-renewal capacity resulting into development of epithelial cancer in mice [24]. Wnt blocks glycogen synthase kinase 3 (GSK-3β)
activity thus stabilizes Snail and β-catenin levels. This process is related to cancer metastasis and is thus involved in the EMT programme. Also Snail interacts with β-catenin and enhances Wnt signaling.

B. Notch signaling pathway
Recent studies reveal that Notch signaling activates EMT in cancer because this signaling pathway is responsible for cell fate, proliferation, differentiation, apoptosis and the maintenance of stem cells. It is thought that Notch can regulate endothelialial and mesenchymal markers to sustain mesenchymal transformation. Notch pathway increases cellular migration by activating nuclear factor kappa β (NF-κB), Matrix metalloproteinase 9 and vascular endothelial growth factor (VEGF) in pancreatic cancer cells. Several studies suggest that Notch inhibition can reverse EMT in the mesenchymal to epithelial transition (MET). This phenomenon is considered to be a promising therapeutic strategy in cancer treatment [25].

C. Hedgehog signaling
Hedgehog signaling is a self-renewal pathway. It is involved in embryonic cell growth and organogenesis. Hh is also involved in regulating genes associated with cell proliferation, differentiation, and cell motility. Hh pathway is normally inactive in adult organs but become very active in cancer. In such cases Hh increases myofibroblast differentiation and production of extracellular matrix which in turn enables the EMT process in cancer cells. The EMT process is actively involved in the generation of tumor metastasis and tumor recurrence. Such CSCs that have undergone EMT display resistance to therapy are also generated during Hh signaling. Cellular migratory potential is also increased by up-regulation of Mucin-4 (MUC4) and fibroblast growth factor receptor 1(FGFR-1) stabilization. Other studies show that the process in pancreatic cancer can also be regulated by Forkhead box protein M1 (FoxM1)- caveolin, GLI-Kruppel family member (GLI1), hepatocyte growth factor (HGF) or platelet-derived growth factor (PDGF). Hence it can be said that EMT type pancreatic tumor cells represent a highly important research focus for the therapies aiming at reducing or preventing invasion, metastasis and therapeutic resistance in pancreatic cancer. In vertebrates, there are basically three homologs of Hh sonic Hh, desert Hh and Indian Hh, which are expressed at different stages of development indicating that they may have different functions. Mutation in SHH pathway results into increased cellular proliferation, transformation ultimately leading to cancer. It has been found that inhibition of SHH signaling reduces metastatic tumor formation in pancreatic adenocarcinoma and prostate cancer [26]. Recently, it was found that the level of SHH was very high in pancreatic CSCs indicating that SHH play a key role in adult stem cell renewal. In highly tumorigenic pancreatic cancer cell population, there was an increase in the expression of developmental signaling molecule SHH. SHH is a signaling molecule which is highly expressed in the developing embryos. RT-PCR of three samples of normal pancreas and three separate pancreatic cancer xenografts showed that SHH expression was highest in CD44+CD24-ESA+ cells, which suggests that SHH expression is markedly upregulated in pancreatic CSCs as shown in the Figure 4 [8].

VI. ACTIVATION OF HEDGEHOG SIGNALING PATHWAY IN PANCREATIC CANCER

Different important molecules that are present in Hh signaling pathway were detected after performing immune-histochemical studies of pancreatic cancer tumors of human patient and of NOD/SCID mice. Patched 1 (Ptc 1) receptor and smothened protein were detected in tumors derived from pancreatic cancer (Figure 5) [27].

![Figure 4: mRNA expression of SHH, important in developmental signaling pathways, in normal pancreas, bulk pancreatic cancer cells, nontumorigenic CD44+CD24-ESA- pancreatic cancer cells and highly tumorigenic CD44+CD24+ESA+ pancreatic cancer cells (After Chenwei et al. 2007).](www.ijsrp.org)
VII. ROLE OF CYCLOPAMINE IN HEDGEHOG SIGNALING PATHWAY

Cyclopamine is a steroidal alkaloid or phytochemical, found in the plant *Veratrum californicum*, commonly called the corn lily. It interacts directly with Smo and thus inhibits Hh signaling [28-30]. It was found that 7 days after the administration of cyclopamine, there was no change in the cell density or morphology in control pancreatic cells; but there was a marked reduction in the cell density of the cancer cell lines. Those cells detached from the culture plates during the treatment period. The alkaloid did not induce apoptosis but it marginally reduced the proliferation of Smo cyclopamine responsive cell lines. Cyclopamine was used to test whether pancreatic adenocarcinoma require Hh signaling for their own proliferation and survival [27]. It was found that cyclopamine inhibits pancreatic cancer growth *in vitro* and *in vivo* by inhibiting Hh signaling. In pancreatic orthotopic xenograft models, a combination of cyclopamine and gemcitabine inhibited metastatic spread and primary tumor growths [31]. Hence, it suggests that this signaling pathway plays an early and important role in the development of pancreatic cancer.

VIII. DISCUSSION

In this review, the role of most important pancreatic CSCs in the development of pancreatic cancer with special focus on some developmental signaling pathways is summarized. Some highly tumorigenic cancer cells which expressed CD44⁺CD24⁺ESA⁺ cell surface markers are responsible for developing pancreatic cancer. These cells have the ability to self-renew and can produce differentiated progeny and also they can recapitulate the phenotype of the progenitor tumor. It was found that in human breast cancer patients the tumorigenic cancer cell population was CD44⁺CD24⁺ESA⁺. In human brain tumor and prostate cancer, expression of tumorigenic cancer cell population was CD133⁺ and they had a high tumorigenic potential [32-34]. The tumorigenic cancer cell population for melanoma was CD20⁺ cells. All these studies of different CSCs suggests that there are some common markers in different cancer cells but one unique phenotype for marker CD24⁺ is found only in case of pancreatic cancer. These stem cells can
also activate different developmental signaling pathways. It has been found that several developmental signaling pathways such as Wnt, Hh and Notch are activated during pancreatic adenocarcinoma. The mRNA expression of SHH is very high in pancreatic CSCs. The alkaloid cyclopamine have successfully reduced the tumor growth in vitro in NOD/SCID mice models. Hh inhibitors such as cyclopamine may thus be used as a promising drug in the treatment of one of the most aggressive cancer - pancreatic cancer. Identification of pancreatic stem cells and identifying the role of Hh signaling pathway and explication of other signaling pathways which regulate their growth and survival may provide innovative therapeutic approaches in the treatment of pancreatic cancer.

IX. CONCLUSION

CD44+CD24+ESA+ pancreatic cancer cells showed stem cell properties of self-renewal, increased expression of the developmental signaling molecule SHH. CD44+CD24+ESA+ cells formed tumors, histologically indistinguishable from human pancreatic tumors from which they originated. Cyclopamine having teratogenic and antitumor activities inhibits pancreatic cancer growth in vitro and in vivo by blocking Hh signaling pathway. Identification of pancreatic CSCs, by understanding the signaling pathways that regulate their growth, survival may provide novel therapeutic approaches to treat pancreatic cancer as it is notoriously resistant to standard chemo and radiotherapy. Hh signaling inhibition by cyclopamine indicates that it may be used as a potenti drug to show some promising effect in the treatment of pancreatic cancer in the near future.

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Abstract: Instructional strategies explored in this review are class-wide peer tutoring, direct instruction and the behavioural strategy of self-monitoring. The teaching model is known as co-teaching, a model which is becoming the norm in schools in southeast Michigan. It is hypothesized that concrete knowledge of research based instructional methods that can be used in co-teaching situations may reduce rates of teacher frustration and attrition, and will improve academic and behavioural performance of students in a variety of setting. Teaching strategic of child with special need is most essential in teacher education for inclusive education to develop our school education system. Teachers training institute in India for disability children have Bed (spl) Education course which is affiliated to RCI in India. There are six categories of disabilities for teacher education in inclusive education. Mental Retardation (M.R), visual impairment (V.I), orthopedically handicapped (O.H), autistic child (A.U), Herring impairment (H.I), Learning disabilities (L.I) are considered in this study. Here explain how to teach to varieties categories of children with special need to their extend current primary level for all round development. The main purpose of the study is to find out how to develop technique to teach for children with special need in secondary school going children in normal school through inclusive teacher education.

Key words: RCI, CWSN, Inclusive Education, Teaching Strategic, Learning Disabilities, Retardation, Behaviours, Horizons, Exploring etc.

INTRODUCTION: Education is the backbone of our society; country as well as global abord. Most of people said that society cannot develop without well education. It can maintain well develop of various aspect of a country like-(growth GDP, economic, empowerment, socio-cultural activities, international brotherhood, maintain populations ratio etc. but most important things of this matters is education which is fully depend on teaching strategies of teacher in education. We know that there are two kind of education one is general education and another is special education. There are six categories of cwsn child found in our society, like-Mental Retardation (M.R), Visual Impairment (V.I), Learning Disability (L.D), Autistic Child (A.U), Hearing Impairment (H.I), Orthopedically Handicapped (O.H). Eighty percent of people with disabilities live in developing countries. If you are a school-aged child with a disability in one of those countries, you have a one in ten chance of going to school.

In Arsi Zone, Oromia Region, the statistics are even worse. Only 2.3% of children with disabilities are able to attend school. In some cases their community has no school at all. Where there are schools, the teachers
and facilities are not equipped to receive children with disabilities – there is a lack of specialized education, supplies and dedicated space.

Education is a key part of the assistance offered by Christian Horizons in communities in developing countries.

The impact is undeniable. Consider Muktar (pictured), for example. He was supported individually by Christian Horizons for eight years. Muktar is blind. His support enabled him to receive help with school necessities such as fees, uniform and access to materials in Braille. Were it not for Christian Horizons, Muktar would not have been able to attend school. Today, Muktar serves his country and community as a Crown Prosecutor at the Office of the Attorney General Ethiopia.

Christian Horizons launched its Special Needs Education program in Ethiopia in 2007 to help students like Muktar. Reports indicate that students who have Special Needs Education often outperform other students in high school. Christian Horizons Ethiopia has been able to help 331 teachers receive training in Special Needs Education and open 110 Special Needs Units (or Department, which may include multiple classes). As a result, 2,560 children with disabilities have been able to get an education.

It is generally accepted that the first recorded attempt in Ghana to provide education for children with disabilities was undertaken by missionaries in the year 1936 (Anthony & Kwadade, 2006, Avoke, 2001a). In 1964, parents of children with intellectual disabilities (ID) formed an association called the ‘Society of Friends of the Mentally Retarded’ whose extraordinary advocacy led to the establishment of the first ‘home for the mentally handicapped’ in 1966 (GES, 2005). The National Education Act (1961) saw the Ghanaian government assume responsibility for the education of children with disabilities (Anthony & Kwadade, 2006). This, coupled with increasing international influence led the ‘home’ to become the first “school for the mentally handicapped” in 1970 (Avoke, 2001a). The 1970-80’s saw rapid growth in the number of segregated ‘special schools’ for the ‘visually impaired’ (VI), the ‘hearing impaired’ (HI), and the ‘mentally disabled’ (MD). Increasing national recognition of the need for additional education services led to the formation of the Special Education Division (SpEd) within the Ghana Education Service (GES) in 1985 (GES).

Governments across the world recognize the importance of providing an education to all children within an inclusive education system. Yet, despite great progress in getting more children into school over the past decade, children from disadvantaged backgrounds are likely to experience poor quality of education limiting chances of fulfilling their learning potential. Children who face multiple disadvantages related to disability, poverty, gender, caste, religion or where they live, are amongst those least likely to be learning.

The project aims to identify strategies to raise learning outcomes for all children, regardless of their background. It is widely recognized that teachers are central to a child's educational experience. Yet, in low income countries, disadvantaged learners often face poor quality teaching: many teachers are recruited without having a basic subject knowledge themselves, receive inadequate training with limited attention to strategies to support children from diverse backgrounds, and weak incentives and poor teacher governance can lead to low motivation and high levels of teacher absenteeism. The research will, therefore identify which aspects of teaching are most important for improving all children's learning, and so inform governments on the strategies needed to support children who face multiple disadvantages.
PURPOSE OF STUDY: The study may help to understand how to develop teaching technique or how to teach to develop a teaching strategy for children with special need of exploring global teacher education.

STATEMENT OF THE PROBLEM: The research project is concerned with finding out the development of teaching technique or teaching methods for children with special need through exploring horizontal global teacher education.

LIMITATION OF THE STUDY:

1) Time was not sufficient to include more subjects for this project.
2) Samples were only within the area of SSM (Kolkata) in West Bengal.
3) Only low and no cost teaching-learning material or equipment was used in this study.

DELIMITATION OF THE STUDY:

1) 100 CWSN students were selected for this study.
2) Age group of this study was 10-14 years.
3) The study was confined in various schools in Kolkata district.
4) Only the development of teaching was measured in this subject.
5) Different types of classes of CWSN were considered in this study.

METHODOLOGY

The main purpose of the investigation was to find out how to teach or development of teaching methods in children with special need through exploring horizontal global teacher education.

This honors experience is one that I chose for the purpose of seeking a deeper understanding of effective teaching. Over the course of my honors studies, I have reviewed topics which have given me a broader view of all students. One study examined the correlation between depression and television watching. Another project involved taking a deeper look into effective teaching of reading and comprehension strategies. The overall intent for these honors projects was to understand and teach students with academic and behavioral difficulties. The purpose for this final honors project was to add another level of understanding students with academic and behavior difficulties by learning about key research-validated strategies that can enhance the teaching of all students. It was also to turn that information into a booklet to share with other teachers at some point, in order to assist them in effectively teaching to all students. With the increase in the use of coteaching arrangements in schools, this booklet may be something that can be shared so that both general education and special education students may profit by the strategies that the teachers will use. The method involved in this project involved conducting a literature review to summarize the key points of three strategies and one instructional style and then to present these findings in both an academic manner and as a more easily read document for teachers. Practical worksheets were designed and included in the Appendix to help teachers visualize the important steps and begin using these strategies.
Total 100 subjects were taken as the subjects. Among them 50 student were girls and 50 were boys for age group of 10-14 years old.

Six categories of cwsn were considered in different type student of classes in main stream education.

RESULT AND DISCUSSION

Working together is to deliver instruction within one classroom. The determination of who does the different jobs is decided by both the general and special education teachers in order to avoid appropriate rewards should be pre determined to provide positive reinforcement for success. Support and advice from special education teachers can help with proper design and implementation of self monitoring activities. It is often helpful for special education and general education teachers to work together. Co-teaching is also an option for regular and general education teachers who are willing to work together to use their talents in the classroom. Co-teaching Overview. Co-teaching is a teaching model used to support inclusion of students with disabilities in general education settings. In this model, one general education teacher and one special education teacher share all instructional responsibilities within one single classroom. It can potentially bring the best of both worlds. The special education teachers can identify unique learning needs of individual students and enhance curriculum and instruction to match these needs (Zigmond & Magiera, 2001). There are three main objectives of co-teaching. The first is to include a wider range of instructional alternatives. Students who are taught using various teaching styles may better grasp information presented in the classroom. Second, co-teaching is intended to enhance participation of students with disabilities. Thirdly, it is intended to improve performance outcomes for special education students. In co-teaching, both teachers misunderstandings or conflicts about the role of each teacher. Researchers have emphasized that co-teachers should volunteer for this type of teaching assignments and that it should include planning time at least once a week. Proper distribution of responsibilities has been critical to having successful co-teaching outcomes (Walther Thomas, Bryant, & Land, 1996). Research findings. The Individuals with Disabilities Education Act (IDEA) mandated that special education teachers need to be highly qualified in core content areas (Council for Exceptional Children, 2008). Co-teaching is an option that can work without requiring that every special educator be certified in multiple core content areas. Co-teaching allows general education students to work with and better understand students with various ability levels. It provides opportunities for leadership and growth within the least restrictive environment and enhances a student’s sense of responsibility (Dover, 1994). When teachers are able to combine their expertise in content knowledge, learning strategies, and classroom management, then more students can achieve to higher levels of proficiency (Friend and Hurley-Chamberlain, 2007). Research on the effectiveness of co-teaching is limited due to the newness of the delivery model (Zigmond, 2003). Researchers have found that co-teaching can aid in the social development of students with learning disabilities and can increase reading achievement of at-risk students and students with disabilities (Vaughn, Elbaum, Schumm, and Hughes, 1998). Students in a co-taught classroom benefit by having a second teacher who can assist with the learning of all students. Having a special educator in classrooms may help identify students specific learning needs. Co-teaching is most often used for assisting with the inclusion of students with mild mental retardation, behavior disorders, and learning disabilities. It has been used by all grade levels k-12, but is most recommended for elementary and middle school age classrooms (Zigmond & Magiera, 2001). It is at the discretion of the teachers which subjects might be taught using the co-teaching delivery model. Implementation of co-teaching. There are five common approaches to co-teaching. These approaches include parallel teaching, station teaching, alternative teaching, team teaching, and one teaching/one drifting. These approaches could be used according to classroom demographics and situations as well as teacher preference. In parallel teaching,
teachers share the responsibilities of planning and instruction. The class is split into groups and the same information is taught to both groups, so both teachers need to be proficient in the content being taught. Content is the same, but teaching methods may be different. In station teaching, students rotate between both teachers, who repeat instruction using various methods of learning. Each teacher will work with every student. Planning and teaching responsibilities are shared. Alternative teaching suggests that the class is taught as a whole for parts of the lesson. Some students work in a small group for pre-teaching, enrichment, re-teaching, or other individualized instruction. This approach allows for highly individualized instruction to be offered. Teachers should be careful that the same students are not always pulled aside. When team teaching, teachers work as a team to introduce new content, work on developing skills, clarify information, and facilitate learning and classroom management. This requires the most mutual trust and respect between teachers and requires that they be able to mesh their teaching styles. Finally there is one teaching/one drifting. One teacher plans and instructs, while at the same time the other teacher provides adaptations and additional support as needed. This method requires little joint planning, but should be used sparingly due to student distraction and uneven participation from both teachers. When using co-teaching, teachers should consider students’ grade level, ability level, significance of disabilities represented, climate of the educational setting, and administrative support. It is important to consider the appropriate scenarios and handouts to instructional settings, modification of activities, support activities, and assistive technologies. An example organizational chart for determining responsibilities is displayed in Appendix B.1 & B.2. Responsibilities are defined and displayed so that both teachers understand their role and conflicts are avoided. Quick guide for co-teaching approaches. The following guide is designed for teachers to view an easy interpretation of the similarities and differences in co-teaching approaches. Parallel teaching: 1. Divide students into two small groups. Groups may be formed strategically by student needs. 2. Teacher 1 and 2 teach all objectives to their own group. 3. There is an opportunity for students to participate in small group or class discussions. Station teaching: 1. Divide students into two groups. 2. Each teacher plans and teaches information at each station. 3. Students rotate between teachers. Alternative teaching: 1. Teachers plan instruction together. 2. General education teacher instructs the large group. 3. Special education teacher takes students who need additional help or accommodations. Team teaching: 1. Teachers plan instruction and present together. 2. Teachers work together to ensure appropriate and effective learning. One teaching/one drifting: 1. One teacher designs and presents the lesson. 2. The second teacher tours the classroom, providing support by answering questions, re-explaining key concepts, and assisting with behavior management. All strategies and the teaching model can be used as a single tool for improving student success in the classroom, or they can be used in combination with other strategies. This review provides a foundation for teachers. Further research and training opportunities are always beneficial to the professional development of educators.

Sample Direct Instruction Lesson Objective: Students will be able to repeat the rule “Raise your hand before talking” and be able identify two examples and two non-examples with 100% accuracy. Rationale: “Raising you hand before talking is very important in the classroom. It allows all students to have a chance to answer questions being asked. Now we are going to practice appropriate responses when questions are asked.” Lesson: Teacher: “The appropriate response for answering a question is to raise your hand before talking. What is the correct way to answer a question? Get ready.” Signal Class response: “Raise your hand before talking” Teacher: “Excellent. What is the right way to answer a question? Get ready.” Signal Class response: “Raise your hand before talking.” Teacher: “Good. Now we are going to practice some times that people do and do not raise their hand before talking. Class, am I raising my hand before talking when sit quietly in my seat with my hand raised in the air? Get ready.” Signal Class response: “Yes.” Teacher: “Good. Am I raising my hand before talking when I jump up and down saying “ooh, ooh, ooh, pick me, pick me”? Get ready.” Signal Class response: “No.” Teacher: “Good listening. Am I raising my hands before talking when I am
sitting on the group carpet, staring at the teacher, and holding my hand in the air? Get ready.” Signal Class response: “Yes.” Teacher: “Yes. How about if I am clapping to get the teacher attention? Get ready.” Signal Class response: “No.” Teacher: “Your turn, can someone tell me a time when they raised their hand before talking? (Take two responses and briefly discuss.) Teacher: “Great job, everyone. I am going to act out a few situations and ask you each time: Am I raising my hand before talking?” (Possible ask for student helpers, act out 2 examples and 2 non-examples, and a response from the class each time.) Teacher: “Great job everyone! Remember, raise your hand before talking, even when answering a question that was asked.” This lesson is adapted from Kostewicz, Ruhl, and Kubina, 2008. Chapter 3 Self-Monitoring What is Self-Monitoring? Self-monitoring is a strategy that can be used to increase on-task behavior of students by encouraging them to monitor their own behavior. Why would I use it? Self-monitoring interventions equip students to recognize and keep track of their own behavior. When teachers are able to properly implement self-monitoring strategies, student performance rates increase significantly. Eighty percent of students with ADHD exhibit academic performance problems due to their lack of self-monitoring ability. How does it work? It encourages independent functioning, which allow individuals with disabilities to rely less on prompts from teachers. Students keep track of their own behaviour, while teachers monitor progress and provide reinforcements. So what should I do? 1. Identify the specific behaviour 2. Conference with the student 3. Collect baseline data 4. Teach a replacement behaviour 5. Select or design a self-monitoring chart (A.13-A.15) 6. Teach the student to use the system 7. Fade the role of the adult in the intervention 8. Reinforce positive behaviour 9. Monitor the students’ progress (A.11 & A.12) 10. Teach Maintenance Figure 5: Example self-monitoring chart. Name: __________________________________________ Date: ___________________________ Goal: To work quietly for 10 minutes per subject Subject Color in 1 box per minute 1. Math 1 2 3 4 5 6 7 8 9 10 2. Science 1 2 3 4 5 6 7 8 9 10 this chart is set up for the teacher to determine a specific 10 minute window of self-monitoring. The teacher informs the student of a start time and a stop time in which students are challenged to work quietly. For this time period the students’ job is to work quietly. If the student uses an inappropriate behaviour during that period, the teacher simply walks to the students’ desk and crosses off one box. At then end of the ten minutes the student is allowed to color in boxes that are un-marked by the teacher. Appropriate rewards should be pre determined to promise positive reinforcement for success. Appendix A.11 Target Behaviour Scatter Plot Target behaviour: Student gets out of seat out raising his/her hand. Target Time Monday Tuesday Wednesday Thursday Friday 9:00-9:15 9:15- 9:30 9:30-9:45 9:45-10:00 10:00- 10:15 *Place a tally mark in the appropriate section immediately following selected target behavior.

Teachers must be equipped with the skills that are necessary for improved student achievement in order to successfully teach and accommodate the needs of all children. Classrooms are intended to be positive, supportive environments where there is a deep understanding of students social, emotional, and physical well being. And it is important to recognize, nurture, and strengthen the talents found in each student. Teachers who are trained to use various evidence-based teaching methods, both instructional and behavioral, are better prepared to educate in these diverse learning environments and will naturally excel as an educator (Baker, 2005). Understanding and using specific strategies will allow teachers to improve student achievement levels, provide a wider range of instructional alternatives, and promote diversified learning methods for any degree of student ability. It is a teacher’s awareness of the various tools and resources that builds a bridge across educational achievement gaps. Becoming experts on these useful strategies is a concrete way to ensure that “all students have a better chance to learn, excel, and live out their dreams”.
REFERENCE


Detection of Malware and Kernel-Level Rootkits in Cloud Computing Environments

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Abstract:
This paper provides detailed comparisons between different studies based on the topic, “detection of malware and kernel level rootkit in cloud computing environment”, and on the basis of these comparisons, different findings are provided and in the end, this paper provides suggestions to improve different techniques of the detection.

Paper 1:
Rootkit Detection on Virtual Machines through Deep Information Extraction at Hypervisor-level [a]

By: Xiongwei Xie & Weichao Wang, Paper Published in 2013.

Overview:
The first step of an attacker is to attack system’s rootkit, rootkit is basically a collection of tools which is used to run programs; once the rootkit is accessed the attacker can get the administrative control of the system. [1]
Such attacks are very dangerous, the formation of virtualization creates a new technique for the detection of such attacks, and the paper recommends the approach which uses rootkit in detection and prevention. The rootkit which will be designed for the virtual machines to not only detect but also prevent from malware by using information extraction and reconstruction techniques at the hypervisor level.

With the help of important components of virtual machine i.e kernel symbol table, the hypervisor can reconstruct the virtual machine execution state and can get the important information e.g running programs/ processes, active network connection & open files etc. With the help of cross checking of the components, the important information is fetched:
1: Concealed information
2: The anomaly connections among them

The method used in the above paper is executed in Xen 4.1 Linux VMs

The paper implemented given approach in Xen 4.1 with Linux VMs. Results of the experiments showed that the hypervisor can efficiently reconstruct the semantic view of a VM’s memory and detect the rootkits. The access of the hypervisor is only to the high level data structures which has very limited impacts on the performance of VM.

Today’s computer systems are more insecure as compared to the early system, because of the excessive use of internet, today’s systems are more exposed to threats, the severity varies from mild to severe, some threats are detectable some are not, the threats which cannot be detected are more dangerous than the one which can be detected. These are known as stealth attack. The most crucial component that can be attacked is rootkit, so the stealth attack to rootkit is the most severe attack in the recent era.

In such attacks rootkit is the target and the malicious program hides itself to not to be detected and get the administrative control of the system. In these attacks rootkits hide their existence from the anti-malware programs.

Rootkit detection is classified into three groups:
1: the first group analyze and characterize the behavior of rootkit with the help of Hookfinder, K-Tracer, Panorama
2: the second group tries to detect rootkit through some indicators that are unveiled by the interruption with the help of SBCFI, kernel integrity of OS monitoring for the change detection & Copilot
3: the third group design to secure rootkit from changes the OS kernel, author presents a method that uses the static analysis to identify instruction sequence of malicious actives based on their signature. The host based rootkit mechanisms have their limitation e.g there are many effectively secure rootkits which are capable to detect and remove antimalware, Agobot is one of them, it not only can detect but also remove more than 105 types of malware program in victim machine.

There are systems for rootkit detection in VM i.e VM watcher, VMI, UCON, it effectively maintains low level access to the system and makes sure that access cannot be compromised by the internal process of VM.
Although the detection is on detailed level but still some data remains unexamined and some malware remains undetected, VM watcher compares the name of the process, the attacker changes the name of the malware process with the name of other process and to hide itself from detection. Some software packages also contain some hidden components so their hidden goals. The technique proposed by the paper is based on detailed level information extraction and on crossed verification at hypervisor level.

The hypervisor can only perceive or observe the raw memory pages of VM so the need was to provide semantic view of VM’s memory for the states information i.e running processes, kernel level modules, network connections and open files then check execution states and cross verify both with this approach. Hidden malware can be identified with this and the gap between the VM view and hypervisor view can be minimized. The verification identified the mismatches they executed in their approach in XEN which presented trivial performance impact over the virtual environment.

Findings:
The approach is basically based on the view difference between hypervisor and VM, paper proposed to give the same access to hypervisor as the VM has. It’s good in a way that it can verify both as VM and hypervisor. Both are viewing same files processes so they can detect hidden malware with this ability and with the help of mismatched files.

- One point arises that is it safe to give this much access to hypervisor?
- Can hypervisor not be a threat for the system?

Limitation:
This approach is executed in Linux, not tried on the window.

Recommendations:
This approach is good enough and explained in detail. One recommendation is to link this approach with artificial intelligence for the better detection which is also mentioned in the paper for further enhancement, it will make it more effective

Terms/ Key words:
Hypervisor: Virtual machine manager
Anomaly: abnormality, irregularity
Xen 4.1 Linux VMs:
Stealth attacks: attacks that remain undetected by the client computer [2]
HookFinder : It provides the information about the underlying hooking mechanisms that attacker used.
SBCFI: state based control-flow integrity
VMI : methodology used to inspect the low level VM states.
UCON: stands for usage control model

Malware Detection in Cloud Computing Infrastructures [b]
By:
Michael R. Watson, Noor-ul-hassan Shirazi, Angelos K. Marnerides, Andreas Mauthe and David Hutchison
Journal is published in 2015

Overview:
This paper is based on the key concept of the security of cloud that it should not only detect net based threats but also make cloud capable of handling new challenges that target cloud infrastructures. The paper has discussed an online cloud anomaly detection approach, compared detection components etc the paper claimed of the detection of malware and DoS attacks. Authors not only evaluated the system level data but also covered the network level data depending on attack type and showed that their detection approach based on components monitoring per VM is applicable to cloud and its flexible detection system which can detect malware without any knowledge of their functionalities or underlying instructions.

Cloud datacenters are used in private, public and commercial level so it should be able to handle all types of cyber-attacks , the properties of cloud e.g. transparency and elasticity of its services made it vulnerable, clouds dependency on IP network makes it vulnerable. Current approach is based on resource intensive deep packet inspection (DPI) which relies on payload information whereas the proposed approach is based on per flow Meta statistics, derived from packet header and volumetric information which is packet and byte etc count. Their approach targets the cloud and also integrates with infrastructure for the detection and also for the remediation, at infrastructure level they targeted the cloud nodes and network infrastructure that provides the connectivity within the cloud and with external services. Cloud services are provided with one or more VMs which are interconnected, cloud services are divided into three categories:

Software as a service; it has most control and gives limited access to the user
Platform as a service (PaaS); it gives the choice to the user of execution environment, deployment tools but not the ability to be the administrator of their own operating system.
Infrastructure as a service (IaaS); it provides the most control , the user has the ability to install and administer their own choice of OS and run anything on the provided virtualized hardware, it is more sensitive and bit difficult to secure IaaS, the paper mainly focused this cloud service and the techniques are also applicable on the other services.

The paper discussed the approach that uses one class Support Vector Machine (SVM) algorithm and provides its effectiveness, tested this approach on malware and DoS in controlled environment.

Used malware samples were Kelihos and Zeus.

Paper 2:
The experiments are performed on cloud. These experiments have used the implementation of the concepts which are based on Virtual machine. The results of the experiments have shown that online detection of the anomaly takes less time for the bulk of the data per VM with the help of SVM approach. Accuracy rate of these approaches is more than 90%.

The detection of malware in actual cloud is related to VM live-migration, SVM specific parameter estimation is used for better detection, they evaluated overall system, network based or joint datasets

**Findings:**
- Computational cost is not very high for this approach.
- They used the sub modules of architecture's cloud resilience managers which are used in the detection at the end system.

**Limitation:**
The methodology overall worked well and also improved the efficiency of the cloud but it worked more efficiently on joint dataset than the other cases.

**Recommendations:**
- This approach is good when the system is online; offline mode techniques should also be secure and efficient.
- For joint dataset it needed to be improved.
- Datasets are basically under process so data mining techniques can be made more efficient

**Paper 3:**

**Title:**
Detection of Malware and Kernel-level Rootkits in Cloud Computing Environments [c]

**By:**
Win, Thu Yein and Tianfield, Huaglory and Mair, Quentin

**Published in 2016**

**Overview**
Virtual machines is used to store or process data of client machine, these virtual machines are targeted by cyber-attacks e.g. VENOM (use to access hypervisor).

Approaches to malware detection is classified into distributed and hypervisor-based malware detection, distributed is VM agent running into the guest VM, remote monitoring server is monitoring its behavior, use single point of control for the attack detection, it needs signature database.

Hypervisor based malware detects malware within the guest by hypervisor, it protects the results, it makes it infeasible for deployment in production house. The paper present novel virtualization security system, combined system call monitoring and system call hashing in guest kernel with SVM based external monitoring on host. with this approach malware and rootkit detection protect the guest against attacks without any extra burden

**Findings:**
Paper presented rootkit and malware detection systems to protect the virtualization infrastructure against cyber-attacks in cloud environment
- Approach used system call hashing and SVM together in VMI.
- It makes sure that the internal guest VM state can be accurately achieved.
- In also handles the offline SVM case.
- Offline SVM classifies/allows quick attack classification.

**Recommendations:**
Some additional calls can be added for achieving accuracy to attach detection in guest VM.
Data mining algorithms can also be applied for the detection and tracking.
Attacks should be logged for avoiding in future.
Artificial techniques can improve the efficiency of the given approach.

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The Impact of Municipalities Own Source Revenues in Municipalities Capital Investments
A case study: Prishtina

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Abstract- This paper aims to show the impact of municipal own source revenues execution in municipal capital investments execution. Municipalities of Republic of Kosovo especially Municipality of Prishtina faces a low capital investments execution which is supposed to be consequence of low own source revenues execution. This paper intends to show the relationship between own source revenues execution and capital investments execution in Municipality of Prishtina. By trend analysis it is shown that in period 2006-2012 municipal own source revenues have been increasing and after 2013 they have been decreasing. Also the trend line estimates a decrease of municipal own source revenues in forecasting period 2016-2018. The significance of own source revenues execution in capital investment execution in Municipality of Prishtina is analyzed by regression analysis which showed that own source revenues execution has impact in capital investment execution but the increase of own source revenues, if circumstances would remain unchanged, would have a negative effect would increase the surplus. This paper proves that Municipality of Prishtina faces with not well budgetary planning and mismanaging of funds.

Index Terms-capital investments, budget execution, Municipality of Prishtina, own source revenues.

I. INTRODUCTION

In order to achieve higher economic development, states worldwide seek to make many reforms, especially in the way they are organized. Most evident are reforms to decentralize or transfer government functions to municipalities in order to improve public sector (Curristine, Lonti & Joumard, 2007; Hammond & Tosun, 2009; Schaeffer & Yilmaz, 2008). Municipalities are assets, solutions and drivers of economic development which possess a great economic potential that can create wealth and economic opportunities for all (UNHabitat, 2015). Luger (2007), pointed out that municipalities' role in economic development include activities such as planning, financing, delivering, regulating and managing. However, the success of these activities depends on the existence of sound public financial systems both at the central and local levels (Ahmad, Albino-War & Singh 2006). The process of decentralization has powered municipalities but at the same time has challenged them a lot. This paper aims to analyze one of the biggest challenges of Municipalities of Republic of Kosovo, especially Municipality of Prishtina – gathering own source revenues. “Adequacy of own revenues is the key to an improved ability to deliver needed goods and services and to a better accountability of local officials to their constituents” (Martinez Vazquez, 2015 p.30). Municipalities of Republic of Kosovo especially Municipality of Prishtina faces a low capital investments execution which is supposed to be consequence of low own source revenues execution. Municipality of Prishtina in period 2009-2015 has shown low level of budget execution, mainly caused by low execution of capital investments. Low execution of capital investments comes as a result of low execution of own source revenues, which means when planning capital investments the municipality had counted on funds it failed to collect (National Audit Office, 2009, 2010, 2011, 2012, 2013, 2014 & 2015).

Referring to the above paragraph, the topic of this paper is relationship between own source revenues execution and capital investments execution. How is the level of municipal own source revenues collection in Republic of Kosovo? What kind of relationship exist between own source revenues and capital investments in Municipality of Prishtina? If own source revenues would increase, would capital investments increase too? Does low execution of capital investments come just as consequence of low execution of own source revenues or does it also come as consequence of mismanaging? The aim of this paper is to give answers to the questions above, furthermore to confirm the significance of municipal own source revenues in municipal capital investments in Republic of Kosovo.

First chapter is an introduction of contents of the paper. Second chapter will contain data analyses which will consist two parts. In first part, by dint of trend analysis will be shown the collection of municipal own source revenues in Republic of Kosovo in period 2006-2015, while in second part by engaging regression analysis-least square method will be explained the relationship between capital investments execution as depend variable and own source revenues execution as independent variable. Third chapter will contain the conclusions.

The data that are used to accomplish this paper have been taken from reports and financial statements published by Ministry of Finance - Republic of Kosovo (mf.rks-gov.net /Departments/ Treasury/ Reports and Financial Statements) and audit reports published by National Audit Office (www.zka-rks.org / Publications/ Municipalities/ Prishtina Municipality).
II. DATA ANALYSIS


Municipal own source revenues are financial means which are collected by taxes, fees, fines, payments for public services provided by the municipalities, rents from real estates owned by the municipalities, revenues from municipal assets sales, revenues from municipal enterprises and revenues from healthcare and education co-payments and services (Hopland, 2016; Vera & Kim, 2003; Law on Local Government Finance-Republic of Kosovo, 2008; Law on Local Self Government-Republic of Kosovo, 2008; Ministry of Local Government Administration & USAID, 2015).

According to the laws that regulate this area, all revenues collected in a municipality, belong to it and become part of its municipal budget (Law on Local Government Finance-Republic of Kosovo, 2008; Law on Local Self Government-Republic of Kosovo, 2008; Law on Public Financial Management and Accountability-Republic of Kosovo, 2008). Exactly herein lies the importance of own-source revenues and of their growth. Since the municipalities fulfil the biggest part of their needs via Government grants, there are indicators that this fact is having a negative impact on increasing the level of collection of own-source revenues (Ministry of Local Government Administration & USAID, 2015).

It is obvious that in most municipalities of the Republic of Kosovo there is continued improvement compared to previous years regarding the level of OSR (Report of revenues, 2010 & 2014). But all this must be analysed in relation to the new opportunities and challenges as well as the increased need to improve public services for the citizens and to increase capital investments. New sources of revenue must be found and more effective ways must be utilized for both new and existing sources of revenues (Ministry of Local Government Administration, & USAID, 2015).

Municipal own source revenues in Kosovo include property tax, municipal charges, municipal fees and fines-penalties. Property taxes do not play any important role in Republic of Kosovo (World Bank, 2014). Property tax rate is 0.15-1%. This makes the property tax revenues non-significant and causes low partaking in own source revenues. Municipal charges include Regulatory Charges, Rental Income, Education and Co-Payments, Health Co-Payments and Other Municipal Charges. Municipal fees include Licenses and Permits, Certificates and Official Documents Fees, Motor Vehicle Fees, Building Related Permits and Other Municipal Fees. Fines-penalties are collected by central level-Ministry of Internal Affairs and then allocated to municipalities.

Trend analysis below will describe the own source revenues collection in Kosovo in period 2006-2015 (Fig.1). It is noticed that trend line has concave parabola shape (a parabola that opens downward). In generally it is known about concave parabola that the left side of slope, up to turning point, shows a positive effect (by increasing of x value increases y value too) and the right side of slope, beyond the turning point, shows a negative effect (by increasing of x value decreases y value).

Based on the possessed data the trend line shows that in period 2006-2012, the municipalities have had growth in own source revenues collection, from 27,755,000€ as they were in 2006 to 59,448,000€ in 2012. The growth has been: in 2007 about 5%, in 2008 about 46%, in 2009 about 13%, in 2010 about 8%, in 2011 and 2012 about 7%. In 2013 municipal own source revenues were 55,850,000€ or 6% less than in 2012. In 2014 there have been a growth for about 9% or there have been collected municipal own source revenues in amount of 60,955,000€ and again in 2015 the trend line shows a decrease of municipal source revenues to 57,880,000€ or 5% less than in 2014. Also the trend analysis is utilized as a forecasting method to estimate municipal own source revenues. Forecasting period includes 2016, 2017 and 2018. Trend analysis estimates a decrease of municipal own source revenues in forecasting period. If circumstances would remain unchanged, trend analysis estimates municipal own source revenues collection in amount of 55,648,000€ in 2016 or 4% less than in 2015, in 2017 52,064,000€ or 6% less than in 2016 and in 2018 47,281,000 € or 9% less than in 2017. Figure 1 presents the trend line of municipal own source revenues in Kosovo in period 2006-2015.

Figure1. The trend line of municipal own source revenues in Republic of Kosovo, 2006-2015

Source: Ministry of Finance-Republic of Kosovo(mf.rks.gov.net), Author’s calculations

2.2. The impact of municipal own source revenues in municipal capital investments

Capital investments in Republic of Kosovo include road construction, sewerage, water supply, maintenance work, education, healthcare and culture, youth and sport. Municipal spending accounts for close to one-fifth of total investment by general government. The municipalities’ share of capital...
expenditure is expected to increase to 26 percent in 2018 from 22 percent in 2009 (International Monetary Fund, 2016). In this part will be elaborated the relationship between own source revenues and capital investments. Municipality of Pristina is taken as a sample to achieve the results. The data include own source revenues execution and capital investments execution as percentage indicators in period 2009-2015. In this period Municipality of Pristina is characterized by low capital investments execution that comes as a result of low own source revenues (National Audit Office, 2009, 2010, 2011, 2012, 2013, 2014 & 2015).

In 2015 Municipality of Pristina has spent 79% of budget where has executed 62% of capital investments and 45% of own source revenues; in 2014 is spent 69% of budget where are executed 45% of capital investments and 44% of own source revenues; in 2013 is spent 81% of budget while the level of capital investments execution is 71% and level of own source revenues execution is 55%; in 2012 is spent 74% of budget where are executed 56% of capital investments and 43% of own source revenues; in 2011 is spent 77% of budget where are executed 62% of capital investments and 93% of own source revenues; in 2010 is spent 75% of budget where are executed 60% of capital investments and 49% of own source revenues; in 2009 is spent 85% of budget where are executed 78% of capital investments and 69% of own source revenues (National Audit Office, 2009, 2010, 2011, 2012, 2013, 2014 & 2015).

Referring to National Auditor Office’s reports, by dint of quadratic form of regression analysis (Greene, 2012) will be explained the impact of own source revenues in capital investments moreover will be explained the behaviour of capital investments if own source revenues would increase. The estimation equation is:

\[ CI = \beta_0 + \beta_1 \text{OSR} + \beta_2 \text{OSR}^2 + \epsilon \]

where CI presents capital investments execution in percentage or the depend variable. The right side of equation presents the independent variables where \( \beta_0 \) presents the level of capital investments execution if own source revenues would be equal to zero; \( \text{OSR} \) presents own source revenues execution in percentage; \( \text{OSR}^2 \) presents increased own source revenues and \( \epsilon \) presents the error term. Residuals are normally distributed and homoscedastic. There is no serial correlation between residuals. By least square method is reached the estimated equation:

\[ CI = -90.6 + 4.77 \times \text{OSR} - 0.03361 \times \text{OSR}^2 \]

where it is noticed that the linear term is positive whereas the quadratic term is negative. The negative sign of quadratic term shows that the parabola is opened downward. So this model shows that the relationship between own source revenues execution and capital investments execution in Municipality of Pristina is a concave parabola. Regression analysis shows that own source revenues (OSR) have positive effect in capital investments (CI) which is proven by positive sign of linear term but the increase of own source revenues (OSR^2) would have negative effect in capital investments, which is proven by negative sign of quadratic term. In unchanged circumstances, if own source revenues would increase (OSR^2) would have almost the same significance on capital investments as own source revenues (OSR) do (referring to p-value). So Municipality of Pristina would face surplus of funds or even worse would increase the surplus because this municipality has already faced with this problem. Table 1 shows the regression analysis results for own source revenues execution and capital investments execution in Municipality of Pristina.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Adj SS</th>
<th>Adj MS</th>
<th>F-Value</th>
<th>P-Value</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>2</td>
<td>520.1</td>
<td>260.48</td>
<td>7.55</td>
<td>0.044</td>
<td></td>
</tr>
<tr>
<td>OSR</td>
<td>1</td>
<td>448.8</td>
<td>448.84</td>
<td>13.01</td>
<td>0.023</td>
<td></td>
</tr>
<tr>
<td>\text{OSR}^2</td>
<td>1</td>
<td>410.1</td>
<td>410.12</td>
<td>11.89</td>
<td>0.026</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>4</td>
<td>138.0</td>
<td>34.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>658.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Results of regression analysis about CI and OSR execution in Municipality of Pristina, 2009-2015

III. CONCLUSIONS

Municipal own source revenues in Republic of Kosovo get collected by property tax, municipal taxes, municipal charges and fines- penalties. The analysed data in this paper show an unsatisfying level of municipal own source revenues collection in period 2012-2015 (Fig.1). If the municipalities do not start making more precise analyses, planning and calculations, and if they do not work in the direction of raising the internal control in order to achieve higher budget execution level, there will be decrease of municipal own source revenues.

Considering many impacts that own source revenues execution could have, in this paper was elaborated the impact of municipal own source revenues in municipal capital investments, by taking as a sample Municipality of Pristina in period 2009-2015. It is noted that relationship between own source revenues and capital investments in Municipality of Pristina in period 2009-2015 is a concave parabola, which means that the increase of own source revenues execution will not increase the capital investments execution. This proves that this municipality faces two problems: not well-planned budget (low execution of own source revenues and capital investments) and mismanaging of funds (surplus).

The conclusion of this paper is that municipal own source revenues has significance in capital investments execution, but if circumstances remain unchanged, the increase of own source revenues would lead to increase of surplus.

IV. REFERENCES


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i-Travel: An integrated system in unifying the network between travel agencies and tourists

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Kulliyyah of Information and Communication Technology, International Islamic University Malaysia

Abstract- Travel and tourism had become part of essentials among Malaysian. Each year, the number of tourists that consist of domestic and international visitors has growing. There are several comes from Europe, central Asia, Africa, south and North America, while others are from Malaysia. Travel is also part of obligatory of every Muslims as being described by the Holy Quran that says “He it is, who has made the earth subservient to you, (i.e. easy for you to walk, to live, and to do agriculture on it, etc.), so walk in the path thereof and eat of His provision, and to Him will be the Resurrection.” (Al-Mulk:15). This paper consist of explanation about the mobile application that was named as IIUM i-Travel. The mobile application will help the customers and act as intermediaries between the customers and travel agents. The system is similar as Amazon but instead promoting the products, it helps customers on providing the best services and travel packages that are available in the market. The services for the system such as providing the best packages among 3 major target of the potential customers who are university students, Malaysian citizens and Muslim citizens. There are also 2 potential investors that involved which are travel agencies and mosque administrators. A survey was conducted to university student, Muslim’s citizen, Malaysian citizen, travel agents, and mosque administrators in order to understand their jobs, pains, and gains. This paper proposes initial and refined conceptual business model of business model that can be developed and implemented mainly by university student that located in urbanized area.

Index Terms- Travel and Tourism Agencies, Mobile application system, Business Model Canvas (BMC), Value Proposition Design Canvas (VPD)

I. INTRODUCTION

In this modern era, Malaysia had become the world mostly known places for travel and tourism. The industries had contributes some of the economic markets of Malaysia. According to the economic trends in 2015, there are 6 focus sectors of economic corridors that are involved which namely: transport and energy, trade and investment, agriculture, halal products and services, tourism, and human resources development [1]. This shows that one of the factors which is tourism contributes some of the important economics profits such the GDP. Thus, this thrives intra-IMT-GT (which stands for The Indonesia-Malaysia-Thailand growth triangle) trading causing Malaysia to lead with almost 66% of the total intra-IMT-GT trade valued at over USD$50 billion [1]. The aim of IMT-GT is to accelerate the economic transformation of members by exploiting their underlying complementary and comparative disadvantages [1]. This shows that the impact of tourism is quite significant as it helps Malaysia transforming from depending on other source of income. Next, according to Frost and Sullivan (2015), the Malaysia will remain the “Tourism Capital of Southeast Asia” with over 35 million tourists [2]. It is ironic that most the ASEAN countries have becomes center of attraction of tourists including Singapore, Indonesia, Myanmar, Philippines, Laos PDR and Cambodia [2]. From 2009 until 2012, Malaysia leads in tourist arrivals at the percentage starting from 23.6% until 25% ahead of the other those mentioned ASEAN countries.

II. PROGRAM BACKGROUND

The application and the business are focusing on the travel sector of business. This portal will provide the travel agent a trusted platform to promote their services with the affordable rate of price. This system will give you a few features that make the system easier and trusted to be used:-

a) A rating system- with the system will give each of the travel agent a rating that is being rate by customer.

b) A room rental by using Mosque - with the mosque members all in Malaysia they will provide to you a place to sleep and place to eat.

c) Islamic packages - the tourists and Muslim prayers can have a look on the latest and the newest version of travel packages that included Islamic elements.
III. PROBLEM STATEMENT

The overall problem based on the interview that had been done. A few problems are being list based on the famous problem that being faced by the customer and the travel agent:-

a) Expensive- the interviewer stated that they got some problems about the price around the website and they did not have a platform to find the travel agent or customer

b) Economic recession effect travel and tourism- the interviewer also get the feedback that they cannot travel across the sea because of the economic status nowadays means some of the customer is being blacklist with the bank and they is being banned from leaving the country.

c) Trusted and secure -they also give comments about their safety if they hire a travel agent because there are a lot of case that said they have been cheated by the travel agent.

IV. METHODOLOGY

The methods that we use in getting the information are:-

a) Interview- we ask a few questions with our different customer segments to understand what kind of problems they face and we also ask them what kind of platform or solutions they prefer.

b) Online browsing- we also search the information through internet about the current information of VPD and we make some improvement by analysis the BMC and VPD that we get through online searching.

c) Google form- we also provide the google form to our customer based on our customer segment to be filled and we make the analysis of the data to make our business model more efficient and effective.

V. LITERATURE REVIEW

The paper discusses Ninth Malaysia Plan, Tenth Malaysia Plan and Eleventh Malaysia Plan, Economic Transformation Program (ETP), National Tourism Policy (NTP), National Physical Plan (NPP), and Local Agenda 21 (LA21) to discover tourism development perspective in Malaysia. The Malaysian government has given emphasize on the development of tourism industry in the middle of 1980s due to world economic recession and decrease in petroleum assets. The government had established the Ministry of Culture, Arts and Tourism in this connection. In 2004, this ministry was named as ‘Ministry of Tourism’ (Fateh et al., 2009)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Customer Segments</td>
<td>-Youngsters</td>
<td>-Travelers</td>
<td>-Travelers</td>
</tr>
<tr>
<td></td>
<td>-Groups of friends</td>
<td>1)Social traveler</td>
<td>1)Social</td>
</tr>
<tr>
<td></td>
<td>-Lonely travelers</td>
<td>(a)Ease of access to social</td>
<td>traveler</td>
</tr>
<tr>
<td></td>
<td>-Thrill seekers</td>
<td>media generated travel</td>
<td>2)Meticulous</td>
</tr>
<tr>
<td></td>
<td>-Smartphone users</td>
<td>content (b)Ease of “flaunting”</td>
<td>traveler</td>
</tr>
<tr>
<td></td>
<td></td>
<td>travel experience</td>
<td>3)Laidback</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2)Meticulous traveler</td>
<td>traveler</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3)Laidback traveler</td>
<td></td>
</tr>
</tbody>
</table>

-Travelers 1)Social traveler (a)Ease of access to social-media generated travel content (b)Ease of “flaunting” travel experience 2)Meticulous traveler 3)Laidback traveler
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer relationship</td>
<td>--Email for help -Reviews -Social media -Partners</td>
<td>Affiliates(Tourism Boards)</td>
</tr>
<tr>
<td></td>
<td>-Acquire:Advertising(social media), Expert advice, Content sharing(influencers), word of mouth and referrals)</td>
<td>-Acquire:Advertising(social media), Expert advice, Content sharing(influencers), word of mouth and referrals)</td>
</tr>
<tr>
<td></td>
<td>-Keep:Wide selection of itineraries, content creation</td>
<td></td>
</tr>
<tr>
<td>Channels</td>
<td>-App stores -Blogs -Users’ social media -Partners’ media</td>
<td>-Website(Connected through social media)</td>
</tr>
<tr>
<td></td>
<td>-Mobile Application -Direct Sales(OTAs)</td>
<td></td>
</tr>
<tr>
<td>Key Partners</td>
<td>-Tour Creators -Partners(businesses) -App Stores -Cities districts(governments)</td>
<td>-Social Influencers and Content Generators(Bloggers, travel planners) -Service Enablers(Foursquare,Google Maps) -VC and Angel Investors</td>
</tr>
<tr>
<td>Key Activities</td>
<td>-Advice -Information -Marketing -Entertainment</td>
<td>-Platform -Community(App development and UI design) -Community Building(Customer acquisition, customer retention) -Fundraising</td>
</tr>
<tr>
<td>Key Resource</td>
<td>-Intellectual -Human</td>
<td>-Platform(Mobile App development and Web) -Customer Database -Development Team -Sales Force</td>
</tr>
<tr>
<td>Cost Structure</td>
<td>-Cost driven -App development(fixed costs) -IT maintenance(variable) -Tour creation(variable)</td>
<td>-Platform(IT, Software development) -Marketing(Advertisement, customer capture) -Licensing(Payment gateways, enablers)</td>
</tr>
<tr>
<td>Revenue Stream</td>
<td>-Sponsors -Ads -Freemium -Per tour</td>
<td>-Travelers(Free) -Established and less establish players, Government Affiliates(Commission(OTAs; 5% CPA), Targeted Advertising, Customer Insights)</td>
</tr>
</tbody>
</table>
Figure a: http://www.wanderlusttravelandtours.com/ (Front page)

Figure b: http://www.wanderlusttravelandtours.com/
Figure c: www.cuti.my (Front page)[7]

Figure d: www.cuti.my
The proposed initial Value Proposition Design (VPD) is shown in the figure 2. This VPD explains customers’ jobs, customers’ gains, and customers’ pains for student.
Figure 2: Value Proposition Design for Travel agencies

The Value Proposition Canvas

Value Proposition

Customer Segment

Travel Agency

Products & Services

Pain Relievers

Ensure originality
Provide compete information
Gain platform for dealers

Save time
Rating system for company adn dealer

Provide platform to dealer

Figure 3: Value Propositions Design for Students

The Value Proposition Canvas

Value Proposition

Customer Segment

University Student

Products & Services

Pain Relievers

Single online booking system
Promotion category
Registered dealer offer
Rating system

Platform online booking system

Figure 4: Value Proposition Design for Malaysian Citizens

Gains

Loss

Efficient
Fair price
Gain job opportunity
Authentic trusted agency

Time consuming
Make comparison
Make deposit
Make Call
Confirmation and book

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Figure 5: Value Proposition Design for Muslim citizens

Figure 6: Value Proposition Design for Mosque Administrators
VI. EMPIRICAL FINDING (VALUE MAP FROM VPD)

In this section, the customer profile is divided into 2 parts which are the major targeted customer profile and minor targeted customer profile. The focus of major customer profile is towards travel agents and university students only while the minor targeted customer profile are mosque administration, Muslim citizen and Malaysian citizen.

A. Customer segments(results are based on proposed value maps):

<table>
<thead>
<tr>
<th>Customer</th>
<th>Pain</th>
<th>Gain</th>
<th>Jobs</th>
</tr>
</thead>
</table>
| Travel Agent      | -Excessive use of energy because have to continuously update the information from different platform from social media.  
                   | -Have to compete with different kind of promotions that are not related to travel agency in the social media.  
                   | -Wasting energy to communicate with customers (increase waiting time) | -Efficient communication  
                   |                                                                | -Access to the right customer  
                   |                                                                | -Having shown trusted dealer  
                   |                                                                | -Gain platform for all travel agency | -Post through social media on travel packages offered  
                   |                                                                |                                                        | -Travel agent waits for responses by updating interval of every 20 minutes on every social media platforms.  
                   |                                                                |                                                        | -Keep updating the information and give responses to customer | -Save customer database that have made confirmation to book ticket. |
| Muslim citizen    | -Islamic based travel                                                | -Islamic law is fully                                   | -Survey on hotel that is not allowed to be used for non-Islamic travel |

The Value Proposition Canvas

![The Value Proposition Canvas Image]
<table>
<thead>
<tr>
<th>Basic Problems</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency does not follow Islamic law</td>
<td>Provide halal food and beverages.</td>
</tr>
<tr>
<td>-Long waiting of response from the travel agencies</td>
<td>-Survey on the travel packages that have elements of Islamic elements in its schedule</td>
</tr>
<tr>
<td>-Wasting energy to communicate with customer.</td>
<td>-Efficient communication</td>
</tr>
<tr>
<td>Malaysian citizen</td>
<td>-Lower cost</td>
</tr>
<tr>
<td>-Survey on ticket prices on websites, blogs and social media related</td>
<td></td>
</tr>
<tr>
<td>-Book tickets and hotel after found</td>
<td></td>
</tr>
<tr>
<td>-Survey itinerary</td>
<td></td>
</tr>
<tr>
<td>-Survey on public transport available at visiting place</td>
<td></td>
</tr>
<tr>
<td>-Survey the rating of the places such as services, food and etc.</td>
<td></td>
</tr>
<tr>
<td>-Check on weather forecast at of the current holiday destination</td>
<td></td>
</tr>
<tr>
<td>-Survey strategic point.</td>
<td></td>
</tr>
<tr>
<td>-Book transportation(flights, buses, cruises ship or taxis) tickets</td>
<td></td>
</tr>
<tr>
<td>Mosque Administrator</td>
<td>-Able to integrate mosque mobile application with i-Travel application</td>
</tr>
<tr>
<td>-Lack of funds and budget to build or upgrade infrastructure</td>
<td>-Able to gain full authorization to guard the traveler’s room</td>
</tr>
<tr>
<td>-Lack of staff that are willing to work in work administrators</td>
<td>-Able to gain side income</td>
</tr>
<tr>
<td>-Need to find sponsorship and make fundraising to cover the insufficient funds of upgrading the mosque infrastructure</td>
<td></td>
</tr>
<tr>
<td>University Student</td>
<td>-Notify about the current events and activities of mosque.</td>
</tr>
<tr>
<td>-Large time consuming search relevant information about travel and tourism</td>
<td>-Make advertisement about funds and donation to the jamaah of mosque.</td>
</tr>
<tr>
<td>-Bad services provided</td>
<td>-Monitor the usage of traveler’s room</td>
</tr>
<tr>
<td>-Increase waiting time for VISA application</td>
<td>-Ensure that non-Muslim travelers and tourist to wear appropriate dress and covering their aurah.</td>
</tr>
<tr>
<td></td>
<td>-Survey on ticket prices on websites, blogs and social media related</td>
</tr>
<tr>
<td></td>
<td>-Book tickets and hotel after found</td>
</tr>
<tr>
<td></td>
<td>-Survey itinerary</td>
</tr>
<tr>
<td></td>
<td>-Survey on public transport available at visiting place</td>
</tr>
<tr>
<td></td>
<td>-Survey the rating of the places such as services, food and etc.</td>
</tr>
<tr>
<td></td>
<td>-Check on weather forecast at visiting place</td>
</tr>
<tr>
<td></td>
<td>-Survey halal food restaurant as Islam</td>
</tr>
</tbody>
</table>
VII. CONCEPTUAL REFINED SOLUTION

Based on empirical data that was collected, the refined Business Model Canvas (BMC) for i-Travel and Value Proposition Design (VPD) for customer are as follows:

![The Business Model Canvas (BMC) for Travel Agency](image)

**Figure 3: A refined model of Business Model Canvas (BMC) for Travel Agency**

**Key Partners**

- University Students
  1. Included all students from universities across Malaysia

- Travel Agency
  1. Open to all
  2. Recruitment mainly focus on those who want to obtain side income (university students, postgraduate students)

- Investors
  1. Those who involved in travel agencies and tourism such as ministry of tourism of Malaysia, Cuti-Cuti Malaysia.

- Mosque Administrations
  1. Those are included from the administrators who currently worked in the administrations of Mosque. This administrations consist of those who are willing to provide cooperation with investors and stakeholders, shareholders and stockholders.
● Malaysian Citizens
  1. Regular citizens from Malaysia. Consist of all ages

● Muslim’s Citizens
  1. Muslim’s citizen from all countries

Key activities
● Product Development
  1. The mobile application need to be consistently developed by time so that there are some potential advantages in terms of attraction to customers

● Marketing and customer acquisition
  1. Dealing with clients who wanted to have affordable cost of travel packages and tourism.
  2. Dealing with investors who would like to invest the company technology.
  3. Continuous promotions across the websites, televisions and radio.

Value Propositions
● University Students
  1. Provide platform for part-time or full time job.
  2. Provide platform for rating systems of travel agencies that are trusted and branded.
  3. Provide platform to view the background information and license of the company which consist of travel tourism agencies.

● Muslim Citizens
  1. Provide platform that are Islamic Law compliances.
  2. Provide platform that contain islamic packages (consist of Halal food and good atmosphere for accommodation).

● Malaysian Citizens
  1. Provide platform that have links to reservation of transportation (e.g. Uber, GrabCar).
  2. Provide travel and tourist packages that are low cost and affordable.

● Travel Agency
  1. Provide platform for travel agents recruitments.
  2. Provide platform that store customer’s profile (e.g. profile of regular customers, statistics and tables).

● Mosque Administration
  1. Provide platform for events, information and notifications about the current conditions of mosque.
  2. Provide platform for that store and display the number of tourists that have registered to book and stay at traveler’s room (especially for backpackers because this group often have hard times seeking for temporary accommodation).

Customer Relationship
● Social media
  1. Facebook, Instagram, Twitter, Google+

● Customer Support
  1. Consist of employers that can entertain customers who have problems or issues when using the mobile application

● Review, rating and support system
  1. Consist of platform that could measure the ratings and ranking of Travel Agencies based on customer’s perspective and surveys.

Customer Segments
● University Students
  1. Enthusiasm in travel and tourism.
  2. Want a fast and accurate services.
  3. Want a low cost packages which are affordable.
Malaysian Citizens
1. Lower cost and affordable packages.
2. Need instant transportation to the destination (for example: Using Uber or Grab Car from Penang to Kedah).
3. Want special packages for those who have monthly allowance between RM 2000 to RM 3000.

Muslim’s Citizens
1. Want packages that is Islamic Law compliances.
2. Want a platform that could provide the information about Halal restaurants and mosque

Mosque Administrators
1. Wanted to increase the number of Muslim prayers consist of travelers and tourists.
2. Wanted the mosque as a center of attention for tourists and travelers.
3. Wanted the mosque as a center of community activities.
4. Wanted the mosque become business center among travelers and tourists.

Travel Agents
1. Wanted a continuous number of customers and clients which are sustained in terms of its target for each month.
2. Wanted a platform that are centralized and open the recruitment of becoming travel agents instead of promoting through social media, banners and flyers.

Key resources
- Technological Platform
- Web and Mobile App Developer
- Travel Agent
- Mosque Administrators

Channels
- Portal
  1. Provide platform mainly for recruitment and registration of travel agents (product differentiator).
  2. Provide current registration for travel packages.
  3. Platform for advertisement.
- Mobile App for Androids and iOS
  1. Platform for recruitment and registration for travel agents-(product differentiators).
  2. Platform for advertisement for travel agencies (the best rating and most trusted one)-(product differentiators).
  3. Platform to spread the message of events that occur in the mosque, events that occurred in the hotel, cities, town.
- Network of mosque[8]
  1. Place to promote the mobile application to the Muslim community
  2. Center for communities activities and business compound for selling souvenirs and gift

Cost Structure
- Technological Set-Up and Running Costs
  1. Such as usage of servers and maintenances of the servers, laptops, desktops, computers, supercomputers, wireless networks, routers, cables.
  2. Salaries to permanent employees
  3. Salaries for employees who are in the organization environment that work as permanent employees.
- Launch Events and Marketing Expenditures
  1. Cost for launching such as banners, buntings, t-shirt, food, flyers and so on.
  2. Marketing expenditures such as advertisement across the websites of the product, commercial videos in YouTube.
Revenue Streams

● Affiliate
  1. Provide platform for investors to promote their products (this will be only in website platform).

● Mobile application advertisement
  1. Mobile advertisement are used to promote the usage of i-Travel mobile applications.
  2. i-Travel mobile application will be sell at Google Play Store and Apple i-Store

● Online transactions
  1. Common online transactions are being used such as VISA, PayPal, Maybank2U.

Figure 4: A refined Value Proposition Design (VPD)[9]

Figure 4.1 Student VPD

www.ijsrp.org
Figure 4.2 Citizen VPD
Figure 4.3 Muslim Citizen VPD

The Value Proposition Canvas

Value Proposition

Customer Segment: Muslim citizen

Gain Creators

Provide additional information about halal restaurant and food stalls
Additional information suitable Islamic packages

Provide tourist guide that have knowledge about Halal restaurant of a place
Provide additional information about Islamic facilities

Customer Segment: Travel agency

Gain Creators

Use broadcast system to reduce the bottleneck of phone calls

Able to complete tasks within a less time
Able to use new platform

Able to reach customer
Check email
Wait for call

Full access to customer profile
Complex procedures Lots of call

Wait for reply to confirm bookings and reservations
Not enough information
A.Customer segments (results are based on customer survey and interviews):

<table>
<thead>
<tr>
<th>Customer</th>
<th>Pain</th>
<th>Gain</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel Agent</td>
<td>-travel agent face many rules to obey</td>
<td>-Able to collect fees from customers</td>
<td>-Agree that the job as a travel agent is one of part time jobs</td>
</tr>
<tr>
<td></td>
<td>-travel agent had to pay too many fees</td>
<td>-Able to communicate with community</td>
<td>-Agree that they have to set specific target</td>
</tr>
<tr>
<td></td>
<td>-lack of customers</td>
<td>-travel agent can attract more customers toward the mosque</td>
<td>-Agree that the utilization of travel agent are able to attract more customers</td>
</tr>
<tr>
<td></td>
<td>-The rating system of travel agency cause inconvenience to customer who intended to travel because of false rating system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslim citizen</td>
<td>-hard to get Islamic environment</td>
<td>-Muslim’s citizen can stay in a good and Islamic environment</td>
<td>-Muslim’s citizen can go to travel anytime that they want.</td>
</tr>
<tr>
<td></td>
<td>-Want a place that suitable to perform congregational prayers</td>
<td>-Wanted a package that are affordable</td>
<td>-Muslim citizen can live in a secure environment</td>
</tr>
<tr>
<td>Malaysian citizen</td>
<td>-they did not travel agent</td>
<td>-the customers will be able to see the rating that are being rate but the</td>
<td>-Agree that the customers will be able to travel anytime, anywhere</td>
</tr>
<tr>
<td></td>
<td>-Afraid of scam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mosque Administrator  | Handling visitors and tourists that visits the mosque is quite inefficient  | able to collect enough money to upgrade the infrastructure of the mosque,  | Agree that they have to set specific target for the donation that they could gain within a month  |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Faced lack in donation and funds in upgrading the mosque infrastructure within the time planned</td>
<td>agree that some travelers or tourists that interested to visit the mosque even the numbers are quite marginal</td>
<td>Agree that every mosque should be having a community engagement by having weekend mosque activities</td>
</tr>
<tr>
<td>University Student</td>
<td>The rating system of travel agency cause inconvenience to customer who intended to travel because of false rating system</td>
<td>Agree that student will be able to have some extra money by registering to become part-time travel agent while studying</td>
<td>Agree that the job as travel agent were supposed to be a part time</td>
</tr>
<tr>
<td></td>
<td>unlicensed travel agent</td>
<td></td>
<td>Agree that student will be able to make a good travel agent because they are being able to communicate with different language</td>
</tr>
</tbody>
</table>

### a) INDUSTRY FORCES:

Online website for travel has become more popular as people nowadays like to go online. Other than that, pressure from many competitors for travel agencies such as Cuti-Cuti Malaysia [10] and AirBnB [11] researcher came out with the idea of i-Travel which wider the scope of the customer segments which include the Mosque admin in the business plan. This competitor rivalry become one of the major concerns as the companies are racing to gain trust and bargain from customers around the world. Based on Wikipedia (Porter’s Five Forces Model, May 2017), there are five forces that included which are threat of new entrants, threat of substitute, bargaining power of suppliers, bargaining power of customers and industries rivalry are the 5 major factors that influence the industrial forces [12]. In 2014, companies such as Priceline Group and Las Vegas Sand conquered the market with each having total revenue of USD 6.79 billion dollars and USD 13.76 billion dollars. Thus, strengthen the forces in travel and tourism markets.[13]

### b) KEY TRENDS

Nowadays, traveling is become a culture in our society. It is because internet provides the customers the information that make the travel less expensive from before. There are many companies saw those opportunities and make them as a service to encourage their customers to travel. The emergence of smart phones, mobile applications, cloud computing, e-commerce had affected the trends and dependence of citizens to those technologies to dissolved the system in their lifestyle. They seems cannot separate those technologies from their life. Therefore, i-Travel will grab those opportunities by having platform for users to interact and gain access to worldwide travel platforms for those who have enthusiasm in holiday and vacations. In terms of regulatory trends, i-Travel had the ability to detect which customer have criminal offences or were blacklisted and restricted to travel internationally. Low amount of taxes that were imposed to citizens of Malaysia to travel causes i-Travel to provide information about the number of tourists that travel internationally and domestically. Otherwise, taxes will be imposed when there are specific numbers and targets of tourist visiting and traveling outside a country had reached. For examples, based on estimates provided by the Ministry of Tourism and Culture, the revenue collected from the tourism tax is expected to be approximately RM 654,625,090 with an occupancy rate of 60%, and the collections could increase to RM 872,820,120 if an occupancy rate of 80% can be achieved.[14]

### c) MARKET FORCE

Nowadays, there are many companies saw this opportunity and turn them into a business and they have been produce various packages for customer to enjoy on their traveling packages. The customer also will have many choices and they will choose the packages that are affordable to them. During the travel and tourism season, there is an increase of demands of tourists to have vacations whether on overseas tourism or domestic tourism. The increase of bookings and reservations of hotels and flight tickets will open the door for i-Travel to promote the application. However, during the economic recession, this will force i-Travel to increase the price and promotion of the mobile application.
Thus, it has been decided that in order to make further improvement in this business model, a business plan is needed to be developed. The website for travel packages have been globally used for a long time as the internet was introduced. People believe that this kind of service will provide more jobs for students and travel agents. It also will provide the travel agent a platform for them to promote their services. With the current phase economic had reached boom phase [15]. Some of the international conflicts could also affect the conditions of macroeconomic forces. For example, early in 13 February 2017, conflicts emerged between North Korea and Malaysia due to the assassination of Kim Jong Nam, the cousin of the Supreme Leader of North Korea, Kim Jong Un. Malaysian government restricts Malaysian citizens in traveling to North Korea to avoid threats from North Korea[16]. Thus, investors, tend to divert their focus on tourism industries reducing the market sentiment. This type of market could cause a bullish market [15].

**MACROECONOMIC FORCES:**

GDP Annual Growth Rate in Malaysia is expected to be 4.70 percent by the end of this quarter of 2017, according to Trading Economics global macro models and analysts expectation [17]. Thus, opening the door for i-Travel to proceed to market entrants. The unemployment rate of Malaysian were in fluctuated at the range of 2.7% until 3.4%. While at the end of 2014, it had dropped to 2.7% and increased until 3.4% [18]. The state of capital market grew 2.84 trillion ringgit between 2016 and 2015[19]. The corporate tax rate is 24% for all corporates that are available in Malaysia. While for small and medium size with the capitalization of RM2.5million, the rate are 19% at first profit of RM 500 000 and then 24% [20].

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e-Bookstore: Opening Door to the Garden of Knowledge

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Abstract- Second-hand book shopping has been a current trend in today’s stream. The process of selling and buying these second-hand book is somehow lead to time and energy wastage. The purpose of this paper is to give solution through Online Second-hand Bookshop System. The customer segment includes buyer, seller, and donator. This project has proposed conceptual solutions through Business Model Canvas (BMC), Value Proposition Canvas (VPC), and Environment Map (EM).

Keywords- second-hand, bookshop, selling, buying, donating, services, BMC, VPC, EM

I. INTRODUCTION

In this globalization era where most people are exposed to the various type of new technology, there is still many people are sticking to the basic when it comes to reading. These people prefer reading a hard copy book rather than a technology based book like Kindle by Amazon where we can store many e-books inside it. It might be because of the screen of this technology book that emits light and it can hurt our eyes if we stare it for a long time that people do not prefer this way of reading. However, the cost of new books nowadays is very expensive that it hinders people who love to read to buy many books that they want. So, people now are seeking other ways to get their wanted books for a cheaper price and one of the ways is to buy a second-hand book from other people that wanted to let go of their book.

II. PROGRAM BACKGROUND

This paper proposes a business model that will implement e-Bookstore that will target citizens of Kuala Lumpur and Selangor. The main objective of the system is to help people to buy books at a cheaper price easily and these second-hand books will be supplied by our own community. For our business, we will have to prepare the costs to buy the unused books that the people wanted to sell. To sell books, these sellers will have to fill in the form on the website that we had prepared and we will go to buy the books personally from them. These books will then be advertised on our website for buyers to see and buy if it interests them.

III. PROBLEM STATEMENT

There are numerous of bookshops that exist today. The popular ones are MPH, Popular Bookstore, and Kinokuniya. People can buy any selections of books there. However, today's books that are sold in the traditional bookstore are pricey. For one brand new fictional novel, a customer has to pay quite some price for it. This is because physical bookstore has the overhead and other costs to pay (Bookmasters.com, 2016). Furthermore, there is no bookstore yet that sells second-hand book. By logic, by buying these second-hand book the price might get slightly cheaper. When a student purchases a used book, he easily saves more than half the money that he would have spent had he purchased a completely new one (K. Anna, 2013). There are also problems where the bookstore are far away and most of the bookstores are only located in shopping malls. For some part of the country, there is no place that book buyer can get to book shopping easily. Their place may be far from the city and that makes them have to go far to search for a bookstore in malls in order to buy a book.

For sellers who used to sell their used books, there are some problems that they have to endure. They may face customer's negotiation when dealing face to face. The chances for them to find possible buyers are also small. It also takes a lot of their time meeting the customers. Some of them maybe are not interested in selling their used books. It is just that they have so many books that take their space. Since they think that by donating the books would solve their problems since the books may be still in a good condition.
IV. METHODOLOGY

In order to know the problem faced by the buyer, seller, and donator of books, a questionnaire has been generated as a methodology in gaining information for this project. The answers from the respondents are used to know their problems and benefits that they think they can get from the system. 35 respondents have participated in the data gathering. The questions are divided into two parts, seller part and buyer part. There is no scope for the target respondents hence it is open to all to answer. The questionnaire is done through Google Forms and distributed among potential users of our website in Kuala Lumpur and Selangor area. Business Model Canvas (BMC) (Osterwalder, A. & Pigneur, Y., 2010) is also been produced to know how the system can generate money and profit. In order to know the what the customer needs through their views, Value Proposition Canvas (VPC) (Osterwalder, A. et al., 2014) has been created. This is done to know what are the criteria that fit into customer needs. Besides that, EM (Osterwalder, A. et al., 2014) is produced to know the market forces, competitive analysis, macroeconomics and the foresight of the system.

V. LITERATURE REVIEW

To get more ideas on how to implement the system in our business, we reviewed two businesses that have the same type of services as what we plan to do which is Amazon.com and Lazada.my websites.

A. Amazon.com

Amazon is a popular American e-commerce that is based in Seattle, Washington in July 1994, attracting every people on Earth by becoming the largest online retailer in the world. The founder, Jeff Bezos started the business as an online bookstore and it was one of the first online businesses that emerged after the Internet is allowed to be used by average people as before that only certain organization can use the Internet. In the beginning, Amazon started slow but then, it survived the period where many online businesses fail in the early 2000s with their initial business plan strategy and become popular and profitable business after that. Their success until nowadays might be because they always look at the customer and their innovative business model built around a market-changing customer value proposition, mentioned by Dagley (2013). By using Amazon, a large collection of books can be found and interested buyers can choose whichever they prefer; a new book or second-hand book at a different range of price. The chosen book will then delivered fast to your front door making the process much easier than the traditional way of going to the physical bookstore. Figure 1 below shows the screenshot of Amazon.com website homepage.

![Figure 1 Amazon.com website](image1)

![Figure 2 Business Model Canvas of Amazon](image2)

From Figure 2 that shows the Business Canvas Model of Amazon, we can see that Amazon build a partnership with a network of sellers that will use Amazon website to sell their products and Amazon will get revenues from each transaction made by those sellers and buyers. Hence, besides getting profit from their retail sales, Amazon also get revenues from the commission of other sellers’ sale and a monthly subscription of their website. The value proposition that Amazon gives to their customers is the reasonable price where customers can choose their wanted products from many ranges of prices and also convenience for their customers to shop as they just have to buy their products online and wait for the products to get
delivered. These value propositions allow Amazon to extend itself into new markets and deepen its customer relationships, mentioned by Noren (2013).

**B. Lazada.com.my**

Lazada Group was established in 2012 by Rocket Internet, an organization that builds online business start-ups and is based in Singapore. As of 2014, Lazada Group has now operating websites (Lazada.com) for various countries in Southeast Asia such as Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. As mentioned by Chew (2016), the business targeted Southeast Asia region using Amazon.com business model as reference and taking the advantage of Amazon’s weak presence in these locations. Lazada websites now become one of strongest online retailers in the region housing many sellers to use their service. Lazada also uses their own delivery system to send out the product bought by customers, making the delivery more efficient. Figure 3 below shows the screenshot of Lazada.com.my website homepage.

![Figure 3 Lazada.com.my website](image)

According to Figure 4, the value proposition that Lazada offers to their customers is low price, free delivery, and convenient. Then, it becomes unique compared to other e-commerce websites by offering adaily discount from different credit card bank issuer everyday which can attract more customers. Lazada’s revenue streams are from advertisements that other sellers placed on Lazada website and also commission fee from each transaction made between sellers and buyers.

**C. Adaptation of Business Model**

There are many things that we can learn from Amazon and Lazada to improve our business model. As these two businesses are among successful businesses in the world, we can make use of their business model as an example to be implemented in our own business. First, we should create a partnership with various companies that is related to our business like both Amazon and Lazada. For example, we can request for partnership with book publisher companies that can help us to get more cheaper books to be sold on our online bookstore besides other used books that we get from individuals personally. This can help us to generate more revenue from our retail sales. Besides that, we can also implement Lazada’s key activity of delivering seller products to customers. When customers successfully paid for the products, the sellers will hand the products to Lazada and Lazada will help to deliver the products to customers using their own delivery service called Lazada Express (Lex) Courier. Next, we can also use their way of channeling the business that is through both web application and mobile application simultaneously. Instead of our initial plan on having the only website running, adding the mobile application as another channel is also a good idea. It can be a direct marketing channel for our business that everything that we want to provide to our customers is right at their fingertips if they installed the mobile application. We can be visible to our customers at all times as we can see that nowadays people are spending a long time with their smartphones in a day. Mentioned by Howard (2016), in the United States, adults engaged with gadgets like smartphones and tablets for about nine hours and 39 minutes each day. Even though the statistic experiments on people in the United States, we can see the situation here in Asia is almost the same as in the States. Therefore, we can take this opportunity to deliver our product to be known by more people day by day.

**VI. INITIAL CONCEPTUAL FRAMEWORK**

**A. Initial Business Canvas Model**

(refer to Figure 10)

**B. Initial Value Proposition Canvas**
VII. ANALYSIS & FINDINGS

To validate our initial business models in previously shown Business Model Canvas (BMC) and Value Proposition Canvas (VPC), we did some interviews and also distributed survey questionnaires to our customer segments. As a result, we discussed on the preferences of the participants and their opinion on our proposed business plan.

A. For Seller

1) Do you have experience in selling a second-hand book?

Using Figure 5, it can be seen that most participants had sold their second-hand book to other people before. Only 11 out of 35 participants never have the experience selling their books. From a number of people with experience in selling their books, there are more of them sold their book face-to-face instead of solely sold it online.

2) Why people sell their unused book?

From Figure 6, most of them think that selling unused book can generate money with 20 participants choosing this option.

3) What are the difficulties/pains of people face to sell their unused book face to face?

This question is open-ended and we can see from the responses of the participants, many of them said that selling book face to face is difficult when a buyer starts to negotiate the price. Next, they also mentioned that it is very difficult when they need to make an appointment time and location to meet to deliver the book when they have a different schedule and living far from each other.

4) What do you think the benefits that people get by selling their unused book online?

This question is also open-ended question and from the responses, most of them mentioned that by selling books online, it is easier to find a buyer as they can spread the ad. Besides, they also said that it is time-saving and energy-saving.

B. For Buyer

1) Do you have any experience buying a second-hand book?

From Figure 7, we can see that most of them had an experience in buying thesecond-hand book as 71.4% of them chose Yes and other chose No.

2) What benefits can a buyer get if they buy the book online instead of going to the physical store?

This is an open-ended question. Most of them answered that it saves time as they do not need to go to the physical store to buy books. Next, they also said that it is usually cheaper buying online rather than buying it at the store.

3) Do you think that processes to buy the book (or other things) from the Internet are easy or not?

From Figure 8, most of the participants (65.7%)
think that the steps to buy things online are easy. Meanwhile the other 34.3% think the steps are hard.

4) If there is a website special for our community to sell and buy their second-hand books, do you think you will use it?

![Figure 9](image)

From Figure 9, out of 35 participants, 22 of them (62.9%) are interested in using the website that can sell and buy their second-hand books while 12 of them (34.3%) choose Maybe and one of them (2.9%) choose No.

VIII. ENHANCED CONCEPTUAL FRAMEWORK

A. Enhanced Business Canvas Model (refer to Figure 16)

i. Key partners

Key partners are the relationship between suppliers and partners in the business that ensure the business model work. A key partner in this project are the seller with unused books, the supplier of books for e-bookstore and have the collaboration with existing online bookshop also.

ii. Key activities

This is important to the business to know that what action that a company needs to follow make sure the business success. For e-Bookstore, the key activities find the secondhand book, buy it from the seller, advertise and sell through the websites and deliver it to the buyer.

iii. Key resources

Key resources are the assets for the business to run well. In this project, the key resources are technological platforms such as website and mobile application seller who want to sell their unused book.

iv. Value proposition

Value proposition means the benefit that the user can get from this project. e-Bookstore give to values to the customer, seller, and donors. For the customer, they can get a cheaper price than market price, easier to find the wanted books and have trusted platform to buy books. For seller side, they can generate income from their unused books by selling it to the potential customer, get experience to sell unused books online. For donors side, they had trusted platform to do a good deed.

v. Customer relationships

Customer relationship is where the company make the relationship with their potential customer or seller by giving them opportunities to gives feedback, review, and rating to the website and can interact through social media, for instance, Facebook.

vi. Channels

For e-Bookstore, the channels are on the website, mobile application, and network of Mosque.

vii. Customer segments

e-Bookstore expects people who need to buy secondhand books, who want to sell the unused books and those who want to donate the books.

viii. Cost structure

The cost structure is to describe what cost that needs to be calculated in order to run the business. For this case, the company cost structure from technological setup and running costs and salaries to permanent employees.

ix. Revenue streams

Revenue streams are the where the business can get revenue from it, for this case the revenue stream are surge pricing, delivery charges, donation and advertisement on the website.
B. Enhanced Value Proposition Canvas

(refer to Figure 17, Figure 18, Figure 19, figure 20, and Figure 21)

C. Environmental Map

i. Key trends

Nowadays, the usage of the Internet are widely used and almost every one of us uses the Internet in their daily life. So that, the online shopping also becomes one of the trends among the seller that want to generate income from it.

ii. Market forces

The online business received great impact from the potential buyer because it reduces the costs and saves the energy compared they have to go buy to the physical stores. For the seller side, this will be their platform to generate their income easily without spending more money to have the business

iii. Macroeconomic forces

Like Amazon.com, it already become the preferred online shopping website among the user and it make the buyer and seller believed there is another way to doing business than to have physical stores to start the business

iv. Industry forces

The existing website already has their place on the potential user preferred and it makes the researcher have the idea for the e-Bookstore within the Selangor and Kuala Lumpur area that easy for the students to get the books.

D. Strategy Canvas (refer to Figure 22)

From the figure 22, there are many comparisons with Amazon.com and e-Bookstore even though both websites have asimilar business model. The price of the books in Amazon.com might be more expensive than e-Bookstore because e-Bookstore is basically for university students so, the seller and the buyer are mostly among students. The seller literally needs to follow the capability of the students to buy the books. Meanwhile, Amazon.com is one of the trusted platforms for the customers to buy through online compared with e-Bookstore, this website can be trusted also but not yet be the popular trusted platform like Amazon.com.

Furthermore, the quality of the books for both websites are at the same level of quality but for service, Amazon.com little bit higher than e-Bookstore. In terms of convenience, e-Bookstore are more convenience to the user whether seller or buyer because the area cover for the business are in Malaysia and specifically area Selangor and Kuala Lumpur compared to the Amazon.com which is anInternational website. The popularity among the customers, Amazon.com is higher compared with e-Bookstore because Amazon.com is the pioneer for this online business. Moreover, in terms of variety of choice of books that the customer can choose to buy. Amazon.com has a variety of choices compared with e-Bookstore.

So, e-Bookstore needs to improve and always upgrade the features on the website so that the customers will be attracted to be one of the customers. Other than that, these website needs to ensure that the different of the value proposition of these website will make the customers use the websites more often than other online bookshop websites.

IX. CONCLUSION AND FUTURE WORK

In conclusion, the business model canvas and value proposition canvas are important in the business because from there it can ensure that the business is achieving their own value. Otherwise, Online Secondhand Bookshop website can give the opportunity to the seller to learn and gain experience doing the business online. This trend of online shopping will be more popular if the company knows how to deal it because the online business is always competing with physical business. In future, if this website is accepted and being used properly by people in Kuala Lumpur and Selangor whom we targeted for this beginning phase, we could make the scope bigger by expanding our business to whole Malaysia.

X. REFERENCES


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**INITIAL BUSINESS MODEL CANVAS (BMC) AND VALUE PROPOSITION CANVAS (VPC)**

<table>
<thead>
<tr>
<th>JUN ONLINE BOOKSTORE (Initial BMC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Partners</td>
</tr>
<tr>
<td>Supplier of books for our online bookshop – book publishers</td>
</tr>
<tr>
<td>The existing online bookshop eg: Mph online</td>
</tr>
<tr>
<td>Key Resources</td>
</tr>
<tr>
<td>1. Technological platform 2. People who want to sell their unused books</td>
</tr>
<tr>
<td>Cost Structure</td>
</tr>
</tbody>
</table>

*Figure 10 Initial BMC*
Figure 11 Initial VPC for Buyer who wants to buy books

- Save time
- Save energy
- Save money
- Less price
- Instant booking

JUN Online Bookstore

Figure 12 Initial VPC for People in need of Free book

- Prepare variety of books of different genres for people who need it to choose
- Free books - Save money
- Use donation money to buy books to give to who need them

JUN Online Bookstore

Figure 13 Initial VPC for Seller

- Can get money
- Easy steps to sell unused books
- Open website
- Fill in selling form
- Sell
- Difficult to find the buyer
- Waste space because of unused books
- Can get money
- Easy to sell unused books
- Open website
- Fill in selling form
- Sell

JUN Online Bookstore
ENHANCED BUSINESS MODEL CANVAS (BMC) AND VALUE PROPOSITION CANVAS (VPC)

**JUN ONLINE BOOKSTORE (Enhanced)**

<table>
<thead>
<tr>
<th>Key Partners</th>
<th>Key Activities</th>
<th>Value Propositions</th>
<th>Customer Relationships</th>
<th>Customer Segments</th>
</tr>
</thead>
</table>
| 1. Seller with unused books  
2. Supplier of books for our online bookshop  
3. The existing online bookshop e.g: MPH online | 1. Find new/second hand book  
2. Buy from the seller  
3. Advertise and sell the book at the website  
4. Deliver book | CUSTOMER  
1. Can search cheaper books than market price  
2. Find wanted book easier  
3. Many choices of books  
4. Trusted platform to buy the books | 1. Social media  
2. Review, rating & feedback | 1. Buyers who want to buy books  
2. Person who in need of free books. |
| 1. Technological platform  
2. People who want to sell their unused books | SELLER  
1. Can generate source of income  
2. Can get experience to sell unused books online  
3. Trusted platform to sell the books | 1. Websites  
2. Mobile application  
3. Network of Mosque | DONATOR  
1. Donors who want to donate the books  
2. Donors who want to donate money |

<table>
<thead>
<tr>
<th>Key Resources</th>
<th>Revenue Streams</th>
</tr>
</thead>
</table>
| 1. Technological platform  
2. People who want to sell their unused books | 1. Surcharge  
2. Delivery charges  
3. Advertisement on websites  
4. Donation |

**Figure 16 Enhanced BMC**
Figure 17 Enhanced VPC for Buyer who wants to buy book

Figure 18 Enhanced VPC for People in need of Free Books

Figure 19 Enhanced VPC for Seller
Figure 20 Enhanced VPC for Book Donator

Figure 21 Enhanced VPC for Money Donator

STRATEGY CANVAS

STRATEGY CANVAS FOR e-BOOKSTORE

Figure 22 Strategy Canvas
Structural Behaviour of Concrete Block with Flyash Content and Waste Rubber as its Loading Surface for Industrial Purpose

Lalit Krishna Nayak*, Prof. P K Parhi**

*Structural Engg Dept., M.Tech student of CET, Bhubaneswar
**Professor, Civil Engg Dept., CET Bhuaneswar

Abstract- This paper presents the results of a series of tests conducted to assess the influence of block shape, thickness, size, compressive strength of concrete block. The test setup discussed here is based on static plate loading. The effect of load on rubberier surface, the mechanism of load transfer and edge restraints are discussed here.

It is emphasized on optimum use of waste materials generated from thermal plants and vehicles amalgamating it with proper ratio with concrete materials that would generate a desired new material which would satisfy the customer needs.

I. INTRODUCTION

In recent years there has been a great interest in gaining strength of concrete using waste materials in terms of replacement against fine aggregate, coarse aggregate or cement. The corresponding replacement also brings out the different w/c ratio and use of waste with optimum quantity in order to gain the targeted strength. It is highly characterised by addition of superplasticizers and the amount of condition of curing that determines proper attainment of strength.

In concrete blocks, the blocks make up the wearing surface and are major load-spreading component of the pavement and loads. It differs from other concrete blocks as normal concrete blocks have concrete surfaces carrying load on it whereas here we are trying to make it on a rubber surface. With upcoming of various industrial schemes and manufacturing subsidies, it is forecasted that India would be a manufacturing hub. With the growth of small scale industries and machine equipments, there should be a focus from civil engineering point of view to ease and facilitate the necessities that is being needed in it. The majority of machineries that is being carried out in small scale industries are of medium weight and are transported frequently or displaced due to replacements, repairs, maintainance etc.

Here are some problems faced by SME’s; shifting machineries from one place to another, cracking and wearing of concrete pavements due to vibrations and water attack, difficulty in cleaning the base of machineries, unnecessary wastage of materials and not being cost effective, noise and vibrations. In order to address these problems we are trying to make a compounded concrete block with waste tyre as its loading surface for machineries of medium weight, hence it would act as a load bearing agent suppressing all the problems faced in SME’s mentioned above.

II. LITERATURE REVIEW

2.1. FLY ASH REPLACEMENT:

In this programme waste material (fly ash and waste tyre) has been tried to use in an optimum way to get through a result that is feasible to both in economic and industrial favoring use. Fly ash is replaced with cement to achieve strength as fixed that is M25. From NiyaziUrgurKocklal (2011) “utilization of fly ash by replacing coarse aggregate with flyash and concluded that durability of high strength air entrained light weight concrete could be produced using sintered or cold bonded light weight fly ash aggregates having comparable performance with normal weight concrete. Fly ash aggregate light weight concrete and normal weight concrete being air retrained are highly resistant to freeze and thaw action with minimum durability factor. Erdemdamci (2014) indicated that fly ash samples in the ratio of 15% in clinker markedly increases the compressive force strength value at 90 days and decreasing the particle size of flyash and concluded that durability of high strength air entrained light weight concrete could be produced using sintered or cold bonded light weight fly ash aggregates having comparable performance with normal weight concrete. Fly ash aggregate light weight concrete and normal weight concrete being air retrained are highly resistant to freeze and thaw action with minimum durability factor.

III. MATERIAL PROPERTIES

3.1. Cement:

Ordinary Portland Cement (OPC) is the most common cement used in general concrete construction when there is no exposure to sulphates in the soil or groundwater. The cement that used is of Ramco cement, Ordinary Portland Cement (OPC) 43 grade as per standard specification of India. Ramco Cement OPC 43 confirms to IS 8112. The grade is based on the 28-day compressive strength of the cement mortar, which in this case is...
not less than 43 MPa. The physical properties of cement is given in the Table 1.

### Table 1. Physical properties of cement.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OPC 43 Grade cement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial setting time</td>
<td>86 minutes</td>
</tr>
<tr>
<td>Final setting time</td>
<td>274 minutes</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>3.15</td>
</tr>
<tr>
<td>Normal consistency</td>
<td>35%</td>
</tr>
</tbody>
</table>

3.2. Aggregate:

Aggregates are the important constituents in concrete. They give body to the concrete, reduce shrinkage and effect economy. One of the most important factors for producing workable concrete is good gradation of aggregates. Good grading implies that a sample fractions of aggregates in required proportion such that the sample contains minimum voids. Samples of the well graded aggregate containing minimum voids require minimum paste to fill up the voids in the aggregates. Minimum paste means less quantity of cement and less water, which are further mean increased economy, lower shrinkage and greater durability. All the test results of aggregate and fly ash are given in the table 2.

#### 3.2.1. Coarse Aggregate (CA):

Coarse aggregate from stone crusher having a nominal maximum size of 20 mm was used. River Sand was used as a fine aggregate in mix of having a nominal maximum size of 4.75 mm was used.

#### 3.2.2. Fine aggregate (FA):

Natural sand as per IS: 383-1987 was used. Locally available River sand which is the most commonly used natural material for the fine aggregates that is used. For this study the river sand Zone-III is used.

3.3. Fly ash:

In India, coal is major source of fuel for power generation. Indian coal is having low calorific value (3000-5000 K cal) & very high ash content (30%-45%) resulting in huge quantity of ash generated. Fly ash is a kind of ash that is extracted from flue gases through electrostatic precipitator in dry form. This ash is fine material and possesses good pozzolanic property. The pozzolanic property of fly ash makes it a source for making cement and other ash based products.

### Table 2. Physical properties of aggregates and fly ash

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>CA</th>
<th>FA</th>
<th>FLY ASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>2.62</td>
<td>2.62</td>
<td>2.05</td>
</tr>
<tr>
<td>Water Absorption, %</td>
<td>1.65</td>
<td>0.806</td>
<td>0.69</td>
</tr>
</tbody>
</table>

3.4. Waste tyre:

The mentioned material was obtained from waste tyre of heavy vehicle like truck. After cutting the size was varied from 14 cm, 12 cm and circular size of dia 10 cm with proper perforations in order to make a good gripping with the concrete after casting.

3.5. Water:

The common specifications regarding quality of mixing water is water should be fit for drinking. Such water should have inorganic solid less than 1000 ppm. This content lead to a solid quantity 0.05% of mass of cement when w/c ratio is provided 0.5 resulting small effect on strength.

But water which is not potable may be used in making concrete with any significant effect. Dark color or bad smell water may be used if they do not posses deleterious substances. PH of water to even 9 is allowed if it not tastes brackish. In coastal areas where local water is saline and have no alternate sources, the chloride concentration up to 1000 ppm is even allowed for drinking. But this excessive amount of alkali carbonates and bicarbonates, in some natural mineral water, may cause alkali-silica reaction.

3.6. Super Plasticizers (Sika):

High Range Water Reducer (HRWR) admixtures are used to reduce the amount of water by 12% to 30% while maintaining a certain level of consistency and workability (typically from 75 mm to 200 mm) and to increase workability for reduction in w/cm ratio. The use of superplasticizers may produce high strength concrete (compressive strength up to 22,000 psi). Superplasticizers can also be utilized in producing flowing concrete used in a heavy reinforced structure with inaccessible areas.

### IV. Mix Design

In these present work the grades of concrete mix i.e. M25 grade is considered and the proportions is 1:1.73:3.05 calculated as per IS:10262-2009. The water cement ratio is 0.45. The total mixes prepared are of 6 types. The properties of fresh concrete i.e. the slump value is evaluated for:

- TM1 (NCA or 0% replacement),
- TM2 (5% FLYASH),
- TM3 (10% FLYASH),
- TM4 (15% FLYASH),
- TM5 (5% FLYASH + RUBBER SURFACE),
- TM6 (10% FLY ASH + RUBBER SURFACE).

The properties of harden concrete i.e. compressive strength is investigated with different mixes as mentioned above at 7 days and 28 days. Then the strength of concrete is compared with the load of different machineries. If the compound block of concrete with rubber as its loading surface is able to carry the load then we find our aim to be successful. All the quantities and mix proportions for M25 grade of concrete are given in the table 3.

### Table 3: Trial Mix Calculation

<table>
<thead>
<tr>
<th>Trial mix no.</th>
<th>Cement in (kg/m³)</th>
<th>FA in (kg/m³)</th>
<th>CA in (kg/m³)</th>
<th>Water in (kg/m³)</th>
<th>Silica Sika in (%)</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM1</td>
<td>370</td>
<td>670</td>
<td>1186</td>
<td>166</td>
<td>0.8%</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>1.81</td>
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<td>1.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.81</td>
</tr>
</tbody>
</table>
V. RESULTS AND DISCUSSION

5.1. Slump Test:
The replacement of fly ash with cement affects the workability of the concrete. The workability of fly ash replaced concrete shows a decrease in slump with increase of fly ash content of total cement volume and the workability of fly ash replaced concrete shows also decrease in slump with increase in fly ash content of total cement volume. The low slump may be due to high absorption of water during the mixing process. The results of the slump test are shown in Table 4 and figure 2.

<table>
<thead>
<tr>
<th>% of Fly ash replacement</th>
<th>w/c ratio</th>
<th>Slump in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0.45</td>
<td>45</td>
</tr>
<tr>
<td>5%</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>10%</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>15%</td>
<td></td>
<td>38</td>
</tr>
</tbody>
</table>

Figure 2 Workability of concrete in terms of slump value.

5.2. Compressive Strength test:
The compressive strength tests were carried out after 7 days and 28 days for the concrete cubes. The specimen of size 150×150×150 mm cubes were cast according to IS: 516-1969. These specimens were cast in steel forms and were well cured under water till the day of test. Compression test according to IS: 516-1959 was carried out on these cubes. These specimens were loaded at a constant strain rate until failure. The strength of concrete is controlled by the proportioning of cement, coarse and fine aggregates, water, and various admixtures. The ratio of the water to cement is the chief factor for determining concrete strength. The lower the water-cement ratio, the higher is the compressive strength. The results of compressive strength of cubes for 7 days and 28 days are given in Table 5, 6 and figure 3, 4 respectively. The compressive strength of specimen was observed to be optimum with specified percentage of fly ash replacement that was 10% of cement and with same optimum percentage cubes with rubber surface as its loading surface was made and tested for compressive test.

<table>
<thead>
<tr>
<th>Sample</th>
<th>w/ c</th>
<th>Area (mm²)</th>
<th>Load (KN)</th>
<th>Stress (N/mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM1 (0%)</td>
<td>0.4</td>
<td>22500</td>
<td>505</td>
<td>22.44</td>
</tr>
<tr>
<td>TM2 (5% Fly ash)</td>
<td>0.4</td>
<td>25000</td>
<td>525</td>
<td>23.37</td>
</tr>
<tr>
<td>TM3 (10% Fly ash)</td>
<td>0.4</td>
<td>25000</td>
<td>596</td>
<td>26.51</td>
</tr>
<tr>
<td>TM4 (15% Fly ash)</td>
<td>0.4</td>
<td>25000</td>
<td>464</td>
<td>20.62</td>
</tr>
<tr>
<td>TM5 (5% Fly ash + Rubber surface)</td>
<td>0.4</td>
<td>25000</td>
<td>315</td>
<td>14.00</td>
</tr>
<tr>
<td>TM6 (10% Fly ash + Rubber surface)</td>
<td>0.4</td>
<td>25000</td>
<td>300</td>
<td>13.33</td>
</tr>
</tbody>
</table>

Figure 3.

<table>
<thead>
<tr>
<th>Sample</th>
<th>w/ c</th>
<th>Area (mm²)</th>
<th>Load (KN)</th>
<th>Stress (N/mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM1 (0%)</td>
<td>0.4</td>
<td>25000</td>
<td>505</td>
<td>22.44</td>
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<tr>
<td>TM2 (5% Fly ash)</td>
<td>0.4</td>
<td>25000</td>
<td>525</td>
<td>23.37</td>
</tr>
<tr>
<td>TM3 (10% Fly ash)</td>
<td>0.4</td>
<td>25000</td>
<td>596</td>
<td>26.51</td>
</tr>
<tr>
<td>TM4 (15% Fly ash)</td>
<td>0.4</td>
<td>25000</td>
<td>464</td>
<td>20.62</td>
</tr>
<tr>
<td>TM5 (5% Fly ash + Rubber surface)</td>
<td>0.4</td>
<td>25000</td>
<td>315</td>
<td>14.00</td>
</tr>
<tr>
<td>TM6 (10% Fly ash + Rubber surface)</td>
<td>0.4</td>
<td>25000</td>
<td>300</td>
<td>13.33</td>
</tr>
</tbody>
</table>

Figure 4.
than the required strength for loading of medium weight machineries. Therefore we can place it and take into account.

5.3. DISCUSSION AND CONCLUSION:

- The concrete got decreasing slump value with increase in fly ash percentage but it is quite negligible which shows that it has good pozzolanic property and at optimum fly ash content that was 10% it showed last minimal slump that is 36cm but after that slump value increased which infers at definite proportion the binding attains a good bond.

- The compressive strength of cubes with no replacement was after 28 days was nearly to cubes with 10% fly ash replaced cubes leaving behind 5% and 15% replaced cubes which indicates that it is optimum ratio at which concrete attains greater strength.

- On making the waste rubber tyre as loading surface with 10% fly ash replacement with cement we saw a decline in the strength of 28 days test that is with stress value 18 N/mm2 that is with load 400 ton. This is due to reduction in concrete surface area and volume of mortar.

- The waste rubber was properly gripped so that is makes a good bind with the concrete and was placed carefully in the mould with little gap above so that the concrete fills its upper part.

- On placing the compound cube of concrete under the machine of middle heavy weight we saw it easily

![A medium weight machine placed above the compound concrete blocks with loading surface on waste rubber.](image)

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The effect of quality standards on Jua Kali metal products sales (a case of steel products made in Kariobangi Light Industries)

Ruheni Chiira Peter
Kenyatta University

Abstract- This study entails investigation on the quality problems facing informal industry particularly the fabricated metallic products sales, a case of Jua Kali industry in Kenya Kariobangi light industries with aim of assisting in establishing possible sustainable solution. The area under investigation has a population of 300 artisans who are distributed along the streets of Kariobangi light industry located in Nairobi East lands, off outer ring road. The study builds on a success case in South Africa Steel industry which has benefited from application of Total quality management practices. Using purposive sampling method, a sample size of 100 artisans will be selected.

Descriptive research design was adopted and therefore data is quantitative in nature. Data collection tool is closed ended questionnaires and data collection procedure will involve engaging a research assistant tasked to deliver the questionnaires, leave the respondents to fill in and pick them or come for them later as applicable. Upon completion of the questionnaires, the information was compiled and summarized in spread sheet for farther processing. The data was analyzed using descriptive statistical where the data was coded into quantitative variables and analyzed as quantitative data. Upon research analysis, the main recommendations include government intervention by applying ensuring closer monitoring by the quality regulation agency, consolidation of artisans to enable them manage quality challenges and application of modular production strategies that harnesses the advantage of specialization.

Index Terms- Quality standards, Quality management practices, sustainable solution, Total Quality Management, KEBS (Kenya Bureau of Statistics)

I. INTRODUCTION

As emphasized by Singh and Shrivastava (2012), total quality management (TQM) is a crucial aspect on production of all products and services. This involves standardization and quality control processes which seek compliance with international standards such as ISO 9000 and ISO 9001. In the global scenario, many nations have enjoyed the economic benefit of quality adherence. Japan is one popular nation that has stood out to be a beneficiary and a heralds of quality management indicating clearly that there is much to gain from quality compliance.

Sonobe Otsuka( 2006) points that: entrepreneurs within the subsaharan Africa, and East Asia become increasingly motivated to make multifaceted innovations that increase profitability. It is difficult to achieve growth and profitability as long as the entreprise remain higly informal. As a result, we have cases where items particular made of steel are bought from the region, exported to the complying industries overseas, processed farther and eventually imported back selling at much higher price at the expense of local economic benefit associated with industrialization ( Krista, 2006).

In Kenya, Kinyanjui (2006) established that: the Jua kali industry has been experiencing a bottle neck in terms of growth due to the challenges most of which are to do with how business is undertaken particularly in regard to total quality management. The industry is characterized by quality noncompliance which puts the industry in a disadvantaged position in market edge. This leads to a situation where there are over 50% imported competitor products in the same industry.

A new education system namely: 8-4-4, was introduced in Kenya in January 1985, following a recommendation by Mackay (1982) with an objective of equipping the scholars of primary and secondary school level with skills to enable them survive economically through self-employment and farther discussed by King and McGrath (2002): the policy arose out of the concerns that; a basic academic education might lack the necessary content. The system accompanied by the enrichment with trade craft courses as a part of the syllabus. The impact was felt in form of emergence of many informal business units composed of weak and highly unstructured production units and products outlets common in business set up like Kariobangi light industries dealing in steel products and others. They mainly deal in steel products including: wheel barrows, household furniture, agricultural tools and steel confectionary equipment. A number of the artisans are class 8 drop out and appear to have just a little attention given to quality in terms of production processes and presentation. This has led to stagnation of the industry which affects the ability to have an impact in the economic growth.

A standards regulation body namely: Kenya Bureau of Standards (KEBS) has been in operation in the country since it was established in July 1974 by an act of parliament - CAP 496 of the laws of Kenya. The institutions core business was development and enforcement of consumer goods standards with the aim of protecting the consumer. However, in the past, the institution has been very effective in managing the formalized sectors as opposed to the informal Jua kali sector. With the growing demand of compliance to total quality management philosophy; they diversified their operations and started adopting ISO compliance roles which entails certifying business organizations on the same as local agent. This sought to bring the
formal and informal sectors to a level where overall performance can be measured and rated against the international bench marks. In Kariobangi light industries, located in Kenya Nairobi county, there are about 100 steel products workshops operating in a common business environment and has about 300 artisans working in them (Akoten and Otsuka, 2007). They are characterized by informal set up consisting of artisans who are insufficiently trained and produce substandard products which are then sold to the other parts of the country. The study endeavors to investigate the effect of standardization of the said products on the market demand, analyze the findings and come up with possible sustainable solutions to the limitations facing the industry.

Kenyan steel industry quality case

A study undertaken by Muchoke (2013) was focused on: application of design processes on production, its impact on quality and standardization. It was established that, majority of the entrepreneurs in Jua kali industry lack high level formal education, the artisans do not use design processes in the production of goods and services and that has led to poor quality, low standard goods and lack of precision. This was farther supported in study done by Lundvall and Battese (1999) which attributed poor quality, lack precision and standardization to low level education.

Muchoke (2013) recommended that the government should dedicate its efforts to training, enforcement of quality policies and promote use of high level education if the Jua kali sector is to grow. According to the above studies, it is clear that the current situation has been brought about by the practices, attitude and skills of the artisans currently operating in Kenyan industry which affect production processes.

II. RESEARCH ELABORATIONS

From study by Akoten and Otsuka (2007), there are about 100 steel fabrication units in Kariobangi light industries. These are distributed along the four streets which in this study, are coded as A, B, C and D. Out of the 100 units, 30 shops were sampled using systematic sampling technique whereby every 1 was considered after skipping every 2 shops. All of the artisans were served with questionnaires in each unit and therefore a total population of 300 persons was subject to investigation in this study.

Purposive sampling technique was applied since it is effective when studying behavioral phenomena with knowledgeable individuals within (M.A. Dolores. C. Tongoco, 2007). It is ideal for this study because the information is coming from the artisans within. In this study, there were 300 respondents distributed among the four streets as shown above. Out of the 100 shops in the site, 30 shops were picked using systematic sampling which constituted the 30% of the total shops. Out of the total shops, all the respondents in the shops were involved. 100 respondents were subjected to the study which also translated to 30% of the total respondent population.

Quantitative data analysis will be used in this study. According to Abeyesakera (2000), it allows the reporting of summary results in numerical terms given with specific degree of confidence. As per the researcher, some qualitative information can be code into binary variables and analyzed as quantitative data. This is also applicable in this particular study where there are questionnaires formatted to give: Yes or No answers. In this study, the results are recorded in tabled with and coded in scales of 1 to 4 which represent the answers to the questions in the Appendix 1, 2, 3 and 4. The results are in appendix 7 which represent the coded and quantified answers. The table in appendix 7 shows how the ratings are converted for the purpose of analysis.

III. RESULTS AND DISCUSSION

Sales level distribution

The various artisans were grouped according to the shops they operate from. They were farther grouped according to the sales level categories as shown in the table below and summarized in terms of the frequency. Based on the actual sales values, the groups were coded in ratings from 1 to 4. The sales levels for the various operating sites (shops) were grouped in ascending order and coded as 1 to 4 form lowest brackets to the highest. The answers to the questions in the respective questionnaires were also tabulated and coded in terms of ratings from 1 to 4 for the purpose of analysis. The coded rating representing sales were plotted and compared to the coded and quantified results as per the various questions. The kind of graphs adopted helped in cascading the profile of sales over the respective elements addressed in each questions to get a quantified comparison.

<table>
<thead>
<tr>
<th>Quota - Sales bracket(Ksh.)</th>
<th>Number of centers</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratings</td>
<td>Sales values ( brackets)</td>
<td>Artisans frequency</td>
</tr>
<tr>
<td>1</td>
<td>1-200000</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>200001 - 500000</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>500001 - 1000000</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>1000001 - 2000000</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>300</td>
</tr>
</tbody>
</table>

Table: Sales Quota (Sales Bracket) and frequencies
From the table, it is observed that majority of the artisans are in sales bracket 1 representing 52 percent of the artisans. Whereas 24 percent were in sales bracket 2, 16 percent in sales bracket 3, only 8 percent were in sales bracket 4. The answers are converted to numeric figures for the purpose of analysis.

KEBS quality compliance analysis

The KEBS quality compliance analysis was measured in terms of percentage of products in the business that are registered by KEBS; whether the artisans consider KEBS mark of quality important in sales promotion; their perception on whether products with KEBS mark are of better quality than those without and whether it is possible and economical to invest in quality compliance. The results are as presented in the table below:

<table>
<thead>
<tr>
<th>sales bracket</th>
<th>% products registered with the KEBS</th>
<th>% of artisans that consider KEBS mark of quality important in improving sales</th>
<th>% that think products with KEBS mark are better quality</th>
<th>% that believe it is possible and economical to invest in quality compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>48</td>
<td>46</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>76</td>
<td>60</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>84</td>
<td>78</td>
<td>80</td>
<td>74</td>
</tr>
<tr>
<td>4</td>
<td>92</td>
<td>100</td>
<td>95</td>
<td>100</td>
</tr>
</tbody>
</table>

The results indicate that most of the businesses in the lower bracket have majority of their products not registered with KEBS (48%). On the other hand, most of the businesses in sales bracket 4 have their products registered with KEBS (92%). This, therefore, shows that most of the registration with KEBS may have an effect on the number of products that are sold (sales volume) by a respondent. Mainly, the respondents with most of their products registered with KEBS are likely to have more sales. This supports the argument by Temtime and Solomon (2002) that businesses registered with a Standards Body are likely to observe quality as compared to others and hence they will tend to produce products of high quality which will attract more customers. As a result, this indicates that registration of products with KEBS will tend to enhance quality of the products. It is also observed that the artisans operating in level 1 sales group strongly believe that compliance to KEBS doesn’t improve sales(46%). The Sales levels happen to graduate to higher magnitude as the opinion towards the quality compliance tends to improve positively to the climax whereby the respondents who strongly believe (100%) that the compliance promote sales operates at the peak sales level. As illustrated in the Fig 4.1c, the respondents in the lower sales level don’t believe at all whether the KEBS compliance has anything to do with actual quality of their products. As the respondents groups shift from lower to higher sales level, there is notable positive change in the opinion towards the significance of KEBS quality compliance in actual products quality.

In regard to believe in feasibility and need to invest in quality compliance efforts, the operators in higher level of sales bracket strongly believe (100%) it is possible to invest and there is need to invest in safety. This shows a connection in the opinion towards the need to invest in quality compliance and sales levels.

It is observed from the table, that the artisans operating in the shops in the level 1 sales level have lowest magnitude of KEBS compliance while those operating in higher sales levels have high compliance. This shows an improvement in sales with improvement in compliance level. It is also true that majority of artisans have not complied with the KEBS quality standards and therefore the institutional impact is unfelt among them and thus the benefit. This indicates a resultant loss of potential sales and productivity among the metal product fabricators in Kariobangi Light industries.

Quality continuous improvement analysis

Quality continuous improvement analysis was measured in terms of percentage of artisans who found it necessary to keep improving the quality of their product; percentage of those who improved the quality your products for the last one year and by how much did the sales improve following the improvement. The results are as in the table below:

<table>
<thead>
<tr>
<th>Sales bracket</th>
<th>% that agree it is necessary to continually improve quality of products</th>
<th>% of those who have improved quality of products in the last one year</th>
<th>% of improvement for those who put effort to improve quality of products</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>8</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>68</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>100</td>
<td>95</td>
</tr>
</tbody>
</table>

Although most of the businesses in sales group 4 agree that it is necessary to keep improving the quality of their products.
(100%), a number of respondents in the lower bracket do not agree with statement as illustrated in the table (20%).

Similarly, most of the businesses in the sales brackets 3 and 4 have improved the quality of the products (100%). However, very few businesses in the lower sales bracket 1 and 2 have improved the quality of their products in the last one year (8 and 25% respectfully).

The table also shows that most of the businesses in sales bracket 4 (95%) experienced an improvement of sales after they improved the quality of products as compared to the businesses in other sales group. This indicates that quality monitoring tends to improve sales of the products and hence it is a necessary venture for the businesses if they want to improve their profitability.

Poor technical training and the poor attitude towards quality continuous improvement is accompanied with lower frequency and magnitude of actual quality improvement and eventually low sales and vise versa. In this analysis, improvement on the technical training is associated with highly positive attitude and magnitude of actual quality improvement. High quality improvement is associated to actual gain in sales level and thus the income for the artisans.

**Product quality monitoring analysis**

Product quality monitoring analysis was measured using percentage of artisans who found it important to monitor the product quality; comparison of quality of their products with other equivalent from others; whether they monitor the quality of product at every stage of production and percentage of the produced items that are returned due to poor quality.

<table>
<thead>
<tr>
<th>sales bracket</th>
<th>% importance of monitoring quality</th>
<th>% quality comparison with others</th>
<th>% of quality monitoring done</th>
<th>% returned due to poor quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>32</td>
<td>8</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>62</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>86</td>
<td>78</td>
<td>94</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>90</td>
<td>94</td>
<td>8</td>
</tr>
</tbody>
</table>

Results from the table above indicate that only 8% of the respondents agree that they do any monitoring at sales bracket 1. At level 2 only 25% monitor their quality. All Level 3 and level 4 respondents do monitor their quality (94%).

According to the table, it is clear that there are products that are returned due to poor quality. This is more prevalent in the businesses in sales group 1 which receive highest percentage of returned products due to poor quality (52%). It is also worthy pointing that returning of products may be an expense to the businesses since they artisans will have to spend more time correcting the product or they may be required to give their customers other products. If the rate of returning is high, then the business reputation may be ruined. As a result, most of the businesses in lower sales grouping will experience losses due to this.

Most of the businesses support the claim that it is important to monitor the product quality. This statement also supports the previous findings since monitoring the quality of the products will increase the sales.

More importantly, most of the businesses in higher sales grouping claimed that they monitor the quality of their products at every stage of production (94%). This is not the case for the respondents in lower sales group which have less quality monitoring procedure (8%). Hence, it is prudent to claim that monitoring of quality of products is directly related to increased sales.

**Quality planning analysis**

The properties of quality planning philosophy used were percentage of the artisans that have any plans in place dedicated to ensure high products quality; whether quality planning is important in steel product production; percentage average material wastage out of the spent materials in production, average percentage rejection of finished products on account of quality the percentage of time spent on correcting defective products out of the whole production time in a week. Results to the questioned were tabulated, coded into numerical figures and re-tabulated against sales levels which were coded in a similar manner.
From the table above, the results indicate that: presence of quality plans and appreciating importance of quality plans translate into more sales. The results also indicate that taking these steps results into less material wastage, less rejection rate due to defects and less time wasted correcting defects.

Most of the businesses in sales bracket 1 and 2 do not have plans that are dedicated to ensure high quality of products (15 and 17% respectively). On the other hand, businesses in sales bracket 4 have plans for ensuring high quality products (57 and 100% respectively). Moreover, majority of the businesses in the sales bracket 4 strongly agree (92%) that it is important to have quality planning in steel product production which varies significantly with response by the businesses in lower sales bracket (48%). The average material for wastage for the businesses in the lower sales bracket (1 and 2) is very high in the range of 54-86 percent whereas the wastage percentage of materials by businesses in the higher sales bracket is very low (8-16%). The businesses in the lower bracket also reports higher rejection rates (34-50%) of the finished products on the account of quality as compared to the businesses in the higher bracket which reports significantly low percentage (8-14%). Moreover, businesses in higher sales bracket spend less time correcting defective products (7-12%) but on the other hand, businesses in the lower sales bracket spend a lot of time correcting (45-52%). The time spent in correction would otherwise be used in doing other economically significant activities and also a lot of materials and other resources may be used during correction. This illustrates that businesses that are neither quality compliant, nor do they have plans regarding quality achievement, monitoring or improvement will tend to experience less sales as compared to businesses which have invested in quality compliance.

### IV. Conclusion

This study shows the need for the businesses to abide with the quality strategies as well as engage in quality monitoring, improvement, and planning in order to improve their profitability. The industry under investigation consists of a majority who do not applying the quality practices and this is responsible for poor sales. The virtue that the majority artisans operate in the lower level sales bracket which constitutes 52% of the entire population hints that the impact of the KEBS is lower among the lower bracket and more felt in the higher bracket. It is therefore accurate to conclude that the institution penetrates better in formal set up than in less formal ones. The industry has a great potential to generate wealth and the investors have a chance to benefit by engaging in metal products fabrication as long as they adhere to sound practices since already there is 8% of the population in level 4 sales bracket and level 3 sales bracket both of which report over Ksh. 1000 000 per month worth of sales per shop.

The government through the agency such as KEBS has a majority (52%) who have they have not impacted in well in the particular industry. The majority of the artisans groups operating in the lower bracket have similar kind and sizes of ventures and therefore they appear to disintegrate their efforts and resources to highly thinned scale as opposed to those operating in higher sales level bracket who not only make huge sales but they also employ highly skilled staff.

### References


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Access to Legal Aid in Criminal Matters: Istanbul Sample

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Abstract - Academicians focused on “Access to justice” topic in Turkey during the 2000’s, as a result of European Union accession process, the judicial, legislative and administrative systems in Turkey underwent a series of reforms in the last decade. On the other hand, many citizens in Turkey today are still unable to claim their basic rights and access available services because of financial inadequacy and lack of knowledge. This review is aimed to manifest the current situation in access to criminal legal aid specifically in Istanbul that reflects Turkey as the most populated and developed city of the country. To achieve this, legal framework of legal aid in Turkey and the procedure of legal aid provided by the bar association have been summarized and additionally researches regarding the general overview of access to legal aid in criminal matters in Istanbul and the Istanbul Bar Association’s Annual Report have been discussed. Due to the lack of regional and annual data of legal aid statistics, conducting a specific questionnaire severally for each district is recommended for further researches.

Index Terms - Access to justice, penal procedure code, civil and criminal legal aid, social inequality.

I. INTRODUCTION

Access to justice is a principal human right. It is also necessary for the protection of all other economic, social, cultural, civil and political rights, and essential for fighting with poverty and economic inequalities. Legal aid has been introduced as a requirement of the right to fair trial and it is a principle brought not to be deprived of the right to file a case for those who cannot afford it. In the early 20th century, many European countries had no formal approach to legal aid, and the poor relied on the charity of lawyers. Most countries went on to establish laws that provided for the payment of a moderate fee to duty solicitors. To curb demand, legal aid was restricted to lawyer costs in judicial proceedings requiring a lawyer [1,2,3].

“Access to justice” became a popular research topic in Turkey during the 2000’s, as a result of European Union accession process, the judicial, legislative and administrative systems in Turkey underwent a series of reforms in the last decade. Many citizens in Turkey today are still not able to claim their basic rights and access available services because of financial inadequacy and lack of knowledge. This review is aimed to reveal the current situation in access to criminal legal aid specifically in Istanbul, that reflects Turkey as the most populated and developed city of the country. Through the manuscript, legal framework of legal aid in Turkey and the procedure of legal aid provided by the bar association have been summarized and additionally researches regarding the general overview of access to legal aid in criminal matters in Istanbul and the Istanbul Bar Association’s Annual Report have been discussed.

Legal Framework of Legal Aid in Turkey

Right to a fair trial

Right to legal remedies is regulated in article 36 on the Turkish Constitution, accordingly “Everyone has the right of litigation either as plaintiff or defendant and the right to a fair trial before the courts through legitimate means and procedures.” This right is also matter to article 6 (right to fair trial) and article 13 (right to an effective remedy) of the European Convention of Human Rights (ECHR), that it’s closely related.

It’s possible to say that Turkey has a mission to build an effective system to realize access to justice to it’s citizens by considering Turkish Constitution’s below articles [4].

Since judicial activities are costly, this right is guaranteed by the constitution, state has some positive responsibilities to ensure the enjoyment of this right effectively, especially for the people who are lack of financial possibilities. In this context, some arrangements has been made on the legislation in order not to obstruct the right to a fair trial because of attorney’s fee, case fee and the other litigation expenses.

Legislations concerning legal aid basically divided in two forms as legal aid in civil matters and mandatory legal aid in criminal matters, however before this distinction there are some other arrangements that contains both matters. Attorney’s Act No 1136 regulates the content and the process of how to demand and get legal aid service referred to in articles 176-181, the details of these matters has also mentioned in Turkey Bar Association Legal Aid Directive.

In addition to mentioned legislations, while the principles of legal aid in civil matters has regulated by Code of Civil Procedure (HukukMuhakemeleriKanunu HMK) No 6100 between the articles 334 -340, the principles of mandatory legal aid in criminal matters has regulated by Code of Criminal Procedure (CezaMuhakemesiKanunu CMK) as part of mandatory defense counseling and mandatory attorneyship.
Legal Aid in Civil Matters

The grounds of legal aid that apply to civil matters and bankruptcy/dept pursuance has regulated by (HMK) such as the content, the demand and service procedure of legal aid and who could make use of it. In this direction; If persons who are incapable of paying the case costs partially or fully without leading himself and his family in a bad condition can prove accuracy of their allegations and defenses or in application to enforcement and provisional injunction, they can benefit from legal aid (HMK 334/1). If public associations and foundations which are incapable of paying the case costs partially or fully without leading themselves they can benefit from legal aid (HMK 334/2).

The movant has to present his claim and reference evidences briefly and prove that he is incapable of paying the case cost by presenting documents regarding his financial status to the relevant authority.

The litigations cost will be postponed if the movant is appropriate for legal aid. Because all case cost and state outlays has to paid by the losing party at the end of the trial. On the other hand if the legal aid beneficiary could be partially or fully exempted of the payment after the consideration that he would be victimize because of the collection in case he adjudged as unfair by the court.

Mandatory legal aid in criminal matters for the victim

Mandatory defense counsel is issued pursuant the article 239 of CMK among the rights of the intervening party. According to this, in cases where the victim or the individual who suffered damages from the crime has intervened the prosecution, a lawyer shall be appointed by the Bar Association in cases of sexual assault and in crimes that carry imprisonment of five years at the lower level and less, if he puts forward a request to the court.

In addition to this, if the victim or the individual who suffered damages from the crime is a child, deaf or mute, or an individual who is mentally ill to the extent that he cannot make his own defense, then request is not needed in order to appoint a lawyer (Art. 239/2 CMK). This kind of appointment is defined as the “mandatory” defense counseling.

It’s necessary to emphasize that, pursuant to article 334/3 of HMK, reciprocity principle is required for foreign citizens to benefit from legal aid, however for mandatory legal aid in criminal matters there is no citizenship agreement and the regulation is applied to anyone who is intervened the prosecution as victim, witness or suspect.

Mandatory legal aid in criminal matters for the suspect

Mandatory defense counseling and mandatory attorneyship are the principal components of the legal aid in criminal matters. There are some fees to be paid for the lawyers however who serve during the criminal investigation and prosecution procedures.

Because of the significant importance of the values that are subject to criminal procedure, both victim and the party who suffered from the crime need to be represented during the trial in order to protect their rights. However, for the people who are not financially covered adequately, access to justice poses a big problem exactly at this time.

To avoid this, CMK allocated two separate institutions that are “mandatory defense counsel” and “mandatory attorneyship”. The suspect or the accused shall be asked to choose a defense counsel on his behalf. In cases where the suspect or accused declares that he is not able to choose a defense counsel, a defense counsel shall be appointed on his behalf, if he requests such (Art. 150/1 CMK).

According to the second part of the same article; if the suspect or the accused who does not have a defense counsel is a child, or an individual, who is disabled to that extend that he cannot make his own defense, or deaf or mute, then a defense counsel shall be appointed without his request (Art. 150/2 CMK). The third case of mandatory defense counsel is provided for suspects accused of crimes carrying imprisonment terms more than five years.

Another obligatory case that requires mandatory counsel is the decision of arrest. According to the article 101/3 CMK that regulates the decision of arrest; in cases where a motion for an arrest has been submitted, the suspect or accused must have the legal help of a defense counsel chosen by him, or appointed by the bar association.

If mandatory counsel appointed to the one who is suspect or accused of a crime, he has to pay the cost of court and counseling fee in case of the court finds him guilty at the end of prosecution. But pursuant to article 6/3-c ECHR and also as agreed on Court of Cassation Decisions, this cost can’t be demand from the person in subject to prove his financial impossibilities [5].

The Structure of Legal Aid Provided by the Bar Association

In Turkey Bar Associations are authorized to provide criminal legal aid and in this context they established Code of Criminal Procedure Practice Units (CMK Units) to serve citizens. The first CMK unit was established in Istanbul by Istanbul Bar Association and served as a model for the other Bar Associations of Turkey. According to the Istanbul Bar’s annual report for the year 2012, in CMK unit 7555 attorneys are recorded and 4782 of them working actively. Considering the population of the city, the CMK Unit has divided into 26 subunits. The appointments with lawyers used to be made according to an on duty list, at which day the lawyers are available [4].

The request for legal criminal aid can be made by filling an application form which could also be filled by the legal aid bureau employees in case of applicant’s illiteracy. According to the Code of Criminal Procedure, requests may also be made by close relatives or the spouses of the defendants too. Law enforcement officers could advise about defendants’ rights but cannot make a criminal legal application. However since 2010, CCP units began to use OCAS (Code of Criminal Procedure Practice Lawyer Online Tasking System) website to deputize lawyer. By using this web site, courts, judges, prosecutors and law enforcement could request lawyer from bar association, online twenty four hours a day, seven days a week. Then the system is tasking the lawyer automatically, who is up coming next on the system. As to acceptance of duty by lawyer the process is beginning [4].

Among its 81 provinces, Istanbul is Turkey’s most populated city with 13 854 740 inhabitants based on the official census data for 2012. It’s also European’s third and world’s twenty first biggest city. Population growth rate of the city is 1.68 % yearly and projective researches demonstrated that, if these trends continue, Istanbul will be the most crowded city of Europe by 2020. 99% of
the city habitants settled in the urban. The density of population is 2666 person per square km which is 27 times of Turkey’s population density. Since 1950 more than 11 million of people have migrated to city from almost all provinces but mostly eastern part of Turkey. Demographic indicators shows that 84.2% are born outside of Istanbul. 35% of this population are living on Asian side and the rest, 65% are living on European side of the city where employment, economic, cultural and educational activities are intense and easy to reach [6].

Istanbul has 39 districts and most crowded one is Bağcılar with 794,024 people. Almost 5, 5 percent of the city population is living in Bağcılar. The following districts are; Küçükçekmece, Ümraniye, Pendik, Bahçelevler, Esenyurt, Üsküdar and Kadıköy. Literacy rate over 6 years of age and over is 97.3 which is over the country’s average. Further 30% of total universities in Turkey are settled in Istanbul. Unemployment rate for the city is declared as 11.3%. In Istanbul approximately half million people still lives under the poverty threshold which only includes food and non-food items. In other words %5 of Istanbul population considered as poor [6,7]. Crime rates in Istanbul have been decreased during the past five years. This decline could be explained with the effective usage of CCTV’s. According to EU Crime and Security Consortium research results 18% of people become victim of a crime in Istanbul as compared to other metropolis the rate vary as 32% in London, 27% Amsterdam, 24% in Copenhagen, 23% New York, 20% Brussels and 19% Rome [8].

II. RESEARCHES ABOUT THE LEGAL AID IN ISTANBUL

Undoubtedly the most essential question of the subject is to find out how to enter these legislations into force. Because the success of these regulations depends on adopting them to the practice in an effective way. To determine this there are some important researches have been carried out in Istanbul Courthouses in different years.

The first of these was “The Effectiveness of Criminal Justice System” carried out as Project by Prof. Sulhi Dönmez and Prof. Dr. Feridun Yenisey in 1998. The results of this research demonstrates that the accused were represented by the counselors that they’ve chosen by themselves instead of the ones that bar appointed. The reason of this issue determined that the research was limited with Istanbul and included only bad check lawsuits. In the same research it’s seen that the ratio of the lawyers who served legal aid and get paid by the bar association was only %6, 5. Based on this situation it’s recommended to establish an effective payment system to lawyers in order to motivate them and for achieving the legal aid’s objective [9]. But unfortunately it’s known that this issue is still going on after all these years.

The second research project concerning this subject was implemented in 2011 by the cooperation of Bahçeşehir University (BAU), Max Planck Institute (MPI) and HKI under the name of “The Effectiveness of Criminal Justice during the Investigation Process”. The data of this project was 1000 court files that were investigated in court houses and according to the analysis of these files it’s found that while the number of the law suits that a lawyer involved was 20, the number of the law suits without a lawyer was 36 and no information gained regarding lawyer attendance from the other files. This research mostly contains the criminal court of first instance and criminal court of peace law suits. Since the investigation and prosecution procedures of these law suits are not included such crimes that require to have a mandatory counselor, it’s seen that the numbers of the law suits that have mandatory lawyers was inconsiderable as it’s estimated.

In the year 2013 BAU, MPI and HKS have carried out collectively another project themed “Enforcement of Detention and The Role of Defense” [10], that has searched the files that include the verdict of conviction only by the heavy criminal courts in Istanbul Courthouses. According to the survey on application of the pre-trial detention and the role of the defense which carried out by BAU in 2013, the suspect didn’t represented by an attorney at the detention hearing in 124 files (see Table 1).

| TABLE 1 - Was the suspect represented by an attorney at the detention hearing? |
|------------------|------------------|------------------|------------------|
|                  | Frequency | Percent | Valid | Cumulative |
| Valid            |           |         |       |            |
| Yes              | 583       | 77.0    | 82.5  | 82.5       |
| No               | 124       | 16.4    | 17.5  | 100.0      |
| Total            | 707       | 93.4    | 100.0 |            |
| Missing          |           |         |       |            |
| Cannot be understood from this file | 47 | 6.2 | |
| Total            | 50        | 6.6     |       |            |
| Total            | 757       | 100.0   |       |            |

According to the law a defense lawyer must take place at the detention hearing but a few years ago there was a conflict of payment for appointed lawyers between the Ministry of Justice and Bar Association. Therefore, these lawyers protested the situation and weren’t involved in the cases (see Table 2). According to the BAU’s survey, %52 of the defense lawyers were appointed by the Bar Association, only in 106 cases the suspect had enough financial resources to retain his own private lawyer (see Table 3).
It’s instructed above the legal frame and its implementation of legal aid, mandatory defense counselor and mandatory attorney. Thereinafter sociodemographic perspective of legal aid will be mentioned in text.

### TABLE 2 - Is the absence of defense lawyer at the detention hearing related to the conflict between Ministry of Justice and Bar Association?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>43</td>
<td>5.7</td>
<td>68.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>20</td>
<td>2.6</td>
<td>31.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>63</td>
<td>8.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>99</td>
<td>694</td>
<td>91.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>757</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3 - Was the attorney of the suspect private or appointed by the Bar Association?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Private attorney</td>
<td>106</td>
<td>14.0</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>Appointed by the Bar Association</td>
<td>398</td>
<td>52.6</td>
<td>79.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>504</td>
<td>66.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>99</td>
<td>253</td>
<td>33.4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>757</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

III. THE EVALUATION OF THE ISTANBUL BAR ASSOCIATION’S ANNUAL ACTIVITY REPORT

Applications to bar for a lawyer in order to benefit from “Criminal Legal Aid” is a direct indicator of “Access to Justice”. Istanbul Bar Association Annual Activity Report for the year 2012, declares the data of the criminal legal aid demands from law enforcement units from all over the 39 districts of Istanbul, both for the children and adults. Istanbul Bar Association Annual Activity Report for the year 2012 has been collected from Code of Criminal Procedure Practice Lawyer Online Tasking System (OCAS) web site [11]. By using this web site, courts, judges, prosecutors and law enforcement could demand lawyer from bar association, online in twenty four hours a day, seven days a week. Then the system is tasking the lawyer automatically, who is up coming next on the system. As to acceptance of duty by lawyer the process is beginning.

Considering this report’s figures, it is clear that, some districts of Istanbul such as Fatih, Şişli, Beyoğlu, Bakırköy and Üsküdar are demanding many more lawyer than the others. Those districts are not the most populated ones but industrially developed, thus they offer more job opportunities and residents are less than work places. Fatih and Üsküdar are also the main transport hubs of the city. As a result of this the population in these districts change dramatically in the working hours. Criminological researches show that highest crime rates are reported in the city centers where business centers, factories and offices located. On the contrary crime rate is reducing far away from the city center [12].

On the other hand considering report data it can be said that, Çatalca, Adalar, Şile, Beykoz and Silivri districts have rare applications to CCPP unit for a lawyer. These districts can be considered as countryside and low population zone of Istanbul. By comparing the number of criminal legal aid applications to the population of districts, it’s seen that even they are high populated Çekmeköy, Arnavutköy, Zeytinburnu, Sancaktepe and Güngören districts habitants are applying legal criminal aid lesser than it’s expected. Comparing with the most applicant districts with less often applicant districts, it is easy and proper to say suburbs of the city has less awareness of their rights depending economic, social and educational inadequacy.

Criminologists have long suspected that solving problems related to education is key to solving the problem of crime. Education represents the single most important social policy investment in overcoming social disadvantages [13,14]. Household budget research indicates that, only 2, 3 percentage of total expenditures in Turkey done for educational purposes [15]. This figure differs dramatically in high income and poor families. According to this difference, high income group spend their income for education 7 times more than low income group. This gap can be seen in schools too. Because of its population Istanbul has the highest rate in the number of students per classroom and per teacher. The inequality of opportunities in education among Istanbul districts, is stunning. As an example the average of student numbers per classroom rates in Gaziosmanpaşa, Sultangazi, Esenler and Arnavutköy are 34- 38, but 16-18 in Kadıköy, Beşiktaş, Şişli and Bakırköy [16].
Researches also reflect that the poverty and unequal conditions are affecting directly awareness of rights. People in poverty and marginalization directly and indirectly affects their prospects for accessing justice services. Illiteracy and lack of education reduces awareness of their rights and their ability to defend themselves [17].

Istanbul has a young population which is out of labor force. Almost 3, 5 million of the city population is under the age of 15. In another words, one out of every four in Istanbul has not contribute to the household income. At the same time most criminologists suggest that people commit less crime as they getting older. Crime peaks in adolescence and then decline rapidly there after [18]. This fits to the figures of Istanbul Bar Association’s Annual Activity Report, every 3 applications in 4 has been made for children defendants or victims of crime. As it’s mentioned before criminal legal aid is mandatory for children defendants or victims of crime in any circumstances.

IV. CURRENT LEGISLATION DURING THE STATE OF EMERGENCY

After the coup attempt on July 15, 2016 and turmoil incidents related to this attempt, a state of emergency was declared across Turkey on July 20, 2016. At the beginning, the state of emergency was declared for 3 months but recently it has been extended for 6 months more. Since it was declared, many statutory decrees (KHK) has been published in Official Gazette and some of these statutory decrees have articles related to criminal procedure. Here we will only refer to provisions that are effective in criminal defense because it is linked to our topic.

According to KHK 668 which has published in Official Gazette on 27 July 2016-29783 (2nd repetition) and approved by Turkish Grand Assembly with the Act No. 6755, as long as the state of emergency continues with regard to the offences enumerated under fourth, fifth, sixth and seventh sections of fourth chapter of second volume of the Turkish Criminal Code, the offences falling under the Anti-Terror Law and the collective offences; searches and seizures can be carried out at lawyer’s offices by law enforcement officers without the participation of the public prosecutor upon the order of a judge, or by the written order of a public prosecutor, in cases where there is peril in delay. The bar president or an advocate representing him/her shall be present during the search and seizure process; however, the second and third paragraphs of Article 130 of the Law no. 5271 shall not be applied (Art. 3/1-i). The defense counsel’s right to examine the contents of the case-file or take copies of the documents can be restricted by the decision of the public prosecutor, if the purpose of the investigation may be compromised (Art. 3/1-i).

According to KHK 667 which has published in Official Gazette on 23 July 2016-297779 and approved by Turkish Grand Assembly with the Act No. 6749, as long as the state of emergency continues with regard to the offences enumerated under fourth, fifth, sixth and seventh sections of fourth chapter of second volume of the Turkish Criminal Code, the offences falling under the Anti-Terror Law and the collective offences; where there is a risk that public security and the security of the penitentiary institution is endangered, that the terrorist organization or other criminal organizations are directed, that orders and instructions are given to them or secret, clear or crypto messages are transmitted to them through the remarks during the interviews between the detainees and their lawyers; the interviews may be recorded auditory or audio-visually via technical devices, the officers may be made present during the interviews between the detainee and his/her lawyer with a view to monitoring the interview, documents or document templates and files given by the detainee to his/her lawyer or vice versa and the records kept by them concerning the interview between them may be seized, or days and hours of the interviews may be limited upon the public prosecutor’s order.

In the event that the interview of the detainee is understood to be made for the aim set out above, the interview shall be immediately ended, and this fact shall be recorded into minutes together with the grounds thereof. The parties shall be warned about this issue prior to the interview.

In the event that such minutes are drawn up in respect of a detainee, the Office of the Magistrates’ Judge could ban the detainee from interviewing with his/her lawyers, upon the public prosecutor’s request. Decision on banning shall be immediately served on the detainee and the relevant Bar Presidency with a view to assigning a new lawyer. The public prosecutor may ask for replacement of the lawyer commissioned by the Bar. The commissioned lawyer shall be paid in accordance with Article 13 of the Law no. 5320 on the Enforcement and Application Procedure of the Criminal Procedure Code of 23 March 2005 (Art. 6/1-d).

Within the scope of the investigations performed, the defense counsel selected under Article 149 of the Criminal Procedure Code or assigned under Article 150 thereof may be banned from taking on his/her duty if an investigation or a prosecution is being carried out in respect of him/her due to the offences enumerated in this Article. The Office of Magistrates’ Judge shall render a decision on the public prosecutor’s request for a ban without any delay. Decision on banning shall be immediately served on the suspect and the relevant Bar Presidency with a view to assigning a new counsel (Art. 6/1-g).

Within the scope of the investigations and prosecutions, at the most three lawyers shall be present during statement-taking and questioning periods or hearings (Art. 6/1-g).

As seen above, all of these provisions created serious restriction against the right to defense. And all of these practices revealed an important question that the evidence obtained based on these interim measures during the state of emergency can be used after the state of emergency. In order to prevent human rights violations it would be beneficial to reconsider our legal framework [19].
ACKNOWLEDGMENT

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Are There Threats of Social networks among Youths? Western Ethiopia in Context

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Abstract- Social networks continue to play a central role in the lives of Ethiopian youths. The safety of these online spaces and the risky behaviors in which youth engage is of utmost importance. There are youths who face risks and are harmed online. Indeed, some youths are more at risk than others. Those youths who have psychosocial issues; family and school problems, are far more likely to be under threat than the average youth using the internet. This study explores the risks and threats of youths on social networks through assessing their attitudes towards risks; prominent threats; and risk aversion strategies. The objective of this research is to analyze the age and gender dynamics of youths regarding risks and threats through social networks. There are three target population of this study from where the sample is drawn: teen cyber café visitors, cell phone using older youths and laptop using professional youths. For the first target population, systematic random sampling is used whereas for the second and third snowball sampling is applied. The sample size comprises (n=252) questionnaires; and the data is collected and analyzed keeping in view the age and gender dynamics and the result is presented. The findings pertaining to risks and threats on social networks reveal that most of the Ethiopian youths take social networks as a fun and little bit risky. Majority of youths waste their time due to over consumption of social networks. Ethiopian teens bully their counterparts more than the elder youths whereas, females bully online more than males. Mostly youths receive texts as a dominant form of cyberbullying and most of the youths bully bi-annually. To avert the probable threats, maximum youths either block or ignore the strangers on social networks.

Index Terms- Social networks, threats, online communication, youths, Ethiopia.

INTRODUCTION

Online communication has become a centerpiece in the social life of youths. They outnumber adults in their use of communication technologies, such as social networking sites. “Social networks” are online communities that give opportunities to connect with, or provide resources to, clients, colleagues, family, and friends who share common interests. There are many different types of social network sites, many of which are free, and they range from general to those tailored for a specific demographic or interest area. Examples include Facebook, MySpace, LinkedIn, Skype etc. In each social network, a profile is created that describes a person or organization, and then people are invited to join as “friends.” (boyd and Ellison, 2007; Hussain, 2014). The three most visited social networking websites among Ethiopian youths are: Facebook, YouTube and Skype. Facebook is the top most popular (above 95%) social networking site. In frequency, most of the Ethiopian youths (above 40 per cent) use social networks ‘once in a few days’. Time-wise, maximum youths (above 45 per cent) use Social networks 30-60 minutes per session, whereas contact-wise, most of them have more than 300 friends in their profile (Hussain, 2014). The increase in social media has been so rapid and their presence in youths’ everyday life is now so pervasive that, for them, social media is the primary way they interact socially, and a large part of this generation’s social and emotional development is occurring while on the Internet and on cell phones. Because of their limited capacity for self-regulation and susceptibility to peer pressure, youths are at risk as they navigate and experiment with social media (McBride, 2011). The massive popularity of online communication among youths has elicited reactions. Concerns have been voiced that adolescents develop shallow relationships with online strangers or may become victims of online solicitation (Valkenberg & Peter, 2010). The objective of this paper is to analyze the age and gender dynamics of youths regarding risks and threats through social networks.
LITERATURE REVIEW

The main risks and threats for youths online today are associated with at least five factors: the predominant use of online communication (whether it is anonymous); the communication partner (friend or stranger); the type of use (compulsive or non-compulsive); the timeline of data collection (i.e., the effects were more negative in the early stages of the Internet); and motivation to use a particular technology (e.g., for communication or entertainment). Valkenberg and Peter (2010) expound anonymity (freedom to hide identity), synchronicity (freedom to edit) and accessibility to intimacy as the important threat on social networks. Furthermore, according to Boyd and Marwick (2009) there are three issues that dominate as online threat: sexual solicitation, harassment, and exposure to inappropriate content. Online solicitation is harassing or teasing communications that are not designed to seduce youth into offline sexual encounter. One in seven minors in a national United States sample is sexually solicited online. Peers and young adults—not older adults—account for 90% of solicitations in which approximate age is known. Many; 69% of solicitations involve no attempt at offline contact and youth typically ignore or deflect the experience without distress (Wolak, Kimberly & David, 2007). Harassment or bullying is an aggressive, intentional act or behaviour that is carried out by a group or an individual repeatedly and over time against a victim who cannot easily defend himself or herself (Olweus, 1999). Cyber-bullying is “an overt, intentional act of aggression towards another person online” (Ybarra & Mitchell, 2008) or a “willful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices” (Hinduja & Patchin 2008). Hinduja and Patchin (2009) found that 82% of victims in their United States sample knew their perpetrator (and that 41% of all perpetrators were friends or former friends). Exposure to inappropriate content is pornography and other problematic content. Encounters with pornography are not universal and rates of exposure are heavily debated. Wolak et al (2007) found that 42% of youth in a United States sample reported unwanted or wanted exposure or both; of these, 66% reported only unwanted exposure, and only 9% of those indicated being “very or extremely upset.” Furthermore, rates of unwanted exposure were higher among youth who were older, suffered from depression, and reported being harassed or solicited online or victimized offline.

METHODS AND MATERIALS

This research has been accomplished through quantitative research design. The study was conducted in Nekemte town of Oromia region in Ethiopia. It is situated at the elevation of 2088 m above sea level, and located at a latitude and longitude of 9°51’N 36°33’E. It is at the center of the road network for South Western Ethiopia. The town is fairly developed having about 15 cybercafés, 300 EVDO connections and 700 CDMA users through which social networks is used on the internet (Ethiopian Telecommunication, 2012). There are three target population of this study from where sample is drawn. They are teen cyber café visitors, cell phone using older youths and laptop using professional youths. The participants of this research are social networks users falling under teen and youth category. An individual who had used social networks through internet at least once in the last one month is the participant of this research. The participants are the desktop user teens from five cyber cafes; cell phone user youths from five universities; and laptop using professional youths of different organizations of the town. The tool used for quantitative data is self-administered questionnaire. In order to get desired response, the close ended type items were included in the questionnaire. A pilot study of 20 cases has been done to draw Cronbach Alpha and add value to the questionnaire. The sample size of this study is 252, which is statistically derived for questionnaire survey using the assumptions of desired precision 5% and confidence level 95%. The sample includes both male (n=126) and female (n=126) youths. In addition, age-wise it also includes teens (n=111) and older youths (n=141) youths. As there are three target population of this study from where sample is drawn, for the first target population (teen cyber café visitors) systematic random sampling is applied. For the second (cell phone using older youths); and third (laptop using professional youths) target group snowball sampling is applied. The survey sample includes teen desktop users in 5 different cyber cafes of town; cell phone using older youths in 5 different universities of the town, and laptop (EVDO/CDMA) using professional youths of the town. The questionnaire is translated into English. After the data is gathered through questionnaire, it is analysed through SPSS in terms of frequency and percentage.

RESULTS AND DISCUSSION

A. Profile of the respondent
The respondent profile of this study consists of 126 (50%) male and 126 (50%) female. Age break up constitutes 111 (44%) teens and 141 (56%) older youths. In education, the respondents include 31% preparatory students, 28%
less than first degree, 23% first degree and 11% second degree. Occupation-wise, 149 (60%) respondents are students, 26 (10%) are skilled workers, 10 (4%) are clerks/salesmen 3% are self-employed professionals and small traders followed by unemployed people, businessmen, junior officers and senior officers.

Table 1: Respondent profile

<table>
<thead>
<tr>
<th>S. No.</th>
<th>VARIABLES</th>
<th>RESPONDENTS (Base=252)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GENDER</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Male</td>
<td>50 (126)</td>
</tr>
<tr>
<td>2.</td>
<td>Female</td>
<td>50 (126)</td>
</tr>
<tr>
<td></td>
<td>AGE</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Teens</td>
<td>44.0 (111)</td>
</tr>
<tr>
<td>2.</td>
<td>Older youths</td>
<td>56.0 (141)</td>
</tr>
<tr>
<td></td>
<td>EDUCATION</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>5-9 years of school</td>
<td>7.1 (18)</td>
</tr>
<tr>
<td>2.</td>
<td>10-12 class</td>
<td>31.0 (78)</td>
</tr>
<tr>
<td>3.</td>
<td>Less than First Degree</td>
<td>27.8 (70)</td>
</tr>
<tr>
<td>4.</td>
<td>First/Second Degree (General)</td>
<td>23.0 (58)</td>
</tr>
<tr>
<td>5.</td>
<td>First/Second Degree (Professional)</td>
<td>11.1 (28)</td>
</tr>
<tr>
<td></td>
<td>OCCUPATION</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Unskilled Worker</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Skilled Worker</td>
<td>10.3 (26)</td>
</tr>
<tr>
<td>3.</td>
<td>Small traders</td>
<td>2.8 (7)</td>
</tr>
<tr>
<td>4.</td>
<td>Shop Owners</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Business with employing non</td>
<td>0.4 (1)</td>
</tr>
<tr>
<td>6.</td>
<td>Business with employing 1-9</td>
<td>1.2 (3)</td>
</tr>
<tr>
<td>7.</td>
<td>Business with employing 10 &amp; above</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Self-employed professionals</td>
<td>3.2 (8)</td>
</tr>
<tr>
<td>9.</td>
<td>Clerical/Salesman</td>
<td>4.0 (10)</td>
</tr>
<tr>
<td>10.</td>
<td>Supervisor Level</td>
<td>15.9 (40)</td>
</tr>
<tr>
<td>11.</td>
<td>Jr.Officer/Executive</td>
<td>0.8 (2)</td>
</tr>
<tr>
<td>12.</td>
<td>Sr.Officer/Sr. Executive</td>
<td>0.8 (2)</td>
</tr>
<tr>
<td>13.</td>
<td>Student</td>
<td>59.1 (149)</td>
</tr>
<tr>
<td>14.</td>
<td>House-wife</td>
<td>-</td>
</tr>
<tr>
<td>15.</td>
<td>Unemployed</td>
<td>1.5 (4)</td>
</tr>
</tbody>
</table>

Note: The number in parenthesis is frequency of responses

B. Attitude towards threat

The EU Kids Online project (2009) provides a matrix model for thinking about risks to young people online. Whilst far from comprehensive, it provides a useful frame for considering young people’s exposure to, and participation in, risk factors and risk behaviours through their online social networking activity. They are underlined as illegal content, pedophiles, grooming, strangers, extreme or sexual violence, other harmful or offensive content, racist/hate material activities, advertising/commercial persuasion, biased/misinformation, exploitation of personal information, cyber-bullying, stalking, harassment, gambling, financial scams, suicide, anorexia, invasions/abuse of privacy, and illegal activities like hacking and downloading. Therefore, online social networks opens up the possibility of young people for many risks (Hussain, 2014).
Fig 1: Attitudes towards risk on social networks by age and gender

The figure demonstrates that when asked about the youths risk perception on social media, majority of the male youths (45%) take social media, as a fun and little bit risky whereas 34% regarded social media as a fun and safe. 14% of male youths take it carelessly and only 8% consider social media as very risky. Likewise, majority of the female youths (54%) take social media, as a fun and little bit risky whereas 26% regarded social media as a fun and safe. 13% of male youths take it carelessly and only 7% consider social media as very risky. Age-wise data of risk perception on social media shows that majority of the teens (46%) take social media, as a fun and little bit risky whereas 33% regarded social media as a fun and safe. 13% of male youths take it carelessly and only 8% consider social media as very risky.

C. Prominent risks and threats

Risks factors are those conditions of situations that are empirically related to particular out comes. The social networks introduce new opportunities for Ethiopian youths to get access to problematic content, including pornographic and violent content as well as that which depicts or encourages self-harm (Hussain, 2014).

### Table 2: Risks and threats by age and gender

<table>
<thead>
<tr>
<th>Risks and Threats</th>
<th>Male Teens (Base=54)</th>
<th>Female Teens (Base=57)</th>
<th>Male Older Youths (Base=72)</th>
<th>Female Older Youths (Base=69)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage</td>
<td>Percentage</td>
<td>Percentage</td>
<td>Percentage</td>
</tr>
<tr>
<td>Pornography/hate speeches</td>
<td>35.1 (19)</td>
<td>35.0 (20)</td>
<td>48.6 (35)</td>
<td>40.5 (28)</td>
</tr>
<tr>
<td>Cyber-bullying</td>
<td>31.4 (17)</td>
<td>47.3 (27)</td>
<td>41.6 (30)</td>
<td>46.3 (32)</td>
</tr>
<tr>
<td>Meeting stranger</td>
<td>37.0 (20)</td>
<td>22.8 (13)</td>
<td>30.5 (22)</td>
<td>43.4 (30)</td>
</tr>
<tr>
<td>Wastage of time</td>
<td>44.4 (24)</td>
<td>22.8 (13)</td>
<td>45.8 (33)</td>
<td>52.1 (36)</td>
</tr>
<tr>
<td>Social exclusion</td>
<td>14.8 (8)</td>
<td>26.3 (15)</td>
<td>23.6 (17)</td>
<td>28.9 (20)</td>
</tr>
<tr>
<td>Personal information</td>
<td>12.9 (7)</td>
<td>26.3 (15)</td>
<td>23.6 (17)</td>
<td>33.3 (23)</td>
</tr>
<tr>
<td>Sexual predation</td>
<td>18.5 (10)</td>
<td>19.2 (11)</td>
<td>26.3 (19)</td>
<td>24.6 (17)</td>
</tr>
<tr>
<td>Frauds</td>
<td>18.5 (10)</td>
<td>12.2 (7)</td>
<td>20.8 (15)</td>
<td>28.9 (23)</td>
</tr>
<tr>
<td>Unwanted attention</td>
<td>18.5 (10)</td>
<td>19.2 (11)</td>
<td>23.6 (17)</td>
<td>24.6 (17)</td>
</tr>
<tr>
<td>Hacking and identity theft</td>
<td>18.5 (10)</td>
<td>15.7 (9)</td>
<td>30.5 (22)</td>
<td>26.0 (18)</td>
</tr>
<tr>
<td>Invasion of privacy</td>
<td>18.5 (10)</td>
<td>24.5 (14)</td>
<td>31.9 (23)</td>
<td>28.9 (20)</td>
</tr>
<tr>
<td>Haven’t thought about it</td>
<td>12.9 (7)</td>
<td>12.2 (7)</td>
<td>5.5 (4)</td>
<td>10.0 (7)</td>
</tr>
</tbody>
</table>

Note: The number in parenthesis is frequency of responses
The table 2 clarifies that for male youths the top five risks on social media are wastage of time (45%), exposure to porn, hate speeches (43%), harassment or bullying (37%), meeting strangers (33%), and privacy issues (26%). For female youths the top five risks on social media are harassment or bullying (47%), wastage of time (39%), exposure to porn, hate speeches (38%), meeting strangers (34%) and personal information (26%). Age-wise for teens the top five risks on social media are harassment or bullying (40%), exposure to porn, hate speeches (35%), wastage of time (33%), meeting strangers (28%) and privacy issues (22%). For older youths the top five risks on social media are wastage of time (49%), exposure to porn, hate speeches (45%), harassment or bullying (44%), meeting strangers (37%) and privacy issues (30%).

D. Risk and aversion strategies
Web filters and blocking content is the most frequently used mechanism to promote safety and risk. But, the most used mechanism for ensuring young people’s safety online (blocking and filters) is least trusted as effective. Interventions through training is most trusted as effective but least frequently used. Actively supervising young people’s internet use is the one which is widely used and most credible method (Davies & Cranston, 2008).

<table>
<thead>
<tr>
<th>Risk Aversion Strategies</th>
<th>Male Teens</th>
<th>Female Teens</th>
<th>Male Older Youths</th>
<th>Female Older Youths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never had such a problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t know of any strategy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking guardians/parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motherhood statements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applying self censorship</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threatening</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changing the password</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintaining the confidentiality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting the profile as private</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocking the unwanted ones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ignoring the unknown ones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig 2: Risk aversion strategies by age and gender

The figure 2 demonstrates that to avoid risk on social networks, for male youths top five risk aversion strategies are blocking the unwanted contacts (54%) followed by ignoring the strangers (50%), maintaining confidentiality (47%), setting the profile as private (43%) and applying self-censorship (34%). The five risk avoiding strategies of female youths are blocking the unwanted contacts (65%) followed by ignoring the strangers (56%), maintaining confidentiality (45%), setting the profile as private (43%) and applying self-censorship (44%). The five risk avoiding strategies of teenagers are blocking the unwanted contacts (50%) followed by ignoring the strangers (46%), setting the profile as private (46%), maintaining confidentiality (41%), and applying self-censorship (33%). The five risk avoiding strategies of older youths are blocking the unwanted contacts (59%) followed by ignoring the strangers (59%), maintaining confidentiality (48%), setting the profile as private (40%) and applying self-censorship (35%).

CONCLUSION AND RECOMMENDATION

In sum, the Ethiopian youths are very insensitive in relation to social networks threats. Majority of youths take social networks as a fun and little bit risky followed by fun and safe. Very few people think that social networks are very risky. Moreover, the top five risks associated with social networks expressed by Ethiopian youths are: wastage of time, cyber-bullying, pornography, meeting strangers, and invasion to privacy. Further, to avoid risk on social networks
networks. Ethiopian youths use the five most popular strategies; and they are: blocking the unwanted contacts, ignoring the strangers, maintaining confidentiality, setting the profile as “private” and applying self-censorship. Eventually, the findings pertaining to risks and threats on social networks reveal that most of the Ethiopian youths take social networks as a fun and little bit risky. Majority of youths waste their time due to over consumption of social networks. Maximum youths either block or ignore the strangers on social networks to avert the probable threats. Ethiopian teens bully their counterparts more than the elder youths whereas, females bully online more than males. Mostly youths receive texts as a dominant form of cyberbullying and most of the youths bully bi-annually. Researches consistently highlight a connection between the practices of seeking access and being exposed to social networks, suggesting that an effective intervention needs to account for the motivations that youths have when they seek access. Blocking access certainly has its place, but if we fail to address those who are seeking access, we will not curtail the most problematic outcomes. The more we create channels of communication between youths and responsible adults and empower youth to play an active role in any intervention, the more successful we will be in combating the risks and threats we face. Youths should think and rethink about privacy before posting anything on social networks as it does not exist in the web world. The studies expose that majority of teens and females add everyone in their network which leads them to online harassment. The elders should aware youths about the ramifications of posting inappropriate material. Youths need to know that once they post something, it cannot be taken back and can follow them. General privacy concerns and identity disclosure concerns are of greater importance to female youths than male youths. While signing up for opening a profile on social networks youths should be advised to stay safe related to the disclosure of important information like home address, phone number, and other privacy concerns. In addition, sometimes guardians need to check privacy settings and online profiles for the better safety and security. Finally, the time spent on computer is important to notice as it leads to social networks depression of the youths.

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AUTHORS

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Using Structural Equation Modeling Approach on the Role of Teacher Religion on High Performance Work System and Teacher Performance

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Abstract - The Integrating the strategic human resource management research with teachers views of their performance. In this study, it proposed that the human resource management practices of a high-performance work system enhance teacher performance in the school context. However, the introduction of Teacher Religion as a mediator between HPWS and Teacher performance which encourages teachers to engage in cooperative behaviors with the student which is essential in achieving its superior performance. The results were based on the data collected from six education district in Lagos State Nigeria of 264 teachers largely supported the proposed theoretical framework and shed light on the influence teacher religion mechanism on high-performance work system and teacher effectiveness in their performance using Structural Equation Modeling (SEM) analysis. Results of the analysis revealed that collective Teacher Religion mediated the relationship between HPWS and Teacher Performance indirectly; consequently, HPWS directly influenced the performance of the teacher.

Index Terms - HPWS, Structural Equation Modeling, Teacher Performance, Teacher Religion

I. INTRODUCTION

This paper examines a competing mechanism that might mediate the link between high-performance work system (HPWS) and teacher performance. Research on strategic human resource management (SHRM) has found a positive and significant relationship between high-performance work systems (HPWS) and employee performance (Boxall & Macky, 2009; Combs, Liu, Hall, & Ketchen, 2006). However, the incorporation of religious, spiritual dimension in the workplace is leaner towards individual reflection and more attentive to the relationships with self-intrinsic (Jeanette, 2008) that enhance quality performance.

This study examines how teacher religious spirituality mediates between HPWS and teacher performance as an alternative motivated tool that can help to develop education industry to the expected standard as proposed in Figure 1. In light of these, the first explanation holds that HPWS are designed to increase employee performance using its elements such as recruitment, development, appraisal, compensation, caring and involvement which increase job performance (Chuang & Liao, 2010). As a matter of fact, scholars have detected the positive effect of Religious Spirituality on organizational functions and practices since the last decades (Benefiel, 2008; Hall, Oates, Anderson, & Willingham, 2012; Wong & Hu, 2012). Therefore the second explanation expresses the positive contribution of teacher religious spirituality to HPWS. The third part presents the effect of Religious spirituality on teacher performance. It is observed that employee attitude to work is an integrated part of his/her self-concept that that is seriously affecting not only his performance at workplace but also his/her life at home. The incorporation of Religious spirituality at the work environment has made known as a new potent additional mechanism to enhance performance (Carroll, 2013; Fry & Nisiewicz, 2013; Fry & Kriger, 2009) which contribute to the management measurement process (Dean & Safranski, 2008). Therefore, the emergency of religious spirituality in the workplace has sprung up unintentional debate (Giacalone & Jurkiewicz, 2010). They claimed that reoccurrence social and business changes that result in a global change of value have called for divine spirituality intervention.
Figure 1: Hypothesized Research Model.

**HPWS and Teacher Performance**

Boundless of literatures have studied the relationship between high perform work system and organization performance, among them is Yakubu (2011) who points out in his conceptual framework the importance of human capital factors at the organizational level. The researcher emphasized in his model how HPWS can influence employee service quality and task performance. Aside from this, Paracha, Ismail, & Amin (2014) also implemented HPWS elements in their model such as training and selection, performance appraisal, salary, etc they proclaim how this element can affect human capital and organization commitment which can result in school performance.

High-performance work organization is higher distinctive and must be cut carefully to each firm’s industrial situation context to provide maximum performance. These HPWS practices will only cause a strategic effect if they are compatible generally and integrated with each other. However, if the entire HRM system support organization to reach its target goals (Becker, Huselid, & Urich, 2001). Interestingly, through HPWS organizations provide a chance for employees to take part in decision-making, this can induce employee morale, improve skill, knowledge, and ability to perform (Lepak, Liao, Chung, & Harden, 2006). Similarly, it is quite obvious that no standard policy can work out in education set up except teachers representatives are practically and actively involved in making policy formation and feel a sense of “ownership” of reform. Consequently, teacher attrition and turnover rate are compounding school staffing problems and leading to a loss of teaching expertise (OECD, 2005). Meanwhile, the introduction of HPWS into the education system can serve as a solution to the persistent attrition and turnover rate.

According to some researchers, in response to these practices, employees show their positive behavior toward the organization in shape of commitment (Appelbaum, 2000 & Settoon, Bennett). HPWS has the potential to create significant positive results such as improved productivity and increased quality levels. At the same time, it can also lead to increased stress levels and a more intense work environment. Its implementation can also prove to be a task challenging with several potential problems, because to whom much is given, greater will equally demand. Despite that, it is easily deduced that out of the bundles of HR practice in which their goals are directed towards organization success and achievement; HPWS can still be regarded as the most seasoned and potent mechanism of HR elements.

A high-performance work system seeks to enhance organizational performance by combining innovative work and management practices with reorganized work flows, advanced information systems, and new technologies. Most important, a high performance work organization builds on and develops the skills and abilities of frontline workers to achieve gains in speed, flexibility, productivity, and customer satisfaction. Additionally, teachers are regard as an academic employee in the education industry that has direct access to the students, and their learning is influenced by many factors which teachers skills, knowledge, attitudes, practices and productivity are not left out. As a matter of fact, the innovation of HPWS in the education ministry can impact positive outcome in the learners. Therefore, the researchers proposed:

*Hypothesis 1a:* HPWS is positively related to teachers perception about the teacher performance.

**HPWS and Teacher Religious Spirituality**

Researchers have examined the impact of “bundles” of HR practices on organizational outcomes. The idea that a system of HR practices may be more than the sum of the parts gives rise to debate as to the specific configuration of practices constituting a high-performance system. Some work suggests “universal” HPWS effects (Huselid, 1995.), while other are of the opinion that HPWS effects may depend on competitive strategy conditions of a company. This has the undertone that the absence of HPWS in an organization can jeopardize the goals and objectives of such establishment. Moreover, Pawar (2009)
suggests that workplace spirituality can be encouraged at both levels. At the individual level, people might participate in spiritual development programs by learning meditation. The organization itself can use spiritual values to modify organizational planning and strategy making. HRM practices such as selection, training and development, Appraisal and evaluation etc., can be influenced spiritually because it is a pillar in organizational culture that provides a context for daily life.

As a matter of fact, interest in spirituality as a scholarly topic has grown in recent years, possibly as a result of the confluence of various events. Cacioppo (2000) has argued that the modern world is plagued by social, economic, and environmental problems that are the result of human greed and a lack of love and compassion. He contends that these large-scale problems have triggered in humankind a renewed search for harmony and peace, a search that is essentially a spiritual journey. Biberman and Whitty (1997) have gone so far as to claim that organizational studies have undergone a fundamental shift from a mechanistic paradigm that values rationality and science to a spiritual paradigm that values consciousness and understanding. Such a shift enables an emphasis on issues such as team work, trust, creativity, and openness to change as approaches to dealing with the disruptions caused by the drive toward globalization by keeping businesses thriving in a changing world.

However, aside from HPWS practice, researchers have identified religious spirituality as an alternative panacea to employee performance. This has been significantly proved among teachers in Lagos State secondary schools in Nigeria. The nation is well known with her multicultural and one of the religion adherent nations of West Africa where Islam and Christianity are majorly practiced. As a matter of fact, the aforementioned religious practices have spread to nook and corners of the inhabitants lives which teaching profession is not left out. More importantly, one should be aware that there are two notable religious body organizations among the Lagos State teachers known as Muslim teachers association and Christian teachers association respectively. Their code of conduct is based on spirituality, tolerance, steadfastness and reward in the hereafter as their major objective. In addition, one should be aware that the HR practice of HPWS that enhance employee performance is been poorly managed between the policy makers of the education ministry of Lagos state and the teachers. One should have conclude that the poor HRM practice should have collapse the teaching system, but the involvement of religious spirituality attitude plays a significant role as a survival strategy that enliven the system till date. Therefore the researchers propose:

**Hypothesis 1b:** HPWS is positively related to teachers shared perception about the teacher religion.

**Teacher Religion and Teacher Performance**

Scholars have detected the positive effect of RS on organizational functions and practices since the last decades ((Benefiel, 2008; Hall, Oates, Anderson, & Willingham, 2012; Wong & Hu, 2012). Employee attitude to work is an integrated part of his/her self-concept that that seriously affecting not only his performance at work place, but also his/her life at home. The incorporation of Religious spirituality at the work environment has make known as a new potent additional mechanism to enhance performance (Carroll, 2013; Fry &Nisiewicz, 2013; Fry &Kriger, 2009) which contribute to the management measurement process (Dean &Safranski, 2008). The emergency of religious spirituality in the workplace has sprung up unintentional debate (Giacalone&Jurkiewicz, 2010). They claimed that reoccurrence social and business changes that result in globally change of value has called for religious spirituality intervention.

Interestingly, transformation can begin in the workplace when organizations open themselves to the cultivation of their own employees’ spirituality. This would mean addressing employees as whole human beings in terms of their physical, mental, emotional, and spiritual needs (Dehler & Welsh 2003). Lifting up the whole person in the workplace should not be seen entirely as an altruistic act. Research has demonstrated that by addressing the spiritual side of human experience in organizations help reduce stress, enhance creativity, and improve problem solving (Tischler, Biberman, &McKeage, 2002). By focusing on the spiritual qualities of meaningfulness and joy at work, organizations have found increased job satisfaction (Harunget al., 1996), enhanced job involvement, organizational identification, and work rewards satisfaction (Kolodinsky, Giacalone&Jurkiewicz, 2008), greater honesty, trust, and commitment (Krishnakumar& Neck 2002), and also improved work performance (Duchon &Plowman 2005). Spirituality at work is not a fringe idea. In fact, spirituality at work addresses human activities such as personal development, learning, compassion, and searching for meaning or higher purpose (Gull &Doh 2004).

Authors like O’Murchu (1997) and Elton-Challcraft (2002) also agree on the relational character of spirituality. When defining spirit and spirituality, Myers (1997:61) also accentuates aspects of transcendence and meaning: “Spirit is that property of being fully and wholly human that fuels our predisposition to transcend each and every condition in our experience. Spirituality is a construction of meaning meant to inform the human way we engage in that process of transcendence.” Spirituality therefore relates intimately to establishing existential meaning, and often invokes questions of meaning: Why am I here? What really matters in life? What is the meaning of my life and how do I help others find meaning in their lives? What is my calling or vocation in life? The answers to these spiritual questions impact profoundly on what a teacher does and on how his/her actions are performed. Indeed, for Frankl (1964:99) “Man’s search for meaning is a primary force in his life”. Van der Walt &Valenkamp (2008) conclude that spirituality symbolises the human being’s quest for meaning, depth and values, and describes how person relates his or her actions towards the Absolute and towards others and to their own being, core values and practices.

The spiritual paradigm essentially recognizes that people work not only with their hands, but also their hearts or spirit (Ashmos and Duchon 2000). It is when people work with a committed spirit they can find a kind of meaning and purpose, a kind of fulfillment which means the workplace can be a place where people can express their whole or entire selves. Thus,
enabling the expression of human experience at its deepest, most spiritual level may not only reduce stress, conflict, and absenteeism, but also enhance work performance (Krahne, Giacalone, & Jurkiewicz, 2003), employee well-being, and quality of life (Karakas, 2010). Note, that the workplace is seen as an arena where spirituality can be found and expressed (Milliman et al., 2003, George et al., 2004). The idea is that when people fully engage their work with a sense of purpose they approach expressing their complete selves, including their spiritual selves. Workplace spirituality can thus be interpreted to be meaningful at both the individual and the organizational levels of analysis (Kolodinsky et al., 2008, Pawar, 2008). At the individual level, spirituality can be seen as an affective and cognitive experience: an employee feels and believes in a spiritual connection to work and the work place. At the organizational level, spirituality can be seen as a reflection of spiritual values that is part of the organization’s culture and is thus used to inform behavior, decision-making, and resource allocation (Kolodinsky et al. 2008). Therefore, following the above reviews, the researcher proposed to find the perception of employees’ on how positive relation of teacher religious spirituality at work on their performance will make them feel obligated to their task that will be more beneficial of the school organization:

**Hypothesis 2:** Employees’ shared perception of the teacher religion is positively related to teacher performance.

### II. METHODOLOGY

**Research Design**

A quantitative survey using a questionnaire was used to carry out the research in government secondary schools in Lagos State. Using a questionnaire was appropriate for this study because they can reach a significant number of people in a relatively quick amount of time and with minimal expenditure (Ary et al., 2006). The survey was aimed to provide on the perceptions of government secondary school teachers in Lagos State regarding the role of the teacher religious spirituality in improving teachers’ job performance and HPWS. The study was conducted to obtain an understanding on how this religious spirituality mediates its affects between teacher performance and HPWS.

**Data Analysis Procedure**

The researcher first used CFA to test whether each of the measurement items specified could load significantly onto the latent constructs with which they were associated and whether each construct was empirically distinct from the others. At the same time, it has been recommended by researchers (James, Mulaik, & Brett, 2006; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), Structural equation modeling was employed to provide a better balance of statistical power by simultaneously testing both paths from an independent variable to a mediator, and from the mediator to the dependent variable (MacKinnon et al., 2002) to examine the relationships proposed in the research model.

**Sampling and Population Procedure**

Population refers to a large group of interest, in order words; it is a group of individual who possesses the same features (Creswell, 2013). It is worth mentioning that the population of this study comprised the selected secondary schools in the 20 local governments of the state that will compose of male and female teachers irrespective of their work experience. Lagos State is popularly known as an administrative division of Nigeria that is located in the southwestern part of the country. Though, smallest in land mass but is arguable to be the most economically vibrant, Centre of Excellence and with the largest population. Lagos State was divided into five Administrative Divisions, which were further divided into 20 Local Government Areas or LGAs. In 2001, the existing 20 Local Government Areas were split for administrative purposes into Local Council Development Areas as shown in Table 1.

<table>
<thead>
<tr>
<th>Administrative divisions</th>
<th>Local Government Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Badagry Division</td>
<td>Badagry, Ojo, Amuwo-Odofin, and Ajeromi-Ifeodun</td>
</tr>
<tr>
<td>2. Epe Division</td>
<td>Epe and Ibeju-Lekki</td>
</tr>
<tr>
<td>3. Ikeja Division</td>
<td>Alimosho, Agege, Mushin, Ikeja, Shomolu, Kosofe, Oshodi-Isolo, and Ifako-Ijaye</td>
</tr>
<tr>
<td>4. Ikorodu Division</td>
<td>Ikorodu</td>
</tr>
<tr>
<td>5. Lagos Division</td>
<td>Apapa, Surulere, Eti-Osa, Lagos Mainland, and Lagos Island</td>
</tr>
</tbody>
</table>

*Source: Adopted from Central Office of Statistics, Lagos State Ministry of Economic Planning and Budget, 2011.*

To make secondary education more accessible, and the learning environment more conducive to students and teachers in the state public schools, the government created six educational districts in the year 2005, which are named as follow in Table 2:

<table>
<thead>
<tr>
<th>District</th>
<th>Local Government Areas zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>District 1</td>
<td>Agege / Alimosho / Ifako-Ijaye</td>
</tr>
</tbody>
</table>
Furthermore, every district has its own Tutor General/Permanent Secretary as the head of the Directorate of educational affairs. To ease the responsibilities of the districts and proper coordination that yield school performance. Meanwhile, the zonal offices were created (or “intending to”) easing the responsibilities of the school and the district headquarters. The researcher carried out his research within randomly selected secondary schools from each of the educational districts. The selected sample size from each of the districts will be conducted to have a representative and give each district equal opportunity to participate in the research, so the findings can be generalized without being biased. Since the issue of gender often actively present in research practices, the researcher selected the sample population of both male and female accordingly.

Instrument

The instrument for this study was a questionnaire compiled from various past researches and self-adapted questions. The items selected for the questionnaire were edited to customize the objectives of the survey which focused on three main elements (HPWS, Teacher Religion and Teacher Performance) as shown in the hypothesized model in Figure 1. The reliability of each was tested to show that the items are reliable to the study and to ensure precise value for the result. The result of the Cronbach’s Alpha was be above 0.7 which showed that all items are reliable for the study (see Table 3).

The questionnaire was divided into four sections with the first section containing items regarding the respondent’s profile, the second section on HPWS with 34 items including six subscales of staffing, training, involvement/participation, performance appraisals, compensation, and caring adapted from Chuang & Liao (2010). The third section was a self-adapted scale item which employed to measure the teacher spirituality which contained six items. The fourth section consist Teacher Performance, including three subscales such as School Climate Student Knowledge and Student Performance adapted from past researches. However, each item using a Likert type scale rated from 1 = strongly disagree to 11 = strongly agree were used as measurement.

Data Collection

Furthermore, the total of 1,500 questionnaires was distributed among the teachers in all the six districts, 304 were returned, listwise deletion of respondents with missing information resulted in a final sample of 264 teachers from the six districts. As shown in Table 3, the larger respondents are from District 1 (33.3%); District 2 (19.7%); District 4, (15.5%); District 3(14.0%); District 5(9.8%) and District 6 (7.6%) respectively.

### Table 3: Distribution of collected survey from the respondents in each district

<table>
<thead>
<tr>
<th>Districts</th>
<th>Local Government Area</th>
<th>No of Respondents</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>AGEGE</td>
<td>88</td>
<td>33.3</td>
</tr>
<tr>
<td>2.</td>
<td>IKORODU</td>
<td>52</td>
<td>19.7</td>
</tr>
<tr>
<td>3.</td>
<td>ETIOSA</td>
<td>37</td>
<td>14.0</td>
</tr>
<tr>
<td>4.</td>
<td>MAINLAND</td>
<td>41</td>
<td>15.5</td>
</tr>
<tr>
<td>5.</td>
<td>AGBOJU/AMUWO</td>
<td>26</td>
<td>9.8</td>
</tr>
<tr>
<td>6.</td>
<td>OSHODI/ISolo</td>
<td>20</td>
<td>7.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>264</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### III. RESULT AND FINDINGS

**Measurements and Reliability**

Table 5 below, shows the reliability score for this study which is also known as Cronbach’s Alpha. The Cronbach's Alpha value must be above than 0.7 to show that the items are reliable whereas if the value is below 0.7, it means that the items are not reliable to the study. As stated in Table 5, the Cronbach's Alpha for this study is 0.916 which means the items are reliable to the study.

**High Performance Work System (HPWS)**

A total of 34 items (rated from 1 = strongly disagree to 11 = strongly agree) were used to measure HPWS, including six...
subscales (practices) of staffing, training, involvement/participation, performance appraisals, compensation, and caring adapted from Chuang & Liao (2010). All subscales displayed good internal reliability as shown in Table 4, and the overall \( \alpha \) was .951 across the subscales of HPWS.

**Teacher Religious Spirituality**

The six-item short form of the Survey of teacher religious spirituality items was a self-adapted scale item which employed to measure the teacher spirituality. These items (rated from 1 = strongly disagree to 11 = strongly agree) were focus on how religion affect their spirituality consciousness as workplace and all items displayed an excellent internal reliability of \( \alpha = .881 \).

**Teacher Performance**

However, a total of 15 items (rated from 1 = strongly disagree to 11 = strongly agree) were used to measure Teacher Performance, including three subscales such as School Climate, Student Knowledge, and Student Performance that displayed good internal reliability as shown in Table 5, and the overall \( \alpha \) was .926 across the subscales of HPWS.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sub-Scale Measurement</th>
<th>No of Items</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Performance Work System (HPWS)</td>
<td>Staffing</td>
<td>5</td>
<td>.846</td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td>5</td>
<td>.866</td>
</tr>
<tr>
<td></td>
<td>Involvement/Participation</td>
<td>6</td>
<td>.846</td>
</tr>
<tr>
<td></td>
<td>Performance Appraisals</td>
<td>6</td>
<td>.812</td>
</tr>
<tr>
<td></td>
<td>Compensation</td>
<td>7</td>
<td>.831</td>
</tr>
<tr>
<td></td>
<td>Caring</td>
<td>5</td>
<td>.858</td>
</tr>
<tr>
<td></td>
<td>Total Items</td>
<td>34</td>
<td>.951</td>
</tr>
</tbody>
</table>

**Table 5: Distribution of Reliability of Variable**

**Table 5: Frequency and percentage of the participants’ gender, Years of Teaching Experience, qualification and Year of training**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>135</td>
<td>51.1</td>
</tr>
<tr>
<td>Female</td>
<td>129</td>
<td>48.9</td>
</tr>
<tr>
<td>Total</td>
<td>264</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of Teaching Experience</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5yrs</td>
<td>85</td>
<td>32.2</td>
</tr>
<tr>
<td>6-10yrs</td>
<td>87</td>
<td>33.0</td>
</tr>
<tr>
<td>11-15yrs</td>
<td>31</td>
<td>11.7</td>
</tr>
<tr>
<td>16-20yrs</td>
<td>20</td>
<td>7.6</td>
</tr>
<tr>
<td>21-25yrs</td>
<td>13</td>
<td>4.9</td>
</tr>
<tr>
<td>26-30yrs</td>
<td>19</td>
<td>7.2</td>
</tr>
<tr>
<td>31-35yrs</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>36-40yrs</td>
<td>2</td>
<td>.8</td>
</tr>
<tr>
<td>41yrs and above</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>264</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma/OND/NCE</td>
<td>83</td>
<td>31.4</td>
</tr>
</tbody>
</table>

**Background of the Respondents**

Results of participants’ gender, years of working experience, education qualification, work location and year of training shown in Table ---. The largest group of respondents were 135(51.1%) reported their gender as male while the female were 129 (48.9%). The highest working experienced teachers were 6-10 of experience were 87 (33.0%), 1-5yeras with 85 (32.2%), and those with 11-15years of teaching experience were 34 (12.8%), while those in the range of 16-20 of their experience were 22 (8.4%). Other categories include 26 -30years of experience 19 (7.2%), 21-25years of experience 13 (4.9%) 31-35years 4 (1.5%) respectively. However, none of the respondents had any working experience between 36-40years and 41years and above. In the teaching qualification, 152 (56.4%) had their first degree in B.ED and HND. 83 (31.4%) teachers had either National Certificate of Education or Diploma. Only 29 (11.0%) teachers had completed master’s degrees as education specialists while none of the teachers had obtained doctoral degrees in education. The years of training varies according to each respondent. 188 (71.2%) had 1-5years of training; 62 (23.5%) 6-10years of training; 7 (2.7%) had undergone 11-15year of training, 5 (1.9%) had 16-20years of training experience and only two respondent (.8%) had 21years of training experience and above.
Measurement Model Analyses

The measurement model or Confirmatory Factor Analysis is a statistical method used to test the relationships between the factor structure of the observed variables and their underlying latent construct(s) exists. It was also used to verify the construct validity of the scale and its psychometric properties. Moreover, a Measurement model was also used to examine the relationship between the latent variables and their measures. However, the results of CFA indicated that the hypothesized three-factor model had 120 distinct sample moments, 35 distinct parameters to be estimated and 86 degrees of freedom. The fit indices generally indicate a good fitting model, more precisely, the chi-square was $\chi^2 = 156.158$, $df = 86$, $\chi^2/df = 1.816$, $P = .001$ which stated that the value of the chi-square with its respective P-value indicated the model fit well with the data.

Moreover, the other indices also meet the requirement of above .90 these include GFI = .929, AGFI = .900, NFI = .919, RFI = .901, IFI = .962, TLI = .953, CFI = .961, and RMSEA = .056. Moreover, the covariance between each factor reflected a high-level inter-correlation between each other as ‘HPWS and ‘Teacher Religion is (0.81), ‘HPWS’ and ‘Teacher Performance’ are (0.88), the ‘Teacher Religion’ and ‘Teacher Performance’ is (0.83) respectively. As a matter of fact, the researcher concluded that the measurement model analysis of the hypothesized model displayed a high statistical significance that is acceptable for the researcher to precede and examine the structural model analysis.

IV. STRUCTURAL MODEL ANALYSIS

AMOS 4.0 software was used to test the hypothesized model. AMOS is a common program used for structural equation modeling, which assesses the validity by the magnitude of the direct structural relation that occurs between a latent construct and its purported indicator (Joreskog&Sorbom, 1993). The fit of
the structural model is assessed by adding the predicted paths to the measurement model. Because the hypothesized a partial mediation model, a direct path from HPWS to teacher performance is added, indicating that part of the causal effect of HPWS on the teacher performance was direct, whereas a separate part of the causal effect passed through teacher religion (James et al., 2006).

Figure 3: Path model of Teacher Religious Spirituality on HPWS on Teacher performance

However, the hypothesized research model (Figure 3) achieved an acceptable fit with this data ($\chi^2 = 156.158$, $df = 86$, $\chi^2/df = 1.816$, $P = .000$, GFI = .929, AGFI = .900, NFI = .919, RFI = .911, IFI = .962, TLI = .953, CFI = .961, and RMSEA = .056). Furthermore, in reviewing the structural parameter estimates gives compatible results with the hypothesis of the study, the result showed that the coefficients of the path from HPWS to teacher performance ($\beta = .61$, $P < .001$) was strong and a positive relationship between the measure of HPWS and teacher religion thus supporting Hypotheses 1a. More so, Hypotheses 1b was also supported because the coefficient of the path from HPWS to Teacher Religion was significant ($\beta = .81$, $P < .001$), which indicated a positive relationship between HPWS and Teacher Religion. Additionally, a statistically significant and positive coefficients was found for the paths between Teacher Religion and Teacher performance ($\beta = .31$, $p < .02$), therefore the results supported Hypothesis 2 of the study. Therefore, these findings show that the mediator variable (Teachers Religious Spirituality) indicate a significate role in mediating between HPWS and the Performance of the teachers.

Table 6: Indicator Loading of Hypothesised Structural Model Regression

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized Estimate</th>
<th>Standardized Estimate</th>
<th>Critical Ratio</th>
<th>Squared Multiple Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher_Religious_Spirituality</td>
<td>&lt;--- HPWS</td>
<td>1.032</td>
<td>.809</td>
<td>7.945*</td>
</tr>
<tr>
<td>Teacher_Performance</td>
<td>&lt;--- HPWS</td>
<td>.713</td>
<td>.596</td>
<td>4.685*</td>
</tr>
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</table>
V. CONCLUSION

The growing secondary schools education awareness in Nigeria, specifically Lagos state has lured the education policy makers to search for a potent Human Resource practice that will retain teachers in their primary assignments. This has made it mandatory for the education administrators to examine the efficacy of HPWS on teacher performance. Structural equation analysis on a sample of 264 respondents from six education districts in Lagos state. The study has proved the positive effect implementation of the HPWS on teacher performance.

Aside this, one of the important tests in this research was an examination of the mediation effect of religious spirituality intervention between HPWS and teacher performance. The outcome was that HPWS can be influenced by RS to enhance teacher performance. This can be understood that in a situation where HPWS is not properly managed, Religious spirituality can still be implemented to energize teachers’ performance since it has stronger intrinsic inner drive that still keep the Lagos state public secondary school teachers in their job.

Moreover, performance is the major goal that every organization looks forward to achieve in their employee. It serves as a determinant factor of an organization. The result shows the significant effect of HPWS on teacher performance while religious spirituality has proved the significant effect on both HPWS and teacher performance. At this point, it should be stressed that combination of HPWS and RS would not only raise sense of teacher spirituality at work, but also imbied in them high performance that will reflect in students’ academic outcome. However, the data analyses reported strongly support those expectations. As a matter of fact, the more religious spirituality embraced by employees, the better they perform their work.

Finally, the research makes an important contribution to the study of religious spirituality at education ministry, because it provides empirical evidence of a significant, positive relationship between religious spirituality, HPWS and teacher performance. The overall connection between spirituality and work performance supports the findings reported by Duchon and Plowman (2005) and confirms a theoretical assumption that bringing religious spirituality to the workplace positively affects organizational outcomes (Neck and Milliman 1994, Biberman and Whitty 1997, Burack 1999, Cavanagh, 1999, Mitroff and Denton 1999, Cacioppe 2000, Pratt and Ashforth 2003, Jurkiewicz and Giacalone 2004, Kinjerski and Skrypnek 2004).

Note = * significant at P < .05

Furthermore, Table 4.5 examined and presented the unstandardized, standardized regression weight, critical ratio and squared multiple correlations for the hypothesised structural model. The analysis indicated that the path coefficient from each indicator to the single factor is significant which supports the validity and reliability of the items. However, the assessment of the squared multiple correlations also indicated that most of the indicators achieved the minimum threshold required (.50). This showed that most of the latent factor is this analysis is more than half of the explained variance in each indicator. With regards to the factor loading, the analysis found relatively higher indicator loading for the elements of high performance work system on teacher performance and the mediator.

<table>
<thead>
<tr>
<th>Teacher_Performance</th>
<th>Teacher_Religious Spirituality</th>
<th>.330</th>
<th>.352</th>
<th>3.072*</th>
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</thead>
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<tr>
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<td>.611</td>
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<td>Training</td>
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<td>.610</td>
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<tr>
<td>Studentperformance</td>
<td>Teacher_Performance</td>
<td>0.945</td>
<td>.713</td>
<td>10.355*</td>
</tr>
</tbody>
</table>

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Factors Influencing Implementation Of Projects In Community Based Organizations In Kenya. A Case of Child Regional Education Support Services

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Abstract- The study sought to assess the factors influencing implementation of projects in community based organizations in Kenya with a case study of Child Regional Education Support Services. To achieve this objective, the study was guided by the following specific research objectives: to assess how funding affects implementation of projects in community based organizations in Kenya, to establish the effect of training on implementation of projects in community based organizations in Kenya, to assess the effects of organization structure on implementation of projects in community based organizations in Kenya and to establish the effects of stakeholder relationships on the implementation of projects in community based organizations in Kenya. The study adopted a descriptive research design as it sought to gather information, summarize, present and interpret it for the purpose of clarification. The target population of the study included all the employees at the CBO. Stratified sampling technique was used in the research whereby questionnaires were used to collect data. Data was collected, analyzed and presented in tables using frequencies and percentages. The study revealed that project funding, project training, and project structure and project stakeholder involvement affected implementation of project at the CBO. The study also revealed that the CBO have limited resources, and therefore they have to develop partnerships with other organizations and donors that can provide resources. It was established that projects were not expertly implemented at the CBO due to lack of adequate and skilled staff in project management. It was recommended that development partners should increase their level of funding to the CBO since they play an important and relevant role in providing services at the local level. To enable employees deliver quality services, the study recommended that the organizations hires qualified staff and in addition, it trains them to enable them deliver services optimally.

Index Terms- funding, community based organizations, organization structure, stakeholder relationships

I. INTRODUCTION

A lesina and La Ferrara (2010) reviewed projects implemented by CBOs in U.S.A localities and found they were performing poorly due to low level of training among project leaders. Khattak and Khan (2008) argue that while CBOs in India are engaged in many economic activities that serve to increase the level of disposable income in local areas, it is however noted that 73% of the federal government grants that CBOs handle are mismanaged due to poor governance and mismanagement of the funds of the organizations. In a case based evaluation of community based project in Jamaica and Nicaragua conducted by World Bank (2002) Operations and Evaluation Department found poor management of funds lead to failure of 38% of the projects.

Though there are numerous projects being implemented across Africa, it is interesting to note that not much impact on the lives of the targeted communities can be reported. Several CBOs are faced with Project Implementation challenges at different levels hampering their quest to deliver quality services and impact positively on the lives of the communities in which they operate. During the last Africa Community Based Organizations Conference held in Ghana in 2012 for instance, it was reported that 22 out of the 38 Community Based Organizations (CBOs) in the Region were facing challenges attributed to bad governance and poor project organizational structure(Lopes, 2013).

Kleemeier (2000) examined water projects implemented by CBOs in South Africa and found 63% of them are performing poorly due to financial mismanagement.

Okumu (2012) reviewed Projects implemented by CBOs in Kenya and observed that they face numerous challenges among them poor leadership and governance issues especially in accountability and transparency (Kaaka 2013). For instance, the Child Regional Support Services, a CBO that caters for children living in slum areas in Kenya has faced various problems while implementing its projects (LeRoux, 2007). These include employees who have not been adequately trained, lack of commitment between major stakeholders as well as poor management of funds. It is evident that, for long time project money has not been managed in a transparent manner and that the communities are not sufficiently involved in its management leading to loss of funds, numerous incomplete, low quality and irrelevant projects.

In Kenya, Community based organizations have been affected by various factors while implementing their projects (Obisi, 2012). CRESS Kenya, a community based organization that is involved in support programmes to those affected by HIV has not been able to fully achieve its objectives of fully implementing their programmes due to poor leadership as well as poor management of funds (Wafula &Ndirangu, 2009). Several other Community Based Organizations are involved in the implementation of various projects in Kenya. A number of issues in their management have made them not to achieve the desired

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results. This includes mismanagement of these project funds (Wafula & Ndirangu, 2009).

Project schedules are an indicator of project implementation, Mkutu (2011). Lopes (2012) states that project budget is an indicator of project training. According to Longman and Mullins, (2009), stakeholders’ satisfaction is an indicator of project implementation. Therefore, project schedules, project budget and stakeholders’ satisfaction are indicators of project implementation.

Implementation of a project will always be successful if management strategies and coordination guidelines are clearly defined. Independent of the type of project to be carried out, a work plan is needed indicating the pursued objectives, the expected results, the activities to be developed, as well as the budget available and timeframe given. Each of the activities has to be assigned to a particular individual, department or organization that should have proven experience and the capacity to achieve the goals. Local community workers, who can speak the local languages, are the first to integrate in the project, as these types of actions require that the implementers know the culture of the community to gain their trust and achieve a real impact.

Project funds implemented by CBOs have faced numerous challenges among them management and governance issues especially in accountability and transparency (Kaaka, 2013). Khadiagala & Mitullah, (2007) state that the amount of funding is an indicator of project funding. The flexibility of funding is also an indicator of project funding (Vincent, 2012). The reliability of funding is also an indicator of project funding (Wafula, 2009). Therefore, the amount of funding, flexibility of funding and reliability of funding are indicators of project funding.

Without project training, it will be difficult to acquire skills and without skills organizations will not be able to adequately implement their projects (Obisi, 2009). Training is the process of transmitting and receiving information to problem solving (Nadeem, 2010). (Omole, 2009) states that the type of training is an indicator of project training. On the other hand (Cole 2002) states that the level of training is an indicator of project training. (Okumu, 2012) further states that contact time is an indicator of project training. Therefore, the type of training, level of training and contact time are indicators of project training.

For an organization to function optimally even as projects are being implemented, they ought to have a clear organizational structural design, Smit et al (2007). Structures include relevant Non-Government Organization departments, workers, and other stakeholders in the organization. (Neuman, (2006) states that the type of project structure is an indicator of project structure. (Moore, 2013) states that the efficiency of a project structure is also an indicator of project structure. (Omondi, 2009) also states that leadership is an indicator of a project structure. Therefore, the type of project structure, the efficiency of a project structure and leadership are indicators of a project structure.

A stakeholder has the ability to influence the implementation of a project due to his or her strength or force (Moore, 2013). Stakeholders must play a central role in setting up priorities and objectives in order to ensure relevance and appropriateness. Influence and power of a stakeholder can affect the success or failure of an initiative (Karanja 2010). The number of stakeholders is an indicator of project stakeholders (Kaaka, 2013). Also, the skills of project stakeholders are indicators of project stakeholders (Lopes, 2012). (Mkutu, 2011) states that the level of education among stakeholders is an indicator of project stakeholders. Therefore, the number of project stakeholders, the skills of project stakeholders as well as the level of education of stakeholders are indicators of project stakeholders.

The community based organization is a charitable foundation providing vital quality educational opportunities for orphans and vulnerable children living in slums in Nairobi. The implementation of projects including school feeding programs has been done through a greater involvement of the Community Based Organization (Wafula and Ndirangu, 2009). The Community Based Organization is involved in the implementation of various projects in Kenya. Though this CBO has been actively involved in implementing various activities and programmes, internal and external inefficiencies in management have made them not to achieve the desired results. Several of these projects have been initiated where some of the projects stall along the way as a result of different reasons including mismanagement of project funds whereas others are fully implemented (Vincent, 2012).

When it comes to implementing projects in Kenya, Several CBOs in Kenya are faced with Project Implementation challenges at different levels hampering their quest to deliver quality services and impact positively on the lives of the communities in which they operate (Karanja, 2012). In the year 2013/2014 CBOs implementing HIV/AIDS programmes were funded with KES4.55million which doubled from the previous year 2012/2013 of KES2.15million (CACC, 2013). Despite the increase in funding, the Kenya Health Information Systems report 2014 indicates that the prevalence rate remains high at 5.1% ranked 12th countrywide. This indicates that there have been issues on CBOs capability especially with management of project funds (Okumu, 2014).

There are several projects initiated in Kenya and being implemented by various Community Based Organizations. Despite the existence of different project funds, internal and external inefficiencies in their management have made them not to achieve the desired results. Several of these projects have been initiated where implementation of some of the projects stall along the way as a result of different reasons including mismanagement of these project funds. An audit carried out by the National Taxpayers Association (NTA) reveals that KES242 million of the KES1.2 billion allocated to the Community Based Organizations in the period 2012/2013 is either misappropriated or unaccounted for (Matata, 2011).

The audit, carried out in 28 counties, reveals that of the KES242 million, KES179.1 million was lost on shoddy projects, some of which are complete while others remain incomplete (Martin, 2011). KES40.5 million was unaccounted for, and KES22.2 million was spent on projects that have been abandoned (Matata, 2011). High-level projects involving millions of dollars have been discontinued in the past due to different challenges in their implementation in different CBOs in Kenya. Since then, there have been concerted efforts to reverse this trend and position CBOs in Kenya as credible organizations who can undertake partnerships and projects whether funded internally or externally.
The general objective of this study was to determine the factors influencing implementation of projects in Kenya using a case of Child Regional Education Support Services. The specific objectives were: to assess how project funding influences implementation of projects in Kenya, to establish the influence of project training on implementation of projects in Kenya, to assess the influence of project organization structure on implementation of projects in Kenya and to establish the influence of project stakeholder relationships on the implementation of projects in Kenya.

II. LITERATURE REVIEW

2.1 Theoretical Framework

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, within the limits of the critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory which attempts to explain the research problem under study (Williams, 2006).

2.1.1 Financial Distress Theory

This theory is characterized by decline in the firm’s performance, value and failure (Opler & Titman, 2004). Organizations with projects that are supposed to yield profits have to ensure their projects perform as per expectations. Projects for profits should first recoup the initial capital invested then yield profits. This theory is important when addressing financial challenges affecting the successful performance of organizations. The CBOs financial management practices have a gap as they do not operate within budgets have weak internal controls; they do not follow their financial policies and audit their accounts. The main limitation of this theory is that it cannot recognize symptoms of failure early enough in order to make corrections. The performance of CBO projects has been declining and there is need to track and ensure they improve. This theory is focused on the performance of firms which leads to the first research question which focuses on how funding affects the successful performance of the CBOs projects. This theory will therefore, guide in the understanding of the important role that financial management plays in the survival and persistence of organizations.

2.1.2 Human Capital Theory

Entrepreneurial knowledge of an individual gained from education adds economical value to a firm, (Becker, 2008). Skills and knowledge gained through education is important to employees when they are performing their tasks as it improves their performance. CBOs management teams require technical skills to run the projects successfully. These skills could be gained from technical institutions, formal education or on job training. This theory has been put in application in several occasions. The theory has shown the need for the CBOs management team to have skills and experience in project management cycle and use of project management tools and techniques when running the projects. This theory addresses research question two which asks how project management practices such as training affect the successful performance of the CBOs projects. The theory will assist in the understanding of relationship between human capital and economic productivity.

2.1.3 Systems Theory and Governance

Bertalanffy (2010) defines systems theory as a working hypothesis, the main function of which is to provide a theoretical model for explaining, predicting and controlling phenomenon. Hartman (2010) also observes that all organizations consists of processing inputs and outputs with internal and external systems and subsystems which is helpful in providing a functional overview of any organization. CBOs need a functional system to manage their projects well. Kuhn (2004) states that systems need to be controlled as failure in one system leads to failure in other. CBOs need good governance systems in order to ensure there is transparency and accountability. This theory views an organization as a social system consisting of individuals who cooperate within a formal framework, drawing resources, people and finances to produce products. Good governance of CBOs will ensure efficient and effective management of their projects and other resources for maxim outputs. While this theory addresses research question three (which seeks to unpack the effects of good (or poor) governance and organizational structure in the performance of the CBOs projects, the theory will explain the importance role that governance play as part of the overall system that makes up CBOs.

2.1.4 Stakeholder Theory

Stakeholder’s theory argues that every legitimate person or group participating in the activities of a firm or organization, do so obtain benefits, and that the priority of the interest of all legitimate stakeholders is not self-evident (Donaldson, and Preston, 2005). Stakeholder Theory pays equal credence to both internal and external stakeholders; employees, managers and owners as well as financiers, customers, suppliers, governments, community and special interest groups. This theory therefore leads to research question four which inquires on how stakeholder relationship affect the successful performance of the CBOs projects. This theory will therefore assist in the better understanding of the importance of stakeholder relationship in the success of community projects.

2.2 Empirical Review

This section examines the empirical literature review on previous studies relating to the influence of the independent variables of this study; project funding, Project training, project structure and project stakeholders on the dependent variable implementation of projects in CBOs in Kenya.

2.2.1 Project Funding

The search for funding is necessary for the survival and the development of local CBOs. CBOs require external funding sources to respond, and though some CBOs can afford to establish emergency operations for short periods without specific external support, many CBOs eventually turn to UN funding, U.S., UK, or other government grants, private contributions from foundations, communities, or individuals, or umbrella organizations that distribute funding on behalf of another agency or organization. To appreciate the challenges of financial sustainability it is necessary to understand the potential sources.
of revenue for the CBOs (More 2005). While there is tremendous variation in the sources of CBO revenue among countries and CBOs within any sector, there are at the same time identifiable trends of CBO financing. Semboja and Therkildsen (2005) further found out that much local NGO funding comes from international donors (Hulme & Edwards, 2005).

Lee (2007) revealed that there are three sectors from which NGOs can derive their resources. These are the private sector, the general public and government/public sector. Resources from each of these sectors can originate from both external sources (i.e. International) and local (i.e. Domestic or municipal public and private donors). CBO revenue falls within three broad categories; government funding, private giving and self-generated income. Lee further studied local CBOs in Uganda; the CBO sector grants received from international CBOs accounted for nearly half of the total funding in 2001 in Uganda. Grants from bilateral donors are the next most important source with grants from the local government being the third. The average CBO is less likely to receive funding from these three sources and more likely to depend on non-grant income. Furthermore the author discovered that the local CBOs derived very little revenue from members and non-members, with only 2.5 percent of all funding coming from these sources.

According to a UNDP, 2007 report some countries, the local governments are a major source of funding as they have different community welfare and development schemes which CBOs can apply and raise resources and implement projects. The public sector provides various types of subsidies to Community Based organizations. Government funding includes a broad range of direct and indirect support. The UNDP (2007) noted that one-third of CBOs funding come from governments through varied degrees such as subsidies, government grants, and contracting. Exemptions from taxation can be considered a government subsidy. During the last term of Clinton (United States president 1993 -2000) administration for example, the white house support to CBOs increased from 13 percent to 50 percent through USAID assistance. In addition, most embassies of developed countries residing in the developing countries fund local CBOs.

In the view of Fernand (2006) a CBO which receives more than 30 percent of its funding through an external agency, is not free in its actions and above this percentage, the CBO could find itself in a very difficult situation in case of separation between the CBO and the donor due to strategic factors. Fernand stated that in a situation where a greater proportion of an organization funding comes from external sources, effects on the long run in the case of withdrawal of external funding can be felt. The much reliance on external funding therefore makes it difficult for local CBOs to accomplish their stated objectives. He further argues that, external financing tends to impose some degree of constraint on local CBOs. The main challenge for the local CBOs therefore seems to be to take into consideration the demands of its donors, because losing the financial aid would have severe consequences not only for the activities, but also for remunerated personnel. NGO “self-control” appears more frequently than one would think and it is for this reason that it is something to be carefully watched.

2.2.2 Project Training

Training is a fundamental aspect when it comes to management of funds. The ultimate aim of every training and development program is to add value to human resource. Any training and development program that would not add value should be abandoned.

Obisi (2011) argues that Organizations should therefore make training and development of their employees a continuous activity. Without training, acquisition of skills can be difficult and without skills organizations will not achieve its objectives through people. Obisi (2011) further notes that some organizations see training as an expensive venture and may put restriction on training and utilize the money for other activities in the organization. Most people do remarkably well in financial management of the projects implemented, even though most of them have never thought of themselves as financial managers or taken part in any kind of financial management training.

Symes (2006) emphasizes that some organizations spend a great deal of time and money on training efforts for general financial management skills, but after the training, a project leader might still not know how to tailor their financial management skills to the organization’s particular needs. Because of this problem, some organizations develop their own internal financial management methodologies. Many project leaders take on their first financial management duties without benefit of formal training. Through proper financial management skills, a CBO can consistently have good tracking and reporting systems hence this further helps uncover inefficiencies in the overall financial management approach. Concerning training and development, what's good for people is good for the organizations in which they work. What's good for people's development is good for organizational performance, quality, effective management and control, and therefore good for the organization (Symes, 2006).

Lytras, De Pablos and Avison, (2010) indicate that in project management, a training session could aim at developing or improving one of the project leaders competencies. Rightly, organizations are facing great pressure to change these days - to facilitate and encourage whole-person development and fulfillment - beyond traditional training. Many organizations face the challenge of developing greater confidence, initiative, solutions-finding, and problem-solving capabilities among their people. Organizations need staff at all levels to be more self-sufficient, resourceful, responsible, creative and autonomous. This behavior enables staff can operate at higher strategic level, which makes their organizations more productive and competitive.

2.2.3 Project structure

Organizational structure refers to the typically hierarchical arrangement of lines of authority, communications, rights and duties of an organization. Organizational structure determines how roles, power and responsibilities are assigned, controlled and coordinated, and how information flows between the different levels of management. A structure depends on the organization’s objectives and strategy. In a centralized structure, the top layer of management has most of the decision making power and has tight control over departments and divisions. In a decentralized structure, the decision making power is distributed.
and the departments and divisions may have different degrees of independence.

Moore (2002) extensively discusses the issue of project organization and how it influences implementation of CBOS projects. Moore (2002) further admits that the most appropriate organization structure for a given project is generally selected from a limited number of possibilities. This situation arises because there is inference that seeking to implement a new and innovative organization structure will present a risk. One of the key factors in this selection process seems to be an awareness of factors such as the project’s external environment, within which the project seeks firstly to embed itself, and secondly to survive, through developing an appropriate structure.

According to Dutt (2006), an organization interlinks the functional components of an enterprise in the best way to achieve its goal. The function of an organization starts when its objectives are set and the plans to achieve them are formulated. With this in mind, managers have to carry out the right approach and have to put in place certain rules and regulations in achieving them. Dutt (2006) further states that most organizations take on any of the three classical theories of Management, either Bureaucratic management by Max Weber, Scientific Management by F.W Taylor or Administration Management by Henry Fayol. For an organization to function optimally even as projects are being implemented, they ought to have a clear organizational design.

Smit et al (2007) defines organizational design as the arrangement of positions into work units or departments and the interrelationship among them within the organization. Essentially the choice of an organization structure should always be viewed against the strategy of the organization. One way of designing an organizational structure is through departmentalization. This is the grouping of related activities into units or departments. Most organizations face challenges in striking a balance between the functional and project levels leaving gaps for poor project performance.

2.2.4 Project Stakeholders

The notion of stakeholders was originally introduced to the mainstream general management discussion by Freeman (2006). Two years later, Cleland (212) brought stakeholder thinking into the project management paradigm. Ever since, the role of stakeholder management as a central project management process has strengthened, and today even the concept of project management is defined through stakeholders “the process of adapting the specifications, plans, and approaches to the different concerns and expectations of the various stakeholders” (PMI, 2008). Despite the acknowledged importance of stakeholder management, project research still lacks both theoretical knowledge and empirical evidence of various project stakeholder related phenomena (Achterkamp & Vos, 2008).

Kakabadse. (2005) in the extensive review on the stakeholder approach expressed that corporate social responsibility (CSR) and stakeholders’ interests are partly related to each other. In line with this, Kakabadse. (2005) noted that a firm has relationships with constituent (stakeholders) groups and the processes and outcomes associated with these relationships depend on the interest. The interests of all legitimate stakeholders have value and the focus of stakeholder theory is on managerial decision making”. Kakabadse et. al. (2005), therefore, concluded that managers should pay attention to stakeholders.

A study carried out by Mitchell (2007) in stake holder identification and salience, it was found that one interesting characteristic of the stakeholder concept is the dynamics of stakeholders. Over time, the mix of stakeholders may change. New stakeholders may join and wish to be included in any considerations, while others may drop out, through no longer being involved in the process. The concept of the dynamics of stakeholders was acknowledged by Freeman, and according to him, in reality stakeholders’ change over time, and their stakeholders change depending on the strategic issue under consideration.

According to Alkhafaji (2010) on project stakeholders and how they influence implementation of CBOS projects; to explain the dynamics, Alkhafaji (2010) defined stakeholders as the groups to whom the corporation is responsible. Classes of stakeholders can be identified by the possession or attributed possession of one or more of three relationship attributes: power, legitimacy and urgency, Alkhafaji (2010). The influence of the stakeholder in the project depends on the relationship attributes and may affect both timeliness and level of funding.

2.3 Critique of Existing Literature Review and Gaps

Despite the concerted efforts of academicians and researchers such as Pinto &Slevin (2008) to identify the various factors affecting successful implementation of projects in community based organizations within the urban slums, the research was also limited by the fact that successful implementation of projects was affected by many other moderating factors such as government policies, organization culture and the strategy implementation process.

For instance, implementing strategies successfully is vital for any organization, either public or private. Without implementation, even the most superior strategy is useless. The notion of strategy implementation might at first seem quite straightforward: the strategy is formulated and then it is implemented. Implementing would thus be perceived as being about allocating resources and changing organizational structure (Beer & Eisenstat, 2004).

However, transforming strategies into action is a far more complex and difficult task. Organizations seem to have difficulties in implementing their strategies. Researchers have revealed a number of problems in strategy implementation: e.g. weak management roles in implementation, a lack of communication, lacking a commitment to the strategy, unawareness or misunderstanding of the strategy, unaligned organizational systems and resources, poor coordination and sharing of responsibilities, inadequate capabilities, competing activities, and uncontrollable environmental factors (Alexander,2010; Lares-Mankki, 2009).

The factors that were identified in the literature review of this study as affecting implementation of projects in Kenya were Project Funding, Project Training, Project Structure and Project Stakeholder Satisfaction. Although various studies have been done on factors influencing implementation of projects in Kenya, there is no documented study that is based on the stated factors and more so in CRESS Kenya.

Although Fernad (2006) studied the factors that influence implementation of projects in Kenya, The study did not consider
the benefits of having external sources of funding for a CBO and how that can positively influence implementation of its projects. Also, the study did not consider the effects of Reliability of funding on project schedules.

The findings of Kakabdse (2005) on factors that affect implementation of projects in Kenya were that Stakeholders change over time, and their stakes change depending on the strategic issue under consideration. However, the study does not explain clearly on reasons as to why stakeholders may change and how this may influence project implementation. The study also does not explain how stakeholders Level of education may influence project budget.

Pinto and Slevin (2008) after sampling over 650 project managers, the researchers concluded that existing “project success” is something much more complex than simply meeting cost, schedule, and performance specifications. In fact client satisfaction with the final result has a great deal to do with the perceived success or failure of projects. In the words of Baker et al. (2009): “instead of using time, cost and performance as measures for project success, perceived performance should be the measure.” Clarke (2009) also stated that by targeting the main problems and issues using the key success factors as a focus could make a significant difference to the effectiveness of project management. Most researchers do not look at how the projects should perform after the implementation.

In this regard, factors influencing implementation of projects in Kenya have not been fully explored. Therefore, this study sought to shed more light on this area by testing for variables namely Project Funding, Project Structure, Project Training and Project Stakeholders and their influence on projects in Kenya. A Case of Child Regional Education Support Services.

III. METHODOLOGY

This study adopted a descriptive research design and consisted of both qualitative and quantitative research. Descriptive research design was chosen because this study sought to determine the factors affecting implementation of projects in community based organizations in Kenya; a case of Child Regional Education Support Services. By doing this, the study built a profile about the factors affecting the implementation of projects within CBOs in Kenya.

The target population was 167 employees at the CBO. The population was homogeneous as it involved the CBOs management teams only. The study was targeting these respondents owing to the fact that they were responsible for the management of the CBOs projects. The sampling frame was the listing of management staff in the various departments of the community based organizations.

From the target population, a sample size of 50 employees was selected from various departments in the CBO where the study was conducted. Kombo and Tromp (2006) define a sample size as a finite part of a statistical population whose properties are studied to gain information about the whole population.

The study stratified the population into the levels of employment at the CBO. There were three levels comprising of senior and middle level management and other staff. Cooper and Schindler (2003) argue that statistically, in order for generalization to take place, a sample of at least 30 elements (respondents) must exist. Kothari (2004) argue that if well chosen, samples of about 10% of a population can often give reliable data. Following the high homogeneity among the respondents in the different strata, the researcher selected 30% of the target population for inclusion in the study. These were distributed as shown in the Table 3.1.

<table>
<thead>
<tr>
<th>Level in the organization</th>
<th>Sample size (n)</th>
<th>Population (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Management</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Middle level management</td>
<td>20</td>
<td>68</td>
</tr>
<tr>
<td>Other staff</td>
<td>22</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>167</td>
</tr>
</tbody>
</table>

Primary data was collected with the aid of questionnaires. According to Neuman (2007), a questionnaire is a written document in quantitative research that has set of questions directed at respondents. Questionnaires were used since they collect information that is not directly observable as they inquire about feelings, motivations, attitudes, accomplishments as well as experiences of individuals (Borg and Gall, 2009). According to Borg and Gall (2011) questionnaires have the added advantage of being less costly and using less time as instruments of data collection.

Data collection involved contacting the respondents in the sample in order to collect the required information about the study (Cooper & Schindler, 2003). Data collection was done systematically and closely monitored. Primary data was used and collected using a questionnaire with both open and close ended questions.

Prior to launching the study, the questionnaires were pre-tested to 10 randomly selected members of staff of the CBO to ensure workability in terms of structure, content, flow, and duration. According to Cooper and Schindler (2005), a pre-test is defined as the testing of the questionnaire on a small sample of respondents preferably 10 or more.

After the pre-testing of the questionnaire, modifications were made in the questionnaire to reduce the possibility of ambiguity of some of the questions before delivering them to the respondents. Two procedures were followed during the pre-testing of the questionnaire. Cooper and Schindler (2005) observed that the researcher may rely on experts when piloting the instrument to identify changes that can be made with confusing items.

In this study, reliability was ascertained by pre testing the questionnaire with a selected sample of employees to avert biasness. Reliability of research instruments was tested using Test-retest method. This is a measure of reliability obtained by...
administering the same test twice over a period of time to a group of individuals. The scores from Time 1 and Time 2 can then be correlated in order to evaluate the test for stability over time. The method was used because it perceived that it was easy to communicate to the respondents. Cronbach’s alpha coefficient was used to measure the reliability of the questionnaire. Cronbach’s alpha is a reliability coefficient that indicates how items in a set are positively correlated to one another. It measures the correlations among test items, with a measure of 1 being higher in terms of internal consistency and reliability of $\alpha > 0.7$ being acceptable (Revelle& McDonald, 2006).

The accuracy of data collected depended on the data collection instruments in terms of validity. Validity as noted by Robinson (2002) is the degree to which result obtained from the analysis of the data actually represents the phenomenon under study. Validity was ascertained by having all the objective questions included in the questionnaire. Content validity was used to measure validity. Content validity refers to the appropriateness of the content of an instrument. In other words, do the measures (questions, observation, etc.) accurately assess what you want to know? The collected data was analyzed using descriptive data analysis methods. Descriptive statistics according to Thiry (2007) consists of methods of organizing, displaying, and describing data by using tables, graphs and summary measures. Arithmetic mean was calculated as it takes every value into account in calculating average. In calculating dispersion, standard Deviation was used as it is the best measure of dispersion. Data from questionnaire was coded and entered into the computer using Statistical Package for Social Science (SPSS V 18.0) for analysis. After analysis, data was presented in tables, figures and graphs. This method of data presentation was used as it is reliable and provide the researcher with an opportunity to compare various responses from the questionnaire.

IV. FINDINGS, SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1 Response Rate

This study targeted a sample of 50 management staff within the CBO as well the subordinate staff. It was important to establish the return rate so as to know the exact number of questionnaires that were valid for analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Non Response</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Out of the 50 questionnaires that were issued, 40 were returned. This represented 80% response rate. This was a reliable response rate for data analysis. Mugenda and Mugenda (2003) explains that any response above 60% is adequate for analysis.

4.2 Demographic Information

4.2.1 Gender of the Respondents

This section presents the findings on the general information and characteristics of the respondents.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>28</td>
<td>70</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The study found that 70% of the respondents were male while the remaining 30% were females. This was an indication that there was gender disparity among CBOs staff since the number of males exceeded that of females.

4.2.2 Respondents’ Distribution by Age

Determining the respondents’ age was important as it revealed their level of experience in dealing with the challenges of project implementation. Table 4.3 shows the age distribution of the respondents.

4.2.3 Level of Experience

This section presents the findings on the level of experience of the respondents.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 years</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>3-5 years</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>6-10 years</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Above 10 years</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The study found that majority of the respondents had between 3-5 years of experience in dealing with the challenges of project implementation.
Table 4.3: Respondents distribution by Age

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19-25</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>26-30</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>31-40</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>41-45</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Above 45</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The results indicate that 10% of the respondents were 19-25 years, 25% of the respondents were between the ages of 26-30 years, 30% of the respondents were between 31-40 years, and 15% were between 41-45 years while 20% were above 45 years. Based on the findings, the respondents who were between the ages of 31-40 years were the majority followed closely by those between 26-30 years at 25%. This therefore would suggest that they were able to appreciate and understand project implementation challenges.

4.2.3 Respondents Education

In terms of the respondents’ level of education, the study found that 47.5% had college education, and 52.5% had university degree and higher. These results are summarized and presented in Table 4.4. The results imply that majority of the respondents had university education.

Table 4.4: Education level of Respondents

<table>
<thead>
<tr>
<th>Education</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma</td>
<td>19</td>
<td>47.5%</td>
</tr>
<tr>
<td>University degree and higher</td>
<td>21</td>
<td>52.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The educational background points to the fact that most of the respondents were adequately educated and thus easily understood the issues raised in the questionnaire concerning the area of study. Given the level of education the respondents also clearly understood the ethics of research and thus were expected to give honest and informative responses which would add to the credibility of the final research findings and report.

4.2.4 Current Designation

The study sought to establish the current designation of the employees in the organization.

Table 4.5: Current Designation in the Organization

<table>
<thead>
<tr>
<th>Current designation</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairman</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Managing director</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Program managers</td>
<td>5</td>
<td>12.5%</td>
</tr>
<tr>
<td>Finance managers</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Project managers</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

From the findings shown in the table 4.5, majority of the respondents were field officers and other job categories. This therefore would suggest that they were able to appreciate and understand project implementation challenges. Thus, they were expected to give honest and informative responses which would add to the credibility of the final research findings and report.

4.2.4: Period Worked Within the NGO

The study sought to establish that the employees had worked with the CBO.
Table 4.6: Period Worked Within the NGO

<table>
<thead>
<tr>
<th>Period worked</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>17</td>
<td>42.5%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>8</td>
<td>20%</td>
</tr>
<tr>
<td>11-15 years</td>
<td>9</td>
<td>22.5%</td>
</tr>
<tr>
<td>16-20 years</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Above 21 years</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From the findings, majority (42.5%) of the respondents had worked with the CBO for between 1-5 years, 22.5% had worked with the CBO for between 11-15 years, 20% had worked with the CBO for 6-10 years and 10% had worked with the CBO for between 16-20 years above while 5% had worked for over 21 years as shown on Table 4.5. It was concluded that majority of the respondents had worked at the CBO long enough to understand issues relating to project implementation. This could also indicate that they had first-hand experience and knowledge on how CBOs operations were handled and could give insights on any gaps that may exist.

4.3 Project funding And Implementation of Projects

This section assessed the extent to which project funding affected project implementation at the CBOs. The indicators for this variable were amount of funding, flexibility of funding and reliability of funding as presented in this section.

4.3.1 Respondents Distribution as relates to influence of funding

The respondents were asked whether amount of funding, flexibility of funding and reliability of funding affects project implementation at the CBOs. Their views are indicated in Table 4.7

Table 4.7: Distribution by amount of funding

<table>
<thead>
<tr>
<th>Project funding And Implementation of Projects</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of funding influences implementation of projects schedule</td>
<td>4.11</td>
<td>0.33</td>
</tr>
<tr>
<td>Amount of funding influences implementation of projects budget</td>
<td>4.44</td>
<td>0.53</td>
</tr>
<tr>
<td>Amount of funding influences project stakeholder satisfaction</td>
<td>4.33</td>
<td>0.50</td>
</tr>
<tr>
<td>Flexibility of funding influences implementation of projects schedule</td>
<td>4.44</td>
<td>0.73</td>
</tr>
<tr>
<td>Flexibility of funding influences implementation of projects budget</td>
<td>4.11</td>
<td>0.60</td>
</tr>
<tr>
<td>Flexibility of funding influences project stakeholder satisfaction</td>
<td>4.44</td>
<td>0.73</td>
</tr>
<tr>
<td>Reliability of funding influences implementation of projects schedule</td>
<td>4.11</td>
<td>0.33</td>
</tr>
<tr>
<td>Reliability of funding influences implementation of projects budget</td>
<td>4.44</td>
<td>0.53</td>
</tr>
<tr>
<td>Reliability of funding influences projects stakeholder satisfaction</td>
<td>4.11</td>
<td>0.60</td>
</tr>
<tr>
<td><strong>Composite Mean and Standard Deviation</strong></td>
<td><strong>4.28</strong></td>
<td><strong>0.54</strong></td>
</tr>
</tbody>
</table>

With a mean of 4.44 respondents agreed that Amount of funding influences implementation of projects budget. Therefore, with a composite mean of 4.28 from the study, it was found that project funding influences projects implementation.

4.3.2 Project training and implementation of projects

Table 4.8: Distribution by influence of training

<table>
<thead>
<tr>
<th>Project Training and Implementation of projects</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of staff training influences projects schedule</td>
<td>4.63</td>
<td>0.52</td>
</tr>
<tr>
<td>Type of staff training influences projects budget</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Type of staff training influences project stakeholder satisfaction</td>
<td>4.63</td>
<td>0.52</td>
</tr>
<tr>
<td>Level of staff training influences projects schedule</td>
<td>4.13</td>
<td>0.64</td>
</tr>
<tr>
<td>Level of staff training influences projects budget</td>
<td>4.25</td>
<td>0.71</td>
</tr>
<tr>
<td>Level of staff training influences project stakeholder satisfaction</td>
<td>4.25</td>
<td>0.46</td>
</tr>
</tbody>
</table>
4.3.3 Project structure and project implementation

<table>
<thead>
<tr>
<th>Project Structure and Implementation of Projects</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project structure influences projects schedule</td>
<td>4.44</td>
<td>0.73</td>
</tr>
<tr>
<td>Type of project structure influences projects budget</td>
<td>4.22</td>
<td>0.67</td>
</tr>
<tr>
<td>Type of project structure influences project stakeholder satisfaction</td>
<td>4.33</td>
<td>0.71</td>
</tr>
<tr>
<td>Efficiency of project structure influences projects schedule</td>
<td>4.11</td>
<td>0.33</td>
</tr>
<tr>
<td>Efficiency of project structure influences projects budget</td>
<td>4.33</td>
<td>0.71</td>
</tr>
<tr>
<td>Efficiency of project structure influences project stakeholder satisfaction</td>
<td>4.33</td>
<td>0.50</td>
</tr>
<tr>
<td>Project leadership influences projects schedule</td>
<td>4.22</td>
<td>0.83</td>
</tr>
<tr>
<td>Project leadership influences projects budget</td>
<td>4.22</td>
<td>0.67</td>
</tr>
<tr>
<td>Project leadership influences projects stakeholder satisfaction</td>
<td>4.22</td>
<td>0.67</td>
</tr>
<tr>
<td>Composite Mean and Standard Deviation</td>
<td>4.23</td>
<td>0.65</td>
</tr>
</tbody>
</table>

With a mean of 4.44, respondents agreed that Type of project structure influences projects schedule. Therefore, with a composite mean of 4.23 from the study, it was found that project structure influences projects implementation at the CBO.

This section assessed the extent to which structural factors affected project implementation at the CBO. The indicators for this variable were type of project structures at the CBO, efficiency of project structures in the CBO and project leadership as presented in this section. Their views are indicated in Table 4.9

4.3.4 Stakeholder involvement and project implementation

<table>
<thead>
<tr>
<th>Stakeholder Involvement and Project Implementation</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of project stakeholders influences projects schedules</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Number of project stakeholders influences projects budget</td>
<td>4.63</td>
<td>0.52</td>
</tr>
<tr>
<td>Number of project stakeholders influences stakeholder satisfaction</td>
<td>4.00</td>
<td>0.53</td>
</tr>
<tr>
<td>Skills of project stakeholders influences projects schedule</td>
<td>4.50</td>
<td>0.76</td>
</tr>
<tr>
<td>Skills of project stakeholders influences projects budget</td>
<td>4.00</td>
<td>0.53</td>
</tr>
<tr>
<td>Skills of project stakeholders influences stakeholder satisfaction</td>
<td>4.50</td>
<td>0.76</td>
</tr>
<tr>
<td>Level of stakeholder education influences projects schedule</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Level of stakeholder education influences projects budget</td>
<td>4.75</td>
<td>0.46</td>
</tr>
<tr>
<td>Level of stakeholder education influences of stakeholder satisfaction</td>
<td>3.88</td>
<td>0.64</td>
</tr>
<tr>
<td>Composite Mean and Standard Deviation</td>
<td>3.81</td>
<td>0.46</td>
</tr>
</tbody>
</table>

With a mean of 4.75 respondents agreed that Level of stakeholder education influences projects budget. Therefore, with a composite mean of 3.81, it was found that project stakeholder involvement has an influence on project implementation.

This section assessed the extent to which stakeholder involvement affected project implementation at the CBO. The indicators for this variable were number of project stakeholders, skills of project stakeholders and level of education of stakeholders as presented in this section. Their views are indicated in Table 4.10.

4.4 Summary of the Findings

A summary of key findings deduced from the data analysis of this study are summarized in table 4.11 with respect to the research objectives and their composite mean and standard deviation derived during data analysis.
Influence of project funding on implementation of projects in CBOs in Kenya; a case of Child Regional Education Support Services had a composite mean of 4.28 and a composite standard deviation of 0.54. Influence of project training on implementation of projects in CBOs in Kenya; a case of Child Regional Education Support Services had a composite mean of 4.32 and a composite standard deviation of 0.50. Influence of project structure on implementation of projects in CBOs in Kenya; a case of Child Regional Education Support Services had a composite mean of 4.23 and a composite standard deviation of 0.65. Influence of project stakeholder involvement on projects in CBOs in Kenya; a case of Child Regional Education Support Services had a composite mean of 3.81 and a composite standard deviation of 0.46.

4.5 Discussions of the Findings

This section focuses on detailed discussion of the findings of the study. It focuses on some of the issues associated with management of project funds that emerged out during the study. Discussions of findings were done according to each independent variable.

4.5.1 Project Funding

The study sought to establish how amount funding influences implementation of projects. The study established that 35% of the respondents indicated that amount of funding greatly influenced implementation of projects. Sabatini (2002) argues that CBOs have limited resources, and therefore they have to develop partnerships with other organizations and donors that can provide resources. Most of the respondents indicated that flexibility and reliability of funding, to a very large extent or to some extent influenced implementation of projects. Thorn (2011) argues that the donors and outside partners do not just give resources; they also want to control the activities of the organization to ensure that they are aligned with their interests. Foller & Thorn 2008 argues that the erosion of organization autonomy could entail the organization being expected to adopt the donor’s criteria for implementing and monitoring programmes, including using a logical framework and articulating results in complicated formats using western languages which the organization members are not familiar with. If this happens organizations become more attuned and accountable to donors’ needs than to the people they are meant to represent and serve.

4.5.2 Project Training

The study established that most of the respondents, regardless of whether they attended training or not, stated that staff training, to a very large extent, influenced implementation of projects. From these findings, it is clear that staff training on project management is important for management of project funds. This is in agreement with Roberts, (2007) who recommends that some projects may benefit if their participants are trained in project management. Taylor, (2006) argues that organizations are now being more selective about whom they choose to put in the project management pool, and they are beginning to ensure that these people have the requisite skills, training and experience. Taylor, (2006) recommends that a project manager must have a strong, active, and continuous interest in teaching, training, and developing subordinates.

4.5.3 Project Organizational Structure

The study sought to determine the influence of project organizational structure on implementation of projects by community based organizations. The study revealed that more respondents strongly agreed or agreed with the statement that clear understanding of members’ roles and responsibilities has an influence on the management of project funds hence better implementation of projects. This agrees with Forsyth 2005 who argued that effective group performance depends to a large extent, on the size of the group. In order to be effective, group size should be kept to a minimum without jeopardizing workload and goal achievement.

4.5.4 Project Stakeholders’ Involvement

On whether stakeholders’ involvement affected project implementation at the CBOs, 10% of the respondents somehow agreed with the view that skills of project stakeholders affected project implementation at the CBOs. 50% agreed while a further 25% strongly agreed.

The respondents indicated that stakeholders were involved in different ways. For the beneficiaries, they were involved by accepting to work hard with the resources provided to make sure that they were successful in life. For the donors, they were involved through audits and providing technical support whenever they could to ensure project success.

4.6 Study Conclusions

Table: 4.11 Summary of Key Findings

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Arithmetic Mean (x̅)</th>
<th>Standard Deviation (δ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To assess the influence of project funding on implementation of projects in CBOs in Kenya</td>
<td>4.28</td>
<td>0.54</td>
</tr>
<tr>
<td>2. To assess the influence of project training on implementation of projects in CBOs in Kenya</td>
<td>4.32</td>
<td>0.50</td>
</tr>
<tr>
<td>3. To assess the influence of project structure on implementation of projects in CBOs in Kenya</td>
<td>4.23</td>
<td>0.65</td>
</tr>
<tr>
<td>4. To assess the influence of project stakeholder involvement on projects in CBOs in Kenya</td>
<td>3.81</td>
<td>0.46</td>
</tr>
</tbody>
</table>

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In alignment with the objectives of this study, the following conclusions were made following data collection and analysis. Research objective one in this study was to assess the Influence of Project Funding on projects in CBOs in Kenya. It was found that with a mean of 4.44, the Amount of funding influenced implementation of projects budget. It was therefore concluded that Project Funding influences implementation of projects in CBOs in Kenya.

Research objective two in this study was to assess the Influence of Project Training on projects in CBOs in Kenya. It was found that with a mean of 4.63, the Type of staff training influenced implementation of projects schedule. It was therefore concluded that Project Training influences implementation of projects in CBOs in Kenya.

Research objective three in this study was to assess the influence of Project Structure on projects in CBOs in Kenya. It was found that with a mean of 4.44, the Type of Project Structure influenced implementation of projects schedule. It is therefore concluded that Project Structure influences implementation of projects in CBOs in Kenya.

Research objective four in this study was to assess the influence of Project Stakeholder Involvement on projects in CBOs in Kenya. It was found that with a mean of 4.75, the Level of stakeholder education influenced projects budget. It is therefore concluded that Project Stakeholder Involvement influences implementation of projects in CBOs in Kenya.

1.7 Recommendations

4.7.1 Policy Recommendations

It was therefore recommended that development partners should increase their level of funding to CBOs since they play an important and relevant role in providing services at the local level. CBOs positively affects the process of rural change i.e. increase in income, improvement in health, nutrition and literacy status of the populations. It was recommended that Community Based Organizations hire qualified staff and in addition, it trains them to enable them deliver services optimally and to also enable employees deliver quality services. Following the unique operations and accounting for CBOs, it is important that staff is trained on the operations for timely project implementation.

It was recommended that Community Based Organizations be encouraged to adhere to organizational structure, develop well defined member roles and responsibilities so as to ensure projects funds are efficiently and effectively used. It was therefore recommended that the organization engages the stakeholders more to harmonize goals and objectives with the aspirations of the stakeholders and reduce dissonance levels thereby increasing satisfaction. It is also recommended that the CBOs involve stakeholders in all their strategic management right from strategic formulation to strategic evaluation. This will reduce the levels of resistance and also ensure that the stakeholders support the activities of the organizations.

4.7.2 Recommendations for Further Study

This study was based on factors influencing implementation of projects in CBOs in Kenya using a case of Child Regional Education Support Services. The study centered on key factors in the NGO sector. The following are suggestions for further study:

1. To allow for generalization, it is recommended that another study be carried out to establish factors affecting project implementation in Government organizations. This is specifically because Government organizations operates differently from those in NGOs.

2. It is recommended that further studies be carried out on factors influencing implementation of projects in other CBOs for generalization.

3. It is also recommended that an in-depth study be carried out on gender role in community based organizations undertaking development projects.

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AUTHORS

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Effectiveness of active learning in Nursing Education

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* Charge Nurse
** Senior Nursing Instructor RCN Peshawar
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Abstract- Active learning is the process of education where students become extensively engaged in learning directly rather than learning things passively. It encourages the students to take an active role in learning. It is not only concerned to class room theory, but it also facilitates nursing students to practice their skills in the real world.

Objectives: to determine the effectiveness of active learning by comparing it with passive learning.

Method: The study design used for the study was cross sectional comparative study design. 62 BScN students of semester 1 and semester 3 were selected through probability sampling techniques. The participants were exposed to both active learning and passive learning technique and then their results were compared based on posttest. Frequencies and percentages were calculated through MS Excel 2013.

Result: The result shows that the different teaching methods yields different in results. The most effective methods was tutorial with highest post-test mean score (mean 75.2 ± 11.3), the second method was written assignment with Mean score 70.48 ± 15.2, whereas the mean score on PPT Lecture was 65.7 ± 14.7.

Conclusion: It is concluded that nursing students should be engage in active learning to gain plenty of knowledge in theory and to bring the theory in practice in clinical side. The active learning environment should be supported in all Nursing institutes that student become self-centered not teacher centered.

I. INTRODUCTION

Active learning is the process of education where students become extensively engaged in learning directly rather than learning things passively. It encourages the students to take an active role in learning and enhance critical thinking, self-directed learning and problem solving ability by using different types of active learning methodologies and hence it is called Student Centered Approach towards learning. Several methodologies are used to engage the students in different activities such as reading, writing, discussion or problem solving that promote analysis, synthesis and evaluation of class content. Active learning enables the nursing students to apply theory which they learn in the class into clinical practice as well. According to Johnston and Tinning (2001) problem-based learning which is a part of active learning is widely used in nursing education for assessing the students to integrate nursing theory into practice.

Active learning also provides many opportunities for nursing students to ask questions where they are unclear. It is not only concerned to class room theory, but it also facilitates nursing students to practice their skills in the real world. According to Leong and Clutter (2015) students are always encouraged to perform their skills in clinical even if they are not fully expert and are encouraged to ask relevant questions where they are doubtful and have weakness.

In active learning, the students are not totally dependent on teacher, rather the student are more active than teacher. Tezer and Besgül (2014) states the active role of teacher and passive role of students is removed in active learning and teacher only guides the students where they need. In this approach, the students act as a critical thinker, researcher, producer and decision maker; and they are in touch with other students as well as teacher; although, they are neither dependent on teacher nor students. Different learning theories are also related to active learning. According to Acikgoz (2007) the active learning is based on two main theories in the field of education which are constructivism and cognitivism. It is not the good way that student only engage in passive learning and step in the screen full of slides and don't involve in any other activity which can lead them lack of confidence skills and knowledge. According to Fahlberg (2014) the teacher must move out the student from screen slides and involve them to use knowledge in practical life and participate actively to change the situation.

In active learning environment, students are always train to think critically and reflectively which help them to become self-directed learners (Justice et al., 2007). It means that the students in active learning are involved cognitively and constructively with empowerment and they learn independently by reflecting their past knowledge. Active learning also enhance the performance of nursing student in clinical practices as well as in theory classes. According to Leong & Clutter (2015) if the active learning model is encourage in the clinical setup as well as in class room, the nursing student might improve their performance which will increase their ability to learn and practice their expertise with willingness and interest.

II. MATERIAL AND METHODS

The study was conducted in a private nursing college of Peshawar KP. Pakistan. The target population the students of BScN students of the college. The study design used for the study was descriptive cross sectional comparative study design. The sampling techniques used was Probability systemic sampling. The sample size was 62 BScN students of semester 1 and semester 3. The inclusion criteria was all semester 1 and semester 3 students of BScN, while the exclusion criteria was students on medical leaves.

The participants were both male and female of diverse culture and language aged between 17 to 23 years old. The majority of the participants came from rural areas especially...
from Chitral and Swat. There was no significance difference between the participants in terms of age and years of education as all participants were passed intermediate science subjects. The study tool used for the project was post test. To maintain respect their autonomy and confidentiality a well explained informed consent was presented to the participants. Data analysis was done through MS Excel 2013, frequencies and percentages were calculated.

The effectiveness of active learning strategy was determined by comparing it with passive learning, a session on NCP was arranged for all students, a group of students were taught through traditional lecture method while two groups were involved in active learning through tutorial and written assignment.

III. RESULT

Means and SDs were calculated for each category to examine the most effective learning strategy. The result shows that the different teaching methods yields different in results. The most effective methods was tutorial with highest post-test mean score (mean 75.2 ± 11.3), the second method was written assignment with Mean score 70.48 ± 15.2, whereas the mean score on PPT Lecture was 65.7 ± 14.7. Chart 1 and table 1 illustrate the comparison and results of the three different strategies.

![Chart 1: Mean score and standard deviation](chart.png)

<table>
<thead>
<tr>
<th>Sno.</th>
<th>Methodology</th>
<th>Mean Score</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PPT Lecture</td>
<td>65.7</td>
<td>14.7</td>
</tr>
<tr>
<td>2</td>
<td>Tutorials</td>
<td>75.2</td>
<td>11.3</td>
</tr>
<tr>
<td>3</td>
<td>written Assignment</td>
<td>70.48</td>
<td>15.2</td>
</tr>
</tbody>
</table>

Table 1: Mean and SD of Score achieved on three different teaching Methods

IV. DISCUSSION

The result obtained from the above study showed that active learning strategy is more effective than passive learning especially in nursing education. In active learning, the students are always participate actively and the study is always student centered. Tezer & Besgul (2015) said that the active role of teacher and passive role of students are minimized in active learning and teacher only involve when student need their guidance. In this method instead of teacher the students act as a critical thinker, researcher, producer and decision maker and they are in touch with other students as well as teacher but not depend on them. Active learning not only limited to theory classes but it also improve the clinical performance. The study conducted by Leong and Clutter (2015) showed that all the nursing student got high score when they are supported by active learning model in clinical side. They suggested that if the active learning model is encourage in the clinical setup as well as in class room, the nursing student will ultimately improve their performance which will increase their learning ability and practice their expertise with interest.

V. CONCLUSION

From the above study it is concluded that nursing students should be engage in active learning to gain plenty of knowledge in theory and to bring the theory in practice in clinical side. The active learning environment should be supported in all Nursing institutes that student become self-centered not teacher centered. Active learning environment also necessary because it enhance critical thinking, decision making power, self-directed learning and problem solving ability of the students.
VI. RECOMMENDATIONS

The recommendation for future is proposed. Firstly, training should be given to all faculty to apply active learning strategies during the class as well as in clinical side. Secondly, there should be more study on other active learning strategies beyond tutorial and assignment. For this, it was suggested to train all the present faculty to apply active learning strategies and also to do research on other active learning strategies to check their effectiveness as well. Finally, it was recommended that there should be active learning environment in both classes as well as in clinical in near future.

REFERENCES


AUTHORS

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The Influence of Staff Performance Review on Performance of State Corporations in Kenya.

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Abstract- Performance management is a growing field in the public and private sector globally. This study sought to ascertain the influence of staff performance review on performance of State Corporations in Kenya. The correlation results show that staff performance review is related to performance of State Corporations (r = -0.463, p < 0.05). The construct for the dependent variable also show a significant inverse association with the dependent variable. This is depicted by r = -0.393, p < 0.05 for staff duty allocation, r = -0.358, p < 0.05 for progress monitoring and r = -0.379, p < 0.05 for performance appraisal. Overall, staff performance review explains 21.4% of the variance on performance of State Corporation. The model has a good fit demonstrated by analysis of variance (ANOVA) F value of 26.977, p < 0.05. Regarding the constructs for the predictor variable, staff duty allocation has greater influence on the dependent variable (β = -0.209) followed by performance appraisal (β = -0.193) and progress monitoring (β = -0.181) respectively. Since a lower composite score is preferred, these results indicate improvements in staff performance review leads to performance improvement. The results underscore the need for duty allocation, performance appraisal and progress monitoring to stimulate improved corporate performance.

Index Terms- Staff performance review, Staff duty allocation, Performance monitoring, Performance appraisal, Corporate performance.

I. INTRODUCTION

Globally, public sector institutions have in most cases lagged behind the private sector on efficiency and effectiveness for delivery of goods and services. This trend had prompted a global movement to stimulate efficiency and effectiveness of this sector. Performance measurement has been viewed as a key tool that will facilitate achievement of this goal. In Kenya there has been concerted effort to improve the performance of the public sector institutions since the early 1960s. The Republic of Kenya developed Sessional Paper No. 10 on African Socialism and its Application to Planning in Kenya in 1965. This laid to foundation for the establishment of State Corporations in the country (Republic of Kenya, 1965). These have grown to approximately 200 corporations in 2014. The Government of Kenya has further embarked on public sector reform processes aimed at increasing efficiency and effectiveness in this sector. The Structural Adjustments Programme (SAP) was introduced in 1986 and comprised of a series of political and economic reforms promoted mainly by the World Bank and the International Monetary Fund (Rono, 2002). In 1993, the Government introduced the Civil Service Reform Programme (CSRP) that emphasized improvements in efficiency and productivity (Sawe, 1997). Results-Based Management (RBM) was initiated in 2003-2008, mainly to address economic recovery, wealth and employment creation (Kobia & Mohammed, 2006; Obong'o, 2009). In 2004, the Government of Kenya introduced performance contracting for public sector institutions (Obong'o, 2009). This is a negotiated document with clear targets that is signed between the Government as owner of the public institution and management of these institutions (Ochieng, 2010). This approach is rooted in results based management and informed by the balanced score card theory ensures a balanced evaluation process (Republic of Kenya, 2013).

II. RESEARCH ELABORATION

2.1 Statement of the problem

Performance contracting was introduced for all public sector institutions in 2004. The aim was to improve performance of the public sector in delivery of goods and services. An annual evaluation is done which provides a performance composite score that grades the public sector institutions according to performance. A major limitation of this approach is that while it provides the grade and ranking, it does not provide the reasons for good or bad performance. Hence, the lessons learnt in all the institutions remain undocumented. Literature however points at staff performance review as one of the determinants of corporate performance. This study aimed at ascertaining the influence of this variable on performance of State Corporations in Kenya.

2.2 Specific objective

To ascertain the influence of staff performance review on performance of State Corporations in Kenya.

2.3 Hypothesis

There is no significant influence of staff performance review on performance of State Corporations in Kenya.

2.4 Literature review

2.4.1 Performance prism theory

The performance prism theory was developed by Neely, Adams & Kennerley (2002) to explain determinants of corporate performance. It underscores the importance of stakeholders in firms’ performance. The five facets of the prism include stakeholders’ satisfaction, capabilities, stakeholders’ contribution, strategies and processes. These facets form the key

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result area for corporate performance. Emergence of performance prism has been described as a positive development to the traditional method of performance measurement where financial issues were prioritized (Roshan & Jenson, 2014). This view is also held by Zeglat, ALRawabdeh, ALMadi & Shrafat (2012) who concur with this theory while recommending incorporation of stakeholders needs. Reza (2014) state that the main difference between performance prism and other performance measures is its focus on stakeholders. Striteska and Spickova (2012) have identified three key strengths of the performance prism theory as focus on stakeholders, consideration of stakeholders contribution and laying of a firm foundation for performance measures. They have also identified four issues as little information on implementation of performance measures, some measures may not be very effective in practice, lack of sufficient link between the measures and results and failure to consider existing performance management systems.

2.4.2 Staff performance review

Staff performance review involves setting clear goals, key performance indicators and monitoring system to ensure objectivity. It is one of the factors that influence corporate performance (Muraga, 2015). Performance review influences employees’ motivation towards work as well as innovation (Tan & Nasurdin, 2011). According to Iqbal, Ahmad, Haider, Batool and Qurat-ul-ain, (2013) when they state that performance appraisal has a positive relationship with employee performance with motivation as a moderating variable. Performance evaluation is positively associated with employees’ performance in the public and private sector (Jamil & Raja, 2011). According to Kumar (2014), performance appraisal influences capability of employee and corporate performance positively. Some critics have argued that staff performance review if often subjective and biased process (Boachie-Mensah & Seidu, 2011). This view is shared by Mehta (2014) who has stated that the relationship between performance appraisal and employee performance is dependent on how this is done and the level of transparency. Alvi, Suraniand Hirani (2013) have also argued that there is no relationship between performance evaluation and job satisfaction. This argument is similar to Culbert (2008) statement that staff performance review does not influence corporate performance.

2.5 Methodology

2.5.1 Study design

This was a cross sectional descriptive study that targeted quantitative and qualitative data. Both primary and secondary data was collected. This design was adopted in view of time and resource constraints

2.5.2 Study population

The study population was 200 State Corporations that signed performance contract and were evaluated during the financial year 2013/14. This formed the sampling frame for the study.

2.5.3 Sample and sampling

A sample of 132 State corporations was drawn using simple random sampling method. Rotary method was used in this case. The officers’ in-charge of performance contract and human resource management in each institution were targeted to fill the questionnaire.

2.5.4 Data collection

This was done using self-administered questionnaires. The questionnaire was pretested prior to use and achieved a Cronbach’s alpha of 0.767. Each State Corporation was requested to complete two questionnaires one by the officer in-charge of human resource management and the other one by the officer in-charge of performance contract.

2.5.5 Data analysis

Data was entered using the statistical package for social sciences (SPSS). This was cleaned for errors before analysis. Data analysis involved descriptive statistics, correlation and regression analysis.

III. RESULTS

3.1 Descriptive characteristics on staff performance review practices

3.1.1 Staff duty allocation

The first construct for the predictor variable was staff duty allocation. In most corporations (85.3%) duty allocations was done in the first quarter. Various reasons were given as to why the allocation of duties in the performance contract was done at a specific quarter. The most prominent reason mentioned by 43(42.2%) respondents was to ensure that employees were clear with the target. Most corporations 66 (64.7%) allocated duties in writing. The main reason for choice of method of duty allocation reported by 43(42.2%) respondents was to ensure there was evidence of allocation.

3.1.2 Progress monitoring

Progress monitoring was the second construct for the predictor variable. In most cases, the progress monitoring schedule was developed in the first quarter as reported by 64(62.7%) respondents. The main reason reported by 47(46.1%) respondents for the period of development of the progress monitoring schedule was to facilitate timely monitoring of activities. On compliance with progress monitoring schedule, majority of the corporation’s 67 (65.7%) reported compliance level of between 81% and 100%.

3.1.3 Performance appraisal

The third construct of staff performance review practices was performance appraisal. 76(74.5%) corporations appraised between 80% and 100% of the staff during the financial year 2014/15. The main reason for the percentage staff appraised was the policy to appraise all staff as reported by 60(58%) respondents. Most respondents 99(97.1%) were of the opinion that staff performance review improves corporate performance

3.2 Diagnostic tests for study variables

Reliability

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Reliability of data was assessed using the Cronbach’s alpha value for staff performance review. This was 0.7367 and the value for performance of State Corporation was 0.9680. Fraenkel and Wallen, 2006 state that this value is statistically acceptable if it exceeds the 0.7 threshold.

Validity

Validity test was done using factor analysis. The results of the Kaiser-Meyer-Olkin (KMO) test show a value of 0.657. Bartlett’s test of sphericity shows that the approximate Chi-Square was significant for all the variables confirming construct validity. According to Dayan (2011) the values for the Kaiser-Meyer-Olkin (KMO) test should be ≥ 0.5 while the Bartlett’s test of sphericity should be significant.

4.4.3 Multicollinearity

Multicollinearity was measured through computation of the variance inflation factor (VIF) for the predictor variable which was 1.139. This figure negates multicollinearity problem as multicollinearity becomes a problem if the VIF exceeds 10 (Bryman, 2012).

4.4.4 Normality

The data exhibited normality with the predictor variable having a skewness of 0.661 and kurtosis 0.572. Similarly, the dependent variable had a skewness of -0.816 and kurtosis 0.333. Aluja, Blancha and Garcia, 2005 have stated that normality of data is evident if none of these values exceed +1 or -1.

4.4.5 Autocorrelation

Autocorrelation was computed using the Durbin Watson statistic. According to Gujarati (2003) a coefficients ranging from 1.5 to 2.5 shows absence of autocorrelation. This study obtained a value of 1.983 indicating no autocorrelation.

3.3 Correlation analysis results

Results show that staff performance review is associated with performance of State Corporation. The strength of the relationship is denoted by a Pearson coefficient \( r = -0.463, p < 0.05 \) implying a significant inverse relationship. This means that improvements in staff performance review leads to improvements in corporate performance since lower performance composite scores are preferred. The construct for the dependent variable also show a significant association with the dependent variable. This is depicted by \( r = -0.393, p < 0.05 \) for staff duty allocation, \( r = -0.358, p < 0.05 \) for progress monitoring and \( r = -0.379 \) for performance appraisal. The results are similar to those of Iqbal, Ahmad, Haider, Batool and Qurat-ul-ain, (2013) who established a correlation of 0.590 between performance appraisal and employee performance.

3.4 Regression analysis results

It was hypothesized that: \( H03: \) There is no significant influence of staff performance review on performance of State Corporations in Kenya. The study applied model \( Y = \beta_0 + \beta_1X + \epsilon \) to test this hypothesis. Application of the model to predict the dependent variable using the independent variable is constructed using the constant \( (\beta_0 = 0.180, p < 0.05) \) and coefficient of staff performance review \( (\beta_1 = -0.453, p < 0.05) \) shown in table 1.

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Adjusted R Square</th>
<th>Rstd. Error of the Estimate</th>
<th>Durbin-Watson</th>
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<tr>
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<td>R Square</td>
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<tr>
<td>1 .463</td>
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<td>B</td>
<td>Std. Error</td>
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<td>1 (Constant)</td>
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<td>.084</td>
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<tr>
<td>Staff Performance Review</td>
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<td>.087</td>
<td>-.463</td>
</tr>
</tbody>
</table>

Dependent variable: Performance of State Corporation
Predictor variable: Staff performance review

Thus the causal relationship for the two variables is depicted as follows:

\[ P = 0.180 - 0.453 \text{SPR} + \epsilon \]

Where \( P \) = Performance of State Corporation

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The model results show the predictive power of the independent variable over the dependent variable. From the model summary, staff performance explains 21.4% of the variance in the performance of State Corporations. The analysis of variance $F$ statistics measures 26.977, with $p$ value less than 0.05 meaning the model is true and exists. The prediction power of this model is significant since both the constant and staff performance reviews have $p < 0.05$. Therefore, the null hypothesis is rejected and alternative hypothesis accepted that there is a significant influence of staff performance review on performance of State Corporations in Kenya.

Regression of the constructs of the predictor variable of the dependent variable indicate that staff duty allocation has greater influence on the dependent variable ($\beta = -0.209$) followed by performance appraisal ($\beta = -0.193$) and progress monitoring ($\beta = -0.181$) respectively. The results agree with the findings of Jamil & Raja (2011) who concluded that performance evaluation is positively associated with employees’ performance in the public and private sector. Muraga (2015) study established that a unit change in staff performance management leads to 36.3% unit change in corporate performance.

IV. CONCLUSION

The main objective of the study was to ascertain the influence of staff performance review on performance of State Corporations in Kenya. The study findings show that staff performance review is related and also has a positive influence on performance of State Corporation. Similarly the constructs of staff performance review namely staff duty allocation, progress monitoring and performance appraisal are related and have a positive influence on the dependent variable. Staff duty allocation has greater influence on the dependent variable followed by performance appraisal and progress monitoring respectively. The study recommends formulation of policies to promote staff duty allocation, staff appraisal and progress monitoring that order for improved corporate performance. Further, the study recommends similar studies be conducted targeting the County Governments, non-profit making organizations as well as private companies as the results of this study may not be generalized to cover these institutions.

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Analysis on Mix Design of High Strength Concrete (HSC) using IS: 10262-1982 and partial replacement of waste marble aggregates as coarse aggregate

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Abstract- This research paper includes the mix design of high strength concrete (HSC) concrete with specified characteristic compressive strength of 60 N/mm$^2$ according to IS-10262:1982. The waste marble chips are partially replaced as coarse aggregate. High strength concrete is a construction material with improved properties like strength, durability etc. than ordinary concrete. High strength concrete can be achieved through proper mix design process. Therefore, mix design plays an important role in the concrete technology. HSC can be achieved through using good quality of ingredient materials, following proper methods of casting and testing & calculations of mix design, and using comparatively low water-cement ratio. In this research, super-plasticizer is used as a chemical admixture to the concrete. This research is carried out to study the mix design of high strength concrete with partial replacement by waste marble chips.

Index Terms- Concrete, High Strength Concrete, IS: 10262-1982, Mix Design, Super-Plasticizer, Waste Marble Aggregates.

I. INTRODUCTION

Concrete is a most commonly used and preferred material for construction purpose throughout the world as it is durable, easy to make at constructional sites, easy to transport and place and it can be moulded into any desired shape and size. The main ingredients of concrete are easily available in most of the places. This makes concrete even more popular and preferred material for construction purposes.

According to IS 456:2000-Plain and Reinforced Concrete-code of practice, Concrete is generally classified as: Ordinary Concrete, Standard Concrete and High Strength Concrete (HSC). Ordinary concrete and Standard concrete may be defined as the concrete with specified characteristic compressive strength of 150 mm cube at 28 days between 10 to 20 N/mm$^2$ and 25 to 55 N/mm$^2$ respectively. The high strength concrete may be defined as the concrete with specified characteristic compressive strength of 150 mm cube at 28 days between 60 to 80 N/mm$^2$.

Waste marbles are produced from marble industries. Every year, tons of marbles are getting wasted. Instead of using coarse aggregates, if these waste marbles can be utilized as coarse aggregate then the wastage amount can be minimized every year. By this, costs of construction can also be minimized as well as it can be better for our environment. The wastes of marbles can be converted into aggregate by breaking it into small size pieces and can be used as replacement to coarse aggregate as well as it can be used as a replacement to fine aggregate by making its fine powder.

In this research, the concrete having grade M60 is mix designed and the waste marble aggregates are partially replaced in high strength concrete by 0%, 10%, 20% and 30% of weight of natural coarse aggregate used.

II. LITERATURE REVIEW

There are numerous research reports available on the mechanical and chemical properties of concrete. However, the research works carried out for the high strength concrete are found to be limited.

Mohammad Abdur Rashid and Mohammad Abul Mansur (2009) carried an experimental study on “Considerations in producing high strength concrete”. The targeted strengths of concretes were from 60 MPa to 130 MPa. A larger ratio of CA to FA (1.81) was considered in the study. While the variables considered were the water-cement ratio (from 0.34 to as low as 0.20). Test results are found to support the reviewed information on HSC production. Also, the water-cement ratio and the suitable admixtures with their optimum dosages are found to be the most important parameters for producing HSC.

According to Sanjay Srivastava, Dr S.S Jain, Dr M.P.S. Chauhan, (2014), in development of HSC, the aggregate of smaller size play very important role. Fineness modulus of aggregate play very important role in development of high strength concrete. It affects the strength greatly.

According to Mr. Sachin, Mr. Yudhvir Yadav (2016), in the mix design method for high strength concrete the smaller size aggregate plays very important role in the achievement of high compressive strength. With the increase of cement contents the strength of concrete increases.

Jay P. Chotaliya, Kuldeep B. Makwana, Pratik D. Tank (2016) carried an experimental study on “waste marble chips as coarse aggregate”. They proved that the marble concrete proves more economical at rate of around 7.44% than concrete made with conventional coarse aggregate.
III. MATERIALS USED

The ingredients of high strength concrete are: Cement, Fine aggregate, Coarse aggregate and water. Admixtures may be used to enhance some properties of the concrete. Here waste marble chips are replaced as coarse aggregate.

A. Cement

It is one of the most important ingredients of concrete. It acts as a binder element in the concrete. In this research, Ramco OPC 43 grade cement is used. The properties of this cement are given in table below.

Table I: Properties of Cement

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Colour</td>
<td>Grey</td>
</tr>
<tr>
<td>2</td>
<td>Confirms to IS</td>
<td>8112:1989</td>
</tr>
<tr>
<td>3</td>
<td>Specific Gravity</td>
<td>3.15</td>
</tr>
<tr>
<td>4</td>
<td>Initial setting</td>
<td>80 min</td>
</tr>
<tr>
<td>5</td>
<td>Final Setting</td>
<td>265 min</td>
</tr>
</tbody>
</table>

B. Fine aggregate

In this research, River sand is used as fine aggregate. The properties of the river sand used are given in table below.

Table II: Properties of Fine Aggregate

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Specific Gravity</td>
<td>2.74</td>
</tr>
<tr>
<td>2</td>
<td>Water Absorption</td>
<td>0.9%</td>
</tr>
<tr>
<td>3</td>
<td>Sieve Analysis</td>
<td>Zone-III</td>
</tr>
<tr>
<td>4</td>
<td>Fineness Modulus</td>
<td>2.319</td>
</tr>
</tbody>
</table>

C. Coarse aggregate

Stones made from Crushed rocks are used as coarse aggregate in this research work. The properties of coarse aggregate used are given in table below.

Table III: Properties of Coarse Aggregate

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Specific Gravity</td>
<td>2.74</td>
</tr>
<tr>
<td>2</td>
<td>Water Absorption</td>
<td>0.5%</td>
</tr>
<tr>
<td>3</td>
<td>Sieve Analysis</td>
<td>Confirming with table-2 of IS-383:1970</td>
</tr>
<tr>
<td>4</td>
<td>Maximum size of coarse aggregate</td>
<td>20 mm</td>
</tr>
</tbody>
</table>

D. Water

Water hydrates the cement in the concrete and makes the concrete workable. Water used in the preparation of concrete should be free from dirt and organic matters. Palatable water has been used throughout this research work.

E. Admixture

This is an additional ingredient in concrete. This may or may not be used. Admixture may be used in the concrete to enhance some properties like strength, durability, workability, to increase or decrease setting times etc. Here, Sikament Super-plasticizer is used as an admixture. It is dark brown coloured liquid. It increases the workability of the concrete, homogeneity and cohesiveness, strength & durability of concrete, water proofing property and decreases the final setting time of concrete. The properties of this super-plasticizer are given in table below.

Table IV: Properties of Super-Plasticizer

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Specific Gravity</td>
<td>1.145</td>
</tr>
<tr>
<td>2</td>
<td>colour</td>
<td>Dark brown</td>
</tr>
</tbody>
</table>

F. Waste marble aggregates

Waste marble pieces are broken into small pieces like aggregates. The nominal maximum size of marble aggregate used was 20 mm. The properties of the waste marble aggregates used are given in the table below.

Table V: Properties of Waste marble aggregates

<table>
<thead>
<tr>
<th>Sl no</th>
<th>properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Specific gravity</td>
<td>2.77</td>
</tr>
<tr>
<td>2</td>
<td>Water absorption</td>
<td>0.5%</td>
</tr>
<tr>
<td>3</td>
<td>Fineness modulus</td>
<td>6.49</td>
</tr>
</tbody>
</table>

IV. MIX DESIGN

Mix Design is a process of selecting suitable ingredient materials of concrete and determining their relative proportions as economically as possible that would satisfy the desired properties of fresh and hardened concrete as well. For mix design purpose, the complete knowledge of the various properties of the ingredient materials and the conditions at the site should be known beforehand. In India, generally IS Codes are followed for designing a concrete mix. IS:10262-1982 - Indian Standard Recommended Guidelines for Concrete Mix design has been revised with Indian Standard code for concrete mix proportioning - Guidelines i.e., IS-10262:2009. But IS-10262:2009 is only applicable for ordinary and standard grade concrete.

In this research work, concrete with specified characteristic compressive strength of 60 $\text{N/mm}^2$ is mix designed according to IS: 10262-1982.

A. Data required

The basic data required for design of concrete mix of grade M60 are given in the table below.

Table VI: Basic data required for mix design

<table>
<thead>
<tr>
<th>Basic Data</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic Compressive</td>
<td></td>
</tr>
</tbody>
</table>
B. Compressive strength value

The compressive strength values of concrete according to various ages are shown in table below.

Table VII: Compressive values of concrete according to various ages

<table>
<thead>
<tr>
<th>Age of Concrete in days</th>
<th>Percentage strength attained</th>
<th>Compressive strength value in MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>65%</td>
<td>47.36</td>
</tr>
<tr>
<td>28</td>
<td>99%</td>
<td>72.14</td>
</tr>
</tbody>
</table>

C. Estimation of air content

According to IS-10262:1982, approximate amount of entrapped air to be expected in normal concrete is taken as 2%.

D. Selection of water content and fine to total aggregate ratio

According to IS-10262:1982, for above M35, for 20 mm size aggregate, water content and sand as percent of total aggregate by absolute volume is taken as 180 kg per cubic meter of concrete and 25%.

E. Casting of samples for mix design

The size of the cube Specimen is (150x150x150) mm. A total of 5 trials for mix design were casted. In each trial 6 cubes are casted. A total of 30 cubes are casted for the mix design of high strength concrete.

F. Curing of samples

In the next day of casting, cube samples were de-moulded from the moulds and placed in curing tanks until they are taken out from it for further tests. 3 and 3cubes - from each trial are taken out in 7 day and 28 day respectively for compression test.

G. Mix proportions

The designed proportions are shown in the following table.

Table VIII: Mix Proportions

<table>
<thead>
<tr>
<th>Trial</th>
<th>Water</th>
<th>Cement: Fine</th>
<th>Super-</th>
</tr>
</thead>
</table>

H. Distribution of ingredients in concrete

The distribution of ingredients in concrete of trial mix 1, trial mix 2, trial mix 3, trial mix 4 and trial mix 5 are shown in the following charts.
A. Compression test result of trial 1

The 7-day and 28-day compressive test result of Trial-1 are given in the following table.

<table>
<thead>
<tr>
<th>Age in days</th>
<th>7</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Cubes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cube Strength in MPa</td>
<td>Cube 1</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Cube 2</td>
<td>42.66</td>
</tr>
<tr>
<td></td>
<td>Cube 3</td>
<td>42.11</td>
</tr>
<tr>
<td>Average Compressive Strength in MPa</td>
<td>42.59</td>
<td>66.006</td>
</tr>
</tbody>
</table>

B. Compression test result of trial 2

The 7-day and 28-day compressive test result of Trial-2 are given in the following table.

<table>
<thead>
<tr>
<th>Age in days</th>
<th>7</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Cubes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cube Strength in MPa</td>
<td>Cube 1</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Cube 2</td>
<td>43.48</td>
</tr>
<tr>
<td></td>
<td>Cube 3</td>
<td>44.48</td>
</tr>
<tr>
<td>Average Compressive Strength in MPa</td>
<td>45.95</td>
<td>64.73</td>
</tr>
</tbody>
</table>

C. Compression test result of trial 3

The 7-day and 28-day compressive test result of Trial-3 are given in the following table.

<table>
<thead>
<tr>
<th>Age in days</th>
<th>7</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Cubes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cube Strength in MPa</td>
<td>Cube 1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Cube 2</td>
<td>46.86</td>
</tr>
<tr>
<td></td>
<td>Cube 3</td>
<td>45.20</td>
</tr>
<tr>
<td>Average Compressive Strength in MPa</td>
<td>46.68</td>
<td>70.79</td>
</tr>
</tbody>
</table>

D. Compression test result of trial 4

The 7-day and 28-day compressive test result of Trial-4 are given in the following table.

<table>
<thead>
<tr>
<th>Age in days</th>
<th>7</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Cubes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cube Strength in MPa</td>
<td>Cube 1</td>
<td>47.35</td>
</tr>
<tr>
<td></td>
<td>Cube 2</td>
<td>46.89</td>
</tr>
<tr>
<td></td>
<td>Cube 3</td>
<td>48.37</td>
</tr>
<tr>
<td>Average Compressive Strength in MPa</td>
<td>47.53</td>
<td>72.62</td>
</tr>
</tbody>
</table>

E. Compression test result of trial 5

The 7-day and 28-day compressive test result of Trial-5 are given in the following table.

<table>
<thead>
<tr>
<th>Age in days</th>
<th>7</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Cubes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cube Strength in MPa</td>
<td>Cube 1</td>
<td>48.13</td>
</tr>
<tr>
<td></td>
<td>Cube 2</td>
<td>49.57</td>
</tr>
<tr>
<td></td>
<td>Cube 3</td>
<td>48.74</td>
</tr>
<tr>
<td>Average Compressive Strength in MPa</td>
<td>48.81</td>
<td>73.72</td>
</tr>
</tbody>
</table>

F. Comparison of results

The comparison of the compressive strength of concrete is given in the following table.
<table>
<thead>
<tr>
<th>Trials</th>
<th>7-day compressive test result in MPa</th>
<th>28-day compressive test result in MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Expected</td>
</tr>
<tr>
<td>T1</td>
<td>42.59</td>
<td>47.36</td>
</tr>
<tr>
<td>T2</td>
<td>43.95</td>
<td>47.36</td>
</tr>
<tr>
<td>T3</td>
<td>46.68</td>
<td>47.36</td>
</tr>
<tr>
<td>T4</td>
<td>47.53</td>
<td>47.36</td>
</tr>
<tr>
<td>T5</td>
<td>48.81</td>
<td>47.36</td>
</tr>
</tbody>
</table>

These comparisons of compressive test results can be shown as graph, given below.

Chart VI: Comparison of Compressive Test Result

VI. REPLACEMENT BY MARBLE AGGREGATES
The trial mix-4 and 5 give satisfactory results. For further experiment, trial mix-5 is taken into consideration.

In the proportion obtained from trial mix-5, marble aggregates broken from waste marbles are partially replaced as coarse aggregate by 0%, 10%, 20% and 30%.

A. Casting and curing

Four types of replacements are done and are denoted as C1, C2, C3 and C4. A total of 24 cubes were casted- 6 for each replacement trial. In the next day, the cube samples are de-moulded from the moulds of size (150x150x150) mm and placed in a curing tank until they are taken out for further tests.

Table XV: Replacement trials corresponding to coarse aggregate replacement percentage

<table>
<thead>
<tr>
<th>Replacement Trials</th>
<th>Coarse Aggregate Replacement percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>0</td>
</tr>
<tr>
<td>C2</td>
<td>10</td>
</tr>
<tr>
<td>C3</td>
<td>20</td>
</tr>
<tr>
<td>C4</td>
<td>30</td>
</tr>
</tbody>
</table>

B. Distribution of ingredients of replacement samples

The distribution of ingredients in concrete of replacement samples are shown in the following charts.

Chart VII: distribution of ingredients of C1

Chart VIII: distribution of ingredients of C2

Chart IX: distribution of ingredients of C3

Chart X: distribution of ingredients of C4
C. Results

Test results of compressive strength of concrete after partially replacing coarse aggregate is shown below.

Table XVI: Test results of HSC after partial replacement of CA by waste marble aggregates

<table>
<thead>
<tr>
<th>Trials</th>
<th>Coarse Aggregate Replacement percentage</th>
<th>Average Compressive test result in MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>7day</td>
</tr>
<tr>
<td>C1</td>
<td>0</td>
<td>48.81</td>
</tr>
<tr>
<td>C2</td>
<td>10</td>
<td>50.79</td>
</tr>
<tr>
<td>C3</td>
<td>20</td>
<td>57.35</td>
</tr>
<tr>
<td>C4</td>
<td>30</td>
<td>60.29</td>
</tr>
</tbody>
</table>

D. Comparison of results

The comparisons between the results are shown in the graph below.

The replacement of coarse aggregate by marble aggregates made from waste marbles also gives very satisfactory result. If marble wastes are available at site, then it should be replaced with coarse aggregates as it gives very impressive result than only using stones as coarse aggregate and it also reduces cost as it is made from waste marble pieces.

VII. CONCLUSION

The trial mix-5 with ingredients (cement: sand: coarse aggregate) ratio 1: 0.76: 2.47 with super-plasticizer 0.8% of cement used and water cement ratio 0.35 gives satisfactory result. This proportion gives compressive strength up to 73.72 MPa at 28 days. This proportion can be used to produce concrete of grade M60.

The high strength concrete can be achieved only by using good qualities of materials, taking relatively low water cement ratio, using proper prescribed methods and good supervision is necessary. The weather conditions should be taken into account while deciding the water quantity. The super-plasticizer should be added carefully. Excess amount of super-plasticizer may result in segregation of the concrete. So the amount of super-plasticizer used should be between 0.5% to 0.8% of the quantity of cement.

REFERENCES

[8] Sanjay Srivastava, Dr S.S Jain, Dr M.P.S. Chauhan, “High Strength concrete of M60 grade for highway pavements for heavy vehicles” (2014)

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Emerging Trend of E-Commerce in India: Some Issues
Advantages and Challenges

Priyanka Yadav

Abstract- Since 1991, after economic reforms explicitly took place in India as a result of opening-up of the economy with a view to integrate itself with the global economy, the need to facilitate international trade both through policy and procedure reforms has become the foundation stone of India’s trade and fiscal policies. Electronic commerce (e-commerce) as part of the information technology revolution became widely used in the world trade in general and Indian economy in particular. With advancements in technology, there have been changes in the methodology for business transactions. India, being a rapid adaptor of technology is apace with the current scenario of electronic data exchanges and has taken to e-commerce.

The role of government should be to provide a legal framework for e-commerce so that while domestic and international trade are allowed to expand their horizons, basic rights such as privacy, intellectual property, prevention of fraud, consumer protection etc are all taken care of. In 2015 our Prime Minister Mr. Narendra Modi has been also innovate the idea of “DIGITOL INDIA”.

Index Terms- E-commerce, India, internet, online

I. INTRODUCTION

Electronic commerce is presently an indispensable ingredient of India’s trade facilitation policy. Since 1991, after economic reforms explicitly took place in India as a result of opening of the economy with a view to integrate itself with the global economy, the need to facilitate international trade both through policy and procedure reforms has become the foundation stone of India’s trade and fiscal policies. Resultantly, last few years have witnessed a technological revolution accompanied by the wide spread use of the Internet, web technologies and their applications. Electronic commerce (e-commerce) as part of the information technology revolution became widely used in the world trade in general and Indian economy in particular. As a symbol of globalization, e-commerce represents the cutting edge of success in this digital age and it has changed and is still changing the way business is conducted around the world. The commercialization of the Internet has driven electronic commerce to become one of the most capable channels for inter-organizational business processes.

Although business-to-business transactions play an important part in e-commerce market, a share of e-commerce revenues in rapidly developing countries like India is generated from business to consumer transactions. E-commerce provides multiple benefits to the consumers in form of availability of goods at lower cost, wider choice and saves time. People can buy goods with a click of mouse button without moving out of their house or office. Similarly online services such as banking, ticketing (including airlines, bus, railways), bill payments, hotel booking etc. have been of tremendous benefit for the customers. Online businesses like financial services, travel, entertainment, and groceries are all likely to grow. E-commerce evolved in various means of relationship within the business processes. It can be in the form of electronic advertising, electronic payment system, electronic marketing, electronic customer support service and electronic order and delivery.

E-commerce stands for electronic commerce and pertains to trading in goods and services through the electronic medium, i.e. the Internet or phone. On the Internet, it pertains to a website, which sells products or services directly from the site using a shopping cart or shopping basket system and allows credit card payments. It involves conducting business with the help of the electronic media, making use of the information technology such as Electronic Data Interchange (EDI). In general connotation, E-Commerce involves paperless transactions and usage of EDI (Electronic Data Interchange), electronic mail, bulletin boards, fax transmissions, and electronic fund transfers. It refers to the process of trading goods and services through an electronic medium such as the internet. With advancements in technology, there have been changes in the methodology for business transactions. India, being a rapid adaptor of technology is apace with the current scenario of electronic data exchanges and has taken to e-Commerce. E-commerce is being used for purchase and sale of multiple products and there are multiple players using various portals and websites for this purpose. The information technology industry might observe it as an electronic business application aimed at commercial transactions. It can involve electronic funds transfer, supply chain management, e-marketing, online marketing, online transaction processing, electronic data interchange (EDI), automated inventory management systems, and automated data collection systems. It typically uses electronic communications technology such as the Internet, extranets, e-mail, e-books, databases, and mobile phones. However, there exists no standard definition for the term and different organizations have defined it in different manner. E-commerce is understood to mean the production, distribution, marketing, sale or delivery of goods and services by electronic means. E-commerce is not a single technology but a combination of sophisticated technologies.
We can visualize the E-commerce from above diagram easily.

II. DISTINCT CATEGORIES OF E-COMMERCE OR E-COMMERCE MODELS:

There are distinct classes of e-commerce applications:

A. Business to Business(B2B) e-commerce

B2B refers to the exchange of services, information and/or products from one business to another. B2B transactions are largely between industrial manufacturers, partners, and retailers or between companies. Business-to-Business refers to the full spectrum of e-commerce that can occur between two organizations. Among other activities, B2B e-commerce includes purchasing and procurement, supplier management, inventory management, channel management, sales activities, payment management, and service and support.

Example: Intel is selling its chips to computer manufacturer online using B2B website.

B. Business to Consumer(B2C) e-commerce:

B2C transactions take place directly between business establishments and consumers. Although business-to-business transactions play an important part in e-commerce market, a share of e-commerce revenues in developing countries like India is generated from business to consumer transactions. Business-to-Consumer e-commerce refers to exchanges between businesses and consumers, e.g., Amazon.com, Yahoo.com and flipcart.com etc. These are the most common and popular types of e-commerce applications. There are two types of B2C e-commerce sites:

1. Social Sites
2. Transactional sites

C. Consumer to Business(C2B)e-commerce:
In this type of E-commerce applications, consumers provide information about required work so that needy companies may contact to provide these services. This model is also known as a reverse auction model. Consumers can band together to form and present themselves as a buyer group to businesses in a consumer-to-business relationship.

D. Consumer to Consumer (C2C) e-commerce:
C2C sites don’t form a very high portion of web-based commerce. Most visible examples are the auction sites. Basically, if some one has something to sell, then he gets it listed at an auction sites and others can bid for it. Consumer-to-Consumer exchanges involve transactions between and among consumers. These exchanges may or may not include third-party involvement as in the case of the auction-exchange eBay. Other activities include: jobs (www.monster.com), Web-based communication (www.icq.com), personal services (e.g., Yahoo! Personals, webpersonals.com) and olx.com etc.

E. Business to Government (B2G) e-commerce:
B2G e-commerce, also known as e-government refers to the use of information and communication technologies to build and strengthen relationship between government and employees, citizens, businesses, non-profit organizations and other government agencies.

F. Business to Employees (B2E) e-commerce:
B2E e-commerce, from an intra-organizational perspective, has provided the means for a business to offer online products and services to its employees and these also known as intranet applications.

III. ADVANTAGES OF E-COMMERCE TO BUSINESSES IN INDIA

There is a rising awareness among the business community in India about the opportunities offered by e-commerce. Ease of Internet access and navigation are the critical factors that will result in rapid adoption of Net commerce. Safe and secure payment modes are crucial also along with the need to invent and popularize innovations such as Mobile Commerce. India Reports provides accurate and easy to understand India specific reports that capture trends, map business landscapes and custom-made reports for specific needs.

Global Trade:
E-commerce is one of the major factors in the globalization of business. Other factors include decreases in trade barriers, globalization of capital markets, the movement toward International Financial Reporting Standards (IFRS), and Internet financial reporting. Internet financial reporting has been particularly helpful to e-commerce companies. IFRS is a global standard for accounting and financial reporting.

Virtual Businesses:
As a result of e-commerce, business firms now have the ability to become virtual businesses. A virtual business is a modular structure of multiple individual business firms connected via online computer technology. The individual firms making up the virtual business are networked, which enables sharing of skills, costs, and access to markets. An individual business firm contributes only its core competencies. The value of a virtual business is that they have the flexibility required to seize new opportunities and be competitive in a complex market.

Lower search costs:
The Internet is likely to bring about low search costs and high price transparency. When competitors simply publish their prices on the Internet, it is possible to design search engines that will monitor prices across different websites, and this will be further facilitated by the growth of protocols such as XML. Such price transparency may facilitate collusion. Internet technology could potentially offer an ideal micro-climate for collusion, due to increased communication and transparency in the market, as well as the potential for more frequent market interactions. In particular, collusion concerns may arise with respect to market design and ownership within both online marketplaces and joint Internet sales ventures.

Other benefits of e commerce are as follows:
- Instant Transaction for business
- Better interaction with consumer.
- It is very reliable network.
- Services can be setup any where.

IV. BARRIERS TO E-COMMERCE IN INDIA

Some of the infrastructural barriers responsible for slow growth of e-commerce in India are as follows. Some of these even present new business opportunities.

i). Payment Collection: When get paid by net banking, one has to end up giving a significant share of revenue even with a business of thin margin. This effectively means one parting away with almost half of profits. Fraudulent charges, charge backs etc. all become merchant’s responsibility and hence to be accounted for in the business model.

ii). Logistics: Businesses have to deliver the product, safe and secure, in the hands of the right guy in right time frame. Regular post doesn’t offer an acceptable service level; couriers have high charges and limited reach. Initially, one might had to take insurance for high value shipped articles increasing the cost.

iii). Vendor Management: However advanced system may be, vendor will have to come down and deal in an inefficient system for inventory management. This will slow down drastically. Most of them won’t carry any digital data for their products. No nice looking photographs, no digital data sheet, no mechanism to check for daily prices, availability to keep your site updated.

iv). Taxation: Octroi, entry tax, VAT and lots of state specific forms which accompany them. This can be confusing at times with lots of exceptions and special rules.

v). Excessive pricing in e-commerce markets: Over the short term, excessive pricing is unlikely to be a major issue for e-commerce companies. Few e-commerce operations are currently making any profits, let alone excessive profits. Over the longer term, however, excessive pricing may become a serious concern for those e-commerce companies that develop dominant positions in their relevant markets.
vi). Collusion: One of the most widely held competition concerns relating to e-commerce is that it may facilitate such collusive behavior. Much of the recent discussion of this issue has focused on the development of B2B online marketplaces that are co-owned by a number of significant market participants. More generally, there are a number of characteristics of e-commerce that might be expected to facilitate collusion, even in the absence of joint ventures and online marketplaces.

vii). Cyber crime in E-Commerce: Cyber crime is a key alarm that consumers have regarding e-commerce. No one wants to become a victim of cyber crime, which is a real hazard to e-commerce. Cyber crime is an e-crime. Cyber crime is a criminal act that involves computers and networks. Cyber crime includes criminal acts such as computer viruses, phishing, and denial of service attacks that cause e-commerce websites to lose revenues. Understanding and defending against cyber crime is critical for companies involved in e-commerce.

The following are some pathways to enhance “Online Customers” in India:

• Goods should have value for the customer along with quality.
• Security is promised.
• Selling Brand articles.
• Establishing trust and winning confidence.
• Providing easy guidance.
• Clear information regarding delivery time.
• Articles ordered and the article delivered should not vary.
• Giving discount offer and other gift items.
• Limited personal information.
• Providing value added service at lower prices.
• Full information regarding the product is simple words.
• Innovative products.
• Social shopping phenomenon.
• Providing price comparison.
• Transparent information regarding the product.

• Indian customers want to buy things that do not cost them much.

V. CONCLUSION

The bursting of the dotcom bubble has made several companies apprehend that doing business on the Internet is not as easy at it sounds. Undoubtedly, the power of the Internet to reach any part of the world holds terrific potential for enhancing international trade and boosting global economy. However, just as every coin has a flip side; it has been observed that doing business on the Internet also has risks and legal issues associated with it. The rapid pace of e-commerce development has generally left the legal system struggling to keep up and gasping for breath. In much the same way as companies doing ecommerce must invent new business procedures and rules, the legal system is trying to adapt existing laws to fit new settings where it is simply unclear how these laws will apply. In the midst of this legal turmoil, India is one of the few countries across the globe that has enacted an e-commerce legislation. However, much more is needed to effectively regulate the tangled web. Effective risk management strategies coupled with adequate legal documentation will go a long way in protecting e-commerce companies. Although the Internet is a goldmine, without adequate legal protection, it could become a landmine. Nevertheless, with the rapid expansion of internet, e-commerce is set to play a very important role in the 21st century, the new opportunities that will be thrown open, will be accessible to both large corporations and small companies. The role of government should be to provide a legal framework for e-commerce so that while domestic and international trade are allowed to expand their horizons, basic rights such as privacy, intellectual property, prevention of fraud, consumer protection etc are all taken care of.

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Zero-Free Regions and Number of Zeros in Annular Regions of Polynomials with Restricted Coefficients

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Abstract- In this paper we find zero-free regions of a special class of polynomials when their coefficients are restricted to certain conditions. We also find bounds for the number of their zeros in some annular regions.

Mathematics Subject Classification (2010): 30C10, 30C15.

Index Terms- Bound, Coefficient, Polynomial, Zeros.

I. INTRODUCTION

The following theorem, called the Enestrom-Kakeya Theorem [2, 3], is well known in the theory of the distribution of zeros of a polynomial:

\[ P(z) = \sum_{j=0}^{n} a_j z^j \]

Theorem A: Let \( P(z) \) be a polynomial of degree \( n \) such that

\[ a_n \geq a_{n-1} \geq \ldots \geq a_1 \geq a_0 > 0. \]

Then all the zeros of \( P(z) \) lie in \( |z| \leq 1 \).

Many generalizations, extensions and refinements of the above result are available in the literature.

Recently Ramulu, Gangadhar and Reddy [4] proved the following results:

Theorem B: Let \( P(z) \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such that for some \( k \geq 1, \delta > 0 \),

\[ ka_n \geq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \geq \ldots \geq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq \ldots \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]

if both \( n \) and \( n-m \) are even or odd or

\[ ka_n \geq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \geq \ldots \geq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq \ldots \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Then all the zeros of \( P(z) \) lie in

\[ |z + k - 1| \leq \frac{1}{|a_n|} \left[ 2\delta + ka_n + |a_0| - a_0 + 2\left( (a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) - (a_{n-1} + a_{n-3} + \ldots + a_{n-m+1}) \right) \right] \]

if both \( n \) and \( n-m \) are even or odd or

\[ |z + k - 1| \leq \frac{1}{|a_n|} \left[ 2\delta + ka_n + |a_0| - a_0 + 2\left( (a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - (a_{n-1} + a_{n-3} + \ldots + a_{n-m+2}) \right) \right] \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Theorem C: Let \( P(z) \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such
that for some \( 0 < r \leq 1, \delta > 0 \),
\[
ra_n \leq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq \ldots \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta
\]
if both \( n \) and \( n-m \) are even or odd
or
\[
ra_n \leq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \leq \ldots \geq a_{n-m+1} \leq a_{n-m} \geq a_{n-m-1} \geq \ldots \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta
\]
if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.
Then all the zeros of \( P(z) \) lie in

\[
|z| \leq \frac{1}{|a_n|}[a_0 - a_n + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+1} + a_{n-m}) - (a_{n-2} + a_{n-4} + \ldots + a_{n-m+2})]
\]
if both \( n \) and \( n-m \) are even or odd
or

\[
|z| \leq \frac{1}{|a_n|}[a_0 - a_n + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m}) - (a_{n-2} + a_{n-4} + \ldots + a_{n-m+1})]
\]
if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

**Theorem D:** Let \( P(z) = \sum_{j=0}^{n} a_j z^j \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such that for some \( k \geq 1, \delta > 0 \),
\[
ka_n \geq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \geq \ldots \geq a_{n-m+1} \leq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0 + \delta
\]
if both \( n \) and \( n-m \) are even or odd
or
\[
ka_n \geq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \leq \ldots \leq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 + \delta
\]
if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.
Then all the zeros of \( P(z) \) lie in

\[
|z + k - 1| \leq \frac{1}{|a_n|}[2\delta + ka_n + |a_0| + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2}) - (a_{n-1} + a_{n-3} + \ldots + a_{n-m+1} + a_{n-m+2})]
\]
if both \( n \) and \( n-m \) are even or odd
or

\[
|z + k - 1| \leq \frac{1}{|a_n|}[2\delta + ka_n + |a_0| + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - (a_{n-1} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})]
\]
if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

**Theorem E:** Let \( P(z) = \sum_{j=0}^{n} a_j z^j \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such that for some \( 0 < r \leq 1, \delta > 0 \),
\[
ra_n \leq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \leq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0 + \delta
\]
if both \( n \) and \( n-m \) are even or odd
or
\[
ra_n \leq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \leq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \geq a_3 \geq a_2 \geq a_1 \leq a_0 + \delta
\]
if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.
Then all the zeros of \( P(z) \) lie in
\[ |z| \leq \frac{1}{|a_n|} \left[ |a_0| + a_0 - r(a_n + a_n) + 2\delta + 2\{(a_{n-1} + a_{n-3} + ... + a_{n-m+3} + a_{n-m+1}) - (a_{n-2} + a_{n-4} + \\
+ a_{n-m+2} + a_{n-m})\} \right] \]

if both \( n \) and \( n-m \) are even or odd

or

\[ |z| \leq \frac{1}{|a_n|} \left[ |a_0| + a_0 - r(a_n + a_n) + 2\delta + 2\{(a_{n-1} + a_{n-3} + ... + a_{n-m+4} + a_{n-m+2}) - (a_{n-2} + a_{n-4} + \\
+ a_{n-m+3} + a_{n-m+1})\} \right] \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

### 2. Main Results

In this paper we find zero-free regions and bounds for the number of zeros of the polynomials considered in the above theorems and prove

\[ P(z) = \sum_{j=0}^{n} a_j z^j \]

**Theorem 1.** Let

\[ a_i \geq a_{i-1} \geq a_{i-2} \geq a_{i-3} \geq ... \geq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq ... \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]

if both \( n \) and \( n-m \) are even or odd

or

\[ a_i \geq a_{i-1} \geq a_{i-2} \geq a_{i-3} \geq ... \geq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq ... \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Then \( P(z) \) has no zero in

\[ M = \left| \frac{a_0}{M} \right| \]

where

\[ M = \left| a_n R^{n+1} + R^n \{k(a_n + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + ... + a_{n-m+2} + a_{n-m}) \} \right| 
- 2(a_{n-1} + a_{n-3} + ... + a_{n-m+3} + a_{n-m+1}) \right| , \text{ for } R \geq 1 \]

\[ = \left| a_n R^{n+1} + R^n \{k(a_n + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + ... + a_{n-m+2} + a_{n-m}) \} \right| 
- 2(a_{n-1} + a_{n-3} + ... + a_{n-m+3} + a_{n-m+1}) \right| , \text{ for } R \leq 1 \]

if \( n \) and \( n-m \) are both even or odd.

If \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then \( P(z) \) has no zero in

\[ M' = \left| \frac{a_0}{M'} \right| \]

where

\[ M' = \left| a_n R^{n+1} + R^n \{k(a_n + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + ... + a_{n-m+3} + a_{n-m+1}) \} \right| 
- 2(a_{n-1} + a_{n-3} + ... + a_{n-m+4} + a_{n-m+2}) \right| , \text{ for } R \geq 1 \]

\[ = \left| a_n R^{n+1} + R^n \{k(a_n + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + ... + a_{n-m+3} + a_{n-m+1}) \} \right| 
- 2(a_{n-1} + a_{n-3} + ... + a_{n-m+4} + a_{n-m+2}) \right| , \text{ for } R \leq 1 \]

Further, the number of zeros of \( P(z) \) in

\[ \left| \frac{a_0}{M} \right| \leq \left| z \right| \leq \frac{R}{c}, c > 1 \]

\[ \frac{1}{\log c} \log \frac{M_1}{|a_0|} \]

do not exceed in case \( n \) and \( n-m \) are both even or odd

and if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then the number of zeros of \( P(z) \) in

\[ \left| \frac{a_0}{M'} \right| \leq \left| z \right| \leq \frac{R}{c}, c > 1 \]

\[ \frac{1}{\log c} \log \frac{M_1'}{|a_0|} \]

do not exceed, where

\[ M_1 = \left| a_n R^{n+1} + R^n \{k(a_n + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + ... + a_{n-m+2} + a_{n-m}) \} 
- 2(a_{n-1} + a_{n-3} + ... + a_{n-m+3} + a_{n-m+1}) \right| , \text{ for } R \geq 1 \]

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\[ P(z) = \sum_{j=0}^{n} a_j z^j \]

**Corollary 1:** Let \( P(z) = \sum_{j=0}^{n} a_j z^j \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such that

\[
|z| < \frac{|a_0|}{M}, \quad \text{where} \quad M = k(|a_n| + |a_n|) + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]

for some \( k \geq 1, \delta > 0 \),

\[ \sum_{j=0}^{n} a_j z^j \]

if both \( n \) and \( n-m \) are even or odd

or

\[ \sum_{j=0}^{n} a_j z^j \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Then \( P(z) \) has no zero in

\[
|z| < \frac{|a_0|}{M}, \quad \text{where} \quad M = k(|a_n| + |a_n|) + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]

for \( R \leq 1 \),

\[ M_1 = |a_n| R^{n+1} + |a_0| + R \{ k(a_n) + a_n \} - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \]

\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \] for \( R \geq 1 \),

\[ M_1' = |a_n| R^{n+1} + |a_0| + R \{ k(a_n) + a_n \} - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \]

\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \] for \( R \leq 1 \).

Taking \( R=1 \) in Theorem 1, we get the following

\[ \sum_{j=0}^{n} a_j z^j \]

**Theorem 2:** Let \( P(z) = \sum_{j=0}^{n} a_j z^j \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such that

for some \( 0 < k \leq 1, \delta > 0 \),

\[ \sum_{j=0}^{n} a_j z^j \]

if both \( n \) and \( n-m \) are even or odd

or

\[ \sum_{j=0}^{n} a_j z^j \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Further, the number of zeros of \( P(z) \) in

\[
|z| < \frac{1}{\log c} \log \frac{M_1}{M_1'}, \quad \text{where} \quad M_1 = k(|a_n| + |a_n|) + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]

\[ \sum_{j=0}^{n} a_j z^j \]

number of zeros of \( P(z) \) in

\[
|z| < \frac{1}{\log c} \log \frac{M_1}{M_1'}, \quad \text{where} \quad M_1 = k(|a_n| + |a_n|) + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]

\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \] does not exceed

\[
\frac{1}{\log c} \log \frac{M_1}{M_1'}, \quad \text{where} \quad M_1' = k(|a_n| + |a_n|) + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]

\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \].
if both $n$ and $n-m$ are even or odd
or
\[ k a_n \leq a_{n-1} \geq a_{n-2} \leq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq \ldots \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]
if $n$ is even and $n-m$ is odd or if $n$ is odd and $n-m$ is even.

Then $P(z)$ has no zero in
\[ \left| z \right| < \left| \frac{a_0}{N} \right|, \]
if $n$ and $n-m$ are both even or odd, where
\[ N = a_n R^{n+1} + R^n \left\{ k \left( a_n + a_n \right) - \left( a_n + a_n \right) \right\} + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \]
for $R \geq 1$
\[ = a_n R^{n+1} + R \left( a_n - k \left( a_n + a_n \right) \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \]
for $R \leq 1$,

If $n$ is even and $n-m$ is odd or if $n$ is odd and $n-m$ is even, then $P(z)$ has no zero in
\[ \left| z \right| < \left| \frac{a_0}{N'} \right|, \]
where
\[ N' = a_n R^{n+1} + R^n \left( a_n - k \left( a_n + a_n \right) \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m}) \]
for $R \geq 1$
\[ = a_n R^{n+1} + R \left( a_n - k \left( a_n + a_n \right) \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m}) \]
for $R \leq 1$.

Further, the number of zeros of $P(z)$ in
\[ \left| z \right| < \frac{R}{c}, c > 1 \]
does not exceed
\[ 1 - \frac{\log N_1'}{\log |a_0|} \]
in case $n$ and $n-m$ are both even or odd and if $n$ is even and $n-m$ is odd or if $n$ is odd and $n-m$ is even, then the number of zeros of $P(z)$ in
\[ \frac{\left| a_0 \right|}{N'} \leq \left| z \right| \leq \frac{R}{c}, c > 1 \]
does not exceed
\[ \frac{1}{\log c} \log N_1' \]
where
\[ N_1' = a_n R^{n+1} + |a_0| + R^n \left( a_n + a_n \right) - \left( a_n + a_n \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \]
for $R \geq 1$
\[ = a_n R^{n+1} + |a_0| + R \left( a_n - k \left( a_n + a_n \right) \right) - \left( a_n + a_n \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \]
for $R \leq 1$,

Taking $R=1$ in Theorem 2, we get the following

**Corollary 2.** Let $P(z) = \sum_{j=0}^{n} a_j z^j$ be a polynomial of degree $n \geq m \geq 2$ with real coefficients such that
for some $0 < k \leq 1, \delta > 0$,
\[ k a_n \leq a_{n-1} \geq a_{n-2} \leq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \geq a_{n-m} \geq a_{n-m-1} \geq \ldots \geq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]
if both $n$ and $n-m$ are even or odd or
or
\[ a_n R^{n+1} + |a_0| + R^n \left( a_n + a_n \right) - \left( a_n + a_n \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \]
for $R \geq 1$
\[ = a_n R^{n+1} + |a_0| + R \left( a_n - k \left( a_n + a_n \right) \right) - \left( a_n + a_n \right) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \]
for $R \leq 1$.

\[ c = \frac{1}{\delta}, 0 < \delta < 1 \]
\[ k a_n \leq a_{n-1} \leq a_{n-2} \leq a_{n-3} \leq a_{n-4} \leq \ldots \leq a_{n-m+1} \leq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \geq a_3 \geq a_2 \geq a_1 \geq a_0 - \delta \]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Then \( P(z) \) has no zero in \( |z| < \frac{|a_0|}{N} \), if \( n \) and \( n-m \) are both even or odd, where

\[
N = 2|a_n| - k(|a_n| + a_n) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
\]

If \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then \( P(z) \) has no zero in \( |z| < \frac{|a_0|}{N'} \), where

\[
N' = 2|a_n| - k(|a_n| + a_n) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1})
\]

Further, the number of zeros of \( P(z) \) in \( \frac{1}{\log \frac{1}{\delta}} \) does not exceed \( \frac{1}{\log \frac{1}{\delta}} \), in case \( n \) and \( n-m \) are both even or odd and if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then

\[
|a_n| < |z| \leq \delta, 0 < \delta < 1
\]

the number of zeros of \( P(z) \) in \( \frac{1}{\log \frac{1}{\delta}} \) does not exceed \( \frac{1}{\log \frac{1}{\delta}} \), where

\[
N_1 = k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
\]

\[
N_1' = k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1})
\]

\[
P(z) = \sum_{j=0}^{n} a_j z^j
\]

Theorem 3: Let \( P(z) \) be a polynomial of degree \( n \geq m \geq 2 \) with real coefficients such that

\[
k \geq 1, \delta > 0
\]

for some \( k \geq 1, \delta > 0 \),

\[
ka_n \geq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \geq \ldots \geq a_{n-m+1} \geq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0 + \delta
\]

if both \( n \) and \( n-m \) are even or odd

or

\[
ka_n \geq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \geq \ldots \geq a_{n-m+1} \geq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0 + \delta
\]

if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even.

Then \( P(z) \) has no zero in \( |z| < \frac{|a_0|}{L} \), if \( n \) and \( n-m \) are both even or odd, where

\[
L = |a_n| R^{n+1} + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \text{ for } R \geq 1
\]

\[
L = |a_n| R^{n+1} + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \text{ for } R \leq 1.
\]

If \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then \( P(z) \) has no zero in \( |z| < \frac{|a_0|}{L'} \), where

\[
L' = |a_n| R^{n+1} + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
\]

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\[-2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+1} + a_{n-m+1})]\) for \(R \geq 1\)

\[-2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\) for \(R \leq 1\).

Further, the number of zeros of \(P(z)\) in \((1, 0] (1, 0] \) does not exceed \(\frac{1}{\log c} \log \frac{L_1}{|a_0|}\) in case \(n\) and \(n-m\) are both even or odd and if \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even, then the number of zeros of \(P(z)\) in \((1, 0] (1, 0] \) does not exceed \(\frac{1}{\log c} \log \frac{L_1'}{|a_0|}\), where

\[\begin{align*}
L &= |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \geq 1, \\
L_1 &= |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \leq 1, \\
L_1' &= |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+4} + a_{n-m+2})\} \text{ for } R \geq 1, \\
L_1'' &= |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \leq 1.
\end{align*}\]

Taking \(k=1, \delta = 0\) in Theorem 3, we get the following

\[P(z) = \sum_{j=0}^{n} a_j z^j\]

Corollary 3: Let \(P(z)\) be a polynomial of degree \(n \geq m \geq 2\) with real coefficients such that

\[a_n \geq a_{n-1} \geq a_{n-2} \geq \ldots \geq a_{n-m+1} \leq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0\]

if both \(n\) and \(n-m\) are even or odd or

\[a_n \geq a_{n-1} \geq a_{n-2} \geq \ldots \geq a_{n-m+1} \geq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0\]

if \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even.

Then \(P(z)\) has no zero in \(\left|z\right| < \frac{|a_0|}{L}\), if \(n\) and \(n-m\) are both even or odd, where

\[L = |a_n| R^{n+1} + R^n \{a_n + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \geq 1, \\
L_1 = |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \leq 1, \\
L_1' = |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \geq 1, \\
L_1'' = |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \leq 1.
\]

If \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even, then \(P(z)\) has no zero in \(\left|z\right| < \frac{|a_0|}{L'}\), where

\[L' = |a_n| R^{n+1} + R^n \{a_n + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \geq 1, \\
L_1' = |a_n| R^{n+1} + |a_0| + R^n \{k(a_n + a_0) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m+1}) - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \text{ for } R \leq 1.
\]
Further, the number of zeros of \(P(z)\) in
\[1, \frac{1}{c}\) does not exceed
\[\frac{1}{\log c} \log \frac{L_1 |a_0|}{L'}\] in case \(n\) and \(n-m\) are both even or odd and if \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even, then the number of zeros of \(P(z)\) in
\[1, \frac{1}{c}\) does not exceed
\[\frac{1}{\log c} \log \frac{L_1 |a_0|}{L'}\], where
\[L_1 = |a_n R^{n+1} + a_0| + R^n (a_n + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}))\] for \(R \geq 1\),
\[L'_1 = |a_n R^{n+1} + a_0| + R^n (a_n + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1})
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}))\] for \(R \leq 1\).

**Theorem 4:** Let
\[P(z) = \sum_{j=0}^{n} a_j z^j\] be a polynomial of degree \(n \geq m \geq 2\) with real coefficients such that
for some \(0 < k \leq 1, \delta > 0\),
\[ka_n \leq a_{n-1} \leq a_{n-2} \leq a_{n-3} \leq \ldots \leq a_{n-m+1} \leq a_{n-m} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0 + \delta\] if both \(n\) and \(n-m\) are even or odd or
\[ka_n \leq a_{n-1} \leq a_{n-2} \leq a_{n-3} \leq \ldots \leq a_{n-m+1} \leq a_{n-m} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0 + \delta\] if \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even.

Then \(P(z)\) has as no zero in
\[|z| < \frac{|a_0|}{D}\] if \(n\) and \(n-m\) are both even or odd, where
\[D = |a_n R^{n+1} + R^n (a_n - k(a_n + a_0) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
- 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m} ))\] for \(R \geq 1\),
\[D' = |a_n R^{n+1} + R^n (a_n - k(a_n + a_0) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}))\] for \(R \leq 1\).

If \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even, then \(P(z)\) has no zero in
\[|z| < \frac{|a_0|}{D'}\], where
\[D' = |a_n R^{n+1} + R^n (a_n - k(a_n + a_0) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}))\] for \(R \geq 1\),
\[D' = |a_n R^{n+1} + R^n (a_n - k(a_n + a_0) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}))\] for \(R \leq 1\).

Further, the number of zeros of \(P(z)\) in
\[1, \frac{1}{c}\) does not exceed
\[\frac{1}{\log c} \log \frac{D_1 |a_0|}{D'}\] in case \(n\) and \(n-m\) are both even or odd and if \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even, then the number

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of zeros of $P(z)$ in $D'$ does not exceed $\frac{1}{\log c} \log D_1'$, where

$$D_1 = |a_n| R^{n+1} + |a_0| + |R^n a_n| - k (|a_n| + a_n) + 2(\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \geq 1$

$$= |a_n| R^{n+1} + |a_0| + |R^n a_n| - k (|a_n| + a_n) + 2(\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \leq 1$.

$$D_1' = |a_n| R^{n+1} + |a_0| + |R^n a_n| - k (|a_n| + a_n) + 2(\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \geq 1$

$$= |a_n| R^{n+1} + |a_0| + |R^n a_n| - k (|a_n| + a_n) + 2(\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \leq 1$.

Taking $k=1, \delta = 0$ in Theorem 4, we get the following

$$P(z) = \sum_{j=0}^{n} a_j z^j$$

**Corollary 4**: Let $P(z) = \sum_{j=0}^{n} a_j z^j$ be a polynomial of degree $n \geq m \geq 2$ with real coefficients such that $a_n \leq a_{n-1} \geq a_{n-2} \geq a_{n-3} \geq a_{n-4} \leq \ldots \leq a_{n-m+1} \geq a_{n-m} \leq a_{n-m-1} \leq \ldots \leq a_4 \leq a_3 \leq a_2 \leq a_1 \leq a_0$ if both $n$ and $n-m$ are even or odd or if $n$ is even and $n-m$ is odd or if $n$ is odd and $n-m$ is even.

Then $P(z)$ has no zero in $D'$, if $n$ and $n-m$ are both even or odd, where

$$D = |a_n| R^{n+1} + |a_0| + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \geq 1$

$$= |a_n| R^{n+1} + |a_0| + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \leq 1$.

If $n$ is even and $n-m$ is odd or if $n$ is odd and $n-m$ is even, then $P(z)$ has no zero in $D'$, where

$$D' = |a_n| R^{n+1} + |a_0| + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+2})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \geq 1$

$$= |a_n| R^{n+1} + |a_0| + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+2})$$

$$- 2(a_{n-2} + a_{n-3} + \ldots + a_{n-m+2} + a_{n-m})$$

for $R \leq 1$.

Further, the number of zeros of $P(z)$ in $D'$ does not exceed $\frac{1}{\log c} \log D_1'$, where

$$D_1 = |a_n| R^{n+1} + |a_0| + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$

of zeros of $P(z)$ in $D'$ does not exceed $\frac{1}{\log c} \log D_1'$, where

$$D_1 = |a_n| R^{n+1} + |a_0| + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})$$
\[-2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \] for \( R \geq 1 \),
\[-2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \] for \( R \leq 1 \),
\[ D'_i = |a_n| R^{n+1} + |a_o| + R \{ -a_n + a_o + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+4} + a_{n-m+2}) \} \] for \( R \geq 1 \),
\[-2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+3} + a_{n-m+1}) \] for \( R \leq 1 \).

Many other results can also be obtained from the above results for different values of the parameters.

3. lemmas

**Lemma 1:** Let \( f(z) \) (not identically zero) be analytic for \( |z| \leq R, f(0) \neq 0 \) and \( f(a_k) = 0 \), \( k = 1, 2, \ldots, n \). Then
\[ \frac{1}{2\pi} \int_0^{2\pi} \log |f(Re^{i\theta})| d\theta - \log |f(0)| = \sum_{j=1}^{n} \log \frac{R}{|a_j|} \]

Lemma 1 is the famous Jensen’s Theorem (see page 208 of [1]).

**Lemma 2:** Let \( f(z) \) be analytic for \( |z| \leq R, f(0) \neq 0 \) and \( |f(z)| \leq M \) for \( |z| \leq R \). Then the number of zeros of \( f(z) \) in \( |z| \leq \frac{R}{c}, c > 1 \) does not exceed
\[ \frac{1}{\log c} \log \frac{M}{|f(0)|} \]

Lemma 2 is a simple deduction from Lemma 2.

4. Proofs of Theorems

**Proof of Theorem 1.**
Consider the polynomial
\[ F(z) = (1-z)P(z) \]
\[ = (1-z)(a_n z^n + a_{n-1} z^{n-1} + a_{n-2} z^{n-2} + \ldots + a_{n-m} z^{n-m} + \ldots + a_2 z^2 + a_1 z + a_0) \]
\[ = -a_n z^{n+1} - (k-1)a_n z^n + (ka_n - a_{n-1}) z^n + (a_{n-1} - a_{n-2}) z^{n-1} + \ldots + (a_{n-m+1} - a_{n-m}) z^{n-m+1} \]
\[ + (a_{n-m} - a_{n-m-1}) z^{n-m} + (a_{n-m-1} - a_{n-m-2}) z^{n-m-1} + \ldots + (a_3 - a_2) z^3 + (a_2 - a_1) z^2 \]
\[ + (a_1 - a_0) z + a_0 \]
\[ = G(z) + a_0 , \]
where
\[ G(z) = -a_n z^{n+1} - (k-1)a_n z^n + (ka_n - a_{n-1}) z^n + (a_{n-1} - a_{n-2}) z^{n-1} + \ldots + (a_{n-m+1} - a_{n-m}) z^{n-m+1} \]
\[ + (a_{n-m} - a_{n-m-1}) z^{n-m} + (a_{n-m-1} - a_{n-m-2}) z^{n-m-1} + \ldots + (a_3 - a_2) z^3 + (a_2 - a_1) z^2 \]
\[ + (a_1 - a_0) z . \]

For \( |z| \leq R \), we have, by using the hypothesis, for both \( n \) and \( n-m \) even or odd,
\[ |G(z)| \leq |a_n| |z|^{n+1} + (k-1)|a_n| |z|^n + |ka_n - a_{n-1}| |z|^n + |a_{n-1} - a_{n-2}| |z|^{n-1} + \ldots + |a_{n-m+1} - a_{n-m}| |z|^{n-m+1} \]
\[ + |a_{n-m} - a_{n-m-1}| |z|^{n-m} + |a_{n-m-1} - a_{n-m-2}| |z|^{n-m-1} + \ldots + |a_3 - a_2| |z|^3 + |a_2 - a_1| |z|^2 \]
\[ + |a_1 - a_0| |z| \]
\[ \leq |a_n| R^{n+1} + (k-1)|a_n| R^n + |ka_n - a_{n-1}| R^n + |a_{n-1} - a_{n-2}| R^{n-1} + \ldots + |a_{n-m+1} - a_{n-m}| R^{n-m+1} \]
\[ a_{n-m} - a_{n-m-1} |R^{n-m} + a_{n-m-1} - a_{n-m-2} |R^{n-m-1} + \ldots + |a_3-a_2|R^3 + |a_2-a_1|R^2 \\
+ |a_1-a_0|R \\
\leq |a_n| |R^{n+1} + R^n \{(k-1)|a_n| + ka_n - a_{n-1} + |a_{n-1} - a_{n-2}| + \ldots + |a_{n-m-1} - a_{n-m}| \\
+ |a_{n-m} - a_{n-m-1}| + |a_{n-m-1} - a_{n-m-2}| + \ldots + |a_3-a_2| + |a_2-a_1| \\
+ |a_1 - \delta - a_0 + \delta| \} \\
\leq |a_n| |R^{n+1} + R^n \{(k-1)|a_n| + (ka_n - a_{n-1}) + (a_{n-2} - a_{n-1}) + \ldots + (a_{n-m} - a_{n-m+1}) \\
+ (a_{n-m} - a_{n-m-1}) + \ldots + (a_3 - a_2 + (a_2 - a_1 + (a_1 + \delta - a_0) + \delta) \} \\
\leq |a_n| |R^{n+1} + R^n \{k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \\
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \} \\
\text{for } R \geq 1 \text{ and } \\
|G(z)| \leq |a_n| |R^{n+1} + R^n \{k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \\
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \} \} \text{ for } R \leq 1. \\
\]

Since G(z) is analytic for \( |z| \leq R, G(0) = 0 \), it follows by Schwarz lemma that 
\[ |G(z)| \leq M|z| \text{ for } |z| \leq R, \]
where 
\[ M = |a_n| |R^{n+1} + R^n \{k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \\
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} |, \text{ for } R \geq 1 \]
\[ = |a_n| |R^{n+1} + R^n \{k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \\
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} |, \text{ for } R \leq 1. \]

Therefore, for \( |z| \leq R \),
\[ |F(z)| = |G(z) + a_0| \\
\geq |a_0| - |G(z)| \\
\geq |a_0| - M|z| \\
> 0 \\
\text{if } |z| < \frac{|a_0|}{M} \]

In other words, F(z) has no zero in \( |z| < \frac{|a_0|}{M} \).

Since the zeros of P(z) are also the zeros of F(z), it follows that P(z) has no zero in \( |z| < \frac{|a_0|}{M} \) if \( n \) and \( n-m \) are both even or odd.
Similarly, if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then rearranging the terms we can show that P(z) has no zero in \( |z| < \frac{|a_0|}{M'} \).

Again, for \( |z| \leq R \) and for \( n \) and \( n-m \) both even or odd,
\[ |F(z)| \leq |a_n| |R^{n+1} + a_0 + R^n \{k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m}) \} |. \]

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for $R \geq 1$ and
\[
|F(z)| \leq |a_n| R^{n+1} + |a_0| + R^k |a_n + a_n| + 2|a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
\]
for $R \leq 1$.

Hence, by Lemma 2, the number of zeros of $F(z)$ and hence $P(z)$ in $|z| \leq \frac{R}{c}, c > 1$ does not exceed
\[
\frac{1}{\log c} \log \frac{M_1}{|a_0|}
\]
in case $n$ and $n-m$ are both even or odd, where
\[
M_1 = |a_n| R^{n+1} + |a_0| + R^n \{k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
\]
for $R \geq 1$,
\[
= |a_n| R^{n+1} + |a_0| + R^k |a_n + a_n| - |a_n| + 2\delta - a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
\]
for $R \leq 1$.

Since $P(z)$ has no zero in $|z| < \frac{|a_0|}{M}$ if $n$ and $n-m$ are both even or odd, it follows that the number of zeros of $P(z)$ in $|z| \leq \frac{R}{c}, c > 1$ does not exceed
\[
\frac{1}{\log c} \log \frac{M_1}{|a_0|}
\]
in case $n$ and $n-m$ are both even or odd.

The case of $n$ even and $n-m$ odd or $n$ odd and $n-m$ even is similar.

**Proof of Theorem 2.**

As in the proof of Theorem 1, we have, for the functions $F(z)$ and $G(z)$, for both $n$ and $n-m$ even or odd
and for $|z| \leq R, R \geq 1$,
\[
|G(z)| \leq |a_n| |z|^{n+1} + (1 - k)|a_n| |z|^n + |ka_n - a_{n-1}||z|^{n-1} + |a_{n-1} - a_{n-2}||z|^{n-2} + \ldots + |a_{n-m-1} - a_{n-m}||z|^{n-m+1}
\]
\[
+ |a_n - a_{n-m-1}||z|^{n-m} + |a_{n-m-1} - a_{n-m-2}||z|^{n-m-1} + \ldots + |a_3 - a_2||z|^3 + |a_2 - a_1||z|^2
\]
\[
+ |a_1 - a_2||z|
\]
\[
\leq |a_n| R^{n+1} + (1 - k)|a_n| R^n + |ka_n - a_{n-1}| R^{n-1} + |a_{n-1} - a_{n-2}| R^{n-2} + \ldots + |a_{n-m-1} - a_{n-m}| R^{n-m+1}
\]
\[
+ |a_{n-m} - a_{n-m-1}| R^{n-m} + |a_{n-m-1} - a_{n-m-2}| R^{n-m-1} + \ldots + |a_3 - a_2| R^3 + |a_2 - a_1| R^2
\]
\[
+ |a_1 - a_2| R
\]
\[
\leq |a_n| R^{n+1} + R^n \{(1 - k)|a_n| + |ka_n - a_{n-1}| + |a_{n-1} - a_{n-2}| + \ldots + |a_{n-m-1} - a_{n-m}|
\]
\[
+ |a_{n-m} - a_{n-m-1}| + |a_{n-m-1} - a_{n-m-2}| + \ldots + |a_3 - a_2| + |a_2 - a_1|
\]
\[
+ |a_1 - a_2| + |a_2 - a_1| + |a_1 - a_0| + \delta
\]
\[
\leq |a_n| R^{n+1} + R^n \{(1 - k)|a_n| + (a_{n-1} - ka_n) + (a_{n-1} - a_{n-2}) + \ldots + (a_{n-m-1} - a_{n-m})
\]
\[
+ (a_{n-m} - a_{n-m-1}) + \ldots + (a_3 - a_2) + (a_2 - a_1) + (a_1 + \delta - a_0) + \delta
\]
\[
\leq |a_n| R^{n+1} + R^n \{|a_n| - k(|a_n| + a_n) + \delta - \delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
\]
\[
- 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m+1})
\]
and for $|z| \leq R, R \geq 1$,
\[
|G(z)| \leq |a_n| R^{n+1} + R^k |a_n - a_{n-1}| 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
\]
Since $G(z)$ is analytic for $|z| \leq R, G(0) = 0$, it follows by Schwarz lemma that $|G(z)| \leq N|z|$ for $|z| \leq R$, where

\[ N = |a_n| R^{n+1} + R^n \{ |a_n| - k(|a_n| + a_n) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \]

for $R \geq 1$ and

\[ N = |a_n| R^{n+1} + R^n \{ |a_n| - k(|a_n| + a_n) + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \]

for $R \leq 1$.

Therefore, for $|z| \leq R$, \[ |F(z)| = |G(z) + a_0| \]
\[ \geq |a_0| - |G(z)| \]
\[ \geq |a_0| - N|z| \]
\[ > 0 \]
\[ |z| < \frac{|a_0|}{N} \] if $|z| < \frac{|a_0|}{N}$.

In other words, $F(z)$ has no zero in $|z| < \frac{|a_0|}{N}$.

Since the zeros of $P(z)$ are also the zeros of $F(z)$, it follows that $P(z)$ has no zero in $|z| < \frac{|a_0|}{N}$ if $n$ and $n-m$ are both even or odd.

Similarly, if $n$ is even and $n-m$ is odd or if $n$ is odd and $n-m$ is even, then rearranging the terms we can show that $P(z)$ has no zero in $|z| < \frac{|a_0|}{N'}$.

Again, for $|z| \leq R$ and for $n$ and $n-m$ both even or odd,
\[ |F(z)| \leq |a_n| R^{n+1} + |a_0| + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3}) \} \]
\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \}
for $R \geq 1$ and
\[ |F(z)| \leq |a_n| R^{n+1} + |a_0| + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3}) \} \]
\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \}
for $R \leq 1$.

Hence, by Lemma 2, the number of zeros of $F(z)$ and hence $P(z)$ in $|z| \leq \frac{R}{c^c}$, $c > 1$ does not exceed
\[ \frac{1}{\log c} \log \frac{N}{|a_0|} \], where
\[ N = |a_n| R^{n+1} + |a_0| + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3}) \} \]
\[ - 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \}
for $R \geq 1$,
\[ = |a_n| R^{n+1} + |a_0| + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta - a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3}) \} \]
for $R \leq 1$. 

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\[-2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\] for \(R \leq 1\).

Since \(P(z)\) has no zero in \(N = az < 0\) if \(n\) and \(n - m\) are both even or odd, it follows that the number of zeros of \(P(z)\) in \(1, 0 > = c \leq c\) does not exceed \(1 \log \log |a_0|/\log c\) if \(n\) and \(n - m\) are both even or odd.

The case of \(n\) even and \(n - m\) odd or \(n\) odd and \(n - m\) even is similar.

**Proof of Theorem 3.**

As in the proof of Theorem 1, we have, for the functions \(F(z)\) and \(G(z)\), for both \(n\) and \(n - m\) even or odd and for \(|z| \leq R, R \geq 1\),
\[
|G(z)| \leq |a_n| |z|^{n+1} + (k - 1)|a_n| |z|^n + |ka_n - a_{n-1}| |z|^{n+1} + |a_{n+1} - a_{n-2}| |z|^{n+1} + \ldots + |a_{n-m+1} - a_{n-m}| |z|^{n-m+1} + \ldots + |a_2 - a_1| |z|^2 + |a_1 - a_0| |z|
\]
\[
\leq |a_n| R^{n+1} + (k - 1)|a_n| R^n + |ka_n - a_{n-1}| R^n + |a_{n+1} - a_{n-2}| R^{n+1} + \ldots + |a_{n-m+1} - a_{n-m}| R^{n-m+1} + |a_{n-m} - a_{n-m+1}| R^{n-m-1} + \ldots + |a_2 - a_1| R^2 + |a_1 - a_0| R
\]
\[
\leq |a_n| R^{n+1} + R^n \{ (k - 1)|a_n| + |ka_n - a_{n-1}| + |a_{n+1} - a_{n-2}| + \ldots + |a_{n-m+1} - a_{n-m}| \}
\]
\[
+ |a_{n-m} - a_{n-m+1}| + |a_{n-m+1} - a_{n-m+2}| + \ldots + |a_2 - a_1| + |a_1 - \delta - a_0 + \delta|
\]
\[
\leq |a_n| R^{n+1} + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\}
\]
and for \(|z| \leq R, R \leq 1\),
\[
|G(z)| \leq |a_n| R^{n+1} + R \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\}
\]

Since \(G(z)\) is analytic for \(|z| \leq R, G(0) = 0\), it follows by Schwarz lemma that
\[
|G(z)| \leq L|z| \text{ for } |z| \leq R
\]
where
\[
L = |a_n| R^{n+1} + R^n \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \quad \text{for } R \geq 1
\]
\[
= |a_n| R^{n+1} + R \{ k(|a_n| + a_n) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2})
\]
\[
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\} \quad \text{for } R \leq 1.
\]

Therefore, for \(|z| \leq R\),
\[
|F(z)| = |G(z) + a_0|
\]
\[ |z| < \frac{|a_0|}{L} \]

In other words, \( F(z) \) has no zero in \( L \).

Since the zeros of \( P(z) \) are also the zeros of \( F(z) \), it follows that \( P(z) \) has no zero in \( L \) if \( n \) and \( n-m \) are both even or odd.

Similarly, if \( n \) is even and \( n-m \) is odd or if \( n \) is odd and \( n-m \) is even, then rearranging the terms we can show that \( P(z) \) has no zero in \( L \).

Again, for \( |z| \leq R \) and for \( n \) and \( n-m \) both even or odd,
\[
|F(z)| \leq |a_n|R^{n+1} + |a_0| + R^n \{ k(|a_n| + |a_n|) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \quad \text{for } R \geq 1
\]

and
\[
|F(z)| \leq |a_n|R^{n+1} + |a_0| + R\{ k(|a_n| + |a_n|) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \quad \text{for } R \leq 1.
\]

Hence, by Lemma 2, the number of zeros of \( F(z) \) and hence \( P(z) \) in \( \frac{R}{c}, c > 1 \) does not exceed
\[
1 \log c \log \frac{|a_0|}{L_1},
\]
where
\[
L_1 = |a_n|R^{n+1} + |a_0| + R^n \{ k(|a_n| + |a_n|) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+4} + a_{n-m+2})
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \quad \text{for } R \geq 1,
\]
\[
= |a_n|R^{n+1} + |a_0| + R\{ k(|a_n| + |a_n|) - |a_n| + 2\delta + a_0 + 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2})
- 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) \} \quad \text{for } R \leq 1.
\]

Since \( P(z) \) has no zero in \( L \) if \( n \) and \( n-m \) are both even or odd, it follows that the number of zeros of \( P(z) \) in \( \frac{|a_0|}{L} \) does not exceed
\[
1 \log c \log \frac{L_1}{|a_0|},
\]
if \( n \) and \( n-m \) are both even or odd.

The case of \( n \) even and \( n-m \) odd or \( n \) odd and \( n-m \) even is similar.

**Proof of Theorem 4.**

As in the proof of Theorem 1, we have, for the functions \( F(z) \) and \( G(z) \), for both \( n \) and \( n-m \) even or odd
and for \( |z| \leq R, R \geq 1 \),
\[
|G(z)| \leq |a_n| |z|^{n+1} + (1-k)|a_n| |z|^n + k|a_n - a_{n-1}| |z|^n + |a_{n-1} - a_{n-2}| |z|^{n-1} + \ldots + |a_{n-m+1} - a_{n-m}| |z|^{n-m+1}
+ |a_{n-m} - a_{n-m-1}| |z|^{n-m} + |a_{n-m-1} - a_{n-m-2}| |z|^{n-m-1} + \ldots + |a_3 - a_2| |z|^3 + |a_2 - a_1| |z|^2
+ |a_1 - a_0| |z|
\]

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\[\leq |a_n|R^{n+1} + (1-k)|a_n|R^n + k|a_n - a_{n-1}|R^n + |a_{n-1} - a_{n-2}|R^{n-1} + \ldots + |a_{n-m+1} - a_{n-m}|R^{n-m+1} + |a_{n-m} - a_{n-m-1}|R^{n-m} + |a_{n-m-1} - a_{n-m-2}|R^{n-m-1} + \ldots + |a_3 - a_2| |R^3 + |a_2 - a_1|R^2 + |a_1 - a_0|R\]

\[\leq |a_n|R^{n+1} + R^n \{(1-k)|a_n| + k|a_n - a_{n-1}| + |a_{n-1} - a_{n-2}| + \ldots + |a_{n-m+1} - a_{n-m}|\}

\[\leq |a_n|R^{n+1} + R^n \{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})\}\]

and for \(|z| \leq R, R \leq 1\),

\[|G(z)| \leq |a_n|R^{n+1} + R\{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})\}\]

Since \(G(z)\) is analytic for \(|z| \leq R, G(0) = 0\), it follows by Schwarz lemma that

\[|G(z)| \leq D|z| \text{ for } |z| \leq R\text{, where}\]

\[D = |a_n|R^{n+1} + R^n \{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})\} \text{ for } R \geq 1\]

\[= |a_n|R^{n+1} + R\{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1}) - 2(a_{n-2} + a_{n-4} + \ldots + a_{n-m+2} + a_{n-m})\} \text{ for } R \leq 1\]

Therefore, for \(|z| \leq R\),

\[|F(z)| = |G(z) + a_0|\]

\[\geq |a_0| - |G(z)|\]

\[\geq |a_0| - D|z|\]

\[> 0\]

if \(|z| < \frac{|a_0|}{D}\).

In other words, \(F(z)\) has no zero in \(|z| < \frac{|a_0|}{D}\).

Since the zeros of \(P(z)\) are also the zeros of \(F(z)\), it follows that \(P(z)\) has no zero in \(|z| < \frac{|a_0|}{D}\) if \(n\) and \(n-m\) are both even or odd. Similarly, if \(n\) is even and \(n-m\) is odd or if \(n\) is odd and \(n-m\) is even, then rearranging the terms we can show that \(P(z)\) has no zero in

\[|z| < \frac{|a_0|}{D'}\]

Again, for \(|z| \leq R\) and for \(n\) and \(n-m\) both even or odd,

\[|F(z)| \leq |a_n|R^{n+1} + |a_0| + R^n \{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})\}\]
\[-2(a_{n-2}+a_{n-4}+\ldots+a_{n-m+2}+a_{n-m})\] for \(R \geq 1\)

and

\[|F(z)| \leq |a_n|R^{n+1} + |a_0| + R\{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
- 2(a_{n-2}+a_{n-4}+\ldots+a_{n-m+2}+a_{n-m})\} \quad \text{for } R \leq 1.

Hence, by Lemma 2, the number of zeros of \(F(z)\) and hence \(P(z)\) in \(\mathbb{D}\) does not exceed

\[
\frac{1}{\log c} \log \frac{D_1}{|a_0|},
\]

where

\[D_1 = |a_n|R^{n+1} + |a_0| + R\{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
- 2(a_{n-2}+a_{n-4}+\ldots+a_{n-m+2}+a_{n-m})\} \quad \text{for } R \geq 1
= |a_n|R^{n+1} + |a_0| + R\{|a_n| - k(|a_n| + a_n) + 2\delta + a_0 + 2(a_{n-1} + a_{n-3} + \ldots + a_{n-m+3} + a_{n-m+1})
- 2(a_{n-2}+a_{n-4}+\ldots+a_{n-m+2}+a_{n-m})\} \quad \text{for } R \leq 1.

Since \(P(z)\) has no zero in \(\mathbb{D}\) if \(n\) and \(n-m\) are both even or odd, it follows that the number of zeros of \(P(z)\) in \(\mathbb{D}\)

\[
\frac{|a_0|}{L} \quad \text{if } n \text{ and } n-m \text{ are both even or odd.}
\]

The case of \(n\) even and \(n-m\) odd or \(n\) odd and \(n-m\) even is similar.

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Historical Perspective of English and Some Pedagogical Problems and Solutions in Teaching English in Sri Lankan Schools

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Abstract- The aim of this research article is to meet 2 objectives. One of the important aims of this research article is to provide information about the historical perspective of English in Sri Lanka. This article also aims to analyze some pedagogical issues and solutions in teaching English in Sri Lankan schools. Since the early 1950s, teaching ESL in Sri Lankan schools irrespective of socio-economic or regional facilities has been a major concern of successive governments of Sri Lanka. As the need of English speaking citizens is felt widely nowadays, the language policy of the Sri Lankan government which further emphasizes the adoption of the effective measures to enhance the quality of teaching still continues. English language teaching and learning styles and strategies are among the main factors that help determine how and how well our students learn a second language. Success of the learning/teaching process largely depends on a set of factors such as students’ motivation, appropriate selection of the teaching approaches, methods, tasks and materials that are mostly determined by students’ psychological characteristics such as learning style and type of intelligence.

Index Terms- historical perspective, Pedagogical issues, teaching and learning strategies and styles, Second Language

I. INTRODUCTION

English was introduced to the island with the arrival of the British in 1796. In the course of time, the English language was firmly planted in Sri Lanka in a systematic manner. The use of English became supreme and pervasive in several domains of language use. Under British rule, English was the language of administration. It was the language of higher education and the most popular language of school education. The Christian missionaries were the first to start teaching English in Sri Lanka.

During the British colonial rule in Sri Lanka from 1796 to 1948, English was the medium of instruction. English had become an indispensable tool for higher education and for intellectual pursuits. English served as a ladder to high positions and without English, no one could have thought of any remarkable achievement in public life. After independence, the mother tongue was considered the best for one’s education especially at the primary level. School children were given the privilege to have their education through Sinhala and Tamil. However, English has been one of the subjects of the school curriculum and has been the medium of instruction in the universities and other higher institutions. So the need for English is still being felt strongly. The recent development in science and technology also demands a sound knowledge of English for bettering the prospects of our students and their services in the modern world.

So English as a link language plays an important role in social activities. Thus everyone wants to learn the English language. Especially in the academic domains each student has to plunge into the task of learning English in order to survive in the competitive academic and social entity. Consequently, the educational planners are taking a series of efforts to teach the English language among students in Sri Lanka. Although English is a foreign language, it is taught as a second language.

Historical Context of English in Sri Lanka

English in South Asia developed vastly following the Colonization by the British. The Colonization began in South Asia in the sixteenth century and the process went on vigorously throughout the eighteenth century and the nineteenth centuries, as the British established their full political control in this region. The British strengthened their power in colonies and the English language also had a firm position there. Consequently, it created a language atmosphere where English L2 speakers emerged in a large number though their competence of the language varied.

The educational activities accelerated by the British Colonial rulers and the consequent influence of the English language over the life of the natives of Sri Lanka are matters of interest. On the 15th of February 1796, the colonial power of Sri Lanka came to the hands of the British. Many remarkable political and educational changes took place in Sri Lanka during the period from 1798 to 1805, when the Hon. Frederic North was the governor. According to the educational policies adopted by North, the learning of English language by natives was given much importance and motivation and several measures were taken to impart English education. Later, the missionaries and the establishment of private schools played a key role in imparting English education. Following this, on the recommendation of the Colebrooke Commission, English was made the medium of instruction in government schools at that time.

Status of English as a second language

The sociology of the use of English in Sri Lanka today and sociological factors affecting the teaching and learning of this language are all closely linked with the country’s modern history starting from the period of British colonial rule (1796 – 1948). The social value placed on the English language in contemporary Sri Lanka is largely related to the British education system which

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for the first time introduced a European language to a minority of Sri Lankans.

Post-independent politicians of Sri Lanka introduced several changes to the British education system which had class and linguistic discrepancies. Their intention was to create an equitable system of education which would cater to all segments of society. Among such changes was the introduction of free vernacular-medium education in all government schools. Consequently, English shifted from being the medium of instruction to a subject in the wider school curriculum, i.e. the second language (Jayaweera, 1984, Rupasinghe, 1990). This shift in the medium of education itself was not completely effective at replacing with vernacular languages in important social strata (Kandiah, 1984) (as cited in Sivagurunathan, 1993). Therefore, the demand for learning English still remains at a high position in contemporary Sri Lanka.

Teaching English as a second language to all Sri Lankan students at school and higher institutions irrespective of their social, economic or geographical background has been a major educational policy of successive governments in Sri Lanka since the early 1950s. This continues to be the declared government educational policy as in recent years more than ever, the country’s need for English speaking citizens has come to be realized. A further goal of education in Sri Lanka is to equip students with necessary knowledge and technical skills required for the modern employment market. Teaching of English is also considered an appropriate means of achieving this goal. The English language therefore, has played and continues to play a distinctive role in the country’s development.

**Function of English language in Sri Lanka**

English is taught as a complementary language to ensure Sri Lankans benefit from globalization and other 21st century issues. The government hopes to make up for the drawbacks of general education that is provided in the mother tongue, through English, an additional language. English is meant to compensate for the limited background provided by the indigenous languages. In many countries in Europe, English is learnt because in the view of educationists, an educated person should know another language. In the European countries, they do not learn English exactly for the purpose we learn it, that is to compensate for the perceived deficiencies in their general education. Most of the European countries provide a general education through their native languages, but need English because of technology.

In Sri Lanka, all teachers of English may not be equipped to observe what English culture is. They may not have specialized in English in degree programmes. Therefore, they need initiation to a high extent into English life and thought for imparting a good quality English education, but not in a sociological sense alone. It is not English life and thought in this “sociological” sense that matters most. It is something of more importance. English is not learnt as a social accomplishment in Sri Lanka. It has a vital function to perform. It is questionable as to what extent it is appropriate to designate the role of English as a second language in Sri Lanka. (Walatara 1965:15). English may function as a second language in countries where it is learnt as a social accomplishment. In Sri Lanka, English has been the medium of instruction in most of the secondary schools for about one hundred years. Presently English has ceased to be the medium of instruction in secondary schools. Therefore, the demand for teaching and learning English still remains at a high status in contemporary Sri Lanka.

Though English is no longer the medium of instruction in secondary schools, its powerful influence in education still exists. It is taught as a compulsory subject in all schools. The position of English is not that of a second language in the view of what the phrase usually refers to in European countries. English is in fact, a non-medium yet vernacular language.

In the past, in most of the rural schools in Sri Lanka, English was taught through reading of the alphabet. English was learnt as if it was the first language of the learner in the past. There was no special focus on spoken aspect of English. However, the student’s spoken ability was satisfactory because together with the student’s progress in the school she/he was exposed to an almost English mother tongue atmosphere. But today the situation is quite different. Students lack exposure to an English using environment. Consequently, their speech ability has declined sharply. (Walatara, 1965)

**Teaching English in Sri Lanka**

Since the early 1950s, teaching ESL in Sri Lankan schools irrespective of socio-economic or regional facilities has been a major concern of successive governments of Sri Lanka. As the need of English speaking citizens is felt widely nowadays, the language policy of the Sri Lankan government which further emphasizes the adoption of the effective measures to enhance the quality of teaching still continues. De Mel (2001) noted that teaching English as a second language has been reinforced especially since 1990s with the aim of finding a solution to the Sinhala-Tamil ethnic conflict which has developed into a devastating civil war, causing a setback in the economic and social development of the country. Further, the educational policies in Sri Lanka are intended to provide students with necessary knowledge and technical skill that are felt to be essential for the modern employment market. Proficiency in English is believed to be an effective means of achieving this goal. (De Lanerolle, 1991 and De Mel, 2001). Thus, the role of English in the country’s national development becomes very significant.

The outcome of the English language programme conducted in schools has been studied by educationists, linguists and sociologists since the early 1950s. Their studies reveal that the programme is only minimally successful even though large investments are made on it. This argument centers round two major facts. Firstly, according to the research findings, only a minority of the student population is successful in scoring satisfactory marks at the G.C.E (O.L) examination. Secondly, most of the Sri Lankan youth do not have the required level of English language proficiency in the private sector job markets (Karunaratne, 2003).

During the British Colonial rule in Sri Lanka (1796 – 1948), the educational system introduced by the rulers allowed for the establishment of schools known as the ‘Superior Schools’ which provided education in the English medium. (Jayasuriya, 1976). Those schools imparted English medium education only among those who were the economically privileged Sri Lankans. Thus, the economically downtrodden people were deprived of
the right of reaching a higher standard of life. In case of schools where the medium of instruction was either vernacular or bilingual, a fee was levied from the students who aspired to learn in the English medium or learn English language as a subject, (Jayasuriya, 1976). Thus, a link was created between the English language and the economic status and this link assigned a social position for the English language as the language of upper classes. This is still the case in contemporary Sri Lanka.

After independence, under successive governments the British education system got modified from time to time. They mainly concentrated on providing equal opportunities in education to all segments of society. Consequently, a free vernacular – medium education system was introduced in all government schools. English was shifted from being the medium of instruction to a subject in the school curriculum, i.e. the second language. Within a decade of independence, the status of English in Sri Lanka underwent a radical change. At the national level trade, commerce, international affairs, tourism etc. required the use of English. The domains that operated on a more local level, such as the education and legal system demanded English. For instance, the faculties of medicine, science and engineering in the national university system conducted courses in the English medium.

At the interpersonal level, some groups continued to use English within the home, family and social environment. In 1987, as per the 13th Amendment to the 1978 Constitution of Sri Lanka, English was made a link language. The employment opportunities outside Sri Lanka, the sudden boom in commercial enterprises and establishment of factories and the adoption of modern technology stressed the need for an international language. Further, the ongoing war compelled the need for a mediating language. Subsequently in 1995, English was proclaimed as a national language (Raheem&Ratwatte, 2007).

Importance of English

In recent years, English is more and more popular in the world. It attracts people due to the interestingness in its tune and structure. However, beside the tune and the structure, this language is learned and studied by a higher number of people with every passing day because of its two importances in this modern world: a mean to communicate and to create a greater opportunity for a job.

The first importance of English language is that it is a mean to communicate in the interconnected and interdependent world. Nowadays, English is called an international/foreign language and it is also the second language of many countries in the world. Therefore, we can realize the importance in communication of this language. When we know English, we can communicate with the citizens of most of counties in this globe, without any confusion in expressing our feelings and thinking.

The other importance of the language is that it creates a greater opportunity for a job. As we know, in this modern world, businesses are targeting at qualities of employees; and, knowing English is one of those qualities. Consequently, if we know English and are good at it, we will have more chances to get a job. Moreover, with an enough amount of knowledge in English, the possibility of promotion in position is even higher. In brief, we cannot deny the importance of English language in this modern world. This language helps us to express thinking and feelings, to talk, to exchange views, and to contact between person and person though wherever we live. Furthermore, in the world that English is considered as the main language, English is now taking an important part in the chance to take a job. Hence, we can predict that English language will continue to develop and bring us more advantages in the near future; and, maybe someday, English will be the only language in the world. There are several factors that make us to learn English Language to go through in the current time. First of all, it has international standard, that’s why everyone needs to learn English in order to get in touch on international level.

There is another factor that make English very important in this world is it is the easiest language of the world to learn. Many people think that it is very difficult and confusing. But the interest and the realization of its needs in our day to day life will make them feel easy to learn English. With good understanding and communication in English, we can travel around the globe. We get assistance and help in English in every part of world. Better you visit some offices, companies, governmental organizations, and other departments, and you will see the importance of English.
It is the technology that allows people to travel further and faster than ever before. It is the Internet that links people regardless of their nationalities and countries they live in. And technology is also the reason why lots of business people are active globally and why more and more entrepreneurs are on the move than ever before. In this world full of the state-of-the-art technology, English serves as a unifying element in many situations, giving all entrepreneurs and small companies a better chance on the market and an ideal comparative advantage over those who lack the ability to communicate in this language.

**Developments of English Language Teaching Methods**

Developments of language teaching over recent decades have been strongly founded on the notion of teaching methodology. Among these language teaching methodologies are grammar-translation method, direct method, reading approach, audio-lingual method, community language learning, the silent way and total physical response. One of the most recent developments in this field is communicative language teaching. In Sri Lanka, since the introduction of English to the school curriculum as a second language in the early 1950s, the direct method followed by the grammar-translation method was used for teaching English. The direct method teaches the target language in the target language while the grammar-translation method teaches the target language in the students’ mother tongue (Mora, 2002, Skela, 1998). However, past experience shows that these methods have not been successful at improving English proficiency of Sri Lankan school students (Karunaratne, 1993). In its attempts to find a solution for this unsuccessful teaching situation and in keeping up with the global trends in the field of teaching English, the Sri Lankan Government has adopted communicative teaching practices in the school English classrooms since the late 1980s (National Institute of Education, 1999).

Communicative language teaching places its focus on teaching language ‘in use’. Proponents of this approach, while emphasizing the importance of developing ‘linguistic competence’ in a learner, place greater emphasis on ‘communicative competence’ (Johnson, 1979, Widdowson, 1979a, 1979b, Wilkins, 1979b). Linguistic competence refers to knowledge about the basic rules of a language (e.g.: grammar, lexis etc.) which a person needs to know in order to use that language. Communicative competence refers to skills other than linguistic which helps learners to place their linguistic knowledge in the social world. For example, communicative competence gives the individual an ability to decide the best thing to say in a particular situation.

In achieving the above communicative objectives of language teaching, proponents of the communicative approach recommend several strategies to be used in a language program (Richards and Rodgers, 2001). The strategies are:

- **Use of a variety of teaching materials:**
  The communicative approach involves three types of instructional material: text-based, task-based and *realia*(Richards and Rodgers, 2001). Text-based teaching refers to the use of a textbook in the classroom for teaching and for classroom activities. Task-based teaching involves a variety of games, role-plays, simulations and any other form of classroom activity that reinforces target language communication in the classroom. The final category of material, *realia*refers to ‘authentic’ teaching material such as newspapers, signs and posters in the target language. According to the proponents of communicative teaching *realia*is a vital classroom tool in the attempt to teach language ‘in use’ (Canale and Swain, 1980, Widdowson, 1996). In addition, In CLIL (Content and Language Integrated Learning) content subjects are taught and learnt in a language, which is not the mother tongue of the learners. Knowledge of the language becomes the means of learning content, language is integrated into the content-based subject teaching, and this increases motivation to study natural contextualized language. Therefore, CLIL provides a practical approach to both content and language learning that improves intercultural understanding.

- **Appropriate use of the students’ mother tongue in the classroom:**
  Recent trends in the field of linguistics emphasize that use of the students’ mother tongue in language teaching and learning is a linguistic human right of the students (Skutnabb-Kangas, 1994, Sridhar, 1994). Therefore, the proponents of the communicative approach have given due recognition to the students’ mother tongue in their teaching strategies. Accordingly, the students’ mother tongue is considered a resource in the language classroom and reasonable use of the mother tongue is recommended (Richards and Rodgers, 2001, Widdowson, 1979b).

- **Student-centred teaching approach:**
  Communicative language teaching also involves a teaching approach that is more student-centred than teacher-centred. Traditionally, a teacher’s role was to provide correct models of language and corrective feedback (Littlewood, 1981, Nunan, 1989). Communicative language teaching requires a shift from this teacher-centred approach (teacher as ‘instructor’) to a student-centred approach (teacher as ‘facilitator of learning’). A teacher is expected to be willing to put his/her students’ learning needs ahead of his/her own behaviour (Brumfit, 1984, Savignon, 1991). Hence it is expected that the students would be allowed to take an active role in the language classroom.

**Classroom Activities and the Use of the Mother Tongue**

The communicative approach involves a range of classroom activities as a source of language practice for students. Such classroom activities, it is argued, should have some ‘missing information’ that needs to be acquired by communicating with another person (Johnson, 1979). These activities are broadly divided into two categories; namely ‘pre-communicative’ and ‘communicative’ (Littlewood, 1981). Pre-communicative activities include grammar and quasi-communicative activities (such as drills and role plays) that are required for subsequent communicative activities. Communicative activities engage students in actual communication with others. All activities observed in this study stopped at the pre-communicative stage without moving on to the communicative stage. The most common type of tasks observed in this study was ‘meaning-focused’. These are activities that engage learners in understanding, extending or conveying meaning by handling.

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their linguistic (grammar) knowledge as demanded by the situation (Prabhu, 1987). Within meaning-focused activities is a sub-category identified as ‘information-gap’ activities that require learners to ‘transfer’ information from one person to another (Prabhu, 1987). The information-gap activities mainly took the form of oral or written comprehension questions related to a text or role-play in the textbook.

Information-gap activities, though common, were not of the nature indicated by communicative language teaching. That is, the information that was exchanged was not ‘unknown’ to either students or teachers and therefore, ‘doubt’, the essence of information gap activities (Johnson, 1979), was non-existent. The information has already been read in the classroom. Consequently, the information required by a particular comprehension question could be picked up from the textbook. Such questions granted limited opportunities for students to engage in independent language production.

As far as teaching English to Tamil students is concerned, the teachers’ and students’ excessive dependency on the mother tongue is another problem related to the classroom activities. Both students and teachers tend to revert to the mother tongue very often in the classroom obstructing the oral communicative objectives of classroom activities. Teachers differ in the extent of mother tongue usage in the classroom. Some teachers do almost all their lessons in English while others resorted to Tamil when they think it to be easier for them and students. The use of the mother tongue by teachers seems to fulfill two classroom requirements. Firstly, they use Tamil in any teaching situations that seem difficult for them to handle in English.

During situations such as the above, the mother tongue is not used as a resource to help students but more as a resource to make the ‘teachers’ job easier’ (Skela, 1998). Such instances also suggest problems related to teacher’s English proficiency. Secondly, teachers use Tamil to explain grammar and to explain instructions to classroom tasks. These can be considered situations of using mother tongue as a resource to improve students’ target language comprehension.

All students, irrespective of their English fluency, prefer to speak in Tamil with each other during classroom activities or when interacting socially. The teachers do not seem to mind this as long as the students appear engaged in learning activities assigned to them. Similarly, the majority of students (except the students who were fluent in English) use Tamil in all their interactions with the teacher. These students speak in English with the teacher only for answering a comprehension question related to a lesson. Therefore, the majority of students show signs of reluctance or shyness to speak in English in the classroom. This may have been due to a lack of confidence. Evidence of such a lack of confidence and its inhibiting effects has been a recurrent observation in language classes. Students ‘lack of confidence is most noticeable when they are reluctant to even ‘read out’ something in English from the textbook.

Proponents of the communicative approach recommend the use of pair or group work as a strategy for making students communicate in the target language (Pica, 1988, 1996). But research has revealed that the tendency shown by students to revert to the mother tongue hinders the communicative objectives of such group activities (Holliday, 1994). Another problem with group activities, as pointed out by Pica (1988), is the tendency for the entire group to depend on one fluent student to find the answer for the activity. For example, at times one student in the group was seen working out and writing the answer on behalf of the group. Both these factors are consequences of students’ lack of English fluency and confidence.

The Role of the Teacher

The communicative approach involves a teaching strategy that is less dominated by the teacher, providing opportunities for students to contribute to what they learn and how they learn it (Nunan, 1989). It has been argued that such a student-centred approach would lead to a friendly and supportive learning environment that minimizes classroom anxiety for students (Littlewood, 1984). In the schools, this communicative principle had been adapted to suit the Sri Lankan teacher-student requirements. All teachers are found to be ‘traditional teachers’. Here, the word ‘traditional’ denotes the dominant role taken by teachers within the classroom (Nunan, 1989). Teaching is done mainly from the front of the class. In every classroom, the teacher does most of the talking. Student obedience in all classrooms means complying with the teacher’s expectations. Most of the time, teachers teach the textbook and expect students to participate within the frame of the textbook. When teachers are not strict to the extent of forcing students to comply with them, most students drift away from the lesson without engaging in any activities. Therefore, teacher-dominance and strictness are necessary factors in these classrooms for learning to take place.

Boost Students’ Self-confidence:

Wherever the students do mistakes, it is the teacher’s duty to give suggestion to them and have to change their negative beliefs and attitudes towards the mistakes that done by them. Teachers can discuss with ‘students the value of language use even if it is not fluent and accurate’ (Nation, 1997). When students are rewarded for successfully conveying a message, they will gradually change their perceptions about mistakes and language use. When the students learn the language, they can be awarded. But in spoken English class, the teacher must encourage them to speak and try to kill their shyness and stage fear. By boosting their self-confidence, the teacher can easily get success.

Creating English Atmosphere for Learning:

Most of the students do not get the opportunity to speak in English because their environment brings them to speak in the local language so the teacher should support them to speak in English. They have to provide the atmosphere and make spoken English classroom environment as a speaking box. More opportunities for speaking English outside the class can also be created. Group activities encourage the students to speak and their speech should be recorded which helps them in learning language. They may also be asked to carry out and record interviews with foreigners who are visiting or living around. But here the teacher should be very careful about the group work because the students may use their mother tongue. In group interaction as a teacher, you have to introduce yourself and ask all students to introduce themselves. “When organizing pair work and group work, make sure that every student’s participation is necessary for the task to be completed.”
Attend to Individual Students’ Needs and Ability:
There are individual differences among students. All the students’ knowledge is not same so that they may not perform as teacher expects, so the teacher should not expect every student to perform at the same level. Different kinds of tasks can be devised to suite different levels. Alternatively, task demands can be adjusted according to individual levels of oral competence. It is thought that once a student has a learning problem, it is best to allow the student to try to solve the problem on their own in the first place. When the problem is too challenging for the student to solve, support can be provided. The above list is made with the amount of support increasing from the first to the last solution.

Need for Good Interaction:
Like other classes, there should be a good interaction between teacher and students in spoken English classes. Firstly teacher can make his participants to come out and speak whatever they can irrespective of the grammatical errors. “It is essential to concentrate on classroom interaction that goes on between and among teachers and students in order to gain insights and increase our understanding of classroom learning and teaching. Examples include how teachers ask questions and correct errors, what effect the type of task might have on learning, and whether reading aloud or silent reading in class results in more learning” (Allwright and Bailey, 1991). Here the teacher has to explain the answers in oral form. If it is in form of written form, there is, perchance, the learners may forget some structures in spoken form.

Use Simple Language
Communication is a two way process. If the speaker speaks with complex language, the student may not understand it so teacher should avoid using long convoluted sentences which may work in written text where the reader can review the sentence several times to decode its meaning. However, this is not an option with spoken language and therefore it is difficult for students to review meaning.

More time Allotment for the Students:
In most of the time, because of heavy work load, the teacher cannot concentrate on all the students but it is better to allot more time for the students. This can be done by giving students more preparation time. Alternatively, allow them to perform oral tasks without time pressure (Ellis, 2005) by giving them enough time to plan for and perform a task at the same time. When the students participate in language classes actively, they indirectly get self-confidence from it. Larsen-Freeman says that “students are more responsible managers of their own learning” (D. Larsen-Freeman, 1986). If the learners have the pressure, they cannot participate actively in language classes. Widdowson says that “When learners write under pressure, they may call upon systematic resources from their native language for the achievement and synthesis of meaning” (Widdowson, 1990).

II. CONCLUSIONS
Success of the learning/teaching process largely depends on a set of factors such as students’ motivation, appropriate selection of the teaching approaches, methods, tasks and materials that are mostly determined by students’ psychological characteristics such as learning style and type of intelligence. CLT (Communicative Language Teaching), having an aim to improve students’ ability to communicate, has left a deep mark on teaching and learning of a foreign language and has been extensively used in classrooms all over the world, notwithstanding the criticism for having neglected the teaching of grammar with a consequent loss among students in accuracy in the pursuit of fluency.

In TBL (Task-Based Learning) is fostered through performing a series of activities as steps towards successful task realization. Since the emergence of TBL tasks have been widely used in language teaching, either as the basis of language course or as one of its components. The major criticisms of TBL concern its applicability to lower learning levels and the use of restricted language patterns. The important advantage offered by CLIL (Content and Language Integrated Learning) is its potential for achieving bilingualism and improving intercultural understanding. Firstly, CLIL helps to broaden intercultural knowledge and understanding and develops intercultural communication skills. Secondly, CLIL improves target language competence and raises awareness of both mother tongue and target language. Thirdly, CLIL provides opportunities to study content and learn subject-specific terminology and hence prepare students for future studies and/or working life. Finally, CLIL offers new learning strategies while adding diversity and flexibility to existing methods and forms of classroom practice.

Each of the approaches can be successfully adopted in the English language classroom either in combination or separately. Students’ needs determined by students’ psychological characteristics as well as other factors influencing the learning/teaching process should be decisive in an approach selection.

Finally, achieving communicative objectives fully requires that classroom activities change to include activities which require teachers and students to communicate in English. The classroom characteristic most closely related to improving the frequency of oral communication is the kind of dominance and strictness exercised by the teacher. As students are comfortable in a strict teaching atmosphere, it is suggested that this strictness be directed towards making students communicate in English. Instead of focusing on keeping students quiet and attentive to the lesson, teachers should encourage students to speak in English.

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Experimentation of Surface Roughness of AISI-1080 in Turning Operation under Different Cooling Conditions

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Abstract- This paper presents the optimized method of machining process for improved surface finish of AISI 1080 steel which was turned under dry, wet and mist condition. In machining operation, large amount of cutting fluids are used for cooling & lubrication purpose. There is necessity to use minimum amount of cutting fluid for machining operations. In this work, to achieve that aim, Minimum quantity lubrication (MQL) method was used to reduce the cutting fluid while machining. A mathematical model will also developed to determine the surface roughness in terms of machining time and cutting tool wear function in terms of the four independent variables: the cutting depth (d), the cutting speed (Vc) and the cutting duration (t). The results application of MQL technique will significantly helps to obtain better performance in compare to dry condition. The purpose of cutting fluid in a machining operation is to cool the work piece, reduce friction, and wash away the chips. The cutting fluid contributes significantly toward machining cost and also possesses environmental threats.

Index Terms- Minimum Quantity lubrication(MQL), Original Equipment Manufacturer(OEM), High Speed Steel(HSS), Surface Roughness(Ra),

I. INTRODUCTION

The motive of this study is to obtain optimum cutting conditions for reduction in tool wear, surface roughness, material removal rate and components of cutting forces in turning of mild steel AISI 1080 with HSS tools. Mild steel have been around in the market for a long time now. However, their potential use in the area of air craft fittings, aerospace components such as shafts, valves, special screws, bushings, cryogenic vessels and components for chemical environments is beginning to be appreciated lately. Mild steel AISI 1080 unlike conventional metals are considered to be ‘easy to machine’ materials, due to their inherent properties. It has been estimated that about most of the mild steel structural components made for automotive industries require some form of machining. This high proportion of machining involved with steel parts in the aerospace and automotive industries. So manufacturer to improve the tool-life in machining of mild steel components used in their manufactured products. The manufactured parts supplier (will be referred as Original Equipment Manufacturer(OEM)) was experiencing productivity loss due to shorter tool-life on the machining station used to machine these mild steel components. Because of the shorter tool-life, the machine used to be down for longer periods of time, owing to frequent tool changes and quality checks after each tool change. This problem was exacerbated due to the fact that the life of some tools was half that of the rest of the tools used to machine of mild steel materials. This resulted in significant bottlenecking on the powder metal component machining stations. Hence, a need was felt to fundamentally study and analyze the machining operation and to develop a predictive model for increasing the life of the tools, surface finish, material removal rate and reducing the components of cutting force. In order to understand the behavior of the mild steel and HSS cutting tools during machining and that extensive experimental work was conducted with varying cutting conditions and response output data was collected. Then optimization technique was used to obtain optimum cutting conditions, which would produce maximum number of components.

II. MINIMUM QUANTITY LUBRICATION SYSTEM

The conventional system of applying the coolant is flood coolant system, in which a large quantity of coolant is continuously impinged on the rake face of the tool. This system is very inefficient. Firstly, a large quantity of the cutting fluid is required. Second, the cutting fluid is not able to reach the cutting zone due to obstruction from chips. A better method is the application of mist lubrication, in which a mixture of air and cutting called aerosol is produced and supplied in the cutting zone with a high pressure. The system uses an atomizer. The atomizer is an ejector where the compressed air is used to atomize the cutting oil. By the air in a low-pressure distribution system to the machining zone. As the compressed air flows through the venturi path, the narrow throat around the discharge nozzle creates a venturi effect in the mixing chamber, i.e., a zone where the static pressure is below the atmospheric pressure, it produces a spray of gaseous suspension called mist in the machining zone which works as cooling as well as lubricating medium.

III. PROBLEM STATEMENT

Cutting fluid used in machining industries has evolve issues like employee health and environmental pollution. The current trend in metal working industry is to completely eliminate or drastically reduce the cutting fluid use in most machining operations, which is practically impossible. Also Metal cutting fluid changes the performance of machining operation because of their lubrication, cooling and chip flushing function. The
growing demands for high productivity machining need use of high cutting speed and high feed rate. This produce high temperature which not only reduce the tool life but also impairs the product quality. Because of this some alternative has been sought to minimize or even avoid the use of cutting fluid in machining operations. One of the alternatives is MQL. The MQL can able to subsidize the heat generated. The saving in cutting fluid and other related costs would be very significant if minimum lubrication (MQL) is adopted. Machining with MQL is cost saving and environmental friendly option.

IV. OBJECTIVE

The purpose of this research is to investigate and optimize the surface roughness in turning operation under different cooling conditions and also to investigate the effect of various cutting conditions for surface roughness.

V. LITERATURE REVIEW

The recent reviews and relevant published work in the area of mild steel AISI 1080 machining using HSS tool inserts. It has been noted that so much published work does not exists on machining of powder metals. The major variables that influence the machinability of mild steel AISI 1080 are Work material and properties, Cutting tool materials, Cutting conditions, Cutting tool geometry, Coolant application and type of machining operation.

In what follows, a brief review of these influencing variables and how they affect machining of mild steel AISI 1080 will be presented.

So many numbers of researchers have been used Taguchi method for design the experiment and also used to optimize the turning operation on the different alloys.

Several recent and novel approaches have been proposed and are examined. The experimental investigation is done on the role of MQL on cutting temperature, tool wear, surface roughness and dimensional deviation in turning of AISI-4340 steel at industrial speed-feed combinations by uncoated carbide insert. MQL under pulsed jet mode protects the operator’s health and reduces the detrimental effects on the environment. MQL technique offer better results than by dry cutting in terms of surface roughness. The tool life was increased by 43.75 % by MQL than dry cutting[8][9][10]. The average chip-tool interface temperature increases with the increases in cutting velocity and feed rate for all three conditions.

VI. EXPERIMENTAL SETUP

Turning Operation on Lathe Machine

A lathe is a machine tool which rotates the work piece on its axis to perform various operations such as cutting, sanding, knurling, drilling, or deformation, facing, turning, with tools that are applied to the work piece to create an object which has symmetry about an axis of rotation.

Turning is a machining process in which a cutting tool, typically a non-rotary tool bit, describes a helical tool path by moving more or less linearly while the work piece rotates. The tool's axes of movement may be literally a straight line, or they may be along some set of curves or angles, but they are essentially linear.

Experimental procedure

For conducting the experiment Centre Lath was used. The work material for experiment was used mild steel AISI 1080 and HSS as the cutting tool. After each and every experiment the HSS tool was removed and allows it to cool naturally. After each experiment work piece is also removed, the average surface roughness (Ra) of work piece was measured by using contact type roughness measurement instrument. The measurement is repeated on three reference places on the cylindrical surface of the work piece. It is a contact type measuring instrument with a probe which is travelling in the work piece surface; probe has a diamond tip of having diameter 2 micro-meter. The range of the measuring instrument is 0.05-40 micro-meter. This procedure is repeated for each experiment with different-different cooling conditions.

Work Material AISI 1080

In turning, the raw form of the material is a piece of stock from which the work pieces are cut. This stock is available in a variety of shapes such as solid cylindrical bars and hollow tubes. Custom extrusions or existing parts such as castings or forgings are also sometimes used. Turning can be performed on a variety of materials, including most metals and plastics. The machinability of a material is difficult to quantify, but can be said to possess the following characteristics:

- Results in a good surface finish
- Promotes long tool life
- Requires low force and power to turn
- Provides easy collection of chips

AISI 1080 mild/low carbon steel has excellent weld ability and produces a uniform and harder case and it is considered as the best steel for carburized parts. AISI 1080 mild/low carbon steel offers a good balance of toughness, strength and ductility. Provided with higher mechanical properties, AISI 1080 hot rolled steel also includes improved machining characteristics and hardness.

- machining, threading and punching processes.
- It is used to prevent cracking in severe bends.

HSS Single Point Cutting Tool

On the basis of literature review HSS tools is selected for turning process. HSS is less expensive per unit than other typical tool materials, and it is more brittle, making it susceptible to chipping and breaking. This gives the benefit of using HSS at the cutting interface without the high cost and brittleness of making the entire tool out of HSS[6][7]. Most modern face mills use HSS tool, as well as many lathe tools and end mills. In recent decades, though, solid-HSS end mills have also become more commonly used.

Cutting Fluids used in Experiment

Water, Soluble oil (mixture of oil and water), Oils (mineral, animal, vegetable, compounded, and synthetic oils)[10]
Cutting environmental condition
Dry cutting, Wet cutting (flood cooling) & Minimum quantity lubrication (MQL) machining

Selection of Input and Output Parameter

Turning Process Parameter
In turning, the speed and motion of the cutting tool is specified through several parameters. These parameters are selected for each operation based upon the work piece material, tool material, tool size, and more. Turning parameter that can affect the process are:
1) Cutting speed, 2) Spindle speed, 3) Feed rate, 4) Axial depth of cut, 5) Radial depth of cut, 6) Type of cutting fluid.

A cutting speed for mild steel of 30 meters/min is the same whether it is the speed of the cutter passing over the work piece, such as in a turning operation, or the speed of the (rotating) cutter moving past a (stationary) work piece such as in a milling operation. For a given material there will be an optimum cutting speed for a certain set of machining conditions, and from this speed the spindle speed (RPM) can be calculated. Feed rate is the velocity at which the cutting tool is fed, that is, advanced against the work piece. It is expressed in units of distance per revolution for turning and boring (typically inches per revolution [rpm] or millimeters per revolution). The thickness of the material that is removed by one pass of the cutting tool over the work piece.

Cutting speed and feed rate come together with depth of cut to determine the material removal rate, which is the volume of work piece material (metal) that can be removed per time unit.

Response Output
Surface roughness of machined parts is the output on which the complete focus is put on. It is measured in decibel and a complete smooth surface has 0 value of surface roughness.

VII. SURFACE ROUGHNESS MEASUREMENT

The quality of surface is a factor of importance in the evaluation of machine tool productivity. Hence it is important to achieve a consistent surface finish and tolerance.

The effects of cutting parameters, which also contribute to the variation in the tool’s modal parameters, are more useful for controlling tool vibration. This study focuses on the collection and analysis of cutting-force, tool-vibration and tool-modal-parameter data generated by lathe dry turning of steel samples at different speeds, feeds, depths of cut, tool nose radii, tool lengths and work piece lengths. This analysis investigated the effect of each cutting parameter on tool stiffness and damping, and yielded an empirical model for predicting the behavior of the tool stiffness variation.
Parameters used in the experiments are:

S.No FEED DOC CUTTING SPEED C.C
1. 0.25 1.5mm 31.68 m/min Dry
2. 0.25 1.0mm 20.966 m/min Wet
3. 0.25 0.5mm 13.0609 m/min Mist

Combination of parameters for optimal Surface Roughness:

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Feed (mm/rev)</th>
<th>D.O.C (mm)</th>
<th>Cutting speed (m/min)</th>
<th>Cooling cond.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.25</td>
<td>1.5</td>
<td>31.68</td>
<td>Dry</td>
</tr>
<tr>
<td>2</td>
<td>0.25</td>
<td>1</td>
<td>20.966</td>
<td>Dry</td>
</tr>
<tr>
<td>3</td>
<td>0.25</td>
<td>0.5</td>
<td>13.0609</td>
<td>Dry</td>
</tr>
<tr>
<td>4</td>
<td>0.25</td>
<td>1.5</td>
<td>31.68</td>
<td>Wet</td>
</tr>
<tr>
<td>5</td>
<td>0.25</td>
<td>1</td>
<td>20.966</td>
<td>Wet</td>
</tr>
<tr>
<td>6</td>
<td>0.25</td>
<td>0.5</td>
<td>130609</td>
<td>Wet</td>
</tr>
<tr>
<td>7</td>
<td>0.25</td>
<td>1.5</td>
<td>31.68</td>
<td>Mist</td>
</tr>
<tr>
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<tr>
<td>9</td>
<td>0.25</td>
<td>0.5</td>
<td>130609</td>
<td>Mist</td>
</tr>
</tbody>
</table>

VIII. CONCLUSION

To find out which input parameter is influencing the average surface roughness, tool flank wear, material removal rate and cutting forces components by using the statistical technique such as ANOVA. After the analysis by ANOVA the most significant factor was obtained in the term of % contribution.

From ANOVA it was found that cutting speed has greater contribution on average surface roughness 37.365%, along with 37.38% and 25.31% respectively as depth of cut and cutting condition. During the analysis it was observed that cutting fluid also have considerable effect on the surface roughness.

The study determined appropriate cutting parameters to optimal performance measures. The Taguchi optimization method was successfully applied in the study\[11\]. Machining parameter surface roughness was maximized for the considered mild steel AISI 1080; process performance was enhanced and product quality was improved.

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Use of Artificial Neural Network in Predicting Survival and Growth Rates and Biochemical Characteristics in *Dendrobium Sonia-28*

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**Abstract** - *Dendrobium* sonia-28 is a popular orchid hybrid for its flowering recurrence and dense inflorescences which currently facing serious production problems due fungal diseases. In the present study, Protocorm like bodies (PLBs) of *Dendrobium* sonia-28 were subjected to different doses of gamma irradiation (10-200 Gy) followed by inoculation with various concentrations of *fusarium proliferatum* culture filtrate (CF) (2.5-20%). The results from these measurements were used in establishing an artificial neural network model meant to predict the result of more samples while being treated as carrying out laboratory measurements would be time consuming. CF and gamma irradiation were model inputs, while output was result value. The prediction performances of various neural network models were evaluated using statistical performance indices such as root of the mean squared error (RMSE), the mean squared error (MSE), and the multiple coefficient of determination (R2). The results show that the multilayer perceptron (MLP) neural network model with different nodes in the hidden layer was desirable for predicting results. Artificial Neural Networks analysis indicated that survival and growth rates of treated PLBs were dependent to treatment doses. Biochemical results revealed that the chlorophyll and total soluble protein decreased notably as the irradiation and inoculation concentration increases.

I. INTRODUCTION

In nature, plants may not be totally free from stresses and are expected to experience some degree of biotic and abiotic stresses (Ramoliya et al., 2004). Furthermore, among the various environmental stresses, pathogens attack significantly limited the plant growth and development (Dehgahiet al., 2015b; Dehgahi & Joniyas, 2016).

To combat stresses, plants exhibit several mechanisms which make them withstand the stress with the formation of new molecules and molecular mechanisms of stress tolerance. These variations are important in producing biotic stress tolerance in plants. However, the degree of tolerance differs from high to low length plants and also from plant to plant (Reddy et al., 2006). In the 21st century, developing stable stress tolerance plants would be a challenge for plant scientists (Atkinson & Urwin, 2012).

**In vitro** selection method via fungal elicitors is preferable due to their low toxicity for plant cell cultures as well as their high efficiency (Yuan et al., 2002; Dehgahiet al., 2014). Establishment of an appropriate phytotoxin concentration that negatively affects cells, tissues, organs and whole plants increases the probability of obtaining disease tolerant lines (Daub, 1986; Dehgahiet al., 2015a). *Fusarium* CF has been used widely in callus tests to select tolerant genotypes (Dehgahiet al., 2014).

*Fusarium* CF was recognised as a suitable agent for the induction of mutants and selection of disease resistant plants (Modgil et al., 2012). **In vitro** mutagenesis is a combination of **in vitro** culture and mutation induction, which provides the opportunity to increase variability of an economically important cultivar or used on plants in developing varieties that are agriculturally and have high productivity potential (Jain et al., 1998; El-Beltagiet al., 2011). Gamma application is preferred since it is not a threat for humankind and environment (Ulukapid & Nasircilar, 2015). Until now, some *Dendrobium* orchids have been successfully generated via mutagenesis and gamma irradiation in Malaysia (Ahmad et al., 2006; Ariffinet al., 2010).

Nowadays, the artificial neural network techniques have been widely used for predicting the nonlinear behaviour of many technical tasks (Ozer et al., 2008). An artificial neural network does not require the accurate knowledge of relationships between variables as needed by traditional techniques. Thus, artificial neural network could be conveniently used for resolving issues which mathematically, physically or structurally more are complicated. Vakili et al. (2015) stated that significant advantage of a neural network is that they could be updateable continuously when new data is available. Furthermore, in contrast to an empirical equation which is created according to limited affecting parameters, logical concurrent relationships between large array of independent and dependent variable would be used in artificial neural network.

Consequently, the current study was undertaken to probe and investigate the effect of gamma radiation and CF concentrations as a mutagen for *Dendrobium sonia*-28 PLBs. Thus, in order to predict the survival and growth rates as well as chlorophyll and protein contents after stress, a suitable neural network program was developed which stress parameters do not require the accurate knowledge of relationships between variables as needed by traditional techniques. Therefore, an artificial neural network technique has been developed and tested to predict the result of which technological tasks are useful.

**In vitro** propagation of PLBs

**In vitro** propagation of PLBs

The PLBs were cultured in semi-solid half-strength MS medium (Murashige & Skoog, 1962) supplemented with 2% (w/v) sucrose, 2.75g/L, Gelrite™ (Duchefa, the Netherlands) and 1mg/L of benzylaminopurine (BAP; Duchefa, the Netherlands).
The cultures were incubated at 25±2°C under 16 hours photoperiod using cool white fluorescent lamps (Philips TLD, 36W, 150 μmol.m⁻².s⁻¹).

The pH value (CyberScan PC 510 pH/mV/Conductivity/TDS/°C/°F Bench Meter, Eutech Instruments, Singapore) was adjusted to 5.7-5.8 before autoclaving (STURDY SA-300VFA-F-A505, Sturdy Industrial Co. Ltd., Taiwan). The PLBs were then subcultured every four weeks.

**Gamma radiation on PLBs**

In order to determine PLB’s gamma radiation sensitivity, four weeks old of 3-4 mm PLBs were irradiated with acute gamma radiation at Agrotechnology and Bioscience Division, Malaysian Nuclear Agency, Bangi, Selangor. The source of gamma rays was Cobalt-60. Hundred (100) PLBs were acutely irradiated with different doses of 0, 10, 20, 30, 40, 50, 60, 80, 100, 150 and 200 Gy (10 replicate containing 10 PLBs for each dose). PLBs were maintained at the above mentioned condition.

**CF treatment of Dendrobium sonia-28 PLBs**

The method reported by Tripathiet al. (2008) was used for the preparation of culture filtrate. In order to evaluate the effect of various severities and virulence of Fusarium wilt index. One hundred (100) additional PLBs were acutely irradiated with different doses of 0, 10, 20, 30, 40, 50, 60, 80, 100, 150 and 200% CF and incubated for four weeks under a 16 hour photoperiod using cool white fluorescent lamps at 25±2°C. One hundred (100) additional PLBs (control) were cultured in Petri dishes, and incubated under the same conditions.

**Determination of survival and growth rate of treated PLBs**

Gamma irradiated PLBs surviving post CF treatment were selected after four weeks. At the end of selection process, PLB’s survivability was scored based on colour of PLBs. The survival percentage of PLBs after selection process was calculated as follow:

\[
\text{Survival} = (\frac{\text{Number of survived PLBs}}{\text{Total PLBs cultured}}) \times 100\%
\]

Growth rate percentages were calculated using the following formula where FW indicates fresh weight (Sopalunet al., 2010).

\[
\text{Growth rate percentage} = (\frac{\text{Final FW} - \text{Initial FW}}{\text{Initial FW} \times \text{Days of incubation}}) \times 100\%
\]

**Determination of chlorophyll contents**

The technique used by Harborne (1973) was used to evaluate the chlorophyll values of control and treated PLBs using following formula:

Chlorophyll a = 11.75 (\text{A}_{663}) - 2.35 (\text{A}_{645})

Chlorophyll b = 18.61(\text{A}_{663}) - 3.96(\text{A}_{645})

Total chlorophyll = chlorophyll a+chlorophyll b

**Determination of total soluble protein content of untreated and CF treated PLBs**

The Bradford (1976) assay employs bovine serum albumin (BSA, Sigma, USA) as standard was used to determine the total soluble protein content of treated and control PLBs.

**Artificial neural networks modelling**

To create general relationships between variables in a given issue, an artificial neural networks has been used. Artificial neural networks is considered as a model of artificial intelligence as well as it is consumed as something able to simulate the brain and nervous system of humans (Shahin et al., 2003; Ozer et al., 2008). Artificial neural networks made of a various processing elements, neurons or nodes. Feed-forward multilayer perceptron network which consisted back propagation algorithms, input and output layers, and some hidden layers is the most widely used artificial neural networks (Erzin et al., 2009).

Habibagahi & Bamdad (2003) and Erzin et al. (2009) stated that although there is no connection among the neurons in the same layer, each neuron is fully connected with the next layer neurons. The output of each node could be defined by following Equation:

\[
\omega = \sum W_{ij} P_i + b_j
\]

Where \(\omega\) indicates output of node \(j\), \(P_i\) indicates input from \(i^{th}\) node, \(W_{ij}\) indicates the connection weight between \(j^{th}\) node of the layer and \(i^{th}\) node of the previous layer, \(b_j\) is the bias at the \(j^{th}\) node. Furthermore, \(\omega\) indicates the transfer function. Moreover, Erzin et al. (2009) stated that although node transfer function is often expressed by sigmoid functions, depending on the nature of the variables, other functions including hyperbolic linear and tangent functions could be used.

Nodes number in the input and output layers indicate the number of input and output variables, respectively (Erzin et al., 2009). Erzin et al. (2009) stated that the neural network systems are normally developed through dividing the available datasets into training, validation, and test subsets. A model is initially trained by using 70% of the data. However, 15% of the data has been used for validation process to minimizing over fitting. Trained model performance has been tested by the 15% remaining data. Hence, for model constructing, the training data are used, however, the testing and validation data are used for accuracy controlling of the developed model (Erzin et al., 2009).

System error is defined as a difference between an experimental and network prediction value (Vakili et al., 2015). Furthermore, Sinha & Wang (2008) and Erzin et al. (2009) reported that a minimum network error is created by changing the nodes number and weight in the hidden layer via cycles of trial and error during training. Various statistical performance indices are often used to analyse the developed network prediction performance. For the current research, mean squared error (MSE), root of the mean squared error (RMSE) and multiple coefficient of determination \(R^2\) have been used as the statistical criteria.

The above mentioned statistical models have been used to select optimum network as well as to quantify the predicted data accuracy from the neural network methods. In the following formulas, \(n\) indicates the data setnumbers, \(k_p\) and \(k_m\) are the predicted and measured results, respectively:

\[
\text{RMSE} = \left(\frac{1}{n}\sum_{i=1}^{n}(k_p - k_m)^2\right)^{0.5}
\]

\[
\text{MSE} = \frac{1}{n}\sum_{i=1}^{n}(k_p - k_m)^2
\]

\[
R^2 = 1 - \left(\frac{\sum_{i=1}^{n}(k_p - k_m)^2}{\sum_{i=1}^{n}(k_p)^2}\right)
\]
According to the methods, the optimum network would have the least MSE and RMSE, which the results of a perfect fit have zero MSE and RMSE. R² can be used as the closeness of fit. While, R² = 0 and R² = 1 are the result of a poor and perfect fits, respectively. In this study, the abovementioned values have been calculated for different neural networks developed by different nodes number in the hidden layer. Furthermore, separate optimum neural networks have been selected accordingly.

In the current study, 2 variables effects on results characteristics have been considered. Hence, the trained neural network system included 2 nodes in the input layer and one in the output layer. A total of 99 datasets have been used in this research. Networks with various nodes in the hidden layer were trained to find the optimum neural networks with the least error. MATLAB (2012) is the using software for modelling of the mentioned neural network which used the integration module in the computer application GENES.

III. RESULTS

Effect of gamma irradiation and CF inoculation on PLBs survival rate

Gamma irradiation and CF inoculation at various doses showed a significant effect on survival rates of PLBs. Lower post-treatment survival was obtained when PLBs were treated with higher concentrations of gamma and CF (Figure 1).

The measured result has been compared with predicted results in different nodes of the hidden layers. Our results indicated that the proposed neural network with 10 nodes in the hidden layer (R = 0.98172 and RMSE = 3.5988 × 10⁻⁸) was found desirable in predicting survival rate (Table 1, Figures 2, 3). The equality line (y = T) indicated network error. A system which showed zero error would have all plots positioned on the equality line. Hence, the plots deviation from the equality line shows system error. For the unknown properties, datasets from previous tests can be used and further tests can be carried out to determine whole results of samples through neural network models.

Effects of gamma irradiation and CF inoculation on the PLBs growth rate percentage

Interaction of various CF and gamma doses indicated higher doses of treatments was found to have significant effects on fresh weight of PLBs (Figure 1). Increasing CF concentration to 20% and gamma radiation to 200 Gy displayed a greater reduce of growth rate in PLBs compared to PLBs inoculated with lower concentration of treatments. Furthermore, the neural network developed for 5 nodes in the hidden layer was found to be optimum as it has the least value of RMSE and MSE and the most value of R² (Table 2, Figures 4, 5).

Effects of gamma irradiation and CF inoculation on the chlorophyll and protein contents

The effect of different CF and gamma doses on the physiological aspects of PLBs was studied. Results indicated that there was considerable reduction in chlorophyll and protein contents of the treated PLBs. However, higher reduction could be observed after higher doses of treatments. Moreover, the neural network developed for 12 and 7 nodes in the hidden layer were found to be optimum for chlorophyll and protein contents, respectively, as they have the least value of RMSE and MSE and the most value of R² (Table 3, Figures 6, 7) and (Table 4, Figures 8, 9).

IV. DISCUSSION

Results obtained by neural network model indicated higher accuracy compared to the estimated and measured results. Moreover, Noh et al. (2006) and Gautam & Panigrahi (2007) obtained high accuracy through neural network analysis on corn plants (MSE = 0.03 and MSE = 0.066, respectively).

Similarly, Wang et al. (2009) analysed their results through the neural network model and stated that RGB components and growth and survival rates was not perfectly linear on assessing rape plant nitrogen concentration. Furthermore, Moghaddam et al. (2011) verified that the MLPNN model can provide more accurate estimations of sugar beet leaf chlorophyll, in comparison to the linear regression model. Kumar et al. (2013) stated that gamma irradiation affects greatly on germination of nine popular rice varieties and their results indicated that increasing doses of gamma irradiation had significant effect on germination for the first seven days under laboratory conditions.

Vakili et al. (2015) reported that using stress accurate dose in each project needs specific measures, adequate management and precautions for avoiding project failures. Limited budget and time and resolving stress problems resulted to improving different techniques. These methods should also be interpreted along with the fact that survival and weight rates and chlorophyll and protein contents decreases with higher stress doses. However, measuring the accurate results is time and money consuming. By using artificial neural network techniques, survival, weight and physiological characteristics can be determined faster with reasonable accuracy.

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Figure 1: Effect of gamma radiation and CF on *Dendrobium* sonia-28 PLBs after four weeks of inoculation. A (Untreated PLBs), B (200 Gy irradiated PLBs treated with 20% CF).

Table 1: Outcomes of various neural networks for *Dendrobium* sonia-28 survival rate results developed for the different number of nodes in the hidden layers

<table>
<thead>
<tr>
<th>Number of nodes</th>
<th>RMSE</th>
<th>MSE</th>
<th>R</th>
<th>R^2</th>
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<td>3</td>
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<td>9.798×10^{-15}</td>
<td>0.91028</td>
<td>0.828609678</td>
</tr>
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<tr>
<td>10</td>
<td>3.5988×10^{-8}</td>
<td>2.8297×10^{-15}</td>
<td>0.98172</td>
<td>0.963774158</td>
</tr>
<tr>
<td>12</td>
<td>4.3189×10^{-8}</td>
<td>3.7189×10^{-15}</td>
<td>0.97426</td>
<td>0.949182548</td>
</tr>
<tr>
<td>15</td>
<td>5.5604×10^{-8}</td>
<td>3.2676×10^{-15}</td>
<td>0.96472</td>
<td>0.930684678</td>
</tr>
</tbody>
</table>
Figure 2: Plot of measured *Dendrobium* sonia-28 survival rate versus predicted survival rate from neural network modelling for 10 nodes in the hidden layers.
Figure 3: Estimated survival rates of *Dendrobium* sonia-28 based on different doses of gamma irradiation and CF inoculation.

Table 2: Outcomes of various neural networks for *Dendrobium* sonia-28 growth rate results developed for the different number of nodes in the hidden layers

<table>
<thead>
<tr>
<th>Number of nodes</th>
<th>RMSE</th>
<th>MSE</th>
<th>R</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4.6835×10⁻⁸</td>
<td>3.968×10⁻¹⁵</td>
<td>0.97321</td>
<td>0.947137704</td>
</tr>
<tr>
<td>5</td>
<td>3.1608×10⁻⁸</td>
<td>1.6354×10⁻¹⁵</td>
<td>0.98952</td>
<td>0.97914983</td>
</tr>
<tr>
<td>7</td>
<td>4.1032×10⁻⁸</td>
<td>2.423×10⁻¹⁵</td>
<td>0.97732</td>
<td>0.955154382</td>
</tr>
<tr>
<td>10</td>
<td>5.6365×10⁻⁸</td>
<td>4.7195×10⁻¹⁵</td>
<td>0.96456</td>
<td>0.930375994</td>
</tr>
<tr>
<td>12</td>
<td>7.1465×10⁻⁸</td>
<td>6.8326×10⁻¹⁵</td>
<td>0.94245</td>
<td>0.888212003</td>
</tr>
<tr>
<td>15</td>
<td>8.1376×10⁻⁸</td>
<td>7.8534×10⁻¹⁵</td>
<td>0.93679</td>
<td>0.877575504</td>
</tr>
</tbody>
</table>
Figure 4: Plot of measured *Dendrobium* sonia-28 growth rate versus predicted growth rate from neural network modelling for 5 nodes in the hidden layers.
Figure 5: Estimated growth rates of *Dendrobium* sonia-28 based on different doses of gamma irradiation and CF inoculation.

Table 3: Outcomes of various neural networks for *Dendrobium* sonia-28 chlorophyll content results developed for the different number of nodes in the hidden layers

<table>
<thead>
<tr>
<th>Number of nodes</th>
<th>RMSE</th>
<th>MSE</th>
<th>R</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9.393×10^{-8}</td>
<td>8.609×10^{-15}</td>
<td>0.92025</td>
<td>0.846860063</td>
</tr>
<tr>
<td>5</td>
<td>8.2649×10^{-8}</td>
<td>7.9149×10^{-15}</td>
<td>0.93567</td>
<td>0.875478349</td>
</tr>
<tr>
<td>7</td>
<td>7.6012×10^{-8}</td>
<td>6.651×10^{-15}</td>
<td>0.94826</td>
<td>0.899197028</td>
</tr>
<tr>
<td>10</td>
<td>3.4988×10^{-8}</td>
<td>1.9195×10^{-15}</td>
<td>0.98183</td>
<td>0.963990149</td>
</tr>
<tr>
<td>12</td>
<td>3.0189×10^{-8}</td>
<td>1.0012×10^{-15}</td>
<td>0.99086</td>
<td>0.98180354</td>
</tr>
<tr>
<td>15</td>
<td>3.3604×10^{-8}</td>
<td>1.4652×10^{-15}</td>
<td>0.98432</td>
<td>0.968885862</td>
</tr>
</tbody>
</table>
Figure 6: Plot of measured *Dendrobium* sonia-28 chlorophyll content versus predicted chlorophyll contents from neural network modelling for 12 nodes in the hidden layers.
Figure 7: Estimated chlorophyll contents of *Dendrobium* sonia-28 based on different doses of gamma irradiation and CF inoculation.

Table 4: Outcomes of various neural networks for *Dendrobium* sonia-28 protein content results developed for the different number of nodes in the hidden layers

<table>
<thead>
<tr>
<th>Number of nodes</th>
<th>RMSE</th>
<th>MSE</th>
<th>R</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>$5.893 \times 10^{-8}$</td>
<td>$4.909 \times 10^{-15}$</td>
<td>0.96022</td>
<td>0.922022448</td>
</tr>
<tr>
<td>5</td>
<td>$4.2639 \times 10^{-8}$</td>
<td>$3.5249 \times 10^{-15}$</td>
<td>0.97562</td>
<td>0.951834384</td>
</tr>
<tr>
<td>7</td>
<td>$3.260 \times 10^{-8}$</td>
<td>$1.751 \times 10^{-15}$</td>
<td>0.98778</td>
<td>0.975709328</td>
</tr>
<tr>
<td>10</td>
<td>$3.5888 \times 10^{-8}$</td>
<td>$2.4195 \times 10^{-15}$</td>
<td>0.98173</td>
<td>0.963793793</td>
</tr>
<tr>
<td>12</td>
<td>$4.5189 \times 10^{-8}$</td>
<td>$3.8289 \times 10^{-15}$</td>
<td>0.97345</td>
<td>0.947604903</td>
</tr>
<tr>
<td>15</td>
<td>$5.7604 \times 10^{-8}$</td>
<td>$4.8676 \times 10^{-15}$</td>
<td>0.96368</td>
<td>0.928679142</td>
</tr>
</tbody>
</table>
Figure 8: Plot of measured *Dendrobium* sonia-28 protein content versus predicted protein contents from neural network modelling for 18 nodes in the hidden layers
Figure 9: Estimated protein contents of *Dendrobium*sonia-28 based on different doses of gamma irradiation and CF inoculation.
Challenges Facing Women Micro and Small scale Business Enterprise Owners in Jimma Town

(Comparative study, Women enter in to the business by themselves and through Micro and small business enterprise office)

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Abstract- The research was concerned with the challenges facing women micro and small scale enterprise owners when they run their business in Jimma town. The primary aim of this research was to identify the major challenges facing women micro and small enterprises owners in comparison. The researcher examined the owners’ access to finance, their management skills, their access to markets, access to necessary technology, their levels of education, access to business premise, access to necessary infrastructure and access market information. The researcher examined different support provided by responsible parties for both business owners. The researched also examined the possibility of alleviating business challenge in both target groups. The primary data was collected through structured questionnaire and unstructured interview from 381 sample respondent (owners) who are selected by stratified sampling and from higher officials respectively. The result shows that the challenges are similar for both respondents with different extent. The major challenges are lack of: financial access, business training opportunity, access to technology, access to market information, access to infrastructure, access to raw material, and access to market. On the other hand, results also reveal, the owners that enter in to the business through micro and small enterprise office have got better support than that of those owners enter in to the business by themselves. Furthermore, the result revealed that, from those owners who enter in to the business by themselves, those who are the member of chamber of commerce have got support from the office. Regarding alleviating the challenge, those owners who enter in to the business through micro and small enterprise office are in a better position in alleviating the challenge. Hence, government officials need to exert much effort towards alleviating those challenges by coordinating different stakeholders. And the chamber also needs to exert much more effort in awareness creation about the office.

Index Terms- Challenge, women business owner, Jimma, Ethiopia

I. INTRODUCTION

It is widely accepted that micro and small enterprise (MSE) sector has the potential to provide a livelihood for a significantly large number of people in least developed country like Ethiopia (Zewde and Associate, 2002). According to ILO (2002) the informal employment, outside of agriculture, is defined as employment that comprises of both self-employment, in the informal enterprises, and wage employment, in the informal jobs, without secure contracts, worker benefits, or social protection these represents nearly half or more of the total non-agricultural employment in all regions of the developing world. It ranges from 48% in North Africa to 51% in Latin America, 65% in Asia, and 72% in sub-Saharan Africa. The informal sector is also a larger source of employment for women than men in developing countries, for example in sub-Saharan Africa 84% of women non-agricultural workers are informally employed compared to 63% of male non-agricultural workers.

As one of the developing country, in Ethiopia also, microenterprises are generally considered to be the domain of poor, rural and urban women (Zewde and Associate, 2002). As some authors wrote, the largest segments of Ethiopian private sectors are composed of micro, small and medium scale businesses enterprise (Abebe & Belay 1997). As per the Ethiopian Central Statistics Authority (2004), almost 50% of all new jobs created in Ethiopia are attributable to micro and small businesses enterprises. According to Aregash as cited in Eshetu and Zeleke (2008), in Ethiopia 98% of business firms are micro and small enterprises. Even if the composition of the female informal workforce varies across regions, the majority of economically active women in developing countries, this is about 60% of the total populations engaged in the informal sector are female urban work force. It makes up a significant share of the micro-enterprise population, and is considered critically important to poverty reduction strategies. (Gebrehiwot & Wolday, 2005).

Because of the above reason, the Government of Ethiopia gave attention to the promotion and development of MSEs, especially for women as a strategy for poverty reduction and increasingly for employment creation. The issuance of the first national MSE Development and Promotion Strategy in 1997 and formulation of Women Policy in 1998 aims to empower women by facilitating conditions to have access to resources and to participate in economic activities. Ethiopia’s industrial development strategy issued in 2003 also singled out the...
promotion of MSEs development as one of the important instruments to create productive and dynamic private sector. The promotion of this sector is justified on the grounds that enhancing growth with equity, creating long-term jobs, providing the basis for medium and large enterprise and promoting exports etc. The strategy puts a means to support the MSEs such as, infrastructure, and financial facilities, supply of raw materials, training, and related assistance (Ageba and Ameha, 2004). The efficacy of such involvements, however, depends on identifying the key problems or constraint of micro and small business enterprises

Despite the challenges of MSEs, different studies have exposed that enterprises owned by women practice the same challenges as those owned by men; however certain characteristics are typical for many women-owned firms. These characteristics include: small size, limited prospects for profitability and failure to provide collateral for obtaining loans (Coleman, 2002). According to Amha & Admassie (2004), in Ethiopia more than half of all women business owners often face gender related challenges related to establishing new businesses as well as operating or expanding existing businesses. So that, to take appropriate measures for these problems or challenges, and to increase the participation of women in poverty reduction, knowing the challenges is a prerequisite.

Regarding the number of women participated in business, as per the population and housing census of Ethiopia 2007, the total population of the county is 73,750,932 from these 36,533,802 are females. This accounts 49.56 % of the total population. This shows that Ethiopia is among those African countries that are known by human resource potential. But, because of different constraints the country could not utilize this human resource effectively and efficiently.

Among the country in Ethiopia, Oromiya region has the largest population with 26,993,933 people. And Jimma is one of the towns from Oromiya region with the population number of 128,330. From this total population 12,137 were participated in business. As per the information obtained from the town micro and small enterprise agency, and trade and industry office (20012) there are 5700 enterprise in Jimma town. From these only 1294 enterprises are owned by women. This shows that unlike the above mentioned studies in the town the participation of women in micro and small business Enterprise is low. However, as per the researcher knowledge, before now any research could not be conducted in relation with challenges of women micro and small business owners in the town comparatively. This study aimed to compare women business owners who enter in to the business by themselves and trough micro and small enterprise office. Because of this reason, the researcher motivates to conduct this research in order to investigate the problem comparatively and to provide possible recommendation.

1.1. STATEMENT OF THE PROBLEM

As mentioned in the introduction above, women’s are the main actors of micro and small enterprise and also they have a large share in poverty reduction. But, there are different obstacles that hinder utilization of women human resource in effective and efficient ways. This is supported by different empirical evidences. Studies, (Zewde & Associates, 2002; Ehetu and Zelek, 2008; ILO, 2003; ILO, 2005; Solomon, 2004; Desta, 2010; Rahel and Issac, 2010 ) were identified the major challenges which faced by women business owners. Those are: lack of market access, lack of Information access, Lack of affordable appropriate technology, Lack of opportunities for bulk purchase of inputs, Low levels of education, access to finance, access to land for business premises, access to business development services, lack of infrastructural facilities, raw material problem etc.. These hinder the participation of women in poverty reduction or force them not to contribute a lot to the poverty reduction of the town, region and the country as a whole.

Despite this fact, even though, different studies (which are cited above) were conducted on women business owners in the country, there is an acute shortage of studies conducted with a specific objective of analyzing the problems of Micro and small enterprises operated by women in each town rather selected major town in Ethiopia from all over the country. In addition to this the previous research conducted without differentiating business owners engage in the business by themselves or through Micro and small Scale Business enterprise office.

Therefore, this study is different from those researches discussed above by focus area. Because, this study specifically emphasized on investigating those challenges comparatively and it will conduct particularly in Jimma town. Thus, in this study the researcher intended to assess the different challenges women business owners in MSEs facing in the town.

1.2. OBJECTIVE OF THE STUDY

1. To investigate the challenges facing Jimma town women business owners in micro and small scale business enterprise.

2. To examine whether or not the business owner have got any support from governmental institution when they face business challenges

3. To assure that whether there is any difference in alleviating business challenge when women perform their business activity by themselves and when they perform it with the support of micro and small enterprise office or not.

II. BRIEF LITERATURE

The micro enterprise is private business enterprise, it is probably owned by an individual, maybe supported by one or two family members, engaged in income generating activity. Micro enterprise is likely to be a trading activity; selling food or clothing in street, making and selling handicrafts. There is probably very little investment in fixed assets and inventory investment would be minimal. Enterprise sales may not be distinguished from any other kind of income the individual or household earns. These “enterprises” may be quite unstable and if better opportunities arise or if costs cannot be covered the individuals involved may move on. This situation can be based very much on a “hand-to-mouth” existence. By contrast, a small business usually has an existence separate from that of the owner. The business may be incorporated as a sole proprietorship. Continuity would be anticipated. There would be some level of investment, if not in fixed assets then in inventory. It is likely that employees would include non-family members.

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One would expect business finances to be separate from the finances of the owner and her/his family (AEMFI, 2009).

Regarding the definition of Micro and small business enterprise, Wolday (2007) has verified that various countries have different criteria to determine the size of their enterprises such as number of employees, assets employed, sales turnover or a combination of all these. The Ethiopian government, in its micro and small enterprise strategy (1997), defined MSEs based on the size of the capital and level of automation as follows.

“Micro enterprises are those small business enterprises with a paid up capital of not exceeding Birr 20,000 and excluding high-tech consultancy firms and other high-tech establishments and Small enterprises are those business enterprises with a paid up capital of above Birr 20,000 and not exceeding Birr 50,000, and excluding high-tech consultancy firms and high-tech establishments (Welday, 2007, pp. 1).”

Regarding women in business, history and public perception would suggest that business is typically the field of men. In most countries, a large number of businesses are not owned or managed by women. (Women’s Unit UK 2001). But, gradually the issue of women business is becoming more popular across the globe. The participation of women is gradually more being viewed as one of the major contributors in economic growth. Irrespective of their participation in small-/medium-scale enterprises or in the informal/formal sectors, their contribution to output and value addition is significant. Women business is not only necessary for their economic survival but also for strengthening the social system. Promoting women’s business development is therefore critical for economic growth and development. Participation of women in small business enterprises is very encouraging in some African countries (Sub-Saharan Africa Trade and Economic Cooperation Forum Report, 2003).

When it comes to Ethiopia, it is one of the developing countries where the small-scale enterprises are estimated to employ 1.5 million people. Out of these 1.5 million people that engage in small-scale enterprises the proportion of women is high as small-scale enterprises are an important source of livelihood for women in Ethiopia (Reta, 2000). In studying the involvement of women in small-scale enterprises, the survey conducted by the CSA in 2004 covering 48 towns indicated that 65 per cent of the informal sector activities are owned and run by women.

Despite this fact, generating employment for Ethiopian women is a major challenge keeping in view insufficient opportunities in the existing formal sector. They have not only less opportunity to get education than men but also have less employment opportunities – i.e. one of the main factors cited for migration and trafficking (Emebet, 2003). According to Reynolds (2004), one way of protecting women from the manipulative situations of migration is to create job opportunities within the country, and Provision of special assistance to women business and SMEs.

A national survey conducted by the Ethiopian Welfare Monitoring Unit as cited in Eshetu and Zeleke (2008) shows that women business in Ethiopia are not provided with adequate policy related and strategic support from the national government, and that the promotion of vibrant SMEs should be one of the most important priority strategies for empowering women, addressing miserable poverty and unemployment.

Businesses and enterprises activated by women contribute for economic dynamism, diversification, productivity, competition, innovation and economic empowerment of the poorest of the poor. Historically, there has been a well recognized tradition of women being involved in small businesses and enterprises. However, it is only recently that women’s business has gained the attention of economic planners and policy makers particularly in developing countries like Ethiopia. Even though, the national government has come to acknowledge that supporting enterprises operated by women promotes gender equality and economic empowerment, the majority of enterprises operated by women face difficulty in terms of access to finance, resources, business skills and institutional support from the national government (National Bank of Ethiopia (2002); Ministry of Trade and Industry of Ethiopia, 2003; Negash & Kenea, 2003).

1.3. VARIABLE DESCRIPTION

Women business owners have faced different difficulties when they run their business. The major factors the researcher has used in this study are the following:

Access to finance: it is a key issue for women. Accessing credit, mainly for starting an enterprise, is one of the major constraints faced by women. They often have fewer opportunities than men to gain credit for different reasons, including lack of collateral, an unwillingness to accept household assets as collateral and negative perceptions for female business owners by loan officers (Mahbub,2000).

Lack of infrastructural facilities: The availability of a well-established, well-maintained infrastructure plays a key role in the smooth operation of an enterprise and might ultimately affect whether it succeeds or not. In order to operate, enterprises need roads for transportation, sanitation, water, electricity…etc. Hence, the unavailability of such facilities poses a serious obstacle in efficient operation of an enterprise. Larger firms with better access to finance are more capable of being situated in territories characterized by more developed infrastructural services, hence the less ability of female to access such facilities imposed seriosus problem on them. Finally, the social immobility of women might play an important role in hindering them from relocating their enterprises to regions better equipped in terms of infrastructure. Poor infrastructure is a challenge, including during the rainy seasons when women micro business owners had little protection from rain or choking sun during hot seasons (Jagero & Kushoka , 2011).

Access to land for business premises (for production and marketing): this is one of the major constraints for businesses of all sizes. Especially for women it’s it is a major problem and it has caused women to operate from their houses or on the streets with poor sanitary conditions and exposed to theft and harassment by the police and clients. The availability of plots of land and premises in strategic areas for MSEs to produce and market their products is essential (Solomon, 2010)
Access to training: Studies have indicated that women generally are less educated than men in the micro enterprise sector. Access to training opportunities for MSEs is very limited regardless of the fact that several NGOs, supporters and government bodies do provide training. Access to apprenticeship training and on-the-job experiences is also very limited while other services such as business extension services and counseling are generally unavailable for MSEs. Some women are unable to attend training organized in conventional workshops, mainly because the activities they are engaged in require them to work on the business continuously (ILO, 2006).

Lack of Market Access and Information: Some of the literature on Ethiopian women business owners, particularly microenterprise operators, indicates that women face serious difficulties in marketing their products or services. Research has revealed that this problem is often caused by the fact that women especially those in the rural areas, produce and try to market their products around the homestead, thereby limiting their market to individual buyers or the immediate neighborhood. This narrows the market and limits the enterprise’s expansion capacity. Often such practices stem from lack of information about market opportunities or access to markets. It is essential that the marketing of products should be linked to quality, price and timeliness of delivery of goods and services. Product quality and external factors such as the situation of the existing infrastructure, also affect market access for the products of women (Zewde & Associate, 2002).

Lack of Managerial skill: Simply, managerial skills are knowledge to perform some activities or tasks. This knowledge can be learned, it also can be acquired through practical fulfillment of these activities. Therefore, skills can be acquired through learning and experience of individuals. When we talk about managerial skills, those are skills used from managers that enable them maintaining efficiency in the way how employees complete their working tasks. According to Eshetu and Zeleke (2008), shortage of technical and business related skills constitutes a major problem experienced by female business owners. The educational curriculum prepared for students at the undergraduate level lacks focus, practical content and depth on vocational and business related skills that are essential for successfully initiating and operating micro enterprises. The fact that 56% of women business owners had poor technical skills and this shows that the Ethiopian Ministry of Education has not done enough to empower potential women entrepreneurs.

Lack of access to modern technology: - Technology, as it relates to MSEs, is defined here as the ability or capability to translate and convert ideas into tangible goods and services. In addition to the capability (software) aspect, most MSEs – including those run by women – require labor-saving machinery and equipment. The lack of appropriate technology inhibits the growth and development of enterprises operated by women. For instance, women engaged in pottery and semi-processed food items like "enset", still use age-old, crude tools that are in some cases hazardous for the health of the women involved. The quality of their products is also poor in many cases, forcing them to be sold at very low prices despite the considerable time involved in production. Especially in rural areas, access to appropriate labor-saving technologies for women could create opportunities for new and better businesses to which their time and effort could be devoted more productively (Tsegaye, 1998).

II. METHODS AND MATERIALS

1.4. TYPE OF DATA AND METHOD OF DATA COLLECTION

To achieve the objectives of the study, both primary and secondary source of data was used. Regarding the sources of data, the primary data obtained from the town women (micro and small) business owners. Furthermore, secondary data collected from different related literatures, websites, and different documents and records. Questionnaire was used to collect data from the town women (micro and small) business owners. Because questionnaire requires low cost for larger sample size and it’s free from bias of the interviewer. The researcher also used unstructured interview to collect primary data from officers.

1.5. STUDY POPULATION

The study populations of this study were Jimma town women (micro and small) business owners. It was consider separately as women who enter in to the business by themselves and women who enter in to the business through micro and small scale business enterprise office. As per the information obtained from the town trade and industry office, and micro and small enterprise agency (2012), the total number of women who enter in to the business by themselves is 1170, where as the total number of women who enter in to the business through micro and small enterprise agency is 124.

1.6. SAMPLE SIZE

The total sample sizes for women business owner who enter in to the business by themselves was 319. The number of women business owners that was taken from the population has been determined based on Cochran formula for n in sampling for finite population;

\[ n = \frac{\text{no}}{1 + (\text{no} - 1)/N} \]

\[ \text{no} = \frac{z^2 pq}{d^2} \]

\[ = \frac{(1.96^2)(0.5)(0.5)}{0.05^2} \]

\[ = \frac{384.16}{384.16} \]

\[ = 384.16 \]

\[ n = \frac{1 + (384.16 - 1)/1170}{289.5 \approx 290} \]

For non respondents 10% had been added:

\[ = 290 \times 0.1 + 290 \]

\[ = 319 \]

Where: n-- sample size

d-- Margin of error
p -- Population proportion
N – Population size
(Cochran 1977, pp. 75 & 76)

The researcher was used the most frequently chosen confidence value 95% ($1.96$) from $z$ distribution table. A larger value for the quantity $p(1 - q)$ is result in a larger sample size. Note that the largest value of $p(1 - q)$ occurs when $p = 0.50$, that the sample size is sufficient to obtain the desired margin of error. It is also recommended to use planning value of $p = 0.5$ when there is no previous work done on similar topic, pilot study was not conducted, and judgment is not used to select preliminary sample, based on this fact the researchers has choice $p$ to be 0.5 (Anderson 2009, PP. 313- 316). And for the other target group who are women enter in to the business through micro and small enterprise agency the sample size was 62 which are 50% of the total population. So, the total sample size for this study was 381.

1.7. SAMPLING TECHNIQUE

For selecting the needed samples respondent, for both target groups stratified sampling was used. The strata were divided based on the sector they engaged. This is because of the nature of the population which is heterogeneous.

1.8. DATA ANALYSIS METHOD

After the data had been collected, the researcher edit, organized, and stored the data in SPSS to make it easy for analysis. Descriptive statistics specifically table was used to analyze the data.

1.9. CHALLENGES FACED BY WOMEN BUSINESS OWNERS IN JIMMA TOWN

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Challenges</th>
<th>Frequency</th>
<th>Percent</th>
<th>Frequency</th>
<th>Percent</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have no Enough financial access</td>
<td>259</td>
<td>88.7</td>
<td>35</td>
<td>61.7</td>
<td>26.99</td>
</tr>
<tr>
<td>2</td>
<td>I didn’t have Business training opportunity</td>
<td>262</td>
<td>90</td>
<td>18</td>
<td>31.57</td>
<td>58.43</td>
</tr>
<tr>
<td>3</td>
<td>I have no Enough business premises</td>
<td>253</td>
<td>86.6</td>
<td>41</td>
<td>71.9</td>
<td>14.67</td>
</tr>
<tr>
<td>4</td>
<td>I have no Access to technology</td>
<td>248</td>
<td>85</td>
<td>38</td>
<td>77</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>I have no good Access to market information</td>
<td>239</td>
<td>81.8</td>
<td>36</td>
<td>63.2</td>
<td>18.6</td>
</tr>
<tr>
<td>6</td>
<td>I have no full Access to infrastructure</td>
<td>231</td>
<td>79</td>
<td>40</td>
<td>70.2</td>
<td>8.8</td>
</tr>
<tr>
<td>7</td>
<td>I have no Access to raw material</td>
<td>253</td>
<td>86.6</td>
<td>39</td>
<td>68.4</td>
<td>18.2</td>
</tr>
<tr>
<td>8</td>
<td>Have good managerial skill</td>
<td>178</td>
<td>61</td>
<td>35</td>
<td>61.4</td>
<td>0.4</td>
</tr>
<tr>
<td>9</td>
<td>I have no enough Access to market</td>
<td>256</td>
<td>84.2</td>
<td>31</td>
<td>54.4</td>
<td>29.8</td>
</tr>
</tbody>
</table>

Source: questionnaire 2011/2012

As can be seen from table 1: above, regarding financial access, the majority, 88.7% of the respondents from the owners who enter in to the business by themselves replied that as they have no enough financial access where as, from the owner who enter in to the business through micro and small enterprise office 61.7% of them replied as they have no enough financial access with the deference of 26.99%. Then 90% of the respondents from owners who enter in to the business by themselves replied as they didn’t have any training opportunity while, from the owners who enter in to the business through micro and small enterprise office only 31.57% of them replied as they didn’t got any training opportunity with the deference of 58.43%. Related to, working premise, 86.6% of the respondents from owners who enter in to the business by themselves responded as they have no enough business premises while, from the owners who enter in to the business through micro and small enterprise office 71.9% as they have no enough business premises with the deference of 14.67. The majority that is about 85% of the respondents from
owners who enter in to the business by themselves replied as they didn’t have good access to technology while, from the owners who enter in to the business through micro and small enterprise office 77% of them replied as they good access to technology with the deference of 8%. Beside, 81.8% of the respondents from owners who enter in to the business by themselves responded as they have no enough access to market information although, from the owners who enter in to the business through micro and small enterprise office 63.2% of them replied as they have no enough access to market information with the deference of 18.6%. Regarding access to infrastructure, majority 79% of respondents from owners who enter in to the business by themselves replied as they didn’t have good access to infrastructure at the same time, from the owners who enter in to the business through micro and small enterprise office 70.2% of them replied as they have no good access to infrastructure with the deference of 8.8%. In relation to access to raw material, about 86.6% of respondents from owners who enter in to the business by themselves replied as they have no good access to raw material whilst, from the owners who enter in to the business through micro and small enterprise office 68.4% of them replied as they didn’t have good access to raw material with the deference of 18.2%. from the total respondents about 61% of respondents from owners who enter in to the business by themselves replied as they have good managerial skill whilst, from the owners who enter in to the business through micro and small enterprise office 61.4% of them replied as they have good managerial skill with the deference of 0.4%. Regarding to market access, about 84.2% of respondents from owners who enter in to the business by themselves replied as they didn’t have no enough access to market whilst, from the owners who enter in to the business through micro and small enterprise office 54.4% of them replied as they didn’t have good access to market with the deference of 29.8%.

1.10. SUPPORT PROVIDED BY RESPONSIBLE PARTIES
The following table shows that different support

<table>
<thead>
<tr>
<th>Item</th>
<th>Business owners enter in to the business by themselves</th>
<th>Business owners enter in to the business through micro and small enterprise office</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
</tr>
<tr>
<td>1. I Haven’t got any support from anybody regarding how to run my business</td>
<td>262</td>
<td>90</td>
<td>18</td>
</tr>
<tr>
<td>2. The type of support for those who got support from different offices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>0</td>
<td>0</td>
<td>39</td>
</tr>
<tr>
<td>Working premise</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Credit opportunity</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Market linkage</td>
<td>30</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>3. Who provide these supports?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSE office</td>
<td>0</td>
<td>0</td>
<td>39</td>
</tr>
<tr>
<td>Chamber of Commerce</td>
<td>30</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Trade and Industry</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: questionnaire 2011/2012

From the above Table number 6 it can be seen that, the majority, 90% of the respondents from the owners who enter in to the business by themselves have not got any support from anybody. Whereas, from the owner who enter in to the business through micro and small enterprise office only 31.57% of them have not got support with the deference of 58.43%. Then from the owners who got support 30(100%) all of them who are the member of chamber of commerce have got supports from the office which is market linkage. While, from the owners who enter in to the business through micro and small enterprise office 68.43% of them have got different support like training, working premise, Credit opportunity and Market linkage by Micro and small enterprise office.

V. CONCLUSION
The main objective of this study was to examine the major challenges that influence women micro and small enterprise owners in Jimma town comparatively. The result shows that, the challenges are similar for both respondents with different extent. The major challenges are lack of: financial access, business training opportunity, access to technology, access to market information, access to infrastructure, access to raw material, and access to market. Previous researches in the country (Zewde & Associates, 2002; Ehetu and Zelek, 2008; ILO, 2003; ILO, 2005; Solomon, 2004; Desta, 2010; Rahel and Issac, 2010) also made the same conclusion, as those factors are the major challenge for most of women business owners.

On the other hand, results also reveal, the owners that enter in to the business through micro and small enterprise office have got better support in different aspect like training, working premises, access to credit, and market linkage than that of those owners enter in to the business by themselves. Furthermore, the result reveled that, from those owners who enter in to the business by themselves, those who are the member of chamber of commerce have got support from the office which is market linkage. But, most of them are not the member of the chamber.
due to lack of awareness about the office, lack of knowledge about the importance of being the member of the chamber and also due to having bad image for the office. Most of them, understood that being the member of the chamber is to pay membership fee without having any importance so that, they don’t want to be the member of the chamber.

Regarding alleviating the challenge, those owners who enter in to the business through micro and small enterprise office are in a better position in alleviating the challenge due to the supports which are provided by the office.

VI. RECOMMENDATIONS

Result of the study shows, for both owners the challenges are the same and it has a great impact on their business performance, and also it restricts the contribution of those women in economic development since they are the major actors in the sector. Hence, government officials needs to exert much effort towards alleviating those challenges by coordinating different stakeholders like TVET (Technical and Vocational Education and Training) to provide training, Micro finance institutions to facilitate credit opportunity and other stakeholders as well.

Beside, the owners those who enter in to the business, and are not the member of the chamber have not got any support from anybody, particularly trade and industry office need to exert much more effort to alleviate the identified challenges for those legally registered owners since the pay tax for the government.

Furthermore, the study also paint red most of the owners have not awareness about chamber of commerce, they have no knowledge about the importance of the office, and they have bad image for the office. So that, the chamber need to exert much more effort to create awareness about the office and the service provided by them in order to create awareness and to correct the owners wrong perception about the office through different Medias.

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Effect of Personality Trait on Ethical Leadership in Selected Basic Schools in Ghana

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Abstract- The aim of the study was to examine the effect of the big five personality traits on ethical leadership using selected public basic schools within the Ayawaso district in Ghana. A total of 180 respondents consisting of leaders and subordinates were conveniently selected for the study. The leaders responded to a questionnaire concerning their personality traits while subordinates rated the ethical behavior of their leaders. Data collected was analyzed mainly using hierarchical regression analysis and independent sample t-test. Results indicated that, personality traits such as conscientiousness and extraversion had a positive effect on ethical leadership behavior after controlling for all other variables. Furthermore, the analysis revealed that leader conscientiousness accounts for the most variance in ethical leadership behavior. Also, there was no significant difference in ethical leadership behavior due to gender of leaders. A summary of the overall findings of the study are discussed as well as future directions for further study.

Index Terms- Ethical Leadership, Personality traits, Gender.

I. INTRODUCTION

Leadership plays a huge role in helping organizations to meet their goals. The behaviour of leaders at various levels of an organization affects the conduct of subordinates, which is then translated into the achievement of positive or negative outcomes both in the long and short run life cycle of an organization. Hence, the behaviour of leaders has attracted the interest of management researchers (Avolio, Walumbwa, & Weber, 2009; Nelson & Treviño, 2007; Yukl, 2006). Leaders, by virtue of their status and position, have some form of power that is formally recognized, however, the negative use of this power can have rippling negative effect on the organization or nation at large.

A striking case was when some public judges in Ghana were investigated and found guilty on accounts of various forms of corruption having turned the hands of the law to favor those who gave some gifts in the form of bribery in order to be set free from hideous crimes at the expense of the innocent, some resigned and others relieved off their capacity as state judges (Transparency International, 2015). Researchers have thus for years shown interest in the field of leadership, more specifically about such unethical behaviours of leaders (Grojean, Resick, Dickson, & Smith, 2004). So far as organizations are concerned, ethics is better addressed in the field of leadership because leaders have been described as those who are in the best position to set up the ethical tone within organizations and hence the study of ethics is very key (Kalshoven, 2010). In agreement to this assertion, Northouse (2010) opined that ethics is central to leadership as it not only affects the behaviour of the employee but also the climate within the organization as well as shareholder and stakeholder perception of the organization. Ethical leadership is defined as the exhibition of those characteristics and virtues as expressed through one's relationship with others and as a result the expression of normatively appropriate conduct through a two way relationship (Brown, Treviño, & Harrison, 2005). Normatively appropriate conduct refers to acting in a manner that is generally expected of leaders in a workplace context; that is, leaders are expected to take responsibility for their actions as well as act fairly and justly applying rewards and punishments appropriately where it is due. Ethical leadership from this perspective according to Brown and Treviño (2005) has brought about a more understandable way of approaching the ethical leadership construct in research.

The social learning theory by Bandura (1977) pointed out that employees would exhibit the ethical climate that exist within an organization, this was emphasized by Brown et al. (2005) when they proposed that leaders who display ethical behaviours influence their followers not necessarily because they are leaders but because they hold a degree of credibility which tends to enhance model effectiveness. Other studies have also confirmed the impact supervisors’ ethical or unethical leadership behaviour has had on subordinates’ outcome such as conduct, role conflict and pro-social behaviour (Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009; Zafar, 2013). There continues to be a great interest in the mass media and academic community about the ethical and unethical behaviours of leaders across the globe. Copious studies done so far on ethical leadership have shown positive correlations between ethical leadership and employee attitude and behaviour such as commitment, trust, employee in role performance, confidence on the job, psychological capital strength and organizational citizenship behaviour (Brown et al., 2005; Kalshoven, Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009; Piccolo, Greenbaum, & Eissa, 2012). Abraham Lincoln, one of the greatest residents of the United States once highlighted that, "Nearly all men can stand adversity, but if you want to test a man's character, give him power" (Weiss, 2006, p. 32). However, just as other studies have somewhat neglected, we must not wait to see the consequences of unethical leadership practices before acting. Waiting to see how leaders who do not know how to handle power affect negatively the lives of others before we act would not be a prudent response.

Therefore, organizational researchers have seen the need to make enquiries into tools that can aid in predicting the behaviour of leaders within organizations (Fretwell, Lewis, & Hannay, 2013). That is, the possibilities that certain things could help to predict the behaviour of an individual. Some researchers have asserted that the study of personality characteristics in relation to...
ethical behaviour could be one of the key antecedents to ethical leadership behaviour (Ashkanasy, Windsor, & Treviño, 2006). Thus, from the perspective of human personality traits, there could be some key traits in an individual that would make him act ethically or not. Diverse personality traits have been identified over the last 25 years by profound psychologists. However, a consensus has been built according to Digman (1990), in the last 25 years to describe human dimensions in five proportions or features. Following that, empirical studies have been conducted to further prove that the big five factor personality trait is stable across nationalities and cultures (Cobb-Clark & Schurer, 2011). Much of research into ethical leadership have used the big five personality trait as it has been observed to be culturally generalizable (Kalshoven, 2012; Marcus, Hoft & Riediger, 2006; Ones, Viswesvaran & Dilchert, 2005; Walumbwa & Schaubroeck, 2009).

Another argument making the Big five a center of attention is that apart from being cross culturally generalizable, “integrity tests are not clearly distinguishable from the big five dimensions” (Kalshoven, 2010, p. 69). In a theoretical discussion, Brown and Trevino (2006) also found these three traits (Conscientiousness, Agreeableness and Neuroticism) to be good predictors of a leader’s ethical behaviour. Hence, some studies that made enquiry into this relationship was aimed at predicting ethical leadership by using traits such as conscientiousness, neuroticism and agreeableness, excluding the other two traits (extraversion and openness to experience). For instance, Walumbwa and Schaubroeck (2009) found out that there was a significant positive relationship between conscientiousness and ethical leadership, whereas traits such as neuroticism was negatively related to ethical leadership behaviour. In their study, they excluded traits such as extraversion and openness to experience based on the explanations given by Brown et al. (2005) that these traits were not linked to the ethical leadership construct. On the contrary, Borman (2013) provided some theoretical debates and hence included these two traits, having found a significant positive relationship between ethical leadership and traits such as extraversion. Hence, the primary aim of the current study is to further contribute to the ongoing debate by further assessing theoretically and empirically about the effects each of the big five personality trait variables on ethical leadership. It is with this inquiry that this study aims to explore the process through which personality traits as defined in the big five relates to ethical leadership. In the nutshell, the overall aim of this study is to further test the relationship between ethical leader behaviour and the Big Five personality traits in some selected basic schools in the Ayawaso central sub-metro district.

1.1 Statement of the Problem

The increasing scandals and credit crisis in the global business have given rise to ethical leadership in recent times (Bello, 2012; Zafar, 2013; Monahan, 2012). In Ghana, issues of unethical leadership have had their say in the very fabric of businesses as well as the health and educational sector. For instance, a 2010 report by the World Bank revealed that Ghana was second to Chad when it came to the misappropriation of funds allocated to the health sector. Furthermore, the educational sector of the Ghanaian economy was charged with unethical practices as it was listed third (3rd) out of a total of twenty-six countries in Africa on cases of mass corruption. More appalling was the fact that the country was ranked number one (1st) by the Transparency International (2013) when it came to the payment of bribes within schools in African countries. The issue of payments of bribes before admitting students into schools was an open secret (Transparency International, 2010) as a result of inadequate infrastructure to contain students and hence admission was for either the very intelligent or those capable of paying bribes (Ajayi, 2011). Furthermore, the Domestic Violence and Victims Support Unit (DOVVSU) officers of Ghana have reported and penalized more than three hundred cases from April 2010 through to 2015 about headmasters who have sexually assaulted pupils.

Despite the fact that the Ghana education service have emphatically stated in the section 28 of the Teachers Code of Conduct that the payment of bribes and other negative practices are highly unethical and come with sanctions (GES, 2008), this seems not to prevent headmasters from acting otherwise.

There is much literature on ethical leadership and how it affects businesses, however, far less is known empirically about the antecedents of ethical leadership. Studies into personality types as an antecedent of ethical leadership behaviour have utilized the big five personality trait due to its consistency and generalizability across cultures. However, studies conducted on the antecedents of ethical leadership have mostly used three of the big five personality traits (Conscientiousness, Agreeableness, and Neuroticism) on the basis that the other traits have no bearing with the ethical leadership construct (Kalshoven, 2012; Walumbwa & Schaubroeck, 2009). The purpose of this study was to further argue, theoretically and based on empirical findings, the importance of the other two traits (Extraversion and Openness to experience) and include them in testing for the relationship between ethical leadership and the five factor personality using the educational institution in Ghana, Ayawaso central sub-metro district as the case study. To fulfill this purpose, a quantitative study was performed collecting data from public basic selected schools in Ayawaso Central Sub metro district.

1.3 Ethical Leadership

From the western tradition viewpoint, ethics can be traced as far back as the time of Plato (427-347 BC) and Aristotle (384-322). The concept of Ethics originated from the Greek word “ethos” which illustrates conduct or character. This refers to the kind of character an individual or society perceives as desirable. For the purpose of this study, ethical theories can be divided into two main streams, that is, theories about the conduct and theories about the character of the leader (Northouse, 2013). Furthermore, Northouse (2013) points out that two main ideas ought to be discussed when issues of ethical theories of conduct are discussed, these are the consequences of a leader’s action and the duty that governs what was done. These are referred in the field of ethics as utilitarianism and deontology respectively. These two theories have received much attention so far as debates in ethical decision making are concerned (Conway & Gawronski, 2013). According to the principle of deontology, what is ethical is due to the principle and not what surrounds it, that is, a leader according to deontology, ought to always exhibit what is generally termed...
as good without compromise based on the conditions he finds himself in. However, it must be noted that decisions being described as good or bad is based on context and the context one finds himself in should play a huge role in the ethical decision they take. A critical assessment of the Brown and Trevino’s (2005) definition of ethical leadership points out to a rather utilitarianistic approach to ethical leadership. According to utilitarianism, what is ethical depends on the condition one finds himself and ethical leadership will seek for the good of the many and not just the few satisfied. The term “normatively appropriate” conduct by Brown et al (2005, p. 120) refers to conducts that are expected (Zafar, 2013; Walumbwa & Schaubroeck, 2009). What is expected although may be due to what one has always been doing, in this context, it means what one should do based on the situation at hand. For instance, a leader will not be ethical if he has to make an employee work up to the daily working hours considering complaints of illness and a negative sign of health, such a leader is expected to excuse the subordinate off duty and cover up even it means bending some rules.

The fact that ethical leadership is chiefly exhibited through relationship with followers means that it can be considered as a relational concept (Akker, Heres, Lasthuizen, & Six, 2009). That is, the ethicality of a leader is observed as they interact with their followers on a day to day basis. Ethical leadership can therefore be best assessed by the subordinates who relate with the leader hence it is argued as a social construct that demands more than one rater. Words such as “considerate”, “trustworthy” and “morally upright” are a few of many good adjectives that have been used to define ethical leaders (Zafar, 2013). Ethical leaders are expected to be those who will not just make decisions based on principles but more so based on the situations they find themselves in and will seek to understand issues not just from their view point but also that of their subordinates, thus agreement and conscientious, whiles not compromising fully their moral integrity. This needs more clarification; ethical leaders are expected to act as moral persons and moral managers which in sum leads to the making of ethical followers (Treviño, Hartman, & Brown, 2000).

1.4 The Social Learning Theory and Ethical Leadership

Brown et al. (2005), inferring from the social learning theory Bandura (1977), explained some causatives and aftermaths of ethical behaviours of leaders. The social learning theory explains why the perception of employees about the ethical or unethical behaviour of leaders is affected by the personality characteristics of the leader as well as situational influences. According to the social learning theory, the credibility of leaders plays a huge role in followers perceiving them as ethical leaders. The social learning theory (Bandura, 1977) supports the idea that followers learn and emulate the behaviours of leaders so far as those behaviours are credible and attractive to them. In other words, direct supervisor’s behaviour impacts subordinate behaviour whether for the good or worse. That is, what is considered “desirable and attractive” is at the discretion of the followers considering the contest they find themselves.

From the social learning theory, certain personality characteristics in an individual informs his behaviour and thereby attracts or repel others since people look outside for direction, guidance or imitation (Kohlberg, 1969; Treviño L. K., 1986). According to Bandura (1986), there’s a great likelihood for ethical leaders to be models in their organizations since they have a combination of power and credibility which is attractive to subordinates. Hence being a model for followers goes beyond just being in power but also having the required desired personality characteristics. Furthermore, these characteristics are not just observed but also the ethical leader tends to communicate ethical values to subordinates in order to maintain focus in the midst of other messages such as winning at all cost mentality of most businesses.

1.5 The Big Five Personality Dimensions

In his definition, Catell(1905-1998) refer to personality as that perceptive and social pattern that has immense stability for a period of time and cuts across diverse situations (Eswaran, Islam&Muhd Yusuf, 2011). Hence, it is plausible to assert that the personality of an individual can affect one’s values and attitudes (Olver & Mooradian, 2003). The label “Big Five” was coined by Lewis Goldberg in the year 1976 and was linked purely with personalities in natural language although the term “Big Five Factor” has been used in recent times sign personality questionnaires (Eswaran, Islam& Yusuf, 2011). The five factor model of personality outlines five dimensions of personality traits labeled Extraversion, Neuroticism, Agreeableness, Openness to experience and Conscientiousness (Costa & McCrae, 1992; Goldberg, 1990).

Consciousness

Individuals with this personality trait are labeled to be assiduous, determined and very results oriented. Such individuals are seen to be unrelenting, structured, trustworthy, thorough and industrious (Digman, 1990; McCrae & Costa, 1992; Mount &Barrick, 1995). Hence, leaders that exhibit more conscientiousness are likely to engage in certain actions that are acceptable in a group and would easily attract followers to work with. Also since conscientiousness is linked to following a set of codes, it means that a leader high on that trait will be highly ethical.

Agreeableness

Agreeableness as a personality trait type entails qualities such as the likelihood of someone to relate in a group, to be understanding, honest and warm (Goldberg, 1990; McCrae & Costa, 1987). The maintenance of social relationships has been identified as an outcome of individuals high on agreeableness (Jensen- Campbell &Graziano, 2001). Also, they are observed to be sensitive to the needs of their subordinates. This is in line with ethical leadership who are described as being caring to the needs of their subordinates. People that show more agreeable traits are likely to be able to get along with people in diverse situations and can be very effective team players of which are all critical for the success of every leader (Avolio, Walumbwa, & Weber, 2009).

Neuroticism

Neuroticism also referred to as emotional stability refers to the tendency of an individual to experience has some self-perceptions that can negatively affect one’s image. With
neuroticism comes the likelihood to “experience negative emotions, such as anxiety and anger, more often and more intensely” (Walumbwa & Schaubroeck, 2009, p. 1278). Furthermore, leaders who are high on Neuroticism “are less likely to be perceived as ethical leaders as they will tend to be thin skinned and hostile to others” (Brown & Treviño, 2006, p. 603) and this can greatly affect their relationships with people and also make them more difficult to be approached. Neurotics have been observed to be more self-protecting and hence can easily engage in conflicts as a result of this. Some researchers have identified neurotics as having a set of stimuli that elicits negative emotions and hence have been identified as people who are insecure (McCrae & John, 1992; Terry, 2015).

Extraversion

Extraversion as a personality trait associated with positive emotions. Whereas negative emotions are associated with neuroticism; extraversion is associated one being sociable and easy going. Extraverts are likely to communicate more in public places than introverts. Researchers have asserted that extraverts are more likely to perform as better sales people as compared to introverts or neurotics (Day, Schleicher, Unckless, & Hiller, 2002). This could mean that extraverts have a positive self-image both for themselves and others and hence find it not a difficult task socializing with others. Extraverts are vibrant, assertive and talkative (Bono & Judge, 2004). These appear very appealing and charismatic in nature.

Openness to Experience

Traditionally, openness to experience has been conceptualized as culture, that is, the way one embraces another culture without stereotyping (Bono & Judge, 2004). This type of traits also relates to how makes decisions taking into account whether or she has learnt new or what he or she is exposed to. Being introspective, insightful, resourceful and creative is mostly linked to openness to expression (Bono & Judge, 2004). This means that individuals high on openness to experience can be open for ideas that may be different from their thoughts and this is a very helpful trait in group thinking and decision making. The idea of creativity is also very important in leadership and will play a major role.

II. RESEARCH OBJECTIVES

The overall aim of this study will be to explore locus of control as a possible moderator in the relationship between Leader personality trait (five factor personality traits) and ethical leadership. To achieve this aim, the objectives of the study will be to:

1. Determine the personality trait variable that causes the most variance in ethical leadership.
2. Ascertain whether there is a significant difference in ethical leadership behaviour due to gender.

III. METHODOLOGY

This research conducted in some public basic schools in the Ayawaso central sub metro in Ghana employed the quantitative approach to research. The study employed a cross-sectional survey where standard questionnaires were adapted for some of the variables (ethical leadership) to solicit for information from respondents with the intent of generalizing the results of the study to a larger population (Creswell, 2003). According to Creswell (2003), it is advisable to take into consideration the specific research problem the study seeks to address when choosing the research approach. Based on this premise, a study of this nature that sought to understand the best predictors (personality traits and locus of control) of an outcome (ethical leadership), the quantitative approach to research best suits it. Generally, quantitative research comprises of the use of statistical tools to assess a hypothesis as well as making enquiries into causalities.

Population and Sampling Technique

The population for the study included the supervisors (headmaster and assistant) and subordinates (teachers) of all public basic schools within the Ayawaso central sub metro district. The Ayawaso district was chosen due to the nearness of the district to the researcher as well as the time and low cost of gathering data from respondents. The headmasters and the assistants act in leadership capacities in the various schools and can best be rated by their immediate subordinates who are the teachers. There are 37 public basic schools in the Ayawaso central sub metro district. The schools were chosen because they all belonged to the public sector and hence had a lot in common. The education sector was chosen for this study due to the ethical and unethical practices that continues to plague this sector. Issues of examination leakages plagued with corruption and the mass extortion in the form of bribes before admitting students have become an open secret as the country has been ranked number one on these malpractices among schools in Africa (Transparency International, 2010).

The study employed a multi stage sampling technique (convenience, simple random and purposive sampling technique) in selecting the respondents. Firstly, thirty (30) schools were chosen using the convenience sampling method, that is, those schools where the headmasters were willing to participate in the study were selected. Furthermore, sixty (60) supervisors (headmasters and assistants) per school were purposively chosen because they play supervisory roles in the schools and were the exact respondents needed to provide the researcher with the information needed. Based on this, teachers were chosen where headmasters were already selected. In all, a total of one hundred and twenty (120) teachers were selected using a simple random technique. Some of the selected schools include the Alafoo 1 primary, Alafoo 1 JHS, Alafoo 2 primary and 2 JHS, Experimental 1 JHS, A.N.T, Experimental 2 JHS, Avenor JHS and Kwantum Nkrumah JHS.

Instruments of Data Gathering

The ethical leadership behaviour of leaders was measured using the ethical leadership scale developed by Brown et al. (2005). Individual subordinates were asked to rate the ethical leadership behaviour of supervisors. The scale is a ten itemized scale with sample items such as “My leader listens to what employees have to say”, “My leader disciplines employees who violate ethical standards” and “My leader conducts his/her
personal life in an ethical manner”. Responses are arranged on a five point Likert scale of 1 to 5 as follows "Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, strongly Agree = 5". The personality trait of supervisors was measured using the personality inventory scale by Gosling et al. (2003), a scale that has been proved to achieve higher convergence based on self and observer reports as well as has a higher test retest reliability (mean r=.80) as compared to other personality scales such as five item personality inventory (FIP). The scale is based on the works of Goldberg (1990). It is a ten item scale comprising of five dimensions making up the big five personality trait (Extraversion, Neuroticism, Agreeableness, Openness to experience and Conscientiousness).

IV. FINDINGS

Descriptions of Participants
The study comprised of 60 supervisors. These supervisors were the various head teachers and their assistants, hence 30 head teachers and their respective assistants totaling up to 60. Out of the sixty supervisors, 18 were female whiles 42 were males, a percentage of 30 to 70 respectively. The average age of supervisors was 37 years ranging from 31 years to 50 years. In terms of their educational level, a majority of the supervisors were undergraduate degree holders contributing 55% of the total supervisors. Only two of the supervisors had their highest level of education to be the O level. As many as 23 supervisors had been at post in the same school between six to ten years whiles thirty-seven of them were within their first five years as supervisors in those particular schools.

Preliminary Analysis
Before the main hypothesis of the study was tested, a number of preliminary statistical analysis were carried out to describe the sample selected for the study (for instance normality distribution, frequency, mean), that is, descriptive and summary statistics were tabulated. The data predictor variables were inspected for Multicollinearity, besides, issues of outliers and validity was also examined. Finally, the researcher also addressed how missing data was handled in the study and their impact to the overall findings if the study.

Handling Missing Data
A total of 120 subordinates responded to the questionnaire for measuring ethical leadership whiles and 60 supervisors responded to the questionnaire for work locus of control and personality traits. After a detailed inspection of the questionnaires, it occurred that four subordinates left out an average of three questions on the ethical leadership scale. However, the overall missing data was very minimal. Since each subordinate’s rating of ethical leadership behaviour was computed based on an average of the items on the scale, any missing value was replaced with an average of the questions of subordinates on that particular item (Warner, 2008; Williams, 2015). Therefore, the missing data challenge faced did not hugely affect the analysis and results of the study.

Data Examination: Checking for Errors, Outliers and Testing Normality
Upon resolving issues of missing data as outlined above, other issues such as outliers needed to be inspected and sought out. One of the most important activities that should never be neglected in data analysis is data examination. Haier (2001) explained that though data examination could take much time, it enables the researcher to deal with the impacts of possible outliers, missing data due to wrong data entry or respondents’ unwillingness to fill some part of questionnaire which could otherwise affect the results in some data analysis, mainly regression (Hair et al., 2010; Salkind, 2011). Since multiple regression was employed in the current study, it was prudent to assess some assumptions such as normality, enormous missing data, outliers that could impact the data, Multicollinearity and linearity. An outlier can be described as any score on a set of data with a different characteristic from the remaining data. Hair et al. (2010) described outliers as an abnormally high or low data figure on a variable. Issues of outliers were experienced with some of the variables, hence the impact of these outliers attracted attention, however, after a cursory comparison of the means of the respective variables, it was observed that the difference was not significant. Therefore, it is plausible to conclude that the outliers would not create much problems in the current analysis, hence those data were retained (Pallant, 2013).

The preliminary analysis prior to the main analysis was conducted in a three stage process. Firstly, the normality of the salient variables in the study were assessed using the Shapiro-Wilk's test of normality based on the null hypothesis that the data is normally distributed. From the tables below, it can be inferred that the data was normally distributed and hence was fit for further analysis that involved the use of parametric tests such as mentioned before. As a result, all the variables in the data set were used in a regression and moderation analysis. Furthermore, other descriptive statistics such as the mean and standard deviation of the study variables were conducted. This was followed by the Pearson correlation of the variables in the study. In order to justify data aggregation of ethical leadership at group level, inter rater reliability analysis using the kappa analysis on inter-class correlation as well as the kappa analysis was conducted. In order to ensure that the scales used for collection of data was internally reliable and consistent, an internal reliability analysis was conducted using the Cronbach alpha (α). According to Nunnally (1978) opined that an alpha value of 0.70 or above constitutes a reliable scale.
Multicollinearity Testing of Study Variables

Multicollinearity is regarded as one of the key assumptions to be examined within a set of predictor variables before running a regression analysis. Multicollinearity as an assumption is produced when “any single predictor variable is highly correlated with a set of other predictor variables” (Reyes, 2013, p. 39). Although the assumption of Multicollinearity of predictor variables can be assessed through a correlation matrix output, the researcher sought the need to assess this assumption using the VIF and Tolerance rule as it is more robust than the correlation matrix (Hair, 1995). Using this rule, a tolerance level of less than .10 is considered an anomaly and requires further inspection whiles the Variance Inflation factor (VIF) is supposed to be less than 10 (De Vaus, 2002). Table 2.1 below indicates that for all the predictor variables (locus of control and personality trait) the VIF ranged from 1.160 to 1.384, hence this assumption was not violated. Thus this study did not experience Multicollinearity problems.

Table 2.1: Multicollinearity Diagnostics of Predictor Variables

<table>
<thead>
<tr>
<th>Construct</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscientiousness</td>
<td>0.862</td>
<td>1.160</td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>0.857</td>
<td>1.166</td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.744</td>
<td>1.345</td>
<td></td>
</tr>
<tr>
<td>Openness to experience</td>
<td>0.720</td>
<td>1.384</td>
<td></td>
</tr>
</tbody>
</table>
Justifying Data Aggregation of Ethical Leadership Statistics

A variety of research designs have proved that a single level analysis of some constructs are not without merits, however, some constructs are better assessed on a multi-level (Dixon & Cunningham, 2006). In other words, some social constructs are best assessed on the group level instead of individual assessment. To achieve this, data aggregation must be employed. Ethical leadership is considered as a social construct, that is, ethical leadership is viewed as best assessed by more than one rater instead of a single rater assessing the ethical behaviour of leaders. This would help take care of single measure biases. As a result, various studies in ethical leadership employed the group level ratings of ethical leadership behaviour (Kalshoven, 2010; Walumbwa & Schaubroeck, 2009; Asma, 2013). The current study followed suit to rate ethical leadership on the unit level. That is, two subordinates rated one supervisor each per school. In order to justify data aggregation at the group level, the study employed the kappa analysis tool as well as the intra-class correlation. According to the analysis, a kappa value of above .06 is considered as acceptable level of agreement among raters in the social sciences (Wood, 2007). From the output below, it can be inferred that the kappa value (.63) satisfies considering the threshold, hence aggregating data at the group level is justified. Although the output reports a kappa significance (.000), this is not of interest to researchers, the interest however is whether the kappa value (.63) is high enough to be warranted use in research settings.

Table 2.2: Kappa Analysis of Ethical Leadership Aggregation

<table>
<thead>
<tr>
<th>Symmetric Measures</th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure of Agreement</td>
<td>Kappa</td>
<td>.631</td>
<td>.048</td>
<td>13.457</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* a. Not assuming the null hypothesis.
* b. Using the asymptotic standard error assuming the null hypothesis

Table 2.4: Results of Hierarchical Multiple Regression Analyses for the predictive effect of personality traits variables on ethical leadership behavior

<table>
<thead>
<tr>
<th>Model</th>
<th>$B$</th>
<th>Std. Error</th>
<th>$B$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>1.752</td>
<td>.186</td>
<td>.020</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.379</td>
<td>.056</td>
<td>.661*</td>
<td>.006</td>
</tr>
<tr>
<td>2 (Constant)</td>
<td>.785</td>
<td>.308</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.375</td>
<td>.051</td>
<td>.654*</td>
<td>.010</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.238</td>
<td>.064</td>
<td>.333*</td>
<td>.040</td>
</tr>
<tr>
<td>3 (Constant)</td>
<td>1.26</td>
<td>.354</td>
<td>.001</td>
<td></td>
</tr>
</tbody>
</table>
4. (Constant) 1.253 .349 .001
Conscientiousness .369 .049 .644* .000
Extraversion .236 .080 .330* .005
Neuroticism -.251 .084 -.329* .044
Openness to Experience .154 .091 .223 .097

5. (Constant) .939 .341 .008
Conscientiousness .382 .054 .667* .000
Extraversion .194 .076 .272* .013
Neuroticism -.225 .079 -.295* .076
Openness to Experience .059 .091 .085 .519
Agreeableness .199 .065 .290 .074

$R^2=0.437, 0.548, 0.592, 0.611$ and $0.688$ for steps 1, 2, 3, 4 and 5 respectively. $\Delta R^2=0.111, 0.043, 0.020$ and $0.057$ for steps 2, 3, 4 and 5 respectively. *$p<0.05$.

The overall model produced an $R^2$-squared of 0.47 which indicates that the model is fit for prediction (Field, 2005). From the results of the analysis above, it has been revealed that leader conscientiousness ($\beta=0.661, p<0.05$) and extraversion ($\beta=0.333, p<0.05$) was positively related to ethical leadership behaviour. Leader conscientiousness contributed to a 44% variance in ethical leadership whiles extraversion caused an 11% change in ethical leadership behaviour. On the contrary, as expected, neuroticism ($\beta=-0.175, p<0.05$) was negatively related to ethical leadership, however, it contributed to just 4.3% change in ethical leadership behaviour. Openness to experience ($\beta=0.223, p>0.05$) and agreeableness ($\beta=0.290, p>0.05$) neither had any significant influence nor relationship with ethical leadership as argued in literature. From the analysis, hypothesis 1a and 1d was fully supported even after controlling for other levels. Hypothesis 1b was partially supported whiles hypothesis 1c and 1e would not be supported. The main aim for using this analysis was to identify the most significant contributor to ethical leadership after all other traits have been statistically controlled for. From the analysis, it appears that after controlling for all other traits, conscientiousness appeared to be the trait that causes the greatest significant variance in ethical leadership followed by extraversion. In the nutshell, the hypothesis (2) that leader conscientiousness will account for more variance in ethical leadership behaviour than all other traits was fully supported.

**Gender and Ethical Leadership**

In order to ascertain whether leaders' ethical behavior differs due to their gender, an independent sample t-test was computed using male and female leaders as the test groups. The results have been displayed below:

**Table 14: Independent Sample T-test output for gender and ethical leadership**

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>Gender of leaders</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethical Leadership</td>
<td>Male</td>
<td>39</td>
<td>6.7788</td>
<td>.88596</td>
<td>.14187</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21</td>
<td>7.0238</td>
<td>.81645</td>
<td>.17816</td>
</tr>
</tbody>
</table>

*p is not significant @ .05 level of significance*
From the output table above it can be inferred that there is no statistically significant difference in the ethical leadership behaviour (t_{58} = -1.049, p>0.05) of male leaders (M= 6.78, SD= 0.89) and female leaders (M= 7.02, SD= 0.82). That is, there is enough statistical evidence to conclude that the hypothesis two is valid. Hence hypothesis two was supported.

V. DISCUSSION

The results of the study indicated that personality variable such as extraversion and conscientiousness was positively related to the ethical behaviour of leaders in the study. On the other hand, neuroticism was negatively related to ethical leadership behaviour. The study also revealed that openness to experience was unrelated to the ethical leadership construct. The results of the study show much correspondence with the findings of Kalshoven (2010) and Walumbwa and Schaubroeck (2009). In his study (Kalshoven, 2010), after controlling for all other personality variables, it was only conscientiousness and extraversion that was related to the ethical leadership construct. However, traits such as openness to experience and agreeableness was unrelated to the ethical leadership construct. Walumbwa and Schaubroeck (2009) on the other hand found a negative relationship between Neuroticism and ethical leadership whiles observing a positive relationship between conscientiousness and ethical leadership. On the contrary, Bormann (2013) after propounding an integrative model of ethical leadership realized a positive and significant relationship between ethical leadership and extraversion. This was supported in the current study. It must be noted that perception of ethical leadership is not independent of one’s culture setting (Judge, 2002), that is, the change in setting could result in the diverse results found between extraversion and other traits such as agreeableness and ethical leadership. This implies that universality of what is ethical could be quite ambiguous, for if ethicality should be defined then to what extent is something ethical and how does it relate to one’s culture? Should culture play a role in understanding what ethics is?

As expected, conscientiousness was positively related to leader ethical behaviour. Leaders who are thoughtful of others and have others interest in mind rather than themselves end up being perceived as ethical, on the other hand, leaders who are shy and unstable are likely to be perceived as unethical because their behaviour cannot be predicted. The uniqueness of this study so far as the first and second hypothesis is concerned is the rather large effect of conscientiousness on ethical leadership. This is because previous studies have realized a rather low variance in ethical leadership due to conscientiousness (Kalshoven, 2012; Walumbwa & Schaubroeck, 2009). A critique by Bormann (2013) revealed that this could be as a result of a methodological approach to most studies conducted on personality traits and ethical leadership. In the nutshell, leaders who are high on conscientious traits have a very high probability of being perceived as ethical and hence would reap the consequences of ethical leadership behaviour.

The second objective sought to ascertain whether there is a difference in ethical leadership due to gender of leaders. This objective was developed in accordance with the propositions of Brown et al. (2002) who proposed that due to some characteristics that are inherent in women which differs from men; that is, women tend to take decisions based on care and are very emotional, on the other hand men are justice conscious and take decisions that reflect what should be rightly done without so much thoughts about how the other party would feel. However, the result of this current study presupposes that there is no statistically significant difference in ethical behaviour due to gender of leaders. This supports the findings of Balasubramanian and Krishnan (2012) who investigated a similar relation based on the theory proposed by Gilligan (1982) which posits that since men have some characteristics that are contrary to ethical values, they are less likely to be ethical as compared to women, that is, women have been described to the thoughtful, emotional and caring and hence would make decisions that are influenced by these traits. Furthermore, women have been described as being more conscientious than males in leadership positions, a personality trait that is mostly linked to ethical leadership (Kalshoven, 2012; Walumbwa & Schaubroeck, 2009) than extraversion which is typical of men. Nonetheless, the perception of ethical leadership on the part of subordinates is also influenced by other organizational conditions and other influences like self-monitoring (Brown et al., 2005). According to Bedeian and Day (2004), leaders who show more concern in making themselves liked or to fit into the shoes of followers are likely to sacrifice some ethical values in order to make them appealing to their followers, followers who are able to identify this attitude may have different perceptions about the leader and may interpret that as weakness. That is, although men and women share different characteristics, there are other influences of being perceived as ethical which could be more significant than gender characteristics.
VI. CONCLUSION

The study sought to contribute to the field of ethical leadership by exploring the effects of the big five personality traits. More specifically, the study sought to ascertain the moderating effect of locus of control as proposed by Brown et al. (2005) in a theoretical study. Using a sample from some selected schools in the Ayawaso central sub metro district, the analysis revealed that after controlling for all of the sub constructs of the personality traits, it was only conscientiousness that appeared to be significant to ethical leadership, that is, conscientiousness had a positive effect on ethical leadership. The second research question sought to ask whether there was a significant difference in ethical leadership due to gender. It turned out that there was no significant difference in ethical leader due to leaders’ gender. A moderation analysis established that apart from personality trait of conscientiousness, locus of control did not significantly moderate the relationship between the other personality traits and ethical leadership. That is, a leader high on conscientiousness and locus of control is likely to portray high ethical behavior as compared to one low on conscientiousness. Leaders who show less emotional stability (neuroticism) were more likely to engage in unethical acts.

VII. RECOMMENDATIONS

The study established that certain types of personality traits are able to elicit ethical leadership behavior among leaders within an organization. The study specifically used some public schools within the Ayawaso central sub metro as the case study. Based on the benefits of ethical leadership to organizations, organizations should look for leaders who are less likely to be distracted when on the job. Furthermore, leaders who are to occupy very important positions within organizations should display very high level of morality and must be willing to sacrifice their personal interest for the interest of the common good of the many. What this implies is that organizations should organize leadership training programs that concentrate on training the right personality traits into leaders as it would affect their behavior towards overall success. From the findings of the study, it can be inferred that organizations should work on making their leaders internally controlled, such leaders will own up for their actions and would not push blame to other individuals. Such leaders would display a high degree of accountability which augers well for increased performance.

VIII. FURTHER STUDIES

Based on the identified limitations to the study, some future studies could look at some perspectives. For instance, a longitudinal study of personality traits and ethical leadership could be examined to gain a better understanding of the relationship between the two variables. Furthermore, Brown et al. (2005) opined in a theoretical review that factors such as the moral intensity of issues as well as the ethical context of the organization could influence ethical leadership behavior, hence future studies could look at how these factors influence personality traits in predicting ethical behavior of leaders. Coupled with this, according to Hofstede (2001), the culture setting one finds himself in affects the behavior of such individuals. Hence in predicting ethical behavior future studies could make enquiries into how the power distance culture could look at how power distance culture influences the perception of employees regarding the behavior of their leaders. Furthermore, some studies have found an insignificant relationship between moral judgement and feeling, more studies seems warranted in understanding how internal locus of control affects ethical leadership behavior.

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Feeding behavior and nutritional status of children with celiac disease residing in rural areas of Haryana

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Abstract- Lifelong compliance to gluten free diet is a prerequisite for maintaining well-being of children with celiac disease. It becomes very difficult to restrict wheat based food items from the North Indian diets predisposing children to micronutrient and micronutrient deficiencies and may impair physical and cognitive growth of these children. A cross-sectional study was carried out among 40 children (5-12 years) already diagnosed with celiac disease and were following gluten free diet from last three months. The data was collected from a health facility at Gurugram, Haryana catering to children residing in nearby villages. Anthropometric measurements and 24-hour recall was used to assess nutritional status of the children. Feeding behavior was recorded on a pretested questionnaire. One-fifth of the children were underweight, one-fourth were stunted and all but one had normal BMI [1]. The intakes of all food groups were inadequate by the children as compared with balanced diet [2]. Comparison with the RDA [2] indicated that the intake of all nutrients expect protein, fat and calcium were inadequate. Regular diet counseling would help in alleviating symptoms, improvement in nutritional status and quality of life of children with celiac disease

Index Terms- celiac disease, dietary adequacy, gluten free diet, stunting, underweight.

I. INTRODUCTION

Celiac disease (CD) is intolerance to gluten present in cereals like wheat, barley and rye. CD is an inflammatory small intestinal disorder that can lead to severe villous atrophy, malabsorption, and malignancy. The symptoms are diverse, and may be absent or very subtle. Nearly 3-10 patients remain undiagnosed for every one patient diagnosed with celiac disease showcasing as an iceberg phenomenon [3]. It was previously believed that CD is a disease of Europe. In India, it was reported for the first time in children and adults in 1966. It was observed that CD is prevalent among predominantly wheat consuming states such as Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Bihar and Madhya Pradesh [4].

Celiac disease, also known as gluten-sensitive enteropathy, is an autoimmune disorder caused by ingestion of gluten in genetically sensitive individuals who cannot tolerate gluten protein, a mixture of storage proteins contained in several cereals (wheat, rye, barley and derivatives). The most commonly known protein causing celiac disease is gluten. It contains two types of proteins, gliadin and glutenin, which contain disease causing peptides [5]. The increase in number of these peptides in the gut causes inflammatory reactions followed by a series of symptoms associated with CD like diarrhea, constipation, vomiting, dyspepsia and mouth ulcers etc.

The only effective treatment for the disease is a life-long adherence to a Gluten Free Diet (GFD) that excludes any products derived from wheat, barley and rye grains. The compliance to GFD is an important part of the management of CD. A study conducted on 60 children reported that strict dietary compliance is difficult to adhere to with wheat being a staple cereal in India [6]. Other factors affecting compliance included lack of awareness and non availability of gluten free diets as well as contamination of other items with wheat at grocery shops. Dietary compliance has been reported to vary from 42% to 91% depending on the method of assessment, with the lowest compliance amongst ethnic minorities and those who are diagnosed during childhood [7]. Furthermore, adolescents also have difficulty with dietary compliance [8]. The different eating pattern of these children may have implications on their physical and cognitive growth. The present study was undertaken to assess the nutritional status and feeding behavior of children with celiac disease who are on gluten free diet from last three months.

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II. MATERIALS AND METHODS

The study sample comprised of 40 children (23 boys and 17 girls) aged 5-12 years residing in rural areas. All children were already diagnosed with celiac disease by gastroenterologists/pediatricians and were following GFD from at least last three months. After seeking permissions, the data was collected at a health facility, Gurgaon, Haryana, where children and their parents were coming for the follow ups with gastroenterologists/pediatricians from December 2013 to March 2014.

Data collection in this phase included socioeconomic-demographic profile of families of children, medical profile, anthropometry (weight and height), dietary survey and feeding behavior. The socio-economic demographic data was collected from primary caregivers (mothers/fathers) at their follow-up visit at health facility and recorded in the pre-tested questionnaire. Medical profile was collected from the medical records of children and recorded in the questionnaire by the investigator. Data on anthropometry was collected using standardized procedures. The equipments were calibrated from time to time. Current dietary intake was collected by using 24-hour recall method from mothers of the children using standardized utensils and recipes.

All the data was coded quantitatively and qualitatively in excel sheet frequencies and mean of required data was calculated. Anthropometric data was calculated using Anthro plus [1]. Mean intake of energy, protein, fat, calcium, vitamin A, vitamin C, iron, thiamine, niacin and dietary fiber. NSI Calculator was used to calculate dietary intake of each child and mean percent food and nutrient adequacy was computed.

III. RESULTS

The mean age of the study sample was 8.3±2.41 years. All children were going to school. Nuclear families were higher (55%) than the proportion of joint families (45%). The mean family size was 5.7±1.72 years. The mean numbers of the siblings were 3 siblings per family. None of the parents were illiterate however, nearly half of them had education up to senior secondary level. Majority of the mothers (95.0%) were housewives. More than half (57.5%) of the fathers were into private service as drivers, security guards, sales men, supervisors. Rest 42.5% of fathers were engaged in small businesses like owning a shop (ration, garment or small garage). The average monthly per capita income of the families was Rs. 2681.8 ± 1693.08. All the children had undergone serological tests and 95% of them had intestinal biopsies for confirmation of CD. The mean age of diagnosis in the study sample was 5.6±1.28 years. Symptoms commonly experienced prior to diagnosis, were diarrhea (70%), poor growth (62.5%), weight loss (55%), abdominal bloating (52.5%), excessive gas and fatigue (40%). Majority of children reported that failure in growth, weight loss, excessive gas and fatigue were relieved after initiating GFD. All but two families had medical history of CD. Follow-up visits to the doctors for medical advice was very poor among the group.

Nutritional status of the children

Mean weight of the boys (n=23) was 20.9±3.59 kg and of girls (n=17) was 28.1±9.08 kg. The mean height of boys and girls were 116.2±8.84 cm and 129.3±14.07 cm, respectively. It was seen that girls were taller and heavier than boys. The mean BMI for boys and girls was 15.4±0.75 kg/m² and 16.3±2.03 kg/m², respectively.

Z- scores for weight, height and BMI of the children were computed using WHO MGRS, 2007 standards (Table 1). Nearly one third of the children were stunted (< -2SD). Height-for-age reflects attained growth in length or height at the child’s age at a given visit. This indicator helps in identifying children who are stunted due to prolonged under nutrition or repeated illness. Stunting is irreversible process in nature and reflects cumulative frequencies of retarded growth over the years, which could be due to acute or
chronic illness as well as inadequate intake. One fifth were underweight (<=-2SD WAZ). Weight-for-age reflects body weight relative to the child’s age on a given day.

Only one child was found to be tall (>2SD HAZ) and one was overweight (>2SD WAZ). All had normal BMI for age (-2SD and 2SD) except one child who was wasted (<-2SD BAZ) as shown in Table 1.

<table>
<thead>
<tr>
<th>Height for age (HAZ)</th>
<th>BOYS</th>
<th>GIRLS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-scores</td>
<td>n(23)</td>
<td>n(17)</td>
<td>n(40)</td>
</tr>
<tr>
<td>Stunted(&lt;=-2SD)</td>
<td>9(22.5)</td>
<td>4(10)</td>
<td>13(32.5)</td>
</tr>
<tr>
<td>Normal(-2SD and 2SD)</td>
<td>13(32.5)</td>
<td>13(32.5)</td>
<td>26(65)</td>
</tr>
<tr>
<td>Tall (&gt;2SD)</td>
<td>1(2.5)</td>
<td>-</td>
<td>1(2.5)</td>
</tr>
</tbody>
</table>

*Weight for age (WAZ) (n=31)

<table>
<thead>
<tr>
<th>z-scores</th>
<th>BOYS</th>
<th>GIRLS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>n(21)</td>
<td>n(10)</td>
<td>n(31)</td>
<td></td>
</tr>
<tr>
<td>Underweight(&lt;=-2SD)</td>
<td>5(12.5)</td>
<td>2(5)</td>
<td>7(17.5)</td>
</tr>
<tr>
<td>Normal(-2SD and 2SD)</td>
<td>15(37.5)</td>
<td>8(20)</td>
<td>23(57.5)</td>
</tr>
<tr>
<td>Overweight(&gt;2SD)</td>
<td>1(2.5)</td>
<td>-</td>
<td>1(2.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMI for age (BAZ)</th>
<th>BOYS</th>
<th>GIRLS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>n(23)</td>
<td>n(17)</td>
<td>n(40)</td>
<td></td>
</tr>
<tr>
<td>Wasted(&lt;=-2SD)</td>
<td>-</td>
<td>1(2.5)</td>
<td>1(2.5)</td>
</tr>
<tr>
<td>Normal(-2SD and 2SD)</td>
<td>23(57.5)</td>
<td>16(40)</td>
<td>39(97.5)</td>
</tr>
<tr>
<td>Overweight(&gt;2SD)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Numbers in parentheses denote percentages

*WHO 2007 gave WAZ scores only up to 10 years of age

A study conducted on 50 children (4-9 years) in Chandigarh had shown that low weight and stunting were significantly more frequent in children with CD [9]. Studies had shown that the consumption of gluten free diet improves growth and nutritional status amongst children with CD [10, 11].

Feeding behaviour

All children were prescribed gluten free diet soon after diagnosis of CD. All children and their parents were counseled about GFD by the doctor as well as the dieticians. Nearly ninety percent were using gluten free flours like pearl millet, benagla gram flour, finger millet, soya flour etc to make Indian breads as wheat substitutes but only 15% used separate utensils to cook and store the food. Only half of the parents were giving prescribed vitamin and mineral supplements to their children. Only one child was taking omega-3 supplement whereas 25% were prescribed these supplements.

It was observed that 32.5% of children found difficult to follow gluten free diet. A study [12] on a total of 70 CD patients stated that 53.8% of children found it fairly difficult to maintain GFD.

Data on dietary pattern of the children (n=40) was collected from the mothers/caregivers using structured interview method to understand the current meal pattern and food habits of children with celiac disease. The information obtained on meal pattern, skipping meals, eating out, food likes and dislikes of the children.

Majority of the children (87.5%) were consuming 4-5 meals a day like breakfast, mid-morning, lunch, tea time and dinner. In the present study, 32.5% missed one or the other meal daily, 22.5% missed their meals sometimes and 45% children reported that their children never missed meals. Majority of the children (95%) carried school tiffin daily but 10% of the children did not eat their school tiffin 2-4 times a week. Parents /caregiver stated that 12.5%-15% of children skipped lunch 2-4 times a week and dinner was skipped by 5-10% of the children 2-4 times a week. The reasons for skipping meals were loss of appetite (42.5%), disliked the taste of GF food items (32.5%), angry and anxiety (2.5%).
Eating pattern of the children in the present study was majorly restricted at home only. Majority of the parents (75%) never go out for eating with friends and family. Eating out in wedding (80%) and parties (37.5%) was restricted by the families. The main reason stated that the concern about quality of gluten free items and temptation amongst children towards gluten containing food item refrained them from eating out frequently (75%).

The mean daily intake of different food groups by the subjects were tabulated and compared with the balanced diet for children of different age groups as recommended by the ICMR (2011) in Table 2. The mean percentages adequacy of all the food groups was low among all the children. The mean percentage adequacy of protein, fat and calcium was higher than RDA. The intake of fat was high due to the consumption of full cream milk or buffalo milk by most of the children. High intake of calcium could be attributed to high intake of milk, ragi and jowar. Low intake of vegetables, fruits and pulses among children had resulted in very low intake of iron, vitamin A, vitamin C, and folic acid. The dietary intake of the children was not appropriate which leads to nutrient deficiencies in the body. Dietary counseling should stress on the need for a balanced diet through consumption of variety of food groups to meet nutrient requirements.

<table>
<thead>
<tr>
<th>Food Group</th>
<th>5-6 year(n=11)</th>
<th>7-9 year(n=17)</th>
<th>10-12 year(n=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food intake (g/d) (Mean ±SD)</td>
<td>%adequacy (Mean ±SD)</td>
<td>RDA (gram)</td>
</tr>
<tr>
<td>Cereals</td>
<td>45.5±14.37</td>
<td>37.8±11.98</td>
<td>120</td>
</tr>
<tr>
<td>Pulses</td>
<td>24.5±32.85</td>
<td>81.8±109.5</td>
<td>30</td>
</tr>
<tr>
<td>Green leafy vegetables</td>
<td>0.00</td>
<td>0.00</td>
<td>50</td>
</tr>
<tr>
<td>Roots and tubers</td>
<td>45.0±42.59</td>
<td>45.0±42.59</td>
<td>100</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>0.00</td>
<td>0.00</td>
<td>100</td>
</tr>
<tr>
<td>Fruits</td>
<td>54.5±77.27</td>
<td>54.5±77.27</td>
<td>100</td>
</tr>
<tr>
<td>Fish</td>
<td>0.00</td>
<td>0.00</td>
<td>50</td>
</tr>
<tr>
<td>Meat/egg</td>
<td>0.00</td>
<td>0.00</td>
<td>50</td>
</tr>
<tr>
<td>Milk</td>
<td>444.0±212.78</td>
<td>88.8±42.56</td>
<td>500</td>
</tr>
<tr>
<td>Fats</td>
<td>7.73±2.49</td>
<td>30.9±9.96</td>
<td>25</td>
</tr>
<tr>
<td>Sugar</td>
<td>12.2±8.36</td>
<td>61.3±41.78</td>
<td>20</td>
</tr>
</tbody>
</table>

The mean daily intake of different food groups by the subjects were tabulated and compared with the balanced diet for children of different age groups as recommended by the ICMR (2011) in Table 2. The mean percentages adequacy of all the food groups was low among all the children. The mean percentage adequacy of protein, fat and calcium was higher than RDA. The intake of fat was high due to the consumption of full cream milk or buffalo milk by most of the children. High intake of calcium could be attributed to high intake of milk, ragi and jowar. Low intake of vegetables, fruits and pulses among children had resulted in very low intake of iron, vitamin A, vitamin C, and folic acid. The percent adequacy of fat, calcium and protein was high in the age group of 5-9 years whereas in 10-12 years the intake of all nutrients was inadequate. It was noticed that the elder group shows much inadequacies in the diet as they become independent and eat food of their choices and therefore the intake of various food groups was not included in the diet. The intake of fat was high due to the consumption of full cream milk or buffalo milk by most of the children. High intake of calcium could be attributed to high intake of milk, ragi and jowar. Low intake of vegetables, fruits and pulses among children had resulted in very low intake of iron, vitamin A, vitamin C, and folic acid. The dietary intake of the children was not appropriate which leads to nutrient deficiencies in the body. Dietary counseling should stress on the need for a balanced diet through consumption of variety of food groups to meet nutrient requirements.
It can be concluded from the study that such region specific study would help in analyzing the nutritional status of children having celiac disease using 24 hour recall and anthropometric measurements. In the present study, the intake of all the food groups was inadequate and one fifth of the children were underweight. Regular diet counseling would help in alleviating symptoms, improvement in nutritional status and quality of life of children with celiac disease.

### REFERENCES


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Table 3. Mean nutrient intake and mean percent adequacies of various nutrients by children (n=40), as compared to RDA (ICMR, 2010)

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>5-6 year (n=11)</th>
<th>7-9year (n=17)</th>
<th>10-12year (n=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean nutrient intake Mean ±SD</td>
<td>Mean nutrient intake (g/d) Mean ±SD</td>
<td>Mean nutrient intake (g/d) Mean ±SD</td>
</tr>
<tr>
<td>Energy (Kcal)</td>
<td>721.8±224.0 7</td>
<td>782.9±118.2 1</td>
<td>741.5±142.55</td>
</tr>
<tr>
<td>Protein(g)</td>
<td>32.1 ±16.05</td>
<td>33.0±7.63 5</td>
<td>27.3±5.69</td>
</tr>
<tr>
<td>Fat(g)</td>
<td>42.4±18.13</td>
<td>48.5±8.66 7</td>
<td>40.7±6.25</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>2.1±0.62</td>
<td>2.7±0.83 8</td>
<td>2.7±1.56</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>1042.4±498.74</td>
<td>1079.7±175.10</td>
<td>742.8±247.92</td>
</tr>
<tr>
<td>Vitamin A (µg)</td>
<td>485.6±174.5 3</td>
<td>474.0±283.68 8</td>
<td>384.7±144.37</td>
</tr>
<tr>
<td>Thiamine (mg)</td>
<td>0.5±0.23</td>
<td>0.5±0.13 0.7</td>
<td>0.4±0.10</td>
</tr>
<tr>
<td>Riboflavin (mg)</td>
<td>0.6±0.26</td>
<td>0.6±0.13 0.8</td>
<td>0.5±0.12</td>
</tr>
<tr>
<td>Niacin (mg)</td>
<td>2.6±1.09</td>
<td>2.7±0.43 11</td>
<td>2.8±1.00</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>19.9±11.49</td>
<td>22.3±9.35 40</td>
<td>13.1±6.77</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>5.7±2.85</td>
<td>6.8±2.00 13</td>
<td>6.6±2.94</td>
</tr>
<tr>
<td>Folic acid (µg)</td>
<td>68.4±44.33</td>
<td>81.8±32.69 100</td>
<td>79.0±27.39</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>99.0±23.42</td>
<td>110.6±15.09 -</td>
<td>-</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>2.0±0.97</td>
<td>2.2±0.99 -</td>
<td>2.0±0.58 -</td>
</tr>
</tbody>
</table>

*NSI calculator have taken the value of Beta carotene therefore beta carotene values were used for calculating the mean % adequacy*

---

### Conclusion

It can be concluded from the study that such region specific study would help in analyzing the nutritional status of children having celiac disease using 24 hour recall and anthropometric measurements. In the present study, the intake of all the food groups was inadequate and one fifth of the children were underweight. Regular diet counseling would help in alleviating symptoms, improvement in nutritional status and quality of life of children with celiac disease.

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Mediation of Work Culture between the Job Satisfaction and Organizational Commitment

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** Assistant Professor, SITAMS, Chittoor

Abstract- Every organization needs committed employees for attaining its objectives. The employees when satisfied will have high levels of commitment. The work culture is one of the factors which influence the job satisfaction levels of the employees. In this study the main purpose is to identify the impact of job satisfaction of employees on their organizational commitment levels and also to identify the mediation role of work culture in the relationship of job satisfaction and organizational commitment. Liner regression is the tool used for analysis and data is collected with structured and reliable questionnaire. The results showed that there was significant positive impact of job satisfaction on organizational commitment. The work culture of the organization had full mediation effect in the relation of job satisfaction and organizational commitment. The significant effect of job satisfaction on organizational commitment was disturbed and turned out to be insignificant at 5% level of significance.

Index Terms- job satisfaction, organizational commitment, work culture

I. INTRODUCTION

Every organization has limited resources and it has to optimally utilize the resources for facing the heavy competition. The important resources for the service organizations like software and IT Companies are the human resources. But now-a-days the employees in the field of IT and software sectors often jump from one organization to the other. Every organization needs committed and satisfied employees since the organization commitment enhances the organization performance (Johannes 2008). The satisfied employees have high commitment levels (Chetna and Rajni 2012). In this study the important factor is to identify the satisfaction levels of the employees, work culture and commitment levels of the employees.

A. Job satisfaction:

Job satisfaction is the employees’ perception towards his or her job regarding happiness and satisfaction in the work. It is being driven by many factors in the organization like policies, work environment, conditions, facilities and how management is concern towards the employees. There are two different types of satisfactions in an employee.

1. Affective satisfaction: emotional state of mind of the employee on the entire job.
2. Cognitive satisfaction: satisfaction towards some of the factors like rewards, salary, working hours and others.

B. Organization commitment: This commitment is attitudinal in view. Porter et al (1974, p 604) defined organization commitment as “an attachment to the organization, characterized by an intention to remain in it; an identification with the values and goals of the organization; and a willingness to exert extra effort on its behalf”. Allen & Meyer (1990) opine that the high committed human resources have very low level of attitude to leave the organization. O'Reilly 1989 gives the three stages how the employee develops organization commitment.

Compliance stage: An employee develops attitudes in order to receive specific rewards.
Identification stage: Develops to coordinate with others in order to maintain relationships.
Internalization stage: Develop the sense of belongingness as he likes the system of the organization.

In this study the scales used for measuring organization commitment are affective, continuance and normative scales.

C. Work culture:

Organization is a place where the group of the people come together to work for a common purpose. Hence the employees have to enjoy the work place and should develop a loyal mind towards the organization. Work culture is a very important concept in bringing out the best from the employees and making them to develop sense of organization commitment.

Work culture is a concept which deals with the thought process, beliefs and attitudes of the human resources. When the employees follow the rules and regulations of the organization and stick to the guidelines of the organization, then the organization is said to have well-built work culture.

Strong organization culture helps to have increase in the rate of productivity and satisfied employees. In this study the organization culture is measured in terms of effective interaction, ideologies and principles of the organization.

II. REVIEW OF LITERATURE

- Suprajo and Darmanto (2015), studied the Mediating Role of Jobs Satisfaction among Organizational...
Commitment, Organizational Culture and Citizenship Behavior (OCB): Empirical Study on Private Higher Education in Central Java, Indonesia. 226 samples were collected by the researcher and SEM was applied for analysis. The researched identified that there was significant relationship between organization commitment, organization culture and citizenship behavior. The job satisfaction is the variable that mediated between organization commitment, organization culture and citizenship behavior.

- Awais, Malik and Amina (2015) investigated on A Review: The Job Satisfaction Act as Mediator between Spiritual Intelligence and Organizational Commitment. Organization commitment is the dependent variable, spiritual intelligence is the independent variable and job satisfaction is the mediator. There was a significant relationship between spiritual intelligence and job satisfaction as well job satisfaction and organization commitment. There was no direct relation between spiritual intelligence and organization commitment. Job satisfaction had indirect relation between spiritual intelligence and organization commitment.

- Lelte et al (2014) studied Organizational Commitment and Job Satisfaction: What Are the Potential Relationships? The authors compared two structural models regarding mediation. They concluded that the job satisfaction as the antecedent of commitment and mediated with other variables like work and personal characteristics.

- Martin, Armanu, Surachman and Margono, (2013) conducted a study on The Role of Organizational Commitment as Mediator of Organizational Culture and Employees’ Competencies on Employees’ Performances (A Study on Irrigation Area Management in Southeast Sulawesi). The authors concentrated on organization commitment, culture and employees performance. SEM was used and the results showed that the variables were not having significant relationship. They concluded that the organization commitment as a mediator strengthened the organization culture on employees’ performance.

- Abdhullah (2013) had done thesis on the influence of organizational culture on job satisfaction, organizational commitment and turnover intention: a study on the banking sector in the kingdom of Saudi Arabia. His findings revealed that all culture types were positively associated to job satisfaction and organizational commitment. The variables job satisfaction and organization commitment mediated the relationship between organization culture and turnover intention.

- Aripin et al (2013), studied the Implications of Organizational Culture and Leadership Styles The Effects on Job Satisfaction and Organizational Performance Of Police Sector In Bandung, Cimahi, Garut- West Java. The aim of the research was to find the influence of organization culture, leadership styles and job satisfaction on organization performance. The results showed that there was significant effect of organization culture on job satisfaction and insignificant effect on organization performance. Leadership style also had significant effect on job satisfaction and insignificant effect on organization performance. Job satisfaction was mediating the relationship of organization culture and performance and also the relationship of leadership styles and organization performance.

- Abdul, Abdull and Farzana (2013) had done an investigation on Leadership and Organizational Commitment in the Islamic Banking Context: The Role of Organizational Culture as a Mediator. They used 250 samples of bank employees. Applied linear, multiple regression and sobel test for analysis of data. The results showed significant effect of leadership and organization culture on the organization commitment. Leadership was found to be enhancing the organization culture. Organization culture mediated the relationship of leadership and organization commitment.

- Jack et al (2012) investigated The Influence of Organizational Culture, Organizational Commitment to Job Satisfaction and Employee Performance (Study at Municipal Waterworks of Jayapura, Papua Indonesia). The objective was to find the influence of organization culture and commitment on employee performance. The results revealed that organization culture does not directly influence the employee performance. When job satisfaction mediated the organization culture influenced the employee performance.

### III. RESEARCH METHODOLOGY

The study is based on the primary data collected by the structured and disguised questionnaire. The study is descriptive type of research and convenience sampling is used for collecting the sample unit. The sample unit is the employees of software companies Eurdite software Private LTD, Hudda infotech private Ltd, Harini informatics, Techsoware private Ltd. The sample size is 226. The questionnaire is scaled by using likert scale. The scale values used are 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree, 1 for strongly disagree for the positive type of questions and is the vice versa for the negative type of questions. The questionnaire consists of two parts item part and the evaluation part. The demographic variables used in the study are age, experience, designation and qualification. The data collected is being processed by using SPSS.

#### A. Statement of the problem

Now –a- days in the software companies we can see more number of employees moving from one organization to the other. Hence forth in this the researcher wants to study the commitment level of the employees and the factors how the job satisfaction and the organization culture impacts the commitment levels of the employees. From the above the statement of the problem is clear.

#### B. Objectives of the study

The objectives of the study are as follows:
1. To study the level of job satisfaction of the employees.
2. To study the organization commitment levels of the employees.
3. To identify the impact of job satisfaction of the employees on their organization commitment.

4. To know the mediation effect of work culture in the relationship of job satisfaction and organization commitment.

C. Hypotheses of the study:

H1: There is significant impact of job satisfaction on organization commitment levels of the employees.

H2: There is significant impact of work culture on organization commitment levels of the employees.

H3: Work culture will play the mediating role in the relationship between job satisfaction levels and organization commitment levels of the employees.

IV. DATA ANALYSIS AND DISCUSSION

The demographic statistic responses from 226 are given in the table I. The age group of 31-40 was found to be maximum respondents in this study. The employees having experience of 1-5 years and software engineers were the maximum respondents of the collected data.

Table I: Demographic statistics (N=226)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Labels</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>21-30</td>
<td>10.3</td>
</tr>
</tbody>
</table>

The data is first tested for its reliability. Cronbach’s is used for testing the validity and consistency of the data. The Cronbach’s alpha reliability coefficient is 0.833. This alpha value indicates that the data is highly reliable and consistent. The variables are highly interrelated to one another.

The data is tested for its normality. The Kolmogorov-Smirnov and Shapiro-Wilk’s coefficient is being used. The significant P value is 0.000 which is less than 0.05 at 95% confidence level at a significant level of 5%. This indicates that the data is normally distributed. The values are interpreted in the following table II. Table II also gives the descriptive of mean and standard deviation of the three variables under the study.

<table>
<thead>
<tr>
<th>variables</th>
<th>Work culture</th>
<th>Job satisfaction</th>
<th>Organization commitment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Work culture</th>
<th>Job satisfaction</th>
<th>Organization commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.933</td>
<td>3.224</td>
<td>3.344</td>
</tr>
<tr>
<td>Std Dev</td>
<td>9206</td>
<td>4832</td>
<td>1832</td>
</tr>
<tr>
<td>Kolmogorov-Smirnov</td>
<td>226</td>
<td>226</td>
<td>226</td>
</tr>
<tr>
<td>Shapiro-Wilk</td>
<td>912</td>
<td>226</td>
<td>0.000</td>
</tr>
<tr>
<td>Statistics</td>
<td>174</td>
<td>189</td>
<td>187</td>
</tr>
<tr>
<td>df</td>
<td>226</td>
<td>226</td>
<td>226</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>a. Lilliefors Significance Correction</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is also strong support of Mean and standard deviation on the effect of job satisfaction and the organization commitment. Before going to study the mediation effect according to Baron and Kenny (1986) we need to study the correlation between independent variable, mediator and dependent variable. The correlation matrix of the three variables is shown in the table III.

<table>
<thead>
<tr>
<th>variables</th>
<th>Work culture</th>
<th>Job satisfaction</th>
<th>Organization commitment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Work culture</th>
<th>Job satisfaction</th>
<th>Organization commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work culture</td>
<td>1</td>
<td>0.777</td>
<td>0.594</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>0.777</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Organization commitment</td>
<td>0.594</td>
<td>0.688</td>
<td>1</td>
</tr>
</tbody>
</table>

The variables work culture (r=0.594) and job satisfaction (r=0.688) are strongly associated with organization commitment at the significance level of 0.01.

In order to test the hypotheses H1 and H2 linear regression analysis is done. The results are interpreted in the table IV.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Dependent variable</th>
<th>Independent variable</th>
<th>Beta</th>
<th>t-value</th>
<th>Sig.</th>
<th>F-value</th>
<th>R-square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organization</td>
<td>Job satisfaction</td>
<td>.688</td>
<td>14.19</td>
<td>.000</td>
<td>201.43</td>
<td>.473</td>
</tr>
<tr>
<td>2</td>
<td>Organization</td>
<td>Work culture</td>
<td>.594</td>
<td>11.04</td>
<td>.000</td>
<td>122.11</td>
<td>.353</td>
</tr>
</tbody>
</table>

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The job satisfaction ($\beta=0.777$) has significant impact on the dependent variable. Hence the hypotheses $H_1$ and $H_2$ are proved. The job satisfaction ($\beta=0.777$) has significant impact on the work culture of the organization. When the work culture was introduced as mediating variable, there was change in the beta value of the independent variable. The results are tabulated in the table V.

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Dependent variable</th>
<th>Independent variable</th>
<th>Beta</th>
<th>t-value</th>
<th>Sig.</th>
<th>F-value</th>
<th>R-square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organization</td>
<td>Job satisfaction</td>
<td>.688</td>
<td>14.19</td>
<td>.000</td>
<td>201.43</td>
<td>.473</td>
</tr>
<tr>
<td>2</td>
<td>Organization</td>
<td>Job satisfaction</td>
<td>.572</td>
<td>7.47</td>
<td>.000</td>
<td>3.828</td>
<td>.482</td>
</tr>
</tbody>
</table>

From the above table IV the Beta value is .688 for job satisfaction and .594 for work culture showing significant impact on the dependent variable. From this we can conclude that the work culture mediates the relationship of job satisfaction and organization commitment. Therefore the $H_3$ is proved to be true.

The regression equation can be written as:

$$\text{Organization commitment} = K + \text{job satisfaction (coefficient)} + \text{work culture (coefficient)}$$

K is the constant of the model whose value is 2.528. The equation is

$$\text{Organization commitment} = 2.528 + \text{job satisfaction (0.572)} + \text{work culture (0.150)}$$

There is change in the Beta value with introducing of mediating variable, but the independent variables is significant with $P=0.000$. As the significance effect of job satisfaction did not change this situation is treated as partial mediation of work culture between job satisfaction and organization commitment.

V. CONCLUSION

The employees of the companies selected for the study were found to be pleased to work with the organization. They were also satisfied with the work environment, conditions and the facilities provided by the companies. But the employees were partially satisfied with the performance appraisal and training facilities of the companies. It is advised to the companies that there is need to motivate the employees by providing performance based increments and also to organize the training programmes which help the employee to work more efficiently. In order to achieve higher targets it is necessary for every company to do a continuous research work on the level of Job Satisfaction, work culture and its impact on organization commitment in the organization.

REFERENCES


[10] Martin, Armanu, Surachman and Margono, (2013), The Role of Organizational Commitment as Mediator of Organizational Culture and Employees’ Competencies on Employees’ Performances (A Study on Irrigation Area Management in Southeast Sulawesi), Journal of Economics


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Mid-life Challenges and its Impact on organizational Commitment: A Study of Executives in J&K

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Abstract- Individual perception of high Work life balance (WLB) and sense of Organisational Commitment during Mid-life among executives has become imperative for any organization in order to ensure enhanced performance efficiency, particularly in this era of highly competitive business environment. It is no wonder that the mid-life has attracted numerous contributions from researchers and HR practitioners that attempt to investigate on various factors influencing mid-life, their interrelationship and possible outcomes of different stages of mid-life prevailing among executives. This paper is an attempt to find out the relationship between Mid-Life and Organisational Commitment among female executives of a public sector bank. Purposive and simple random sampling methods were employed to recruit one hundred working executives as participants for the study. Questionnaires were used to collect data, which was analyzed using descriptive and Pearson Correlation statistics. The findings indicated a statistically significant negative relationship between respondent’s Organisational Commitment and mid-life. The findings reinforce the need for healthcare and other professionals, such as social workers to deepen their understanding of the effects of multiple roles on the Organisational Commitment of women who combine employment with parenthood and marriage.

Index Terms- Mid-life, multiple roles, Organisational Commitment, Female Executives

I. INTRODUCTION

Work and family issues are becoming increasingly important for organizations to consider because the nature and composition of the work force is changing and will continue to change in the coming years. The contemporary demographic, technological and organizational changes have made work-family interface a crucial area of concern for scholars and professionals. The world of work is witness to major changes in work force demographics which include the changing participation rates for working women and working mothers, the rise in dual-career couples, the increase in the number of single-parent families, and the increase in the elderly population, which have created difficulties at the work-family interface. As both employee and family roles represent core components of women identity, impediments to work and family related identity formation and maintenance are always stressful.

Balancing the demands of work in family roles is a principle daily task for working women today. Occupying multiple roles provides women with important psychological benefits such as status, ego gratification and increased self esteem but there are also potential costs associated with such role accumulation, including role strain, psychological distress and somatic complaints. The women of today have over strained themselves in the struggle to manage both domestic and work spheres effectively. Studies have reported that over 7 percent of married female professionals are experiencing conflict between work and family responsibilities every day. On the one hand, domestic responsibilities slow down concentration of women as well as her career growth while shouldering the multiple responsibilities, women have broken themselves into two to rise to the challenges, functioning in the work place exclusively committed to their jobs and careers while continuing to shoulder a major share of the work load of home particularly child rearing. As more women pursue demanding careers and as men take on a greater share of family responsibilities the stress of handling multiple roles is affecting both women and men who often display difficulty adopting to wives multiple roles. Conflict is not only effecting women but jeopardizing the interests of the family and the society at large.

The conflict theory suggests that satisfaction or success in work environment entails sacrifices in the family environment: the two environments are incompatible because they have distinct norms and requirements. The women in family environment with certain preferences and behaviours and that the same women in the employing organization with other preferences and behaviours in that environment, are in dynamic, mutually reciprocal, and by directional relationship. What happens in one environment can be a consequence of, or an antecedent to what happens in the other environment.

Work Life Balance at Mid-Life

The concept Work-Life Balance was coined in 1986. By growing concerns the individuals and organizations alike that work can affect family life and vice-versa, thus giving birth to the concepts of “family- work conflict” and “work-family conflict”. The former is also known as work interferes with family” (WIF) while the latter is also called as “family interferes with work” (FIW). In other words, time provided to work is understood as time taken away from one’s family life. Work/life activities appeared in the 1930s. The agreements and approaches constructed by an organization with the intention to make employees do their jobs better and at the sometime assign acclimatization to deal with personal concerns or problems at their family. Present day people, who enter into the workforce, are more likely to have eyes on promotions if it is new job means, the employee has to bring more work to home. In most developing countries, only men worked outside of their home. The old, established joint Hindu family system provided a clear division of responsibilities between the old and the young

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in terms of decision making, the oldest male member in a patriarchal society is the head of household and would make all the important decisions; male and female the men would work outside the household, whereas the women are responsible for children care and taking charge of a household responsibilities, including in some low-income families in certain parts of India, walking many miles each day to bring water and fire wood.

More recently, the lack of vision has given way to the participation-enhancement approach that sees that work can facilitate participation at home and vice-versa. This has given birth to the concepts of “work-family facilitation” and “family-work facilitation” where experiences acquired at work can facilitate participation at home and vice-versa. These two mutually reinforcing concepts, are family members and organizations contribute their work experiences, and vice versa can enrich a balanced work and family life and contributed to building work-life balance (Aryee, S., Srinivas, ES and tan HH, 2005).

Work is core to our lives. It provides us with a feeling of status, achievement, recognition and above all it is a way of income to get our basic and material needs. Globalization and rapid technological changes demand more of workers. Because the world of work is changing in terms of development of new technology, more and more women entering the workforce, resulting in part, in two-earner families and above all there is a conflict between work and personal life. These are some of the challenges faced by today’s workers. Balancing work and family life is a growing concern for both employers and workers. Long working hours and the intensity of work have consistently emerged as two top most concerns of workers. Work-life conflict occurs when cumulative demands of work and non-work roles are incompatible in some respects, such as participation in one role is made more difficult by participation in the other roles (Duxbury, L. & Higgins.C, 2003).

Organisational Commitment
Early studies on organisational commitment viewed the concept as a single dimension, based on an attitudinal perspective, embracing identification, involvement and loyalty (Porter, Steers, Mowday & Boulian, 1974). According to Porter et al (1974) an attitudinal perspective refers to the psychological attachment or affective commitment formed by an employee in relation to his identification and involvement with the respective organisation. Porter et al (1974, p 604) further describes organisational commitment as “an attachment to the organisation, characterised by an intention to remain in it; an identification with the values and goals of the organisation; and a willingness to exert extra effort on its behalf”. Individuals consider the extent to which their own values and goals relate to that of the organisation as part of organisational commitment; therefore it is considered to be the linkage between the individual employee and the organisation. Organisational commitment as an attitude reflects feelings such as attachment, identification and loyalty to the organisation as an object of commitment.

Friendly work life policies are required to reduce negative impacts of work life conflict which is defined by Greenhaus and Beutell (1985) as an incompatibility between responsibilities from the work and family. Recently many researchers have attempted to highlight significance of work life policies. Family-friendly policies should cater for the specific ‘family’ circumstances of all employees (Lilley, 2004).

In developed and developing countries, rising proportions of dual earner families, increased female labour force participation and the growing number of aged dependents means that a higher proportion of employees have family responsibilities (Hall & Liddicoat 2005).

Researchers also support the idea of flexible timing and working conditions (Johns, 2005). Organizations need to accommodate these individuals with remote access for telecommuting, childcare centres, referral programs and employee assistance programs (Dockel, 2003). Despite experiencing work–life conflict, employees may maintain relatively high levels of organizational commitment provided that they perceive the procedures used to plan and implement organizational decisions are fair (Siegel et al, 2005). Spending more time at work can be an outcome of employee commitment as Lee & Hui (1999) argue, “work interference with family may be an indicator of how much devotion one has for work.”

Statement of the Problem
Organizations have focused on reducing the incompatibilities between work and family demands of their women employees. Organizational work life balance (WLB) policies and practices, covering part-time working, job sharing, flexi time, annualized hours, compressed hours, tele-working/e-working, home working, career breaks, study leave, etc, aim at striking a balance between employment and domestic commitments that is equitable and beneficial to both employer and employee. An imbalance between work and family domains is reported to have had negative outcomes for employees (e.g., life dissatisfaction, anxiety, depression, and poor health, etc) and organizations (e.g., absenteeism, decrease in productivity, and increasing turnover, etc). The work-life imbalance is associated with marital problems, impaired parenting, reduced life satisfaction and impaired performance both at work and at home. This is also a problem for employers as the inability to balance work and family demands has been linked to reduced work performance, increased absenteeism, high turnover, poor morale, increased work conflict and inequalities in workloads. For the employers such work-life imbalance means disillussionment, dissatisfaction and strained relations with women employees. Since society is not separate from organizations, the negative impact of this imbalance has its effects on the society in general – lower standards of performance, lower quality of goods and services and a growing feeling of interpersonal conflict being the obvious results.

Extensive research has been conducted on the subject of managing a balance between women’s work and family life by scholars belonging to different disciplines. There is an increased interest in the ways in which women manage their multiple involvements in personal and organizational lives. Various models have been developed to describe relationship between life at work and life at home. Social exchange theory clearly explains the relationship between WLB and commitment and supports the possibility that WLB policies promote employee participation in the organization to the extent that the employees feel obligated to exert “extra effort” in return for these “extra benefits”. One of the increasing concerns among researchers and practitioners at
present is to identify the relationship between WLB practices on different aspects of organisational commitment. Research has linked work and family commitment to work context, family context and various associated factors. Research has also shown that maintaining sustainable WLB is a key to the worker’s commitment to organisation and that organisational commitment is, in turn, positively related to performance, acceptance of change, job satisfaction, participation, power, teamwork and professionalism and negatively related to turnover, turnover intentions, and absenteeism. Many studies reveal that the level of organizational and managerial support an employee feels, their involvement in decision making, and the amount of feedback received about job performance and job role, influence whether a person has high or low work commitment. Some studies have found that employees who perceive their supervisors and organization as family-supportive and accommodating of their familiar concerns and constraints are more committed to their organizations and exhibit reduced withdrawal behaviours. The available research also suggests that work-life balancing policies and practices are the strongest determinants of women’s commitment to work.

II. LITERATURE REVIEW

Work-Life Balance J. Redmond et al. (2006) preferred „Work-Life Balance“ due to the fact that it encompasses the experiences and need of parents and non-parents alike, and are a more progressive theoretical framework in which to think about new ways of living and working that are satisfactory to all. In practice, it involves “adjusting work patterns so that everyone, regardless of age, race or gender can find a rhythm that enables them more easily to combine work and their other responsibilities and aspirations” (Pillinger 2001: 1). Supriya (2010) have highlighted Work-Life Balance across genders and found that both men and women are experiencing work life imbalance. Though after Liberalization, many Indian organizations have been introducing various Work-Life Balance practices like flexi times, part time work, and provision for child care facilities which are facilitated in various developed countries it is found that imbalance still exist among men and women in every organization. Kadam (2012) defines Work-Life Balance is a subject, in which increasing interest in academic literature, legislation and public discloser. WorkLife Balance is a broad concept including proper prioritizing between „Work“ such as career and ambition, on the other hand and „Life“ such as health, pleasure, leisure, family and spiritual development. Work-Life Balance means, meaningful daily achievement and enjoyment in each of four life quadrants work, family, friend and self. The expression Work-Life Balance was first used in the United Kingdom in the late 1970s to describe the balance between an individual’s work and personal life. In the United States, Work-Life Balance was first used in 1986. Pandey (2012) defines Work-Life Balance is a state of equilibrium in which the demands of both a person’s job and personal life are equal. Companies HR People are finding the innovative ideas to get the win-win situation. Effective Work-Life Balance policies are valuable to business and organizations for a number of reasons including reduced staff turnover rates, becoming a good employer or an employee of choice, increased return on investment in training as employees stay longer, reduced absenteeism and sick leave, improved morale or satisfaction, greater staff loyalty and commitment and improved productivity. An employee with better Work-Life Balance will contribute more meaningfully towards the organizational growth and success. Padma et al. (2013) defines the term Work-Life Balance (WLB) is attracted by all including the individuals and Corporate all over the world. Though many have proposed various definitions, there is no accepted definition for this term. WLB is defined as a satisfactory level of involvement between the multiple roles of a person’s life. It is a person’s control over the responsibilities between their workplace, family, friends and self. It is a comfortable state of equilibrium achieved between an employee’s primary priorities at their work place and at their private life. There are various people like family members, friends, supervisors, peer group and others involved in every person’s life. The support gained from them will play a key role in leading a comfortable life journey. On the basis of above literature researcher concludes that the Work-Life Balance is not just to have a balance between work and life but it is an appropriate mix of all the roles played by working women from typical housewives to successful corporate leaders.

Work-Life Balance among Working Women

Campbell et al. (1994) study results revealed that women with children were significantly lower in occupational commitment relative to women without children. Contrary to expectation, women with younger children outperformed women with older children. Samuel and Vivienne (1996) studies revealed that women balance their work and family identity by trading-off one role for the other. In contrast, men are able to simultaneously identify with work and family roles. Carmen K. Fu and Margaret A. Shaffer (2001) have examined the influence of family and work specific determinants of multiple forms of family interference with work and work interference with family conflict and found that parental demands and hours spent on household work were important determinants of FIW conflict and that role conflict, role overload and hours spent on paid work influenced WIF conflicts. Spouse support and superior support and domestic support were played moderate effect on work life conflict. A components approach to Work-Life Balance emphasizes balance as a direct formativie latent construct (Edwards and Bagozzi 2000) which means that work family balance consists of multiple facets that precede balance and give meaning to it (Grzywacz and Carlson 2007). For example, according to Greenhaus et al. (2003) work-family balance consists of time balance, involvement balance, and satisfaction balance. According to Frone (2003) in turn, work-family balance consists of work-family conflict and work-family facilitation (corresponding with role conflict and enhancement, respectively). The advantage of the components approach over the overall appraisals approach to Work-Life Balance is that one can use conceptually based measures of balance that tap into the different aspects of Work-Life Balance. These aspects form the overall evaluation of how well an individual is meeting role-related responsibilities (Grzywacz and Carlson 2007). Hyman and Summers (2004) classified seven major problems which are associated with current practices over Work-Life Balance these are unevenness of adoption across different sectors and
organizations, lack of formalization of policies at organizational level, restricted employee voice over the introduction and implementation of policies, policies are primarily to meet business needs rather than those of employees. There is no evidence of reduction in working hours, tangible and intangible work intrusions into domestic life, domestic responsibilities are still conducted primarily by women irrespective of their employment status. Elizabeth et al. (2005) investigated the influence of gender and tenure status in balancing parenthood and career and results revealed that women reported greater career and family stress and perceptions of less institutional support for balance of work and family as compared to men. Luo Lu, Gilmour, Kao and Huang (2006) in their cross-cultural study of work–family demands, WFC and well-being, compared and contrasted employees from an individualistic (UK) and a collectivist (Taiwanese) society and found that for the British, there was a stronger positive relation between workload and WFC, as well as a stronger positive relation between sharing household chores and FWC than that for the Taiwanese. Based on the research of (Thompson & Prottas 2006) as cited in (Cleveland et al. 2007) minimizing voluntary turnover will translate to lower costs in training and recruitment, and will cultivate a vast pool of managers with more years of experience who can be groomed to be the next tier of future hotel leaders. Moreover, the (Cleveland et al. 2007) suggested that there is a trickle-down effect on the hourly employees when managerial stress and health-related problems are addressed, because the overall workplace climate may improve and this can be done via rolling out strategic programmes with the use of technology. The tourism industry is also haunted with the concept of presenteeism, which does not lead to the achievement of Work-Life Balance (McLaughlin 2006). Cooper as cited in (Deery, Jago & Stewart 2008) suggested that presenteeism is “an overwhelming need to put in more hours or, at the very least, appear to be working very long hours”. If hotels were to promote closing the gap between work-life conflicts and Work-Life Balance, it must exert efforts within its human resources spectrum to minimize presenteeism. In relation to this, Doherty (2004) examined Work-Life Balance for women in the hospitality industry and discovered that the principal deterrents to these women from exploring career advancement opportunities are the very long hours and the lack of flexibility. Krishna Reddy et al. (2010) found that the number of hours worked per week, the amount and frequency of overtime, inflexible work schedule, unsupportive supervisor and an inhospitable work culture increases the likelihood of women employees to experience conflict between their work and family roles. Rincy and Panchanatham (2011) revealed that role overload, dependent care issues, quality of health, problems in time management and lack of proper support from the family are the major factors causing imbalance in work and personal life of women entrepreneurs. Santhi and Sunder (2012) found that supporting environment in the organization, provision of welfare measures play a primary role and alternative working time, child care and recreation play the secondary role in balancing work and personal life.

III. ORGANISATIONAL COMMITMENT

Organisational commitment includes the description by O’Reilly (1989), “an individual's psychological bond to the organisation, including a sense of job involvement, loyalty and belief in the values of the organisation”. Organisational commitment from this point of view is characterised by employee's acceptance of organisational goals and their willingness to exert effort on behalf of the organisation (Miller & Lee, 2001). Cohen (2003, p xi) states that “commitment is a force that binds an individual to a course of action of relevance to one or more targets”. This general description of commitment relates to the definition of organisational commitment by Arnold (2005, p 625) namely that it is “the relative strength of an individual’s identification with and involvement in an organisation”.

The researchers appear to be using the term balance to represent a range of different patterns of commitment, rather than an equality of commitments across roles. We believe that an individual who gives substantially more precedence to one role than the other is relatively imbalanced even if the distribution of commitment to family and work is highly consistent with what the individual wants or values. Whether such imbalances in favour of one role is healthy or not is, in our opinion, an empirical question.

Outcomes of the feelings about work performance (commitment and satisfaction) as well as being in a job and organization that suits one's values and goals affect intentions to quit or stay (Stumpf & Hartman, 1984).

Organizational commitment and turnover are both dynamic concepts (Cohen, 1993). Allen & Meyer (1990) suggested, “Commitment is seen as a negative indicator of turnover.” Their research also made an important contribution towards defining the three components of organizational commitment. Affective commitment “the employee’s emotional attachment to, identification with, and involvement in the organization, Continuance commitment “an awareness of the costs associated with leaving the organization” and Normative commitment “a feeling of obligation to continue employment” (Meyer & Allen, 1991). However in present study organizational commitment was measured as a whole rather than measuring its three components.

A number of studies have suggested that age has a significant impact on organizational commitment (Hrebiniak & Alutto, 1972). Richard and Steers (1977) found that among personal characteristics, age and organizational tenure tend to have a low positive relationship with commitment. Shoemaker, Snizek and Bryant (1977) explored the linkage between various social and demographic factors that were important to Becker’s side-bets notion and organizational and occupational commitment.

Need for Study

Despite the growth of research attention in the area, in the last two decades, work-life balance research has been criticized as being a theoretical (Zedeck, 1992), inadequately conceptualized (Lambert, 1990), methodologically inappropriate (Casper et al., 2007) and narrowly focused (Carlson et al., 2010). Most of the existing studies are, by their nature, general, descriptive and devoid of empirical basis. A number of questions remain unanswered and provide for research challenges for future. Although a substantial amount of stand-alone research
work has been done in both the fields of WLB and organizational commitment, only a few studies have been conducted on the linkage between the two. Research into women’s work-family balance and linkages that this phenomenon has precipitated particularly with job satisfaction and organisational commitment has been done mostly in Western societies. Relatively little is known about the same in non-Western societies including India. In India the ‘reconciliation of work and family’ has become a core concern for policy makers and has encouraged a national-level debate and policy intervention. As an indicator of quality of life, work-life balance has gained both academic and policy currency. However, despite a plethora of research on the subject, empirical investigations of working women’s work-life balance issues and their relationship with organisational commitment are lacking and very little is known about the impact of WLB on various facets of organisational commitment. Furthermore, research conducted on the subject is limited and confined to sectors like banking, IT, education, and manufacturing only. There is scarcity of research on work life balance of women professionals in the health care sector with special reference to Jammu and Kashmir. Therefore, examining the relationship between the various facets of work life balance and organisational commitment of women professionals in healthcare sector is required. Thus present study aims to address this gap in the research.

**Objectives of the Study**

In the light of the above research questions, the specific objectives of the proposed study are as follows:

1. To find out the differences of midlife among executives on demographics basis
2. To establish association between mid-life and Organisational Commitment

**IV. STUDY AREA**

The state of Jammu & Kashmir region is the study area. J&K State is multilingual, multi-ethnic, multi-religious and multi-cultural. This diversity and the state is facing turmoil from last two decades which makes it more attractive for this research.

**V. RESEARCH METHODOLOGY**

**SAMPLE AND QUESTIONNAIRE**

Data were collected using the questionnaire instrument. Questionnaires were distributed to a sample of 200 mid-life employees located in district Jammu and Srinagar in J&K State. Middle aged employees in Banking sector working in different departments were surveyed. In the Questionnaire, Likert five point scale was employed to determine scores, where respondents were asked to rate each attribute on 5-point scale ranging from strongly disagree to strongly agree. The data so collected was subjected to Factor Analysis. Census survey is to be adopted for collecting data. The statements/items for the questionnaire were formed after consulting relevant literature and some relevant research conducted in the area. Besides attitudes scale, the survey questionnaire also included a section to capture the general profile of respondents. They were asked about their demographic background including age, education level, marital status, and preference of job, year of experience and income level. The present study has used tools t-test, one-way ANOVA and Correlation analysis.

**VI. ANALYSIS AND INTERPRETATION**

<table>
<thead>
<tr>
<th>TABLE - 1</th>
<th>SELECTED RESPONDENTS DEMOGRAPHIC PROFILE</th>
</tr>
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<tbody>
<tr>
<td>Gender</td>
<td>Male 173(86.5)</td>
</tr>
<tr>
<td></td>
<td>Female 27(13.5)</td>
</tr>
<tr>
<td></td>
<td>Total 200(100)</td>
</tr>
<tr>
<td>Age</td>
<td>35-40 YEARS 10(5)</td>
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<tr>
<td></td>
<td>40-45 YEARS 76(38)</td>
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<tr>
<td></td>
<td>45-50 YEARS 37(18.5)</td>
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<td></td>
<td>Above 50 YEARS 77(38.5)</td>
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<tr>
<td></td>
<td>Total 200(100)</td>
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<tr>
<td>Educational Qualification</td>
<td>UG 91(45.5)</td>
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<td></td>
<td>PG 92(46)</td>
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<tr>
<th></th>
<th>ABOVE PG</th>
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<td>Total</td>
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<table>
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<th>Family Income Level</th>
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<tr>
<td>UPTO Rs 100000</td>
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<tr>
<td>100000-200000</td>
<td>113(56.5)</td>
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<td>200000-300000</td>
<td>60(30)</td>
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<tr>
<td>300000-400000</td>
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<td>SINGLE</td>
<td>11(5.5)</td>
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<tr>
<td>SEPARATED</td>
<td>25(12.5)</td>
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<tr>
<td>DIVORCED</td>
<td>10(5)</td>
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<td>Total</td>
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<td>LESS THAN 5 YEARS</td>
<td>20(10)</td>
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<tr>
<td>5-10 YEARS</td>
<td>63(31)</td>
</tr>
<tr>
<td>10-15 YEARS</td>
<td>50(25)</td>
</tr>
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<td>15-20 YEARS</td>
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<td>ABOVE 20 YEARS</td>
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<th>Reasons of preference of Job</th>
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<td>ECONOMIC</td>
<td>88(44)</td>
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<td>CAREER CHOICE</td>
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<tr>
<td>Upto Rs 20000</td>
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<tr>
<td>20000-30000</td>
<td>14(7)</td>
</tr>
<tr>
<td>30000-40000</td>
<td>84(42)</td>
</tr>
<tr>
<td>40000-50000</td>
<td>53(26.5)</td>
</tr>
<tr>
<td>Above 50000</td>
<td>46(23)</td>
</tr>
<tr>
<td>Total</td>
<td>200(100)</td>
</tr>
</tbody>
</table>

**Relationship between Mid-life and Organizational Commitment**

Bivariate correlation analysis was run using Pearson’s r to test the research hypothesis that Mid-life factors would be negatively correlated to Organizational Commitment in banking sector executives. A correlation matrix was computed in SPSS.
Table 4.15: Correlation between Mid-life and Organizational Commitment Executives

<table>
<thead>
<tr>
<th>Correlation Between</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-life and Organizational Commitment</td>
<td>-0.654**</td>
<td>.000</td>
</tr>
</tbody>
</table>

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

Significant association exists between midlife and Organizational Commitment. Results are shown in Table 4.6. Only five of the Mid-life variables, Goal conflict (r = -0.319), Work overload (r = -0.498), Fear (r = -0.565), and Working Hours (r = -0.591) and Stress (r = -0.793) demonstrated negative, yet moderate correlations to Organizational Commitment. All these five Mid-life variables had negative and statistically significant correlations with well being.

Summary of Findings
Findings based on the Analysis of Mid-life of Employees

Table 5.1: Test of Differences

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>Midlife Vs Gender</td>
<td>48.990</td>
<td>.000</td>
</tr>
<tr>
<td>Midlife Vs Age</td>
<td>22.678</td>
<td>.000</td>
</tr>
<tr>
<td>Midlife v/s Reason of preference</td>
<td>10.087</td>
<td>.002</td>
</tr>
<tr>
<td>Midlife Vs Experience</td>
<td>10.459</td>
<td>.000</td>
</tr>
<tr>
<td>Midlife Vs Expected Salary</td>
<td>3.513</td>
<td>.000</td>
</tr>
</tbody>
</table>

II) No significance difference was found in Work life balance of middle age employees on the bases of qualification (F= 1.377 ; P>0.05)

III) There is a significant and negative correlation between mid-life and well-being (r = -0.642; p <0.010)

IV) Summary of Test of Association

V) Test of Association

VI) The correlation analysis between mid-life and Organizational Commitment for the total sample revealed the following findings:

Summary of Test of Association

Test of Association

There is a significant and negative correlation between mid-life and Organizational Commitment (r = -0.642; p <0.010). It may be concluded from the results that people who are in their middle age, are facing work life imbalance which is having significant association with the Organizational Commitment. Also, those who are extended responsibility both work and family may find the greatest obstacles in various pursuits of later life.

VII. DISCUSSION AND CONCLUSION

Despite the fact that it is not a new phenomenon, in modern-day J&K society, there is increased formal participation of women in diverse paid jobs. Thus, the importance of women’s work outside their homes cannot be over emphasized due to the numerous benefits it brings to the family. As found in this study, the respondents represented various professions (i.e., Managers, administrative assistants, secretaries, clerks, caterers and accounting assistants). While J&K women have engaged in
The inverse relationship suggests that as mid-life working executives do these activities, their Organizational Commitment decreases. This finding is not surprising because in the child-centered world of today, mothers all over the world, including J&K mothers are very concerned about their children’s education and are therefore willing to support them to the fullest. Most Mid-life women in J&K perform childcare activities single-handedly because these are considered feminine activities. When mothers are not able to help their children with school related activities they may get worried, feel guilty and are likely to conclude that they have failed their children. Peters (1997) asserted that mothers play active role in their children’s education in every area that would directly impact academic success. Mother’s involvement in their children’s academic performance in contemporary society, Peters suggested, is so intense to the extent that they grade themselves according to their children’s academic performance. Since mothers employed outside their homes do not spend much time with their children, they are often blamed for everything that goes wrong with the children. Preparing child for school had a statistically significant inverse relationship with the Organizational Commitment of the respondents probably because mothers get children ready for school and prepare for work at the same time and these activities could be difficult for working mothers to manage simultaneously. Simon (1995) notes that employed wives are likely to experience role conflict and feel guilty as they combine work and family and may also assess themselves as less successful parents and spouses. In addition, the results of the correlation statistics revealed an inverse statistically significant relationship between mothers’ Organizational Commitment and childcare activities of escorting and picking children from school. This finding suggests that balancing these roles with the demands of formal employment are challenging for the participants of this study. Mothers might be late for work after sending children to school and may also have to leave work early to pick children from school. Furthermore, preparing food for children had an inverse statistically significant relationship with the Organizational Commitment of working mothers. It is likely that working mothers cook before they go to work or rush home from work to cook for their children in order to ensure that they eat and go to bed on time.

2. Another finding of this investigation is the inverse relationship between working mother’s Organizational Commitment and household roles. Household tasks that yielded statistically significant results included going to market for food items, washing clothes, cooking, as well as sweeping and mopping. In a related study on work and family roles among Chinese living in Urban China, Lai (1995) found that both work and family roles had a relationship with women’s mental health status. The results of the present study suggest that as working mothers engage in these household tasks, their Organizational Commitment is negatively affected.

Studies on employment and women’s health indicate that heavy job demands may have harmful effects on women’s health, such as fatigue, greater risk of coronary heart disease (Jenkins, 1982) and vulnerability to other physical and mental health risks (Repetti et al., 1989). Even as women have taken on more paid work roles outside their homes, they continue to shoulder much of the responsibility inside the home (Hochschild, 1989). As expected, some household chores could have harmful effects on the Organizational Commitment of working mothers because they are chores that demand time and energy and as a result, could make them feel worn-out as they combine them with career duties. Strong et al. (2001) conclude that household responsibilities make employed women work long days and nights and add considerable burden to their paid work, which may affect their Organizational Commitment. Cooking for example, can conflict with women’s job-related activities because it is normally done on daily basis and requires a lot of planning. Complicating the issue is the fact that there may be times that employed mothers would have to stay longer on their jobs to ensure that assigned tasks are completed or deadlines met. The majority of women in J&K consider the performance of household roles as normal because females are socialized to take care of household while men are considered the breadwinners. The results suggest that certainly, this study on the effects of multiple roles on the Organizational Commitment of working mothers in J&K is useful because it fosters a broader understanding of specific activities that are likely to be harmful to women’s Organizational Commitment as they combine employment, marriage and motherhood. The findings revealed that respondents had varied demographic backgrounds. This is essential because effects of multiple roles on the Organizational Commitment of women employed outside their homes depend on different factors, such as the number of children, ages of children, type and specific characteristics of the job and the level of social support at
home and work. Evidence from existing research indicates clearly that the effects of multiple roles on women’s Organizational Commitment remain divisive. There is general agreement that juggling multiple roles could have both beneficial and harmful effects on the Organizational Commitment of working mothers. In this study, although the findings indicated an inverse relationship between working mothers’ Organizational Commitment and childcare responsibilities, household chores, some activities did not have statistically significant effects on respondents’ psychosocial well-being. These findings suggest not only the need for specific interventions, but also interventions that consider socio-economic backgrounds and cultural differences because some activities might be stressful for particular married working mothers. Given that societal perception of women’s productive and reproductive roles influence their involvement in formal employment, understanding the experiences of married paid working mothers has the potential of providing vital insights into the challenges faced by this group.

3. Although juggling multiple roles often results in role conflict, women can be successful as wives, mothers and employees if social service professionals, such as social workers, counselors, psychiatrists, and psychologists, assist married working mothers to have an in-depth understanding of their responsibilities regarding career and other life choices. Additionally, considering that J&K has not done much to (a) modify family roles to reflect the changing nature of women’s lives and (b) reduce the challenges working mothers encounter as they juggle multiple roles, family friendly policies and structures would go a long way in enhancing working mother’s Organizational Commitment. As well, social support from spouses, extended family, friends, governmental and non-governmental organizations would be useful. We therefore conclude that if working mothers are offered flexible work schedules, affordable childcare services and assistance with household roles, they will be healthy and can contribute effectively to the development of their organizations, families, communities and nations.

REFERENCES


AUTHORS

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Assessment of Knowledge Concerning Personal Hygiene among Kut Technical Institute Female Student's, Waist Governorate 2017

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Abstract- Descriptive study is conducted to assess the knowledge concerning personal hygiene among Kut Technical Institute female student's, and to determine the relationship between female student's their knowledge and demographic characteristics of age, parents education, parents occupation, and socio-economic status.

Methodology: A simple random sample of (100) female student's is selected through the use of probability sampling approach. This sample is distributed to all sections of the Technical Institute. The reliability of the questionnaire which is determined through a pilot study and the validity are achieved through a panel of (10) experts. The overall items, which are included in the questionnaire, are (49) items. These items are divided into (8) sections which include (bathing and skin hygiene, hair hygiene, hands and nails hygiene, foot hygiene, nose-eyes-ear hygiene, mouth and teeth hygiene, clothing hygiene, and genital area hygiene). Data are analyzed through the application of descriptive and inferential statistical data analysis approach.

Results: showed that the overall female students knowledge about personal hygiene is good (73%), and it's also some responses to the knowledge items is poor and constituted (27%). Concerning female demographic characteristics, results indicate that the socio-economic status significant association with their knowledge.

Conclusion: Kut Technical institute female students are good knowledge about personal hygiene (73%). And somewhat knowledge about personal hygiene in terms of mouth and teeth hygiene. It is also, socio-economic status affected their knowledge.

Recommendations: Need to be increase of the public awareness about the importance of personal hygiene particularly for adolescents through mass media to support the strength point of personal hygiene. Further studies can be conducted to involve national level and assess secondary students’ female student's concerning personal hygiene.

Index Terms- Assessment, Knowledge, Personal Hygiene.

I. INTRODUCTION

The term hygiene is derived from Hygeia, the Greek goddess of health cleanliness and sanitation. Hygiene is also the name of a branch of science that deals with the promotion and preservation of health (1). Personal hygiene is very important for protecting and maintaining health and addressing health problems and is also fundamental to the prevention of many diseases, particularly contagious diseases (2). Personal hygiene precautions include hand-face hygiene, regular bathing; using soap and running water in the cleaning process; washing hands before preparing food, before and after eating meals and after using the toilet, hair care washing and using one’s own clothes, towels, shoes and slippers besides constituting a basis for personal and social health, hygiene is an indispensable part of living in society (3). Girls has been specially recognized as a special period which signifies the transition from girlhood to womanhood, it constitute about 1/5th of the total female population in the world. These also constitute a vulnerable group (4). Students who do not wash their hands can spread infections and viruses to others. Personal hygiene entails bathing regularly, keeping hair clean, trimming fingernails and toenails, brushing teeth and using deodorant. Personal hygiene can enhance a person’s self-confidence and improve the chances of success in many areas of life (5).

II. METHODOLOGY

A study aims at:
1. To assess knowledge concerning personal hygiene among female students in Kut Technical Institute.
2. To determine relationship between their knowledge and demographic characteristics of age, parent's level of education, parent's occupation, and economic status,

Study Design: A descriptive study, using assessment approach, is carried out to assess the knowledge about personal hygiene at Kut Technical Institute in Wasit Governorate.

Sample of the study: A Non probability simple random sample of (100) female students is selected from all department of Kut Technical Institute for the purpose of study.

Study instrument: A questionnaire as a means of data collection was constructed for the purpose of study. It consisted from (49) items and divided into (8) sections which include:
1. Bathing and skin hygiene: Which composed of (10) items.
2. Hair hygiene: Which composed of (4) items.
3. Hands and nails hygiene: Which composed of (10) items.
4. Foot hygiene: Which composed of (3) items.
5. Nose, eyes, and ear hygiene: Which composed of (8) items.
6. Mouth and teeth hygiene: Which composed of (7) items.
7. Clothing hygiene: Which composed of (3) items.
8. Genital area hygiene: Which composed of (4) items.

**Validity and Reliability:** The content validity of the instrument was established through a panel of (10) experts, the reliability of the items were based on the internal consistency of the checklist was assessed by calculating Cronbach’s Alpha which as= 0.70.

**Statistical analysis:** Data are analyzed through the application of descriptive statistical data analysis approach that includes, frequencies, percentages, mean of scores, and graphical presentation of data by pie-charge; and inferential statistical data analysis approach that include Chi-squared test.

### III. RESULTS

Table (1): Distribution of Kut Technical Female Student's by their Demographic Characteristics:

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
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<td>12</td>
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</tr>
<tr>
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<td>16.0</td>
</tr>
<tr>
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<td>Institute</td>
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<td>24.0</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>24</td>
<td>24.0</td>
</tr>
<tr>
<td>Mothers Education</td>
<td>daer ot elba toN&amp; write</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>etirw &amp; daer ot elbA</td>
<td>4</td>
<td>4.0</td>
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<td>yramirP</td>
<td>16</td>
<td>16.0</td>
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<td>etaidemretnl</td>
<td>19</td>
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<td></td>
<td>yradnoceS</td>
<td>23</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td>etutitsnI</td>
<td>21</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>13</td>
<td>13.0</td>
</tr>
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<td>Profession</td>
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<tr>
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<tr>
<td>Mothers Occupation</td>
<td>Profession</td>
<td>29</td>
<td>29.0</td>
</tr>
<tr>
<td></td>
<td>Retired</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Home</td>
<td>69</td>
<td>69.0</td>
</tr>
<tr>
<td>Monthly Income</td>
<td>High</td>
<td>58</td>
<td>58.0</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>38</td>
<td>38.0</td>
</tr>
<tr>
<td></td>
<td>Low</td>
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<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

This table reveals that the (56%) of the study sample are within third age group (19) years old. Concerning parent's education, results indicate that the (24%) of fathers are graduated institute and college. Concerning mothers, findings indicate (23%) of mothers are graduated secondary school. In addition to the study results occupation, most of the fathers are professional and account (49%) out total of the study sample (69%) of mothers are home work. Finally in this table Income, results indicate that the most of female students are making high income and account (58%) out total of the study sample.
Table (2): Distribution of Kut Technical Female Student's Knowledge about Personal hygiene by their Domain

<table>
<thead>
<tr>
<th>Overall Domain Knowledge</th>
<th>Scale</th>
<th>F</th>
<th>%</th>
<th>M.S</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing and skin hygiene</td>
<td>Fail</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor</td>
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<td>2.65</td>
<td>Good</td>
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<tr>
<td></td>
<td>Good</td>
<td>65</td>
<td>65.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hair hygiene</td>
<td>Fail</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Poor</td>
<td>31</td>
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<td>2.69</td>
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<tr>
<td></td>
<td>Good</td>
<td>69</td>
<td>69.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hands and Nails hygiene</td>
<td>Fail</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor</td>
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<td>22</td>
<td>2.78</td>
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</tr>
<tr>
<td></td>
<td>Good</td>
<td>68</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foot hygiene</td>
<td>Fail</td>
<td>8</td>
<td>8.0</td>
<td>2.72</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>23</td>
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<tr>
<td></td>
<td>Good</td>
<td>69</td>
<td>69.0</td>
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<td></td>
</tr>
<tr>
<td>Ears, Eyes and Nose hygiene</td>
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<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>27</td>
<td>27</td>
<td>2.73</td>
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<tr>
<td></td>
<td>Good</td>
<td>73</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth and Teeth hygiene</td>
<td>Fail</td>
<td>5</td>
<td>5</td>
<td>2.12</td>
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<tr>
<td></td>
<td>Poor</td>
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<td>17</td>
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<td>Clothing hygiene</td>
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<tr>
<td>Genital area hygiene</td>
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<td></td>
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<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the statistical cut off point, this table reveals that the all domain of personal hygiene, the responses of female students are good knowledge about their personal hygiene, except at the mouth and teeth hygiene, the responses is poor knowledge.

This figure depicts the overall assessment of Kut Technical Institute female student's knowledge about personal hygiene, the majority of them indicate that the (73%) of female students are good knowledge and (23%) are poor Knowledge.
Table (3): Statistical Association between Kut Technical Female Students and their Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Scale</th>
<th>Overall</th>
<th>χ²</th>
<th>D.f</th>
<th>p-value</th>
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<td>18</td>
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<tr>
<td></td>
<td>Total</td>
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<td>73</td>
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<td></td>
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<tr>
<td>Fathers Education</td>
<td>Read &amp; write</td>
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</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>4</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>4</td>
<td>12</td>
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<td>Retired</td>
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<td>Neglect</td>
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<td>Total</td>
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<tr>
<td></td>
<td>Moderate</td>
<td>12</td>
<td>26</td>
<td></td>
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<tr>
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<td>Low</td>
<td>3</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>Total</td>
<td>27</td>
<td>73</td>
<td></td>
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</table>

χ²- Chi-square, Df= Degree of freedom, P-value= Probability value, S= significant, NS= non significant.

This table presents that there is a non-significant association between the Kut Technical Institute female students and their demographic characteristics at p-value more than 0.05, except with their income, which has a significant association with female students at p-value less than 0.05.

IV. DISCUSSION

Part I: Discussion of the demographic characteristics

Results reveals that the (56%) of the study sample are within third age group (19) years old.

Concerning parent's education, results indicate that the (24%) of fathers are graduated institute and college and mothers education, findings indicate (23%) of mothers are graduated secondary school. In a study of Abbas and others who have studied a comparative assessment of knowledge and practice regarding personal hygiene among urban and rural school students in Aslan and others, India. Their findings indicate that the most of the parent’s education are College graduated levels (6).

In addition to the study results occupation, most of the fathers are professional and account (49%) out total of the study sample (69%) of mothers are home work. The present study agreement with the result of study has been assessed the knowledge and practice regarding personal hygiene among school students from an urban areas. A cross-sectional study designs are conducted on school students in India. Data are

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collected according to inclusion criteria using a pre-designed closed ended questionnaire. After statistically analysis, results indicate that the parents occupation (78%) are employed as concerning fathers occupation, and (73%) of mothers are (housewife) unemployed (9).

Regarding income, results indicate that the most of female students are making high income and account (58%) out total of the study sample. While in a study of Beumer and others who have studied state of personal hygiene among school students: A community based cohort study. Their findings indicate that the most of the participants making moderate socio-economic status (9).

**Part II: Distribution of Kut Technical Female Student's Knowledge about Personal hygiene**

Results depicts that the majority of Kut Technical Institute female students are (73%) good knowledge concerning personal hygiene. These important findings show that knowledge can play a decisive role in improving adolescents personal hygiene practices, which in turn would help to protect against diseases and enhance confidence in self-appearance, especially to adolescents.

**Part III: Distribution Statistical Association between Kut Technical Female Students and their Demographic Characteristics**

presents that there is a non-significant association between the Kut Technical Institute female students and their demographic characteristics at p-value more than 0.05, except with their income, which has a significant association with female students at p-value less than 0.05. Dash and Padhi who has studied the impact of school health education programme on personal hygiene and related morbidities in Tribh school students of Wardha Distinct. Their findings indicate that there is a significant association between health educational programme, personal hygiene in term cleaning clothing and economic status at p-value less than 0.05 (10).

**VI. RECOMMENDATION**

The study recommends that further studies can be conducted to involve national level and evaluate secondary students’ female students concerning personal hygiene. As well as decision makers need to be support strength point of personal hygiene.

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Tension Quadratic Trigonometric B´Ezier Curve with Two Shape Parameters

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Abstract- In this paper, quadratic trigonometric Bezier´ curve with two shape parameters, with a tension parameter, are presented. The new basis functions share the properties with Bernstein basis functions, so the generated curves inherit many properties of traditional Bezier´ curves. The presence of shape parameters provides a local control on the shape of the curve which enables the designer to control the curve more than the ordinary Bezier´ curve. These type of functions are useful for constructing trigonometric Bezier curves and surfaces, they can be applied to construct continuous shape preserving interpolation spline curves with shape parameters. To better visualize objects and graphics, a tension parameter is included. In this work we constructed the Trigonometric Bezier curves followed by a construction of the shape preserving interpolation spline curves with local shape parameters and a tension parameter.

Index Terms- Blending Functions, Trigonometric Bezier Curves, Tension Parameter, Shape Parameter, Interpolation trigonometric basis functions, shape control.

I. INTRODUCTION

In computer aided geometric design (CAGD), it is often necessary to generate curves and surfaces that approximate shapes with some desired shape features. Designing free form curves and surfaces is a prevalent feature of CAGD. The key problem, simply stated, is to enable the designer to generate curves and surfaces which behave as he wants them to. The parametric cubic is a powerful tool which, when properly defined, is capable of representing most geometric entities of practical interest. In recent years, the trigonometric spline with shape parameters has gained more interest in CAGD, in particular curve design. Han ¹ presented a class of quadratic trigonometric polynomial curves with a shape parameter. The shape of the curve was more easily controlled by altering the values of shape parameter than the ordinary quadratic B-Spline curves. Han ² introduced piecewise quadratic trigonometric polynomial curves with C² continuity analogous to the quadratic B-Spline curves which have C² continuity. Cubic trigonometric polynomial curves with a shape parameter were discussed by Han ³. In these papers the authors described the trigonometric polynomial with global shape parameter. Single parameter does not provide local control on the curves. To remedy this, Wu et al presented quadratic trigonometric polynomial curves with multiple shape parameters. Bezier´ technique is one of the methods of analytic representation of curves and surfaces that has won wide acceptance as a valuable tool in CAD/CAM system. They are used to produce curves which appear reasonably smooth at all scales. Today, many CAGD systems feature Bezier´ curves as their major building block, since they are very efficient and attain a number of mathematical properties. Both rational and non-rational forms of Bezier´ curves have been studied by many authors. A cubic trigonometric Bezier´ curve with two shape parameters was presented by Han et al. It enjoyed all the geometric properties of the ordinary cubic Bezier´ curve and was used for spur gear tooth design with S-shaped transition curve Abbas, et al. Liu, et. al presented a study on class of TC-Bezier´ curve with shape parameters. Yang, et. al discussed trigonometric extension of quartic Bezier´ curves attaining G² and C² continuity. A class of general quartic spline curves with shape parameters were introduced by Han. Yang, et al studied a class of quasi-quartic trigonometric Bezier´ curves and surfaces. It is important to study the spline curve representations that provide local con-trol, that is, the capability of modifying one portion of the curve without altering the remainder. From a practical standpoint, we are interested in constructing the trigonometric polynomial representations which can manipulate a curve eactually.

The purpose of this paper is to present quadratic trigonometric polynomial blending functions where we include a tension parameter, the latter is mainly important for object visualization. These blending functions are useful for constructing trigonometric Bezier curves and can be applied to construct continuous shape preserving interpolation spline curves with shape parameters. A newly constructed quadratic trigonometric Bezier´ curve with two shape parameters is presented in this paper. The proposed curve inherits all trigonometric properties of the traditional Bezier´ curve and is used to construct open and closed curves.

The remainder of this paper is organized as follows. In section 2, the quadratic Trigonometric polynomial blending functions with shape and tension parameter are described and the properties of these functions are shown. In section 3 Trigonometric Bezier curves are constructed and their properties are discussed. Shape control is discussed in section 4. In section 5, the representation of ellipse and circle are given. The Trigonometric polynomial approximation is discussed in Section 6. Conclusion is given in section 7.
II. QUADRATIC TRIGONOMETRIC BEZIER BASIS FUNCTIONS

Firstly we can define the trigonometric polynomial blending functions with tension parameter and then their properties are given.

2.1 Trigonometric Polynomial Blending Functions with Tension Parameter

The trigonometric polynomial blending functions are given as follows:

**Definition 2.1** for two arbitrarily real value of \( m \) and \( n \), \( \beta \) be the tension parameter and \( t \in 0, \cfrac{\pi}{2\beta} \). The Quadratic trigonometric Bezier basis functions with tension parameter and two shape parameters \( B_{i,\beta} \), \( i = 0, 1, 2, 3 \) are defined as:

\[
\begin{align*}
B_{0,\beta}(t,m,n) &= (1 - \sin(\beta t))(1 - (1 - m)\sin(\beta t)); \\
B_{1,\beta}(t,m,n) &= m \sin(\beta t)(1 - \sin(\beta t)); \\
B_{2,\beta}(t,m,n) &= n \cos(\beta t)(1 - \cos(\beta t)); \\
B_{3,\beta}(t,m,n) &= (1 - \cos(\beta t))(1 - (1 - n)\cos(\beta t));
\end{align*}
\]

For \( m = n = 0 \), the basis functions are linear trigonometric polynomials. For \( m, n \neq 0 \), the basis functions are quadratic trigonometric polynomials.

Figure 1, plots these basis functions for different values of the tension parameter \( \beta \) in the interval \( t \in 0, \cfrac{\pi}{2\beta} \)

![Figure 1. The curves of blending basis functions (for \( t \in 0, \cfrac{\pi}{2\beta} \)).](image)

The blending functions studied in the present work have the following properties which are analogous to those found for the quadratic trigonometric Bezier basis functions.

2.2 Properties of Trigonometric Polynomial Blending Functions:

**Theorem 1.** The basis functions \( B_{i,\beta}(t,m,n), (i=0,1,2,3) \) defined in (1) have the following properties:

(a) **Non-negativity:** When \( t \in 0, \cfrac{\pi}{2\beta} \) there are \( B_{i,\beta}(t,m,n) \geq 0, (i=0,1,2,3) \).

(b) **Partition of Unity:** One has \( \sum_{i=0}^{3} B_{i,\beta}(t,m,n) = 1; \)

(c) **Symmetry:** \( B_{i,\beta}(t,m,n) = B_{3-i,\beta}(\cfrac{\pi}{2\beta} - t, m, n); \) for \( i = 0, 1, 2, 3; \)
(d) **Maximum:** Each $B_{i,\beta}(t,m,n)$ has one maximum value in $t \in \left[0, \frac{\pi}{2\beta}\right]$. 

(e) **Monotonicity:** For a given value of shape parameter $m$ and $n$, $B_{0,\beta}$ is monotonically decreasing and $B_{3,\beta}$ is monotonically increasing.

### III. TRIGONOMETRIC BEZIER CURVES WITH TENSION PARAMETER

This section describes the theory and method of using the tension parameter $\beta$ to control the form of the interpolating trigonometric Bezier curve $B_{i,\beta}(t,m,n)$. Note that changing the tension factor $\beta$ does not affect the form of $B_{i,\beta}(t,m,n)$ and the interpolation features at the data points.

**Definition 3.1:** Let $P = \left( P_0, P_1, P_2, P_3 \right)$ be a set of points $P_i \in \mathbb{R}^2$ or $\mathbb{R}^3$. The Trigonometric Bezier curves with tension parameter $\beta > 0$ associated with the set $P$ is defined by:

$$R_{\beta}(t,m,n) = \sum_{i=0}^{3} (B_{i,\beta}(t,m,n)) P_i; \quad t \in \left[0, \frac{\pi}{2\beta}\right], \quad m,n \in [0,2];$$

(2)

The points $P_i; (i = 0,1,2,3)$ are called quadratic trigonometric Bezier control points.

Figure 2 shows the quadratic Trigonometric Bezier curves with different tension parameter values. Keeping the same control polygon, as $\beta$ varies we are not simply changing the domain of a single curve, but defining different curves. It can be seen that quadratic trigonometric Bezier curves with shape and tension parameter are close to the control polygon. Therefore, quadratic trigonometric Bezier curves with shape and tension parameter can nicely preserve the feature of the control polygon. Control polygons provide an important tool in geometric modeling.

The tension like effect of this tension factor $\beta$ is illustrated in Figures 1 and 2 where the interval changes as a function of $\beta$ keeping all the properties of the blending functions verified. It is an advantage if the curve being modeled tends to preserve the shape of its control polygon.

![Figure 2. The Bezier curves of blending basis functions (for $t \in [0, \pi/2\beta]$)](www.ijsrp.org)
Theorem 2 The quadratic Bezier curve with shape and tension parameter \( (2) \) have the following properties:

(i) **End point properties:**

\[
\begin{align*}
R_\beta(0,m,n) &= P_0; R_\beta\left(\frac{\pi}{2\beta}, m, n\right) = P_3; \\
R_\beta'(0,m,n) &= m\beta(P_1 - P_0); \\
R_\beta'\left(\frac{\pi}{2\beta}, m, n\right) &= n\beta(P_3 - P_2); \\
R_\beta''(0,m,n) &= [-2P_0 + 2m(P_0 - P_1) + n(P_2 - P_3) + 2P_3]\beta^2; \\
R_\beta''\left(\frac{\pi}{2\beta}, m, n\right) &= [2P_0 + m(P_1 - P_0) + 2n(P_3 - P_2) - 2P_3]\beta^2;
\end{align*}
\]

(ii) **Symmetry:** The control points \( P_i \) and \( P_{3-i} \) for \( i = 0; 1; 2; 3 \) define the same quadratic trigonometric Bezier curve in different parameterizations, i.e., for \( i = 0; 1; 2; 3 \).

\[
R_\beta(t; m; n; P_i) = R_\beta\left(\frac{\pi}{2\beta} - t, n, m, P_{3-i}\right) \quad \text{where} \quad t \in \left[0, \frac{\pi}{2\beta}\right] \quad \text{and} \quad m, n \in [0, 2];
\]

\[
R_\beta(t; P_0; P_1; P_2; P_3) = R_\beta\left(\frac{\pi}{2\beta} - t; P_0; P_1; P_2; P_3\right)
\]

(ii) **Geometric invariance:** The shape of the curve (2) is independent of the choice of its control points i.e., the curve (2) satisfies the following two equations for \( i = 0; 1; 2; 3 \).

\[
\begin{align*}
R_\beta(t; m; n; P_1 + q) &= R_\beta(t; m; n; P_1) + q; \\
R_\beta(t; m; n; P_1 * q) &= R_\beta(t; m; n; P_1) + q; \\
\end{align*}
\]

where \( q \) is any arbitrary vector in \( R^2 \) and \( T \) is an arbitrary 2 * 2 matrix.

(iii) **Convex hull:** The entire curve is contained within the convex hull of its defining control points \( P_i \).

(iv) **Variation diminishing property:** no straight line intersects a Bezier curve more times than it intersects its control polygon.

IV. SHAPE CONTROL OF THE QUADRATIC TRIGONOMETRIC BEZIER CURVE

For control points \( P = \left(P_0, P_1, P_2, P_3\right) \) be a set of points \( P_i \in R^2 \) or \( R^3 \). The Trigonometric Bezier curves with tension parameter \( \beta > 0 \) associated with the set \( P \) is defined by:

\[
R_\beta(t, m, n) = \sum_{i=0}^{3} \left( B_{i,\beta} (t, m, n) \right) P_i ;
\]

\[
(iii)
\]
\[ t \in \left[ 0, \frac{\pi}{2\beta} \right] \quad \text{and} \quad m, n \in [0, 2]; \]

We rewrite this equation as follows;

\[
R_\beta(t) = (1 - \sin^2(\beta t))P_0 + (1 - \cos^2(\beta t))P_3 + m(P_1 - P_0)\sin(\beta t)(1 - \sin(\beta t)) + n(P_2 - P_3)\cos(\beta t)(1 - \cos(\beta t));
\]

Obviously, shape parameter \( m \) and \( n \) affects the curve on the control edges \((P_1 - P_0)\) and \((P_2 - P_3)\). The shape parameter \( m \) and \( n \) serve to effect local control in the curve: \( m \) and \( n \) as increases, the curve moves in the direction of edges \((P_1 - P_0)\) and \((P_2 - P_3)\) and as \( m \) and \( n \) decreases, the curve moves in the opposite direction to the edges \((P_1 - P_0)\) and \((P_2 - P_3)\). The parameters \( m \) and \( n \) controls the shape of the curve (3). In figure 2, the quadratic trigonometric Bézier curve with tension parameter gets closer to the control polygon as the values of the parameters \( m \) and \( n \) increases with tension parameter. In figure 2, the curves are generated by setting the values of \( m = 2, n = 2 \) and \( \beta = \pi \) (green lines), \( m = 2, n = 1 \) and \( \beta = \pi \) (red lines), \( m = 1, n = 2 \) and \( \beta = \pi \) (blue lines), \( m = 2, n = 2 \) and \( \beta = 1 \) (green lines).

![Figure 3: The effect on the shape of quadratic trigonometric Bézier Curves with tension parameter with altering the values of \( m, n \) and \( \beta \).](image1)

In order to construct a closed quadratic trigonometric Bézier curves with tension parameter, we can set \( P_n = P_0 \). In figure 4(a),(b),(c),(d), the closed quadratic trigonometric Bézier curves with tension parameter altering the values of the shape parameters \( m \) and \( n \) at the same time. The quadratic trigonometric Bézier curves with tension parameter are generated by setting \( m = 1.5, n = 1.5 \) and \( \beta = \pi/4 \) in figure (a), \( m = 1.5, n = 1.5 \) and \( \beta = 10 \) in figure (b), \( m = 1.5, n = 1.5 \) \( \beta = 0.8 \) in figure (c), \( m = 1.5, n = 1.5 \) \( \beta = 30 \) in figure (d).
Theorem 5.1: Let \( P = (P_0, P_1, P_2, P_3) \) be four control points on an ellipse with semi axes \((2\sqrt{2})a\) and \((4\sqrt{2})b\), by the proper selection of coordinates, their coordinates can be written in the form

\[
P_0 = (2a, 0); P_1 = (a, 2b); P_2 = (-a, 2b); P_3 = (-2a, 0);
\]

Then the corresponding quadratic trigonometric Bézier curve with tension and the shape parameters \( m = n = 2 \) with \( \beta = 0.8 \) and local domain \( t \in [0, 4] \) represents arc of an ellipse with

\[
x(t) = 2a(\cos(\beta t) - \sin(\beta t))
\]
\[
y(t) = 4b(\cos(\beta t) + \sin(\beta t) - 1)
\]

Proof: If we take \( m = n = 2 \) and \( P_0 = (2a, 0); P_1 = (a, 2b); P_2 = (-a, 2b); P_3 = (-2a, 0); \) into (3), then the coordinate of quadratic trigonometric Bezier curve with tension and shape parameter are
x(t) = 2a(cos(βt) − sin(βt))
y(t) = 4b(cos(βt) + sin(βt) − 1)

This gives the intrinsic equation

\[
\left( \frac{x(t)}{2\sqrt{2}a} \right)^2 + \left( \frac{y(t) + 4b}{4\sqrt{2}b} \right)^2 = 1
\]

It is an equation of an ellipse. Figure 5. Shows an ellipse.

**Corollary 5.1:** According to theorem (5.1), if,

\[
a = \frac{1}{2\sqrt{2}}, \quad b = \frac{1}{4\sqrt{2}}
\]

then the corresponding quadratic trigonometric Bézier curves with tension parameter \( β = 0.8 \) and the shape parameter \( m = n = 2 \) and local domain \( t \in [0,4] \) represents arc of a circle. Fig. 6 shows the Circle.

**VI. APPROXIMABILITY**

Control polygon provides an important tool in geometric modeling. It is an advantage if the curve being modeled tends to preserve the shape of its control polygon. Now we show the relations of the quadratic trigonometric Polynomial B-spline curve and cubic Bézier curves corresponding to their control polygon.

**Theorem 3:** Suppose \( P_0, P_1, P_2 \) and \( P_3 \) are not collinear; the relationship between quadratic trigonometric Polynomial B-spline curve

\[
R_β \ (t,m,n)
\]

and the cubic Bézier curve

\[
B(t) = \sum_{j=0}^{3} P_j (3, j)(1 - t)^{3-j} t^j; \quad t \in [0, 1]
\]

with the same control points \( P_i \ (i=0,1,2,3) \) are given by

\[
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\]
\[ B(0) = R_{\beta} (0, m, n); \]
\[ B(1) = R_{\beta} \left( \frac{\pi}{2\beta}, m, n; \right); \]
\[ R_{\beta} \left( \frac{\pi}{4\beta} \right) - P^* = \frac{8(\sqrt{2} - 1)m}{6}(B(\frac{1}{2}) - P^*); \]

Where \[ P^* = \frac{P_0 + P_3}{2} \]
with the assumption that \( m = n \).

**Proof:** we assume that \( m = n \) then the quadratic trigonometric Polynomial B-spline curve
\[ t \in \left[ 0, \frac{\pi}{2\beta} \right] \]
and \( m, n \in [0, 2] \).
And
\[ B(t) = \sum_{j=0}^{3} p_{(3, j)}(1-t)^{3-j} t^j \]
quadratic Bézier curve \( B(t) \); \( t \in [0, 1] \)
By simple computation, we have
\[ B(0) = R_{\beta} (0, m, n); \]
\[ B(1) = R_{\beta} \left( \frac{\pi}{2\beta}, m, n; \right); \] and
\[ B(\frac{1}{2}) = \frac{1}{8}(P_0 + 3P_1 + 3P_2 + P_3) \]
\[ B(\frac{1}{2}) - P^* = -\frac{3}{8}(P_0 - P_1 - P_2 + P_3) \]
where \[ P^* = \frac{P_0 + P_3}{2} \]
\[ R_{\beta} \left( \frac{\pi}{4\beta} \right) - P^* = \frac{1}{2} \left[ m \left( \sqrt{2} - 1 \right) (P_1 - P_0) + n \left( \sqrt{2} - 1 \right) (P_2 - P_3) \right] \]
at \( m = n \)
\[ B(\frac{1}{2}) = \frac{1}{8}(P_0 + 3P_1 + 3P_2 + P_3) \]
\[ B(\frac{1}{2}) - P^* = -\frac{3}{8}(P_0 - P_1 - P_2 + P_3) \]
where \[ P^* = \frac{P_0 + P_3}{2} \]
\[ R_{\beta} \left( \frac{\pi}{4\beta} \right) - P^* = \frac{-(\sqrt{2} - 1)n}{2}(P_0 - P_1 - P_2 + P_3) \]
\[ R_{\beta} \left( \frac{\pi}{4\beta} \right) - P^* = \frac{8(\sqrt{2} - 1)m}{6}(B(\frac{1}{2}) - P^*); \]
Equation (4) holds. These equations show that quadratic trigonometric Bézier Curves with tension parameter can be made closer to the control polygon by altering the values of shape parameters.

**Corollary 6.1:** The quadratic trigonometric Bézier Curves with tension parameter is closer to the control polygon that the cubic Bezier curve if and only if

\[
\frac{3}{4}(\sqrt{2} + 1) \leq m \quad \text{and} \quad n \leq 2;
\]

**Corollary 6.2:** when \( m = n = \frac{3}{4}(\sqrt{2} + 1) \), the quadratic trigonometric Bézier Curves with tension parameter can be closer to the cubic Bézier Curve, i.e.

\[
B(\frac{1}{2}) = R_{\beta} \left( \frac{\pi}{4\beta}, m, n \right);
\]

Figure shows the relationship among the quadratic trigonometric Bézier Curves with tension parameter (green line), the quadratic trigonometric Bézier Curves with shape parameter (blue line) and the cubic Bézier Curve (red line).

**Figure** shows the relationship among the quadratic trigonometric Bézier Curves with tension parameter, the quadratic trigonometric Bézier Curves with shape parameter and the cubic Bézier Curve.

**VII. CONCLUSION**

The trigonometric polynomial blending functions constructed in this paper have the properties analogous to those of the quadratic Bernstein basis functions and the trigonometric Bezier curves are also analogous to the quadratic Bezier ones. In this basis we included the tension parameter which is mainly important for object visualization. The trigonometric Bezier curves are close to the control polygon. Therefore, these trigonometric Bezier curves can preserve the shape of the control polygon. For any shape parameters satisfying the shape preserving conditions, the obtained shape preserving trigonometric interpolation spline curves are all continuous. There is no need to solve a linear system and the changes of a local shape parameter will only affect two curve segments. The shape of the curve can be adjusted using the values of the shape parameters. Further, it can be extended to tensor product surfaces generalizing this idea to quasi-interpolation with trigonometric spline curve.

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PCA3 Blood Level Correlates Positively with Prostate Non Contrast Multiparametric MRI Score

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Abstract- Background and Purpose: Prostate Cancer Antigen 3 (PCA3) and Multi parametric Magnetic Resonance Imaging (mp-MRI) are promising tools for prostate cancer detection. As the most specific marker for prostate cancer, PCA3 had been studied and proved its use fullness in detecting prostate cancer, it is over expressed in prostate cancer. The capability of multi parametric acquisition in MRI improves detection rate. Molecular alteration happens prior to morphological change, both modalities utilize molecular changes as an early sign of prostate cancer. This research will study the correlation between PCA3 as molecular marker in blood with non contrast mp-MRI score also Apparent Diffusion Coefficient (ADC) value as molecular imaging.

Method: There were 68 patients enrolled and met inclusion also exclusion criteria. All patients underwent mp-MRI and blood withdrawal procedure. Evaluation of non contrast mp-MRI category was based on Prostate Imaging Reporting and Data System (PIRADS) version 2, while PCA3 was quantified for mRNA level using Real Time Polymerase Chain Reaction (RT-PCR). Correlation test was done between PCA3, mp-MRI score also ADC.

Results: PCA3 has positive fair correlation with mp-MRI (r=0.404,p=0.001), negative fair correlation with ADC (r=0.373,p=0.002). There is strong negative correlation between mp-MRI score and ADC (r=-0.882,p=0.000).

Conclusion: Higher level of PCA3 that is over expressed in prostate cancer correlates with higher total score of non contrast mp-MRI and lower ADC value. As mp-MRI score gets higher, the ADC value also will get lower.

Index Terms- PCA3 – mpMRI score – ADC – prostate cancer – correlation

I. INTRODUCTION

Prostate Cancer Antigen 3 (PCA3) is the most specific marker for prostate, which is over expressed in prostate cancer. It can be detected in prostate tissue, urine, and blood. As a long non coding RNA, it is not expressed as protein and only can be detected in RNA form (Bussemakers et al., 1999; De Kok et al., 2002; Ferreira et al., 2012; Neves et al., 2013; Malik and Feng, 2016).

PCA3 had been studied and proved its usefulness in detecting prostate cancer, United States Food and Drug Administration (US FDA) had recognized commercial kit for PCA3 urine test. Molecular alteration happens prior to morphological change, both mp-MRI and PCA3 is promising for prostate cancer detection. Taken into consideration about how some patients might feel uncomfortable during prostate massage that is done prior to urine sample collection, PCA3 blood test could be more feasible to be done routinely. Since early detection should avoid unnecessary procedure that could add more burdens to patients, mp-MRI in this research will be done without contrast injection. Previous study had found significant correlation between PCA3 urine test and mp-MRI (Leyten et al., 2013). Multi parametric MRI includes anatomical imaging T2 Weighted Images (T2WI) with functional imaging such as Diffusion Weighted Imaging (DWI), Dynamic Contrast-Enhanced (DCE) MRI or Magnetic Resonance Spectroscopic Imaging (MRSI) in order to achieve better sensitivity also specificity for prostate cancer detection. Since DCE role has been questioned nowadays, with no clear evidence that it improves detection performance compared with the combination of T2WI and DWI, also MRSI has not proven its benefits compared to the interpretation difficulties and technical challenges, this research will use T2WI and DWI sequence with ADC value as a complementary value (National Institute for Health and Clinical Excellence, 2014; Tan et al., 2015; Mohler, Armstrong and and Prostate Cancer Panel Member, 2016; Turkbey, I.B., 2017).

This research will study correlation between PCA3 as molecular marker in blood with non contrast mp-MRI total score also Apparent Diffusion Coefficient (ADC) value as molecular imaging. Until now, authors have not been able to find other previous research that correlates blood PCA3 with non-contrast mp-MRI total score and ADC, when it is important in the light of the increasing role of non contrast mp-MRI for prostate cancer detection.
II. METHODS

All patients underwent mp-MRI procedure using single calibrated MRI unit 1.5 Tesla (Avanto Fit), gradient strength 45 mT/m, slew rate 200 T/m/s, with parameter and specifications as described in table 1.

An endorectal prostate coil (Sentinelle Medical, Siemens AG) was inserted using analgesic gel, a pelvic surfaced array coil is also used. T2WI and DWI categories are scored according to Prostate Imaging-Reporting and Data System (PIRADS) version 2. ADC value was acquired by setting Region of Interest (ROI) in the specific area in the DWI sequence. ADC value would automatically generated by the MRI program, the error in placing the ROI would cause an error for the value as well. To use the same ADC reference value from this research, one should adapt the same specification of MRI as mentioned in table 1.

Table 1. Parameter of mp-MRI

<table>
<thead>
<tr>
<th>No</th>
<th>Sequence and imaging plane</th>
<th>Sequence type</th>
<th>TR (msec)</th>
<th>TE (msec)</th>
<th>Field of View (mm)</th>
<th>Matrix</th>
<th>In-Plane Resolution (mm²)</th>
<th>Slice Thickness (mm)</th>
<th>Flip Angle (degree)</th>
<th>Average b value</th>
<th>Slice Spacing (mm)</th>
<th>Phase Encoding Direction</th>
<th>Scan Duration (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T2-weighted</td>
<td>Axial</td>
<td>7000</td>
<td>112</td>
<td>160</td>
<td>330 x 384</td>
<td>0.4 x 0.4</td>
<td>4</td>
<td>160</td>
<td>2</td>
<td>0</td>
<td>R-L</td>
<td>3.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coronal</td>
<td>7000</td>
<td>98</td>
<td>160</td>
<td>298 x 320</td>
<td>0.5 x 0.5</td>
<td>4</td>
<td>160</td>
<td>2</td>
<td>0</td>
<td>R-L</td>
<td>2.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sagittal</td>
<td>7000</td>
<td>119</td>
<td>160</td>
<td>266 x 320</td>
<td>0.5 x 0.5</td>
<td>4</td>
<td>160</td>
<td>2</td>
<td>0</td>
<td>H-F</td>
<td>2.57</td>
</tr>
<tr>
<td>2</td>
<td>DWI</td>
<td>Axial</td>
<td>3600</td>
<td>86</td>
<td>200</td>
<td>48 x 140</td>
<td>1.4 x 1.4</td>
<td>-</td>
<td>0.50, 500, 800, 1000, 1500, 2000</td>
<td>0</td>
<td>R-L</td>
<td>9.16</td>
<td></td>
</tr>
</tbody>
</table>

TR, repetition time; TE, echo time; DWI, Diffusion Weighted Image; msec, millisecond; mm, millimeter; min, minute; sec, second; R, Right; L, Left; H, Head; F, Feet

Peripheral blood was withdrawn and directly put in EDTA tube for nucleotide extraction followed by DNA amplification with primers Forward 5’-TATCTTGAGTCAGATTGCCAGA-3’ and primer Reverse:5’-CTATTTCTCCTACTCTGACAGTTAGG-3 with housekeeping gene b2MF:5’-GTCTTTCTATCTCTTACTACGTAAGA-3’ and b2MR: 5’-AATCTATGGGGCTGTGACAAAG-3 using Qiagen SYBR-GREEN qPCR Mastermix (QIAGEN, Germany). Each reaction contained 7.5 ml of qPCR mastermix, 5 pM of each forward and reverse primer and 5 ml of the diluted cDNA template. The following cycling conditions were applied: 95°C for 15 minutes, followed by 45 cycles of 95°C for each 20 seconds period, 58–59°C for 20 seconds and 72°C for 20 seconds. Data for each cycle was acquired at the elongation step and each reaction was carried out in triplicate. Relative gene expression levels were calculated using Pfaffl calculation (Pfaffl, 2001).

III. RESULTS

There were 68 patients who participated in this study. Inclusion criteria are PSA level ≥ 4 ng/ml with or without nodular palpable prostate from DRE. Exclusion criteria are hypoglycemia, hyponatremia, deviant temperature, not cooperative/ fail do MRI procedure, patients with MRI contra indications, claustrophobia. All of them underwent mp-MRI: T2WI and DWI sequence exam also blood withdrawal to be evaluated for PCA3.

Table 1. Patients’ Results

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Number/ percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sample number</td>
<td>68</td>
</tr>
<tr>
<td>2.</td>
<td>Mean age</td>
<td>67.72 ±1.036</td>
</tr>
<tr>
<td>3.</td>
<td>Median of PSA</td>
<td>10.3 (4.46:110.69)</td>
</tr>
<tr>
<td>5.</td>
<td>Median of mp-MRI score</td>
<td>5 (2:10)</td>
</tr>
<tr>
<td>6.</td>
<td>Median of ADC value</td>
<td>0.792 (0.339:1.868)</td>
</tr>
</tbody>
</table>

PCA3 could be detected from all the blood samples that were collected. The median value is 9.572 with the minimum value is 6.070 and maximum value is 14.097. Multi parametric MRI has total score of 2 until 10, with the median value is 5. ADC value has median value of 0.792, minimal value is 0.339 while maximum value is 1.868.

Correlation of PCA3 Levels With Multi parametric MRI Total Score

Numeric variables of PCA3 levels were analyzed statistically using nonparametric Spearman correlation. There was statistically significant fair correlation between PCA3 level and total score of mp-MRI (R=0.404, p=0.001). Figure 1 below showed scattered plots of linear correlation between PCA3 levels and mp-MRI total score.
Correlation of PCA3 Levels With ADC
PCA3 levels had statistically inverse significant correlation with ADC value \( (R=-0.373, p=0.002) \) as shown in figure 2 below.

Correlation of Multiparametric MRI Total Score With ADC
Total score of mp-MRI has a strong inverse correlation with ADC value \( (R=-0.882, p=0.000) \).

IV. DISCUSSION

From the results above, it is shown that PCA3 that’s theoretically over expressed in prostate cancer has linear correlation with mp-MRI total score, and inverse correlation with ADC value. The higher expression of PCA3 that indicates malignancy, the higher mp-MRI total score and the lower ADC value should be. The result is also consistent with the strong inverse correlation between mp-MRI score and ADC value. Aiming for better feasibility and comfort for patients, this research use non-contrast mp-MRI exam using T2WI and DWI sequence. From previous research, T2WI and DWI sequence has better Area Under the Curve (AUC) than T2WI alone, and interestingly T2WI alone performed better than T2WI+DCE as well as three sequences combined. This result lead to better sensitivity and specificity for T2WI and DWI for prostate lesion detection in both peripheral also transitional zone (Delongchamps et al., 2010). Meta-analysis study mentioned T2WI and DWI yielded significantly better AUC, sensitivity and specificity than T2WI alone, also superior to DCE alone (Tan et al., 2012).

T2WI remains to be the backbone of any prostate MRI examination due to its ability to delineate zonal anatomy, detect, localize and stage cancer, including assessment for extra-prostatic extension and seminal vesicle invasion.

DWI sequence explores the random Brownian motion of water molecules in body, it studies the displacement of water molecules during the interval between the application of two diffusion sensitizing gradients. In tumor tissues, cellularity generally increases and cell membranes are hydrophobic that act as obstacles or barrier for water molecular movement, therefore result in diffusion restriction (Cornud, 2017). Data obtained from DWI performed at different b values allows for quantitative analysis. The net displacement of water molecules is interpreted as ADC. Use of several b values, as applied in this research will help to improve the fit of the curve and potentially minimize errors in ADC calculation which is automatically done by MR systems. Low ADC values within an area indicates the presence of restricted diffusion (Sato et al., 2005; Cornud, 2017). It is in accordance with initial publication that reported mean ADC was significantly lower in prostate cancer than in benign tissue. However, the reported ADC values in prostate cancer show great variation, selection of b value is one factor among other that influences the value (Issa, 2002; Cornud, 2017).

Differentiating cancer from benign lesion on the basis of ADC measurement value only is difficult and seems reckless, it requires visual assessment of both the signal intensity on high b value DW image combined with visual assessment of ADC map. When properly optimized, both 1.5 Tesla (T) and 3.0 T magnets can provide adequate diagnostic quality for prostate MRI in clinical practice. The use of rectal coil will also acquire smaller Field Of View (FOV) and thinner slice in 3 T or 1.5 T (Medved et al., 2014).

This research result is expected to encourage further research in blood PCA3 and non-contrast MRI, the level in malignancy and the cut off value, also diagnostic parameters to be compared to PIRADS version 2.
V. CONCLUSION

PCA3 level correlates with non contrast mp-MRI results, both in total score and ADC value. Mp-MRI score itself has strong correlation with ADC value.

Higher level of PCA3 that is over expressed in prostate cancer correlates with bigger total score of non contrast mp-MRI and longer ADC value. As mp-MRI score gets higher, the ADC value also will get lower.

REFERENCES


Diagnosing Diabetes using Data Mining Techniques

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Abstract- Diabetes is a disease which is affecting many people now-a-days. Most of research is happening in this area. In this paper, we proposed a model to solve the problems in existing system in applying data mining techniques namely clustering and classifications which are applied to diagnose the type of diabetes and its severity level for every patient from the data collected. This paper tries to diagnose diabetes based on the 650 patient's data with which we analyzed and identified severity of the diabetes. As part of procedure Simple k-means algorithm is used for clustering the entire dataset into 3 clusters i.e., cluster-0 - for gestational diabetes, cluster-1 for type-1 diabetes (juvenile diabetes), cluster-2 for type-2 diabetes. This clustered dataset was given as input to the classification model which further classifies each patient’s risk levels of diabetes as mild, moderate and severe. Further, performance analysis of different algorithms has been done on this data to diagnose diabetes. The achieved results show the performance of each classification algorithm.

Index Terms- Classification, Clustering, Data Mining Techniques, Diagnosis of Diabetes, Expert Clinical System, Naive Bayes, Random Tree, C4.5, Simple Logistic.

1 INTRODUCTION

Diabetes is the condition that results from lack of insulin in a person's blood. There are other kinds of diabetes, like diabetes insipidus. However, when people say "diabetes", they usually mean Diabetes Mellitus (DM)[1]. People with DM are called "diabetics".

Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. If left untreated, diabetes can cause many complications. Acute complications can include diabetic ketoacidosis, nonketotic hyperosmolar coma, or death. Serious long-term complications include heart disease, stroke, chronic kidney failure, foot ulcers, and damage to the eyes. When there is an increase in the sugar level in the blood, it is called pre-diabetes. The pre-diabetes is not so high than the normal value.

Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced. There are three main types of diabetes mellitus:

- Type 1 DM results from the pancreas's failure to produce enough insulin. This type was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown. The type-1 diabetes is affected by the young people and below 20 years of age. In type 1 the pancreatic cells will get affected and fail to function. Because of nil secretion of insulin, the type-1 diabetic people suffer throughout their life and depend on insulin injection. The type-1 diabetic patients should regularly follow exercises and healthy diet as suggested by dietitians.

- Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This type was previously referred to as "non-insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The most common cause is excessive body weight and not enough exercise.

- Gestational diabetes is the third main form and occurs when pregnant women without a previous history of diabetes develop high blood sugar levels. According to recent study of diabetes, it is found that around 18% of pregnant women have diabetes. Pregnancy during older age may have a risk of developing the gestational diabetes.

One of the main reasons for type-2 diabetes is Obesity. The type-2 diabetes can be controlled by doing proper exercise and taking appropriate diet. If the glucose level is not reduced by the above methods then medicines can be prescribed. National Diabetes Statistics Report 2014 says that 29.1 million people or 9.3% of the U.S. population have diabetes [2].

As of 2015, an estimated 415 million people had diabetes worldwide, with type 2 DM making up about 90% of the cases. This represents 8.3% of the adult population, with equal rates in both women and men. As of 2014, trends suggested the rate would continue to rise. Diabetes at least doubles a person's risk of early death. From 2012 to 2015, approximately 1.5 to 5.0 million deaths each year resulted from diabetes. The global economic cost of diabetes in 2014 was estimated to be US$612 billion. In the United States, diabetes cost $245 billion in 2012.

The recent estimates by the International Diabetes Federation (IDF), with type2 there are about 366 million people in 2011 that got affected and by 2030 it may be increased to 552 million. Almost 80% of the diabetic people belong to middle- and low-income countries. The high blood sugar patient can have heart disease, kidney failure, strokes, and diabetic retinopathy [3]. The number of persons affected by type2 will be increased by 2025.

Among all diabetes patients, 90% of cases are type-2 diabetes, and the other 10% as type-1 and gestational diabetes[6]. Data mining techniques such as clustering and classification can be used to study the health conditions of diabetic patients. Cluster analysis or clustering is the task of grouping a set of
Gao et al., [9] presented an approach known as CoLe which is a two-step process: The first step is model construction, which is used to evaluate the training dataset of a database. The second step is model usage, where the constructed model is used for classification. According to the percentage of test samples or test dataset that are classified, the accuracy of the classification is estimated.

In this paper, the data mining techniques such as clustering and classification are applied to diagnose the type of diabetes and its severity level for every patient.

Further, this paper comprises the following sections. The study of related work is presented in section 2. The proposed methodology is shown in section 3 and followed by experimental results in section 4 and finally section 5 concludes the work.

2 Related Works

According to the World Health Organization (WHO) there are about 350 million people suffering from diabetes mellitus (DM) and diabetes will become the seventh leading cause of death worldwide by 2030. The deaths due to diabetes are expected to rise by 50% during the next 10 years. The number of diabetic persons is increasing in every country, 4 out of 5 people with diabetes live in low and middle income countries and half of diabetics don’t know they suffer from this disease. This global epidemic could be largely attributed to the rapid increase in the rates of overweight, obesity and physical inactivity.

Gao et al., [9] presented an approach known as CoLe which tracks the diabetes in its early stage. CoLe which is a multi-agent system framework that runs multiple miner agents as well as a combination agent. The main aim of CoLe is to achieve a better knowledge in which it presents the data in different methods.

Rajesh et al., [10] used various classification algorithms like ID3, C4.5, LDA, Naïve Bayes, K-NN for diagnosing diabetes for the given dataset. The author concluded that C4.5 is the best algorithm with less error rate of 0.0938 and more accuracy value of 91%.

Afrand et al., [11] presented Artificial Intelligence to design an advanced clinical system for diagnosing diabetes. The author presented Extended Classifier System (XCS) in which we got high accuracy when compared with the other data mining techniques.

Adidelia et al., [12] presented the type of diabetes by using Fuzzy ID3 method. The author uses the system for predicting the disease from data set as it initially clusters the data and applies the classification algorithms on clustered data. The author presented a combination of classification method where they developed EM algorithm for clustering and fuzzy ID3 algorithm to attain decision tree for each cluster.

Patil et al., [13] applied Apriori algorithms to classify type-2 diabetes. The author presented four association rules for the class value “yes”, and for the class value “no”, the author presented ten association rules. For increasing the dataset quality, the preprocessing methods are applied.

Aljarullah et al.,[14] proposed J48 algorithm to diagnose type-2 diabetes which is used for constructing a decision tree. The accuracy of the model is 78.68%.

Jaya Rama Krishnaiah et al., [15] presented a new framework known as duo-mining tool which is used for diagnosing diabetes. The author also applied many classification algorithms like KNN, SVM, decision Tree for type-2 diabetes. Among all algorithms SVM algorithm has the highest accuracy value of 96.39%.

Mandal et al., [16] used hierarchical clustering algorithm to discover the different models for controlling diabetes mellitus.

Kavitha et al., [17]initiated CART Method for predicting the type of Diabetes. The algorithm shows the differences between high risk and low risk patients. The accuracy of this algorithm is 96.377%

Ferreira et al., [18] used different classification algorithms like SimpleCart, J48, Simple Logistics, SMO, NaïveBayes and BayesNet for diagnosing neonatal jaundice in type1 diabetes. Among all algorithms, it was found that Simple Logistics as the best algorithm.

Ananthapadmanaban et al., [19] developed the SVM and Naive Bayes classification algorithms for speculating diabetic retinopathy and found out that the Naive Bayes algorithm has got the accuracy rate of 84%.

SantiWulanPurnami et al., [22] proposed a diagnosis model for diagnosing breast cancer by considering feature selection methods and classification techniques.

PardhaRepalli[23] tries to predict the diabetes of a patient by applying different data mining techniques and analyzed the data based on mining strategies to give predictions to the patients.

Joseph L. Breault [24] proposed a diagnosis database for data mining techniques in which the data is clustered and classified by using different algorithms like c4.5, Naïve Bayes

G. Parthiban et al, [25] applied Naïve Bayes method to diagnose heart related problems which are occurring in diabetic patients.

P. Padmaja[26] proposed a model where in different clustering techniques was used to characterize diabetes data and analyzed it to get different evaluations.

National Center for Chronic Disease Prevention and Health Promotion presented gestational diabetes [20] which shows the Centers for Disease Control and Prevention.

Type-2 diabetes complications [21] are controlled by doing proper exercise and taking appropriate diet. If the glucose level is not reduced by the above methods then medicines can be prescribed.

3 Methodology

In the proposed model, Simple K-means clustering algorithm is used for predicting the type of diabetes. The classification algorithms like Random Tree, Naïve Bayes, C4.5 and simple
Logistics are used to predict the risk levels of diabetes patients who are aware of their diabetes type.

3.1. Discussion

The model proposed in this paper has three stages.
- Stage-1: Data pre-processing.
- Stage-2: Applying Simple K-Means algorithm to the dataset for clustering the data into three clusters as cluster-0 (gestational diabetes), cluster-1 (type-1 diabetes), and cluster-2 (type-2 diabetes).
- Stage-3: Applying Classification algorithms to classify the patient’s risk level of diabetes.

3.2. Dataset Used

The data which is used in this project has records of 650 total diabetic patients of all age group and Table 1 shows all the attributes used for this work.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Considered as Male=1 Female=0</td>
<td>Numeric</td>
</tr>
<tr>
<td>Insulin dependent</td>
<td>Considered as min=50 and max=500</td>
<td>Numeric</td>
</tr>
<tr>
<td>Plasma</td>
<td>Considered as min=2 and max=11</td>
<td>Numeric</td>
</tr>
<tr>
<td>HbA1c</td>
<td>Considered as min=3 and max=19</td>
<td>Numeric</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>Considered as min=30 and Max=370</td>
<td>Numeric</td>
</tr>
<tr>
<td>Diastolic</td>
<td>Considered as min=60 and max=350</td>
<td>Numeric</td>
</tr>
<tr>
<td>Mass</td>
<td>BMI Considered as min=1 and max=200</td>
<td>Numeric</td>
</tr>
<tr>
<td>Bg</td>
<td>Blood group Considered as 0=’O’, 1=’A’, 2=’B’, 3=’AB’</td>
<td>Nominal</td>
</tr>
<tr>
<td>Age</td>
<td>Considered as min=1 and max=125</td>
<td>Numeric</td>
</tr>
<tr>
<td>Pedigree</td>
<td>Considered as 0= no family history and 1= family history</td>
<td>Numeric</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Considered as 1= yes 0= no</td>
<td>Numeric</td>
</tr>
<tr>
<td>Living area</td>
<td>Considered Living area as 0= Urban and 1= Rural</td>
<td>Nominal</td>
</tr>
<tr>
<td>Job type</td>
<td>Considered as 0= stressed job and 1= unstressed job</td>
<td>Numeric</td>
</tr>
<tr>
<td>Food habit</td>
<td>Considered as 0= Healthy and 1= Moderate and 2= Junk Food</td>
<td>Nominal</td>
</tr>
</tbody>
</table>

3.3. Data Preprocessing

The Dataset used in this project has records of 650 total diabetic patients of all age group and Table 1 shows all the attributes used for this work.

Table 1: The attributes used in Data Set for this work

3.4. Accuracy Measures

RandomTree, Naive Bayes, C4.5 and Simple Logistics algorithms were used for this work. The tests are performed by means of internal cross validation 10-folds. Accuracy of each algorithm shows how the datasets are being classified. Recall and precision are the accuracy measures used for this work.

\[ \text{Precision} = \frac{TP}{TP + FP}, \]
\[ \text{Recall} = \frac{TP}{TP + FN}, \]
\[ \text{Accuracy} = \frac{(TP + TN)}{(TP + TN + FP + FN)}. \]

TP - Positive tuples.
TN - Negative tuples.
FP - Incorrectly classified positive tuples.
FN - Incorrectly classified negative tuples.

The corresponding classifiers precision and recall values are listed in Table 2.

Table 2: Results of precision and recall for different classifiers

<table>
<thead>
<tr>
<th>Classifier</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naïve Bayes</td>
<td>0.84</td>
<td>0.89</td>
<td>1</td>
<td>0.85</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>RandomTree</td>
<td>0.947</td>
<td>0.945</td>
<td>0.986</td>
<td>0.953</td>
<td>0.947</td>
<td>0.979</td>
</tr>
<tr>
<td>C4.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Simple Logistics</td>
<td>1</td>
<td>0.996</td>
<td>1</td>
<td>1</td>
<td>0.995</td>
<td>1</td>
</tr>
</tbody>
</table>

4. Results and Discussion

The Proposed system was executed on WEKA tool in three stages, they are 1) First the entire dataset was preprocessed by applying Simple K-means algorithm 2) After preprocessing the dataset was clustered into 3 types as type-1, type-2 and gestational diabetes to find the type of diabetes for each patient 3) The clustered dataset was classified into three classes as mild, moderate and severe. Classification is done in order to predict the risk levels of diabetes for each patient.

4.1. Performance of the Simple K-Means Algorithm

The Simple k-means algorithm clusters the whole dataset into 3 clusters as
- Cluster-0 for gestational diabetes
- Cluster-1 for type-1 diabetes
- Cluster-2 for type-2 diabetes.

The time taken to build the model was 0.15 seconds. Among the 620 instances of the data after preprocessing, 146 were in cluster-0, 115 were in cluster-1 and 359 in cluster-2.

4.2. Classifiers Performance

In the classification model, the clustered dataset is given as input in which each patient’s risk levels of diabetes is classified as mild, moderate and severe. Next it uses all classification algorithms discussed in section 3. Table 3 shows the results of the classification algorithms.

Table 3: The results of the Risk levels in each type

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<table>
<thead>
<tr>
<th>Diabetes Type</th>
<th>Number of Patients</th>
<th>Risk Level</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type-1 Diabetes</td>
<td>115</td>
<td>Mild</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe</td>
<td>36</td>
</tr>
<tr>
<td>Type-2 Diabetes</td>
<td>359</td>
<td>Mild</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe</td>
<td>135</td>
</tr>
<tr>
<td>Type-0 Diabetes (Gestational)</td>
<td>146</td>
<td>Mild</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe</td>
<td>28</td>
</tr>
</tbody>
</table>

The Error rate and accuracy value of each algorithm are shown in Table 4.

**Table 4. Classifiers error rate and accuracy values**

<table>
<thead>
<tr>
<th>Classifier</th>
<th>Error Rate</th>
<th>Accuracy Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naive Bayes</td>
<td>0.091</td>
<td>90.9</td>
</tr>
<tr>
<td>Random Tree</td>
<td>0.036</td>
<td>96.3</td>
</tr>
<tr>
<td>C4.5</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Simple Logistics</td>
<td>0.1</td>
<td>99</td>
</tr>
</tbody>
</table>

From the Table 4, the diabetes dataset consists of 650 tuples with 14 attributes were analyzed to find the accuracy and error rate by using various classification algorithms. From the above analysis, it was found that C4.5 algorithm is the best one when compared to other classifiers for diagnosing diabetes because C4.5 algorithm has more accuracy value and less error rate.

**4.3. Random Tree**

From figure 1, it was found that among the 14 attributes, insulin dependent, plasma, age, pedigree and food habit played an essential role in diagnosing diabetes. The tree reveals that for a diabetic patient with insulin dependent value less than 197.5 mmol, the diabetic level will be mild, and if insulin dependent value is greater than 197.5 mmol, it may lead to moderate level of diabetes. When the age of the patient is less than 35 with pedigree = 1, then the patient may have moderate level of type-2 diabetes. If the patient’s age is greater than 35 with HbA1c value greater than 5%, it may lead to severe level of diabetes. The tree also shows the food habit of the patient and with age value greater than 35, it will lead to severe level of diabetes.

**4.4. C4.5 Tree**

From Figure 2, it was found that the attributes which are used in this tree are gender, pedigree, junk food. The tree reveals that if gender = 0 and pedigree = 0 and if age < 35 then the severity will be mild. If the age > 35 with gender = 0 and pedigree = 0 then the severity will be moderate. It shows that when gender = 1 and pedigree = 0 with age < 35 then the severity will be mild, and with age > 35 shows the severity as moderate. And it shows the severity level as severe when the gender = 1 and pedigree = 1 with age < 35.

**5. Conclusion**

Diabetes is most commonly occurring disease. Preventing, controlling and creating awareness about diabetes is important as it leads to other health problems. Type-1 and type-2 diabetes may lead to heart problems, kidney diseases and eye related problems. It is important to prevent or control gestational diabetes because Gestational Diabetes Mellitus (GDM) may go away after pregnancy, but women who have GDM seven times more are likely to develop type-2 diabetes than women who do not have GDM in pregnancy. The children of the GDM mother have the risk of obesity and type-2 diabetes. All of these difficulties can be handled by controlling the blood sugar levels. From this study, it was found out that data mining techniques can be used for predicting the type and risk levels of diabetes. Through this study, it is found that the data mining techniques are important and it leads to valid approaches for predicting the risk of gestational diabetes. So it is our recommendation to use new techniques like data mining for decision making in medical fields, which improves the diagnosis of diseases like gestational diabetes. This research helps the doctors and health organizations in using the data mining techniques in the medical field which helps in predicting the type of diabetes and risks levels associated with it. Thus the proposed model helps in improving the diagnosis of the diseases which indeed helps in early cure of disease in the patients.

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Experimental Investigation on the Properties of Recycled Concrete and Coconut Shell Aggregate Concrete

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Abstract: In this experimental study, the properties of recycled aggregate and coconut shell aggregate concrete are examined and the scope of recycled aggregate and coconut shell aggregate in construction is investigated. The basic properties of recycled and coconut shell aggregate concrete are examined wrt the natural aggregate concrete. Basic changes in all aggregate properties were determined and their effects on concreting work were discussed. Basic concrete properties like compressive strength, split tensile strength, workability etc. are conducted here for different combinations of recycled and coconut shell aggregate.

The paper aims at analyzing and comparing split tensile strength and compressive strength characteristics with partial replacement of recycled aggregate as well as coconut shell aggregate concrete using M25 grade concrete.

Keywords: Ordinary Portland cement (43 Grade), recycled aggregate, coconut shell aggregate, natural aggregate, fine aggregate, workability, compressive strength, split tensile strength.

1. INTRODUCTION:

To minimize the adverse environmental effects on the human surrounding, extensive investigations on wastage recycling are being undertaken. The cost of building materials are increasing day by day. As the main ingredient of concrete is coarse aggregate, it is observed that, the use of recycled aggregate and coconut shell aggregate can be useful in concrete for environmental protection and economic use of materials.

The application of recycled aggregate has been initiated in construction projects in many European, American and Asian countries with relaxation of infrastructural laws for increase the use of recycled aggregates. India is the third largest coconut producing country in the world. Huge amount of waste is generated by coconut. The waste coconut shell may be used to replace conventional coarse aggregates. It may help to produce concrete economically and at the same time, will also help to reduce its disposal problem. In this study, coconut shell is used as light weight aggregate in concrete. The properties of split tensile strength and compressive strength with partial replacement of recycled aggregate and coconut shell aggregate concrete are investigated.

2. LITERATURE REVIEW:

2.1. Recycled Aggregate:

M Etxeberria et al (2006) used specified recycled coarse aggregates obtained by crushed concrete for concrete production. Four different recycled aggregate concretes were produced; made with 0%, 25%, 50% and 100% of recycled coarse aggregates, respectively. The mix proportions of the four concretes were designed in order to achieve the same compressive strength. In general, the workability of recycled aggregate concretes is affected by the absorption capacity of the recycled aggregates. The shape and texture of the aggregates can also affect the workability of the concrete. Concrete crushed by an impact crusher achieves a high percentage of recycled coarse aggregates without adhered mortar. Concrete made with 100% of coarse recycled aggregate requires high amount of cement to achieve a high compressive strength and consequently is not an economic proposition as it is
not cost effective. Concrete made with 100% of recycled coarse aggregates has 20–25% less compression strength than conventional concrete at 28 days, with the same effective w/c ratio and cement quantity.

Yasumichi Koshiro et al. (2014) investigated an entire concrete waste reuse model for producing recycled aggregate concrete established with the objective of recycling concrete waste generated during anticipated demolition of older buildings in urban areas. In a redevelopment project of Obayashi Technical Research Institute, a 24-year old building was demolished and concrete waste was used to produce high-quality recycled coarse aggregate using a heat grinder system. Then the quality of concrete using these recycled materials was tested and applied to fair-face concrete structures of a new building. This model enabled all the concrete waste to be recycled.

2.2. Coconut Shell:

B. Damodhara Reddy (2014) studied the use of coconut shell as coarse aggregate by replacing 25%, 50%, 75% and 100% of coarse aggregate with coconut shell. A nominal mix of 1:2:4 was used and free constant water cement ratio was maintained at 0.6. Tests were conducted for workability, flexure, and compression and split tensile strength. Increase in CS percentage decrease densities of the concretes. The overall strength decrease with increase in CS replacement. Replacement of 25% CS gives higher strength compared to other percentage.

Parag S. Kambli (2014) investigated the maximum compressive strength which was found to be 19.7 N/mm² at a coconut shell replacement percentage of 20%. From the experimental results and discussion, it is found that, the coconut shell has very high potential to be used as lightweight concrete. Also, coconut shell as coarse aggregate in concrete can reduce the material cost in construction.

3. MATERIALS:

3.1. Cement:

The cement that used is of Ramco cement, Ordinary Portland Cement (OPC) 43 grade as per standard specification. Ramco Cement OPC 43 confirms to IS 8112. The grade is based on the 28-day compressive strength of the cement mortar, which in this case is not less than 43 MPa.

3.2. Aggregate:

Aggregates are the important constituents in concrete. They give body to the concrete, reduce shrinkage and effect economy. One of the most important factors for producing workable concrete is good gradation of aggregates. Good grading implies that a sample fractions of aggregates in required proportion such that the sample contains minimum voids. Samples of the well graded aggregate containing minimum voids require minimum paste to fill up the voids in the aggregates. Minimum paste means less quantity of cement and less water, which are further mean increased economy, lower shrinkage and greater durability.

3.2.1. Natural Coarse Aggregate (NCA):

Natural coarse aggregates were obtained in crushed form were of granite-type. The natural coarse aggregate is of angular shaped crushed granite with maximum size of 20mm.

3.2.2. Fine aggregate (FA):

The natural fine aggregates are the river sand which is the most commonly used natural material for the fine aggregates. For this study, the river sand Zone-III is used.

3.2.3. Recycled Coarse Aggregate (RCA):

Recycled coarse aggregate can be generated from demolished construction structure which comprises of broken members or components likes the slab, beam, brick wall and others. Recycled concrete aggregates produced from all but the poorest quality original concrete can be expected to pass the same tests required for conventional aggregates. Recycled concrete aggregates contain not only the original aggregates, but also hydrated cement paste. This paste reduces the specific gravity and increases the porosity compared to similar natural aggregates. Higher porosity of RCA leads to a higher absorption. The maximum size of RCA is 20mm.

3.2.5. Coconut Shell Aggregate (CSA):

Available coconut shells were hammered, crushed to smaller pieces, sieved and used for preparation of the
concrete. Maximum size of coconut shell aggregate is 20mm.

3.3. Water:

Water used for both mixing and curing is required to be free from deleterious materials; potable water is generally satisfactory for mixing and curing of concrete. Dark colored or bad smell water may be used if they do not possess deleterious substances.

3.4. Super Plasticizers:

*(High Range Water Reducing Admixture - Sika)*

Sika can be used for all levels of water reduction in various types of concrete ranging from dry cast applications, conventional concrete to SCC (Self-Consolidating Concrete). Sikadelivers water reduction up to 45%. The special formulation of Sika increases compressive strength of concrete and helps maintain the plasticity of the concrete over prolonged period of time. Sika extends concrete workability time in high temperature weather, when slump loss and fast stiffening of the fresh concrete can be a concern. The superplasticizing action of Sika provides high slump, flowing concrete that can be placed with minimal or no vibration even at very low water cement ratios as low as 0.25.

3.5. Plasticizing effect:

The superplasticizing action of Sika provides high slump, flowing concrete that maintains excellent workability and may be placed with minimal vibration even at very low water cement ratio as low as 0.25. Sika plasticized concrete is highly fluid while maintaining complete cohesion within the concrete matrix to eliminate excessive bleeding or segregation.

4. METHODOLOGY AND EXPERIMENTAL INVESTIGATION:

Before the start of the experimental program, the physical properties of cement and aggregate was tested. The physical tests was conducted according to the Indian Standard and all the test results are given in the Table 1 and Table 2.

### Table 1. Physical properties of cement:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OPC 43 Grade cement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial setting time</td>
<td>84 minutes</td>
</tr>
<tr>
<td>Final setting time</td>
<td>272 minutes</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>3.12</td>
</tr>
<tr>
<td>Normal consistency</td>
<td>35%</td>
</tr>
</tbody>
</table>

### Table 2. Physical properties of aggregates:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>NCA</th>
<th>RCA</th>
<th>CSA</th>
<th>FA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>2.62</td>
<td>2.27</td>
<td>1.33</td>
<td>2.62</td>
</tr>
<tr>
<td>Water Absorption, %</td>
<td>1.65</td>
<td>5.64</td>
<td>7.6</td>
<td>0.806</td>
</tr>
</tbody>
</table>

The concrete mixture proportions for M25 grade of concrete are found to be 1:1.8:3.2 calculated as per IS: 10262-2009 and the water cement ratio is 0.45.

In total, 9 types of mixes are prepared. The properties of fresh concrete i.e. the slump value is evaluated for TM1(NCA or 0% replacement), TM2(5% RCA), TM3(10% RCA), TM4(15% RCA), TM5(20% RCA), TM6(5% CSA), TM7(10% CSA), TM8(15% CSA) and TM9(20% CSA) and the properties of hardened concrete i.e. compressive strength and split tensile strength of concrete are investigated with different mixes as mentioned above at 7 days and 28 days. Then the strength of concrete is compared with natural course aggregate (NCA).

**Mix proportions:(For M25 grade)**

Various input data related to the mix proportions for M25 concrete are noted below. The design mix proportion is shown in Table 3. Concrete mixture proportions for M25 grade of concrete are 1:1.8:3.2.

- Target mean strength ($f'_{ck}$) = 31.6 N/mm²
- Water content For 50-75mm slump = 191.6 lit
- As superplasticizer is used, the water content can be reduced 13%.
- Water content = 191.6 x 0.87 = 167 lit.
- Cement content = 167/0.45 = 372 kg/m³
- Volume of coarse aggregate = 0.64 (For Zone – III Sand, 20mm CA )
- Volume of fine aggregate = 1 – 0.64 = 0.36
Table 3: Trial Mix Calculation

<table>
<thead>
<tr>
<th>Trial mix no.</th>
<th>Cement in (kg/m³)</th>
<th>FA in (kg/m³)</th>
<th>CA in (kg/m³)</th>
<th>Water in (kg/m³)</th>
<th>Sika in (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM1</td>
<td>372</td>
<td>670</td>
<td>1186</td>
<td>167</td>
<td>0.8% of Cement</td>
</tr>
<tr>
<td>Proportion</td>
<td>1</td>
<td>1.8</td>
<td>3.2</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

6. RESULTS AND DISCUSSION:

6.1. Fresh Concrete Properties

Workability Test: The replacement of coarse aggregate by RCA and CSA affects the workability of the concrete. The workability of RCA concrete shows a decrease in slump with increase of recycled aggregate content of total aggregate volume and the workability of CSA concrete shows also decrease in slump with increase in coconut shell aggregate content of total aggregate volume. The low slump may be due to high absorption of water during the mixing process. The results of the slump test are shown in Table 4 and Figure 1.

Table 4. Slump Test

<table>
<thead>
<tr>
<th>% replacement</th>
<th>w/c ratio</th>
<th>Slump in mm</th>
<th>RCA</th>
<th>CSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0.45</td>
<td>38</td>
<td>38</td>
<td>35</td>
</tr>
<tr>
<td>5%</td>
<td></td>
<td>35</td>
<td>33</td>
<td>31</td>
</tr>
<tr>
<td>10%</td>
<td></td>
<td>33</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>15%</td>
<td></td>
<td>32</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td>30</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Workability of concrete in terms of slump value

6.2. Hardened Concrete Properties:

6.2.1. Compressive Strength Test:

Concrete specimens are cast and tested under the action of compressive loads to determine the strength of concrete. In very simple words, compressive strength is calculated by dividing the failure load with the area of application of load, usually after 28 days of curing. The strength of concrete is controlled by the proportioning of cement, coarse and fine aggregates, water, and various admixtures. The ratio of the water to cement is the main factor for determining the concrete strength. The lower the water-cement ratio, the higher is the compressive strength.

The compressive strength tests were carried out after 7 days and 28 days for the concrete cubes. The specimen of size 150×150×150 mm cubes were cast according to IS: 516-1969. The compressive strength of specimen was observed to decrease with an increase in the percentage of the RCA and CSA concrete with NA. The results of compressive strength of cubes for 7 days and 28 days are given in Table 5, Table 6 and figure 2, 3 respectively.

Stress = Load of cube / area of cube

6.2.2. Split Tensile Strength test:

The split tensile strength tests are conducted for M25 grade of concrete with different percentages of RCA and CSA replacement by the NA concrete at the age of 7 days and 28 days. Concrete cylinders (100mm diameter x 200mm height) are cast. Once the curing is over for the specific duration, the cylinders are cleaned and dried properly, before placing it in Universal Testing Machine (U.T.M). The plate is lowered and allowed to touch the top surface of the cylinder. The force is applied with gradual increase in load. The load at which splitting of the cylinder takes place is recorded and the split tensile strength is calculated as per formula. The concrete does not resist the direct tension because of its low tensile strength and brittle nature. However, determination of split tensile strength is necessary to determine the load at which the concrete members may fail.

The results of split tensile strength test of cylinder for 7 days and 28 days are given in Table 7 and 8 and are also shown in Figure 3 and 4. The split tensile strength was computed by the expression:

\[ f_{sp} = \frac{2P}{\pi L d} \]
Where,

$f_{sp}$: The split tensile strength of concrete in MPa.

P: Maximum Load on cylinder in Newton.

L: Length of the cylinder in mm.

d: Diameter of the cylinder in mm.

**Table 5. 7 days Compressive Strength Test Results**

<table>
<thead>
<tr>
<th>Sample</th>
<th>w/c</th>
<th>Weight(Kg)</th>
<th>Area (mm²)</th>
<th>Load(KN)</th>
<th>Compressive Stress (N/mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RCA</td>
<td>CSA</td>
<td>RCA</td>
<td>CSA</td>
</tr>
<tr>
<td>TM1 (0%)</td>
<td>0.45</td>
<td>8.86</td>
<td>500</td>
<td>22.22</td>
<td></td>
</tr>
<tr>
<td>TM2 (5% RCA)</td>
<td></td>
<td>8.80</td>
<td>483</td>
<td>21.46</td>
<td></td>
</tr>
<tr>
<td>TM3 (10% RCA)</td>
<td></td>
<td>8.82</td>
<td>488</td>
<td>21.68</td>
<td></td>
</tr>
<tr>
<td>TM4 (15% RCA)</td>
<td></td>
<td>8.83</td>
<td>468</td>
<td>20.79</td>
<td></td>
</tr>
<tr>
<td>TM5 (20% RCA)</td>
<td></td>
<td>8.85</td>
<td>447.5</td>
<td>19.88</td>
<td></td>
</tr>
<tr>
<td>TM6 (5% CSA)</td>
<td></td>
<td>8.41</td>
<td>465</td>
<td>20.67</td>
<td></td>
</tr>
<tr>
<td>TM7 (10% CSA)</td>
<td></td>
<td>8.20</td>
<td>387.5</td>
<td>17.22</td>
<td></td>
</tr>
<tr>
<td>TM8 (15% CSA)</td>
<td></td>
<td>7.84</td>
<td>361</td>
<td>16.04</td>
<td></td>
</tr>
<tr>
<td>TM9 (20% CSA)</td>
<td></td>
<td>7.73</td>
<td>347.5</td>
<td>15.45</td>
<td></td>
</tr>
</tbody>
</table>

**Table 6. 28days Compressive Strength Test Results**

<table>
<thead>
<tr>
<th>Sample</th>
<th>w/c</th>
<th>Weight(Kg)</th>
<th>Area (mm²)</th>
<th>Load(KN)</th>
<th>Stress (N/mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RCA</td>
<td>CSA</td>
<td>RCA</td>
<td>CSA</td>
</tr>
<tr>
<td>TM1 (0%)</td>
<td>0.45</td>
<td>8.87</td>
<td>722</td>
<td>32.08</td>
<td></td>
</tr>
<tr>
<td>TM2 (5% RCA)</td>
<td></td>
<td>8.81</td>
<td>710</td>
<td>31.56</td>
<td></td>
</tr>
<tr>
<td>TM3 (10% RCA)</td>
<td></td>
<td>8.90</td>
<td>694</td>
<td>30.84</td>
<td></td>
</tr>
<tr>
<td>TM4 (15% RCA)</td>
<td></td>
<td>8.92</td>
<td>675</td>
<td>29.56</td>
<td></td>
</tr>
<tr>
<td>TM5 (20% RCA)</td>
<td></td>
<td>8.95</td>
<td>645</td>
<td>28.67</td>
<td></td>
</tr>
<tr>
<td>TM6 (5% CSA)</td>
<td></td>
<td>8.62</td>
<td>705</td>
<td>31.33</td>
<td></td>
</tr>
<tr>
<td>TM7 (10% CSA)</td>
<td></td>
<td>8.50</td>
<td>630</td>
<td>28.00</td>
<td></td>
</tr>
<tr>
<td>TM8 (15% CSA)</td>
<td></td>
<td>7.91</td>
<td>560</td>
<td>24.89</td>
<td></td>
</tr>
<tr>
<td>TM9 (20% CSA)</td>
<td></td>
<td>7.94</td>
<td>495</td>
<td>22.00</td>
<td></td>
</tr>
</tbody>
</table>

**Table 7. 7 days split tensile strength of concrete**

<table>
<thead>
<tr>
<th>Sample</th>
<th>w/c</th>
<th>Weight in Kg</th>
<th>Load in KN</th>
<th>Stress in MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RCA</td>
<td>CSA</td>
<td>RCA</td>
</tr>
<tr>
<td>TM1 (0%)</td>
<td>0.45</td>
<td>3.965</td>
<td>9.45</td>
<td>3.005</td>
</tr>
<tr>
<td>TM2 (5% RCA)</td>
<td></td>
<td>4.05</td>
<td>9.2</td>
<td>2.92</td>
</tr>
<tr>
<td>TM3 (10% RCA)</td>
<td></td>
<td>3.975</td>
<td>8.8</td>
<td>2.81</td>
</tr>
<tr>
<td>TM4 (15% RCA)</td>
<td></td>
<td>4.25</td>
<td>7.5</td>
<td>2.38</td>
</tr>
<tr>
<td>TM5 (20% RCA)</td>
<td></td>
<td>4.30</td>
<td>6.2</td>
<td>2.06</td>
</tr>
<tr>
<td>TM6 (5% CSA)</td>
<td></td>
<td>3.74</td>
<td>6.75</td>
<td>2.15</td>
</tr>
<tr>
<td>TM7 (10% CSA)</td>
<td></td>
<td>3.72</td>
<td>6.60</td>
<td>2.10</td>
</tr>
<tr>
<td>TM8 (15% CSA)</td>
<td></td>
<td>3.57</td>
<td>6.50</td>
<td>2.06</td>
</tr>
<tr>
<td>TM9 (20% CSA)</td>
<td></td>
<td>3.625</td>
<td>6.05</td>
<td>1.92</td>
</tr>
</tbody>
</table>
6.3. DISCUSSION:

- The CSA concrete is observed to have low slump. The slump values of the concrete are between 26 - 31mm, whereas RCA concrete has high slump, when compared to CSA concrete. The slump values of CSA concrete vary from 30-55mm. Observation shows that, the workability decreases with increase in the CSA and RCA percentage. In CSA concrete, the slump is quiet low as compared to RCA concrete, but in both the concrete, slump goes down with the increase in the percentage of replacement.

- The compressive strength of CSA concrete is little low when compared to RCA concrete. The reason is that, the CSA is unable to make proper bonding. The compressive strength is decreased with the increase in percentage of replacement in both CSA and RCA concrete. The strength of CSA concrete at the age of 7 days is having 49-65% strength, while in RCA concrete, the strength value is 63 - 68%.

- Increase in percentage replacement by CSA and RCA reduces the split tensile strength of concrete.

- The weight of CSA concrete is decreased when the replacement percentage is increased, but in case of RCA concrete, the weight is increased with increase in percentage replacement.

- The CSA is having higher water absorption capacity because of higher porosity in its shell structure while in RCA, little low water absorption is observed compared to CSA.

- As per the investigation result, both RCA and CSA concrete are useable, but in comparison, it is preferable to use RCA concrete.

6. CONCLUSION:

The following conclusions are made based on the experimental investigation of the study.

- With the same w/c ratio, the slump value decreases, if percentage of RCA and CSA is increased.

- The compressive strength of RCA and CSA concrete was lower than that of Natural Aggregate Concrete.

- The split tensile strength of RCA and CSA concrete was lower than that of NA concrete.

- Generally, the recycled aggregate, in comparison to the aggregates obtained from natural resources, is characterized by: higher water absorption, lower density, higher content of organic and possibly harmful substances, higher level of crushability, reduced abrasion resistance and reduced resistance to frost. Recycled aggregate can be grouped under heavyweight aggregate.

- The coconut shell aggregates have higher water absorption because of higher porosity in its shell structure. The aggregate impact value of coconut shell aggregates are much lower compared to crushed stone aggregate which indicates that this aggregates have good absorbance to shock.

- Coconut shell exhibits more resistance against crushing, impact and abrasion, compared to crushed granite aggregate. Coconut shell can be grouped under lightweight aggregate.

- The strength of CSA concrete at the age of 7 days is having 49-65% strength, while in RCA concrete, the strength value is 63 - 68%.

- Increase in percentage replacement by CSA and RCA reduces the split tensile strength of concrete.

- The weight of CSA concrete is decreased when the replacement percentage is increased, but in case of RCA
• concrete, the weight is increased with increase in percentage replacement.
• The CSA is having higher water absorption capacity because of higher porosity in its shell structure while in RCA, little low water absorption is observed compared to CSA.

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DEVELOPMENT OF A REMOTE CONTROLLED VERTICALLY ADJUSTABLE WHITE BOARD


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Abstract- This paper presents the design and implementation of a remote controlled vertically adjustable motorized white board for the purpose of teaching. The objective is to have a white marker board that can be adjusted to various height so as to aid maximum use of the board by different teachers of varying heights and to have maximum exposure of what is written on the board to a class with same level seat arrangement. Pro-engineering was used for the CAD drawing of the board and Proteus was used to simulate the circuit designed. Furthermore, this design employs the use of a solid white board, motorized jack, rollers and remote control to aid the vertical adjustment of the height of the Whiteboard. The wood used were seasoned and then cut into the various sizes, component by component. These components were assembled and integrated with the electric jack. Using Kiel vision (software for programming) the code for the remote and the receiver were written and tested. The circuit was then assembled on vero board, using Topwin programmer, the circuit was programmed. After the fabrication, unlike the mechanical solid white board which involves much human effort to push the board through a grooved frame and manually locking it with a bolt by the side for the comfort of the teacher, the Remote control Whiteboard has overcome the manual method of adjustment and aid maximum view in a classroom with same level seat arrangement.

Index Terms- Teaching, vertically, adjustable, roller, solid white board, motorized jack, Pro-engineering, fabrication, and infrared remote control.

I. INTRODUCTION

A whiteboard or dry erase board is a name for a glossy surface, most commonly colored white, where non-permanent markings can be made. Whiteboards operate analogously to chalkboard in that they allow markings to temporarily adhere to the surface of the board [1]. Earlier woods and rocks were used for teaching and learning process. The invention of blackboards was a revolutionary change in the history of mankind which led to the development of the society. In early 1990s it was observed that allergies and other health risks are associated with chalk boards due to the particles released by the chalk which prompted the replacement of blackboards with whiteboards [2]. Since then, the white board has been largely adopted into many other sectors of human endeavor besides teaching because of its many advantages over the chalkboard [3], [4].

There are currently two different accounts of the history of the whiteboard: one from the US and one from the UK, both dating to the late 1950s to early 1960s. The first version has the white board invented by Martin Heit, a photographer and Korean War veteran who produced it from film laminate. The second account is that Albert Stallion who invented the whiteboards while working at American steel producer Alliance in the 1960s [5]. From records he produced the white board with enameled steel. The limitation of both was that they either were mounted on the wall or on a stand permanently. Remote control motorized cleaners were innovated to reduce the human efforts required for cleaning. This type of cleaner is operated by motors and is controlled by remote. The cleaner move in horizontal direction and due to the pressure applied by the dusters whiteboard is erased [2].

With all these wonderful research done to improve the Whiteboard, the limitation remains that little or no attention was given to the vertical adjustment of the Whiteboard using motorized mechanisms. This impedes maximum view in a class room of same level seat arrangement. Also, it discourages individuals with extreme heights from teaching. This limitation will be overcome by this paper with the use of a motorize jack and rollers fastened to the side of the solid Whiteboard to aid motorized vertical adjustment using a remote thereby making teaching efficient.

II. METHODOLOGY

The design and construction of the new system was achieved with the use of wooden frames, solid Whiteboard, rollers, motorize jack, jack grip, metal rail remote control and an AC to DC converter.
A. Wooden Frames

The motorize board often times needs rigid support so as to stand firm in a class room. This was why stands were made with wooden frames having dimensions of 65mm by 65mm and a length of 1735mm. These were prepared from wooden beams of 100mm by 100mm and a length of 3300mm. This stands were grooved at the center 18mm wide to a depth of 40mm so as to support the white board. Also, support beam with a length of 1210mm and thickness of 65mm by 25mm was produced to give rigidity at the top. The base which will aid the whiteboard to stand was produced with the same dimension as the frames discussed above but with a length of 890mm. Support dash board was also produced from plywood of 16mm to give rigidity at the bottom. The dimension of the dashboard is 1244.41mm by 320mm. The CAD drawing showing this component is shown in Figure 1 and 2.
B. Solid Whiteboard

This was achieved by cutting 12mm plywood 1100mm long and 1180mm wide as shown in Figure 3. Lighter wood may sag when writing on the board. Afterwards, the wood was seasoned so as to ensure that it is absolutely dry. White Formica was then used to laminate the board.
C. Rollers

The rollers used as shown in Figure 4 were bought in the local market. This roller was fixed at the side of the solid Whiteboard as shown in Figure 3. This was done to reduce friction when the board slides through the groove on the frame.

![Figure 4. CAD drawing of the rollers.](image)

D. Motorized jack

The motorized jack as shown in Figure 5 was adopted from the mechanism used to position a satellite dish receiver. The jack is made up of a 0.5hp motor, gears and a threaded shaft which ensures good torque. The power specification for the system to work is 36V DC. During the fabrication, 30V DC was used.

![Figure 5. Front view of the motorized jack.](image)
E. Jack grip

The jack grip was made from mild steel plate with thickness of 2mm. The plate was cut to a dimension of 50mm by 50mm so as to form a grip which will couple the Whiteboard with the jack. The plate was formed into U shape as shown in Figure 6 and drilled at the edges with a hole of diameter 12mm which accommodates the bolt which was used to couple the jack to the board.

![Figure 6 CAD drawing of the jack grip.](image)

F. Metal rail.

This component was made from a 2mm thick mild steel plate. The plate was cut 18mm wide and 1600mm long. The reason for the selection of the material is to impede the rollers which are metal in structure from eaten up the wood as a result of friction. This rail was then installed into the groove.

G. Remote control.

The remote control is subdivided into two parts. These are the transmitter and the receiver. The block diagram in Figure 7 and Figure 8 shows the interconnectivity of the components of the transmitter and receiver.

![Figure 7. Block diagram of infrared transmitter.](image)
This unit was produced via the use of 555 timer. The timer was connected in astable mode as shown in the circuit diagram in figure 9 below. The essence of this is to generate a 38 kHz square wave which is used as carrier wave. The carrier wave is modulated with the control signal so as to achieve 7 meters range of control. The 0.1nf capacitor is used to stop false trigger. While the combination of $R_1$, $R_2$, and $C_1$ gives the output frequency. This frequency is governed by the formulae

$$f = \frac{1.4}{(R_2 + 2R_1)C_2}$$

where $f$ = frequency

$C_2$ is the timing capacitor

$R_1$ and $R_2$ are the timing resistors

![Figure 9 Circuit diagram of Astable multivibrator](image-url)
I. NAND gate and IR LED

This was achieved via the use of two NPN transistors. The purpose of having NAND gate is to be able to modulate the carrier wave with the control signal. The circuit diagram is shown in Figure 10 below. R₄ and R₅ are used to properly bias the transistors and R₃ is used to limit the current passing through the infrared LED.

![Figure 10: Circuit diagram of the NAND gate.](image1)

J. MAX 232

The max 232 was used as a serial buffer. In the transmitter, it ensures that the control signal from the controller reaches the NAND gate while in the receiver it ensures that the received signal gets to the controller. The circuit in Figure 11 describes its connection.

![Figure 11: Circuit diagram of Max232](image2)

K. Microcontroller

The micro controller used is 89C51. This was selected among other types because of its availability in the market and affordability. It was wired up with other components as shown in Figure 12. After wards, Kiel C was used to write the code after which it was burned into the controller via a universal programmer. The capacitor at pin 9 is to aid delay so that the system properly Booths before acting on the program. Pin 40 is connected to Vcc (+5V) while pin 20 is grounded. This helps to power the chip. Pin 31 has to be connected...
to Vcc so that the controller can act on the program from within its own program memory. The controller in the transmitter is responsible for the outputting of control signal through the serial transmitter pin (Pin11) while it reads the signal received at the receiver through pin 10. Note that the controller was clocked with a 12MHz crystal.

Figure 12 circuit diagram of the controller.

L. Buttons

Three buttons were used. One was dedicated to control the up motion of the jack, another the down motion and the last was the halt action. These buttons were connected in series with a resistor to ensure a difference in logic when pressed. The points X, Y, Z are the points that output the logic. They output logic one when not pressed and logic zero when pressed. The circuit diagram is shown in Figure 13.

Figure 13 circuit diagram of the buttons.

M. IR receiver

The receiver is a three pin device which helps to captures infrared messages. The three pin component was purchased and used as specified in the data sheet.
N. Relay and Driver.

The relay is an electromagnetic switch. It help in the changing of the orientation of the jack in this project. To achieve this, two relays were used. These relays had to be controlled by the controller of the receiver. However it was not possible to do that directly since the current demand of the relay is more than what the controller can deliver. To overcome this ill, two A1015 transistors had to be used to drive the relays. This is shown in Figure 13.

![Figure 14 circuit diagram of relay and transistor drivers](image)

O. COMPLETE DESCRIPTION OF THE TRANSMITTER AND RECEIVER

The sub unit shown in Figure 15 consists of an astable multivibrator which generates the 38 kHz needed for modulation. When the button is pressed, the control signal is outputted from the controller to the max 232. This signal in modulated with the 38 kHz carrier signal. This will help to push the message out to the LED. The sub unit in figure 16 shows the IR receiver which captures the message and pass it to Max232. The signal is the passed to the controller which interprets it and acts on it. The assembled board is shown in Figure 17.

![Figure 15 Complete circuit diagram of transmitter](image)
Figure 16 Circuit diagram of receiver

Figure 17 Complete assembled remote controlled vertically adjusted motorized board.
III. TEST AND RESULTS

After the completion of the work, unlike the manual Whiteboard that has nothing to measure with a multimeter since there are no circuit involved, essential parameters of some sections of the remote controlled motorize board was measured to ensure that the components were in good condition. This is illustrated with the Table 1 below.

Table 1. Actions of sub units when tested.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Component</th>
<th>Expected result</th>
<th>Observed result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Astable Oscilator</td>
<td>38kHz</td>
<td>38.2KHz</td>
</tr>
<tr>
<td>2.</td>
<td>NAND GATE</td>
<td>To light up the infrared LED when observed under a camera</td>
<td>Infred LED was lighted whenever button was pressed on the remote</td>
</tr>
<tr>
<td>3.</td>
<td>Switch section</td>
<td>5 volts when open and 0 volts when closed</td>
<td>4.5volts when open and 0 volts when closed</td>
</tr>
<tr>
<td>4.</td>
<td>Relay section</td>
<td>To energize when logic zero is applied to the base resistor of the driver and de-energized when logic one is inputed</td>
<td>Relays were energized and de-energized as expected</td>
</tr>
<tr>
<td>5.</td>
<td>White board</td>
<td>To move freely through the groove</td>
<td>Moved freely through the groove</td>
</tr>
</tbody>
</table>

Furthermore, unlike the manual Whiteboard which needs human effort to adjust the height, the remote controlled whiteboard was operated via the use of a remote. Also the transmitter and receiver were tested to ensure communication. From the test it was observed that the system worked as anticipated. The remote control worked within the range of 7 meters. Furthermore, the comfort of teachers with heights between 4.6 feet to height of 6.7 feet was tested. It was observed to be comfortable. Also, in a class of same level seat arrangement, the comfort of the students in viewing the board was achieved.

IV. DISCUSSION OF RESULTS

a. The 38.2KHz achieved was because of the tolerance of the timing capacitor and resistors. However, this did not hinder the workability,

b. The NAND gate helped to modulate the control signal as expected. Without it, the distance of control was less than 5cm.

c. The switch section helped the controller to know the difference when the switch is closed or open. At logic 1, the switch is open and at logic 0 the switch is closed. Logic 1 outputs 4.5V instead of the 5V expected. This is due to voltage drop across the pull up resistors.

d. The relays worked as expected, energizing and de-energizing so as to power the electric jack in different directions.

e. As a result of the rollers attached to the whiteboard, the movement of the board trough the groove was with less friction.

f. Students were quite comfortable since the board could be jacked up to its maximum height. Furthermore, teaches of different heights attests to how comfortable it is while teaching.

V. CONCLUSION

A remote controlled vertically adjustable motorized white board is designed, constructed and tested. The remote works within the range of 7 meters and it aids conveniences in teaching for teachers of extreme heights. Also, it enhances maximum view in a class of same level seat arrangement.

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School and Gender

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In the same classroom, reading the same textbook, listening to the same teacher, boys and girls receive very different educations.” (Sadker, 1994)

Abstract- Today, we are living in a time that is marked by debates and discussions regarding equal pay for both the genders, abolition of sexism and calling out of sexist incidents. Hence, one can say that the different spheres and environments seem to be improving for the female sex. But few archaic methodologies and concepts still surround the definition of feminity, masculinity and it’s expectations. Amongst these changing times, one aspect that is incessant for the ideal development of both the genders is a healthy school environment.

Index Terms- changes, gender, impact, school

I. INTRODUCTION

Young kids begin to develop their gender identity from 2-3 years. Since then, there are primarily three factors that influence the understanding of what gender is and how it should be manifested in the public sphere. These three factors include school, home environment and the media. One of the earliest notions that are ascertained to the students is that one has to choose the types of clothes, toys and objects depending on their gender. Also, while based on one’s appearance, one might belong to either the male or female enunciation, but one might not identify with the same. However, for the sake of the topic, this paper would be limiting itself to the ‘female and ‘male’ gender only for a broad understanding of the different facets of school and gender.

II. IMPACT ON STUDENTS

School environment

Today, in majority of the schools, small kids are already policing one another on the basis of gender. This is highly ironical as school is a place wherein the idea of a uniform has taken shape in order to maintain a non-judgemental and egalitarian platform.

The outcome of such a hostile school environment is twofold. Firstly, both the genders are discouraged from exploring their potential in a certain niche created for the other gender. Secondly, the ideas of prejudice which we are fighting at a social level, get defeated and manifested again at the grass root level.

Definite differences between the two genders

-We see that from the pre-primary days, boys seem to be more overexcited than the girls. And many do not enjoy activities that are sedentary in nature until given a solid reason to do so.

-It is essential to consider the pre-puberty and post-puberty changes in all the genders. After the post-puberty stage, the boys end up having an upper hand in all the physical tasks when compared to the females. Moreover, this is the time when both the genders are being exposed to physical sports. Hence, if equal importance on both the sexes regarding sports isn’t given then it can end up transitioning into a mental block for the girls.

-Disclosure observation is that boys seem to engage in more physical aggression during middle school years than the girls. This is despite any proof that girls are less aggressive than boys.

(Hurst, n.d.)

Discourse between peer groups

There is an ostensible understanding between the peer groups of both boys and girls regarding a certain gender. It is usually regarding the apparent male and female stereotypical traits such as

-Boys are more physical
-Boys need more space to learn
-Boys are not as good at reading and writing as girls
-Girls produce more drama
-Girls tend to multitask better
-Girls will write with more detail (Gender differences in school achievement: The role of self-regulation, 2013)

Such understandings are extremely harmful as they do not consider exceptions and aim to generalise the discourse of gender and its different manifestations in a school and the peer-group environment. Moreover, it sometimes manifests into certain characteristics such as men being strong and powerful and women being weak and dependent.

(Gender differences in school achievement: The role of self-regulation, 2013)

Differences in the classroom

Both the genders are conditioned to learning and modelling the behaviours from their home environments. This includes boys understanding of males being more dominating and their application of the same to get the teacher’s attention. Similarly, the women are told to be more polite and non-authoritative (Lakoff, 1973;1975).

Though the dialogue seems to be changing today, but there is still an inbuilt understanding that girls conform more to classroom rules for talking while boys have tendencies not to follow these rules and also to undermine girls. (Sunderland, 2004, p. 97). Moreover, If someone does not fit into these gender boxes, then they are understood to be erring from their gender and further looked down upon. (EACEA, 2009)
Lack of sensitisation

Another thing boys knowingly or unknowingly do is put girls down and harass them. One example of this is boys using sexually abusive language when they talk to and about girls (Arnot, David & Weiner, 1999, p. 147). This is extremely disarming as in this case, the girl has no equal way to retort back as there isn’t a tag attached to a boy's promiscuity. Hence, in this arena, girls are more vulnerable to threats and further harassment. (EACEA, 2009)

III. RESEARCH

Unequivocal research

Male and female brains are different, according to Dr. Jay Giedd of the National Institute for Mental Health. Though male brains are larger than female brains, but the size difference has nothing to do with cognition. Hence, there are no significant gender differences in cognitive abilities. And so they cannot explain the increasing numbers of a certain gender interested in a particular subject and vice-versa. Moreover, claims such as girls wish to please adults more and hence get better grades, are truely from a social standpoint and have no scientific backing whatsoever. (EACEA, 2009)

Many past research suggest that girls are more successful in school than boys. But to counter it, Hartley and Sutton (2013) have recently reported that the perception of girls to be academically superior might lead to the underperformance of boys on tests. Hence, we don’t know whether statistics that claim to boys being more susceptible to discipline issues and learning difficulties are true or not.

(Gender differences in school achievement: The role of self-regulation, 2013)

Sociological parameters

But even sociological conditions can have its own contentions. This is because research also shows us that it is difficult to separate innate from learned behaviours. Hence, it is hard to decipher when do the pupil start conforming to their gender and it’s existing stereotypes.

Such an example was seen in non-traditional European and American cultures, wherein it was noticed that gender differences were quite pronounced.

(Learning Style Differences)

IV. TEACHERS

What should they do?

Certain research claims that though girls tend to outperform boys, they tend to be overly critical of their performing abilities. (Learning Style Differences) Additionally, many say that girls take failure more seriously than boys, hence use that to fuel their academic performance. This leads to the understanding that teachers should have different teaching styles for both the genders such as being more encouraging and helpful towards the girls while adopting a challenging perspective towards the boys.

(Learning Style Differences)

But even such understandings and actions are flawed as none of them truly see the student as an individual and are finally just a manifestation of the stereotype. Due to these differences, it is imperative for the teachers to get gender differentiation classes before they start teaching, which would equip them with the necessary know-how to accurately decrypt the gender socialization of their students in order to ascertain the individual qualities of the student.

(Learning Style Differences)

Differences in conduct

Einarsson & Hultman write that boys take a lot of energy from the teacher and removes the attention from the girls. (EACEA, 2009) This inevitably leads to girls getting a subordinate role in a classroom. They also have to ascertain to the domination of boys, and are not encouraged to express it to the teacher nor the parents.

The manner in which the teachers talk to the students also varies as when she is interacting with a boy, she acts in a more mature and determined manner, while the girl is retorted to with a low pitch and weak sound. (Einarsson & Hultman, 1984, ; Gulbrandsen, 1994, ).

Girls- the helping hand?

Girls are also meant to do what they’re told and understood to help the teacher to maintain order in the classroom, for example by sitting next to disruptive boys, being a buffer between boys and sometimes help the teacher raise the boys (Einarsson & Hultman, 1984, ; Gulbrandsen, 1994, ; Steenberg, 1997, ; Öhrn, 2002, ; Wernersson, 2006, ).

Also, boys are never made to sit next to a girl to make her more extroverted. Instead of indulging in the former, the girls should be made to indulge in more stimulating work and better assignments.

Similarly, quite often girls are recognised for having worked hard but boys are recognised for being clever (Gulbrandsen, 1994, ) (EACEA, 2009)

Boys are expected to be loud, take up more of the physical space in the classroom, bend the rules and need more support for learning and also need more attention. (EACEA, 2009)

If women are to get more influence in society, they need to be listened to at school (Steenberg, 1997, ) And the teachers need to put in the required efforts from school itself. They need to start realising the after-effects of gender.

Existence of present inequalities

From the results presented above, we can conclude that boys do dominate in the classroom by getting more questions, more time and attention from teachers. And the girls would turn out to be completely different if they were given the same amount of attention and nourishment. Both the boys and girls should also be made aware that inequalities exist at school (Steenberg, 1997, p. 52)

And it goes without saying that in the long run, both boys and girls would benefit from more equality. (EACEA, 2009)
V. TEXTBOOK MATERIALS

Gender stereotypes are also likely to be reinforced or weakened by text books and reading material provided in schools. (EACEA, 2009)

Despite performing equally well as boys in most countries, girls tend to have a weaker self-concept in science than males, i.e., on average, girls had lower levels of belief in their science abilities than boys. Yet, both boys and girls are similarly interested in science; and there is no overall difference in their inclination to use science in future studies or jobs. Along with gender, Socioeconomic conditions also needs to be looked at while analysing children who are under-achieving. (EACEA, 2009)

Curriculum differences

The hidden curriculum transmits to children a collection of messages which often reinforce sex stereotyping (Humm 1989). Studies of these more informal relations have been consistent in revealing the dominance of boys regarding the school space they occupy, the teacher-time that they demand, and the influence that they have over the rest of their peers.

Gender representations

Sometimes textbook language favours stereotyped gender roles. Certain examples include usage of terms like fireman instead of fire fighter. It has been found that men appear more often and in a wider set of roles as workers, whereas women are shown mainly in domestic and romantic roles. Also, qualities that are encoded in scientific inquiry such as 'rationality' are associated with masculine way of thinking. Hence, men end up choosing male vocational pathways and female choose certain female ones.

A recent Greek study shows that boys are most likely to use technology for entertainment than girls although there is little gender difference in other reasons for using technology. (EACEA, 2009)

Such arguments have led to the development and demand of an alternative curriculum that can empower girls and make them more welcome to all subjects. (Brickhouse, 2001)

VI. SOCIETY

What is happening?

Today there are many conversations regarding the role of women in our society and ways to encourage it. This has come to the surface owing to the series of oppression that the latter has had to go through over the years. One of the poignant conversations regarding gender include the multitude of things women and men can and cannot do. And till the time the same is propagated and encouraged at a school level, this understanding will keep shaping up in our society too.

Male domination

Today, men still have the leading positions in politics and business, they still make more money than women and are more politically influential. (Berge & Ve, 2000). Whenever such a stark demographic is seen, then it should be looked into critically.

We see that this habit can be traced to the school environments wherein boys tend to get more attention from teachers. However, in the last decade or so, this focus on girls has been criticised as girls perform better academically than boys (Arnot, David & Weiner, 1999; Wernersson, 2006). The Swedish Education Act states that schools actively and consciously must promote equal rights and opportunities for both sexes. And hence it now becomes a responsibility to transform this unequivocal social dialogue. (EACEA, 2009)

Historical perspectives

Today there are two ways of seeing the gender debate. Over the years, the difference between men and women has often gone unchallenged. For eg- 19th century Europe.

Accordingly, men are physically stronger and tend to see the world in terms of objects, ideas and theories. Women on the other hand mature physically and psychologically at an earlier stage, are more affiliative and nurturing. In a book Males and Females Hutt asserted, that women and men are intrinsically different and that, therefore, these characteristics are not susceptible to change (Hutt, 1972). From this conservative perspective on sex differences, education is seen as a means of socialising and educating boys and girls into their natural and conservative roles as men and women. (EACEA, 2009)

The second, progressive approach, perceives men and women’s social roles as shaped largely by influences arising out of history, culture and society, and thus constantly in the process of change as society itself changes

Discourse on sexuality

In order to create an equal and healthy atmosphere in class, the study of the history of sexuality is important in order to understand the range of possible sexual identities available to young people.

This would lead to the students getting less influenced by the desired social roles and more aware of their masculinity or feminity (Butler, 1990) (EACEA, 2009)

VII. SOLUTIONS

Some of the solutions that can be undertaken to make classrooms more egalitarian include the following

1. Eliminate sex-stereotyping in school textbooks.
2. Switch to mixed-sex pairing or single-sex grouping
   - Usually classrooms, seating arrangements etc focus at segregating or rather grouping boys and girls differently. But, it has been seen that boys and girls work better and learn more cohesively from one another if they are made to work on assignments and breaking stereotypes from a young age itself. (Hurst, n.d.)
3. Adopt a growth and not gender oriented school environment.
4. No influx of only female teachers. ( Smyth & Darmody, 2007)
5. Teachers should be non-discriminatory
6. All teacher education programmes should have a core module on gender equality.
7. Classrooms should involve parents into the discussion, as they are a social link to the world outside.
9. Specific programmes for certain vulnerable groups of boys and girls.
10. Adoption of an overall national strategy to combat gender stereotypes in career choices and to support young people at school with systematic guidance on gender-sensitivity for study and career. (EACEA, 2009)
11. Need for vocational guidance to address specific gender related career choices (EACEA, 2009)
12. Sex education should include biological as well as emotional aspects of sexuality (EACEA, 2009)

VIII. CONCLUSION

Gender inequality is a concern in many countries. The most common goal policies in education is to challenge traditional gender roles and stereotypes. Many European countries are nowadays trying to combat gender stereotyping. Most of them are, however, lacking an overall national strategy. (EACEA, 2009). It is pleasurable to see that the discourse of gender is being looked into in order to analyse the performances of individuals in classrooms. But it still has a long way to go.

There are various instructions and imparting the girls and boys receive from their teachers on a regular basis. Small, discreet actions and words can have different implicit meanings behind them. Furthermore, these teachings forms a part of the culture that we are living in and a reflection of how progressive a certain society is. If we desire indiscriminatory work and home environments, then we need to pay special attention to the ongoing in our classrooms. Moreover, ideal teachers can have a profound effect not just by correcting marksheets but also societies.

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Identify Knowledge of Basic Cardiac Life Support among Nursing Student

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Abstract
The knowledge of Basic Cardiac Life Support (BCLS) is very important among nurses to give basic life support the patient with cardiac arrest in routine work at hospital and in community. Every nurse has to face emergency situation in her life and it is necessary for her to gain sound and effective knowledge of BCLS. Increase survival ratio and decrease death rate is basic concern of health care provider. **Purposes** To identify knowledge of basic cardiac life support among student nurses. **Method** Quantitative experimental study was selected. It was an interventional study. **Instrument** The knowledge was analyzed by using the questionnaires prepared from Basic Life Support (BLS) manual of American Heart Association (AHA). A workshop has been conducted on basic cardiac life support and skills of cardiopulmonary resuscitation among Post RN BSN nursing students of Lahore School of nursing at the skill lab of University of Lahore. Where effect of training of Basic Life Support (BLS) was evaluated based on pretest and posttest training assessment scores. First theoretical Knowledge was explained through power point presentation and practical skills were demonstrated on manikins in skill lab. **Result** The results were analyzed by using paired t test. Out of 62 participants only 3.2% (n=2) participants get high scores in pretest the rest of participant 93.5% (n=58) has moderate knowledge level and 3.2% (n=2) had low knowledge level. Posttest assessment was done with the same question paper showed 96.8% (n=60) secured high score and remaining 3.2% (n=2) passed with moderate score. Mean difference was -9.4 and P value 0.000 showed the workshop highly effective and improved knowledge level in posttest. **Conclusion** Hence BCLS workshop is essential to improve knowledge and skills of cardiopulmonary resuscitation (CPR).

**Key Words:** Basic Cardiac Life Support (BCLS), Cardiopulmonary resuscitation (CPR), Knowledge, Students, Workshop.

INTRODUCTION
Basic cardiac life support means given to the life support a patient in such a situation like sudden cardiac arrest (SCA), heart attack, stroke and foreign body airway obstruction (FBAO). (Chaudhary, Parikh et al. 2011). Basic cardiac life support knowledge and practices for health care provider is a key element or pillar to decreasing the death rate and increasing survival ratio. (Roshana, Batajoo et al. 2012). Globally one third population of the world died each year with cardiovascular diseases. Health care personnel did not have knowledge of effective cardiopulmonary resuscitation techniques. (Meaney, Sutton et al. 2012).

Nurses are the first person who deals to the patients with cardiac in hospital. So, nurses need a good knowledge and effective practices of cardiopulmonary resuscitation. (Xanthos, Akrivopoulou et al. 2012) Student nurses need to be complete the courses of Basic Cardiac Life Support prior to start clinical practices in actual life. (Kardong-Edgren and Adamson 2009).

Post RN BSN students are going to complete their degree program after diploma holding. It is necessary for them to have qualified knowledge and skills especially in cardiopulmonary resuscitation.

Nurses have low level of knowledge of cardio pulmonary resuscitation and skills. It should be required to arrange cardiopulmonary resuscitation training courses on regular bases. (Rajeswaran and Ehlers 2014). It is necessary for every person of
community to have knowledge of cardiopulmonary resuscitation (CPR) and basic life support for increasing the survival rate in life threatening condition especially health care workers like doctors, nurses and paramedic’s staff should have basic and authentic knowledge of cardiopulmonary resuscitation to improve the quality of life. (Chandrasekaran, Kumar et al. 2010).

Basic life support knowledge is a fundamental knowledge and skills for nurses. To retaining BCLS skills among nurses it is necessary to arrange periodically workshop. As health care professional nurses should have fully skilled and competent in their knowledge and skills regarding BCLS as they are close to the patient first when patient went into cardiac arrest.

Cardiac arrest is still leading cause of death around the world. Initial chest compression is the only source for cardiopulmonary resuscitation. (Sidney, Rosamond et al. 2013). In under developing countries like Pakistan even though the person is a health care worker who has to face emergency condition, fails to give basic life support to patient with cardiac arrest. It is generally observe doctors and nurses fails to give proper and effective resuscitation in emergency situation when patient present with cardiac arrest.

Study finding helped the organization to plan and organize similar type of educational and training workshop for not only nursing students but also all Allied Health Science students prior to join an organization in actual life and work in community.

The study was quantitative experimental study. The population selected the student nurses of Post RN BSN year I semester II and Year II semester II. The students who are from Post RN BSN and give consent to become part of the study included. The sample size was (n=62)

**RESEARCH ELABORATION**

Cardiac arrest is the most serious issue in hospital and out hospital setting, which require immediate CPR for reversal of the victim. (Karim 2016). According to American Heart Association victim with cardiac arrest should provide basic life support for cardiopulmonary resuscitation and work up on cardiopulmonary resuscitation services among public to improve survival ratio. (Meaney, Bobrow et al. 2013). The “2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care” increased the focus on methods to improve high quality cardiopulmonary resuscitation (CPR). AHA introduce 5 critical component to improve quality of cardiopulmonary resuscitation as minimise the interruption of chest compression, provide adequate rate and depth, avoid lean the body during perform compression, avoid excessive ventilation and provide minimum rate of ventilation according guidelines. (Meaney, Bobrow et al. 2013).

A prospective quasi experimental study conduct on a single group pre test and post test after BLS class on registered nurses at Jordanian hospital. Data show significant improvement as pre test scores (M=4.6, SD=2.9, range=0-9) and post test scores as (M=7.5, SD=1.7, range=4 to 9). The score in pre test and post test indicate that nurses gain better score in post test. The study shows the effectiveness of BLS simulation class. (Toubasi, Alosta et al. 2015)

A cross-sectional study conducted among medical students and doctors in Rawalpindi-Islamabad Pakistan to assess the knowledge of cardiopulmonary resuscitation from June to September 2011. Results of the study was as inadequate awareness of cardiopulmonary resuscitation among medical/dental students and doctors and recommended to give training of basic life support. (Zamir, Nadeem et al. 2012)

**RESULTS**

**Pre Overall Knowledge**
Pre-test over all knowledge as 3.2% (n=2) give 1-8 correct answer and have low knowledge level. 93.5% (n=58) have moderate knowledge. Only 3.2% (n=2) have high knowledge with (2.00±0.25) shows in (Table 1) (Fig 1)

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Pre -Overall Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low Knowledge (Correct Answered 1-8)</td>
<td>2</td>
</tr>
<tr>
<td>Moderate Knowledge (Correct Answered 9-17)</td>
<td>58</td>
</tr>
<tr>
<td>High Knowledge (Correct Answered 18-25)</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
</tr>
</tbody>
</table>

Fig 1 Pre Overall Knowledge

Post Overall Knowledge

After attending workshop of BCLS knowledge level improved as 96.8% (n=60) have high knowledge as they gave correct answer 18-25 question out of 25 question. Only 3.2% (n=2) passed with moderate level of knowledge as they gave 9-17 correct answers with (2.97±0.17) illustrate in (Table 2) (Fig 2)

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Post-Overall Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Moderate Knowledge (Correct Answer 9-17)</td>
<td>2</td>
</tr>
<tr>
<td>High Knowledge (Correct Answer 18-25)</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
</tr>
</tbody>
</table>
Among 62 participants 40 were from year II semester II of post RN and remaining 22 were from year I semester II. Among all student nurses only 3.2% (n=2) secured high score in pretest and remaining students have moderate knowledge. In post workshop assessment as 96.7% participant secured high score. By paired t test data analysis pretest mean (11.9±2.51). In Posttest knowledge level was high with mean (21.4±1.64) shows in (Table 3)

Table 3 Paired Samples Statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test Score</td>
<td>11.9839</td>
<td>62</td>
<td>2.51221</td>
<td>.31905</td>
</tr>
<tr>
<td>Post-Test Score</td>
<td>21.4194</td>
<td>62</td>
<td>1.66496</td>
<td>.21145</td>
</tr>
</tbody>
</table>

Table4 shows paired sample significant correlation as 0.562.

Table 4 Paired Samples Correlations

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test Score &amp; Post-Test Score</td>
<td>62</td>
<td>.562</td>
<td>.000</td>
</tr>
</tbody>
</table>

The p value of p<0.05 used to determine for the significant results. In short analysis of paired t test such as BCLS knowledge increased significantly from the pretest (M=11.9) to the posttest (M=21.4), Mean differences= -9.4, p value 0.00. Intervention was highly effective and statistics mean scores was high in post-test and improved knowledge level after attending workshop of Basic Cardiac Life Support (BCLS).

Table 5 Comparison of pre workshop and post workshop scores
## Workshop Participant

<table>
<thead>
<tr>
<th>N</th>
<th>Pre Test mean</th>
<th>Post Test mean</th>
<th>Mean Differences</th>
<th>Paired t test P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>11.3</td>
<td>21.4</td>
<td>-9.4</td>
<td>.000</td>
</tr>
</tbody>
</table>

### Conclusion:

The study emphasizes to teach basic cardiac life support skills to student nurses. All students have maximum experience to serve health care organization of 4 to 7 years. On finding of this study students were fail in certain questions: how long should a pulse check, correct compression rate, a child is gasping bus has pulse rate 100 per minute what should rescuer response, response of rescuer on infant become responses after chocking, what should done after AED shock, breath and compression ratio of child among second rescuer, correct compression placement in infant, alone find victim first response, when should use two thumb encircling technique in infant, after scene is clear what should second step, when second rescuer come with AED what should next step, bag valve mask is effective when controlled by two rescuer and best method to hold mask to deliver ventilation via bag valve mask.

Pre overall knowledge was moderate among all nursing students except two secured high scores and two secured low scores. After attending workshop there is significant change in knowledge as all students secured high scores and two person passed with moderate knowledge level. Paired t test and p value >0.05 was used to analyze the significant results. The study was highly effective as on evaluation p value was 0.000 and mean differences between pre and post mean was -9.4. Results significantly show the effectiveness of workshop among nursing student.

In North-karela a cross-sectional study conducted to evaluate knowledge of BLS among health care workers. Study shows results as inadequate knowledge of BLS among health care professionals and recommended BLS Training to improve knowledge. (Nambiar, Nedungalaparambil et al. 2016)

### ACKNOWLEDGEMENT

I want to acknowledge my parents for their support at every step and MisRobina, Mr M Hussain, Mis Hajra Sarwarand a very special friend without their support I cannot achieve my goal.

### REFERENCES


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Mis. Robina Kousar

Mr. Muhammad Hussain
In the era of Internet of Things provide us the digitally connected devices have become an important aspect in our lives including our homes, offices, cars and even our bodies. With the arrival of the IPv6 and Wireless technology the IoT is growing at fast pace. It has been said by the researchers that according to some estimation that by 2020, the number of active wireless connected devices will exceed 40 billion.

A DDoS assault implies that it is managed with a similar focus from various sources – and here the Internet of Things must feel for programmers somewhat like a toyshop would to youngsters: a huge number of gadgets, very regularly unprotected and unmonitored fordrawn out stretches of time. The scale in which these assaults are currently conceivable is rising colossally with the headway of the Internet of Things [1].

Hence, according to the Akamai research that 21% of DDoS attacks now result from Internet of Things devices. Attackers in 2014 opted for high-bandwidth, short-duration attacks, while in Q1 2015 the majority of DDoS attacks used less than 10 Gbps and persisted longer than 24 hours.

In general, Q1 2015 DDoS assaults saw an about 60% expansion in application layer assaults and an almost 125% increment in framework layer assaults over Q1 2014, with the normal assault enduring 24.83 hours versus 17.38 hours in Q1 2014.

**Abstract** - In this report we are going to discuss how IoT can be made secure from the DDoS attacks. A Denial of Service attacks (DoS) happens to make the service unavailable to the legitimate users. The main reason of that system becomes unavailable because the victim device is overwhelmed with thousands of requests making the resources and capacity overload. The Distributed Denial of Services (DDoS) attack is carried out from a large number of systems which attack one target maliciously. For this purpose machines called botnets or zombies are used to request a service at exactly the same time.

The Internet of Things offers a wide variety of smart devices – all of which face the difficulty of securing overall privacy. As the gadgets are all so extraordinary their heterogenic nature is frequently utilized as a reason by produces and proprietors alike to skip adequate security controls.

We will perceive how we can secure IoT against DDoS assaults utilizing diverse calculations and methodologies.

**Index Terms** - IoT, DDoS, Attacks, Devices, Internet, ANN

### I. INTRODUCTION

The Internet of Things devices, including surveillance cameras, webcams and smart thermostats were infected with malware. In the course of recent years or something like that, the Internet of Things has presented tons of recently web associated gadgets—like DVRs and cameras and keen coolers and indoor regulators—that hackers can add to their swarms without any difficulty [2].

Not just is there a sheer measure of these gadgets; however they are regularly ensured with extremely restricted security, if any by any means. It is very simple to abuse those shortcomings

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**IoT Threats can be ordered into Four Types:**

i- **Denial of Service (DoS)** – This risk denies or avoids client’s asset on a system by presenting futile or undesirable movement

ii- **Malware** – Attackers utilize executable code to disturb gadgets on the IoT organize. They may assemble delicate data, or increase unapproved access to the gadgets. The assailant can take preferred standpoint of blemishes in the firmware running on the gadgets and run their product to disturb the IoT engineering.

iii- **Data breaks** – This is a security episode where delicate, shielded or secret information is recovered from the system. Aggressors can parody ARP parcels to tune in on the correspondence between companions on the system.

iv- **Weakening Perimeters** – IoT arrange gadgets are at present not outlined considering the inescapable security. Arrange security components are not frequently exhibit in the gadgets making the system a helpless one for dangers

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**II. PROBLEM STATEMENT**

A portion of the all the more unnerving vulnerabilities found on IoT gadgets have brought IoT security additionally up the heap of issues that should be tended to rapidly. The researchers proceeded to alert that the bugs they found could do considerably more than allow voyeurs to assault the proprietors' near and dear insurance. The weaknesses could in like manner show vital to aggressors who target authorities of immense associations who all over work from home or who get to screens from work phones or frameworks.

At some places it has also been proven that internet connected cars can also be compromised and hackers can carry out any number of malicious activities, including taking control of the entertainment system, unlocking the doors or even shutting down the car in motion. In a latest attack, A DDoS attack occurs when a server is overwhelmed with traffic in a targeted attack. In this case, it’s believed that Internet of Things devices, which cover any object with an Internet connection, were hit.

Dyn DNS believes tens of millions of these connected devices, including surveillance cameras, webcams and smart thermostats were infected with malware. In the course of recent years or something like that, the Internet of Things has presented tons of recently web associated gadgets—like DVRs and cameras and keen coolers and indoor regulators—that hackers can add to their swarms without any difficulty [2].

Not just is there a sheer measure of these gadgets; however they are regularly ensured with extremely restricted security, if any by any means. It is very simple to abuse those shortcomings

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**Tayyaba Khalil**

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and dispatch substantial scale assaults without the information of the proprietor.

**Major Security Threats to IoT Devices:**

Poor security on numerous IoT gadgets makes them easy objectives and frequently casualties may not know they have been contaminated. Assailants are presently very mindful of careless IoT security and numerous pre-program their malware with generally utilized and default passwords. IoT assaults have for some time been anticipated, with a lot of theory about conceivable seizing of home mechanization and home security gadgets. Nonetheless, assaults to date have taken an alternate shape. Assaultors have a tendency to be less intrigued by the casualty and the lion’s share wish to commandeer a gadget to add it to a botnet, the vast majority of which are utilized to perform appropriated disavowal of administration (DDoS) assaults [4].

i. **In-Car WiFi**

In-CarWiFi has indistinguishable security vulnerabilities from customary WiFi hotspots. Without the firewalls exhibit in conjunction with independent company WiFi establishments, in-auto gadgets and information will be at hazard. Once inside the system, an aggressor can parody (act like) the auto, associate with outside information sources, for example, OnStar servers and gather the proprietor's PII, for example, MasterCard information, clarifies Pescatore. That is only one case. Just the creative ability can restrain the sorts of assaults that end up plainly conceivable when a programmer possesses in-auto Wi-Fi, travelers’ gadgets and the auto's character (through satirizing).

ii. **Domestic Use of Drones**

Since Drones depend on helpless telemetry signals, assailants can use them utilizing any of the exemplary assaults including support invades, arrange strings, SQL infusions and confirmation sidesteps that exist in automaton firmware.

Cases of fruitful assaults on drones are as of now on record. In 2009, extremists in the Middle East caught Predator ramble motions because of an inability to utilize secure conventions, as indicated by Cabetas [6]. This empowered the radicals to keep an eye on what the Predators were keeping an eye on (by means of airborne video). Without secure conventions, comparative assaults are conceivable with residential UAVs.

iii. **Retail Inventory Monitoring and Control, M2M**

Worldwide remote M2M incomes will have achieved $50.1billion in 2013, as indicated by Visiongain, LTD. starting at 2014, stock administration innovations will progressively incorporate economical 3G cell information transmitters on bundles. These transmitters will associate with the Internet, making these applications helpless against Internet-based assaults, as indicated by Pescatore.

**III. PROPOSED METHODOLOGY**

Cyber security specialists have cautioned that IoT is an effortlessly exploitable zone in enterprises and can be utilized successfully as a part of mass cyber-attacks. Observation cameras are one case of this as the firmware has a tendency to be comparable no matter how you look at it and contains a powerlessness that can without much of a stretch be abused.

A few measures are as of now being taken to crevice openings and avert security breaks at the gadget level, and endeavors are being directed to handle real calamities before they happen. We are going to introduce an algorithm that will provide following functionalities.

- Monitoring and analyzing both user and system activity.
- Analyzing system configurations and vulnerabilities.
- Assessing system and file integrity.
- Ability to recognize typical attacks patterns.
- Analysis of abnormal activity patterns.
- Tracking user policy violations.

Enormous archives where IoT information is being put away, which can get to be appealing focuses for corporate programmers and modern spies who depend on huge information to make benefits (Earley) [5]. In the wake of monstrous information ruptures and information robbery cases we've found as of late, more exertion should be made to secure IoT-related information to guarantee the protection of purchasers and the helpfulness of organizations and partnerships.

**Signature based Intrusion Detection:**

Signature-based identification is ordinarily utilized for identifying known assaults. No information of typical activity is required however a mark database is required for these sorts of detection systems. For worm location, this framework does not mind how a worm finds the objective, how it propagates itself or what transmission plots it employs. The framework investigates the payload and recognize regardless of whether it contain a worm. One huge test of mark based IDS is that each mark requires a section in the database, thus an entire database may contain hundreds or even a large number of passages. Every parcel is to be contrasted and every one of the sections in the database. This can be very resource devouring and doing as such will back off the throughput and making the IDS vulnerable to DoS assaults [7].

**Anomaly based Intrusion Detection:**

Inconsistency based frameworks recognize unusual practices and create alerts in light of the abnormal examples in system activity or application practices. Ordinary peculiar behaviors that might be caught incorporate 1) abuse of system conventions, for example, covered IP fragments and running a standard convention on a stealthy port;

2) Unique traffic patterns, for example, more UDP parcels contrasted with TCP ones, and 3) suspicious examples in application payload. The greatest difficulties of oddity based discovery frameworks is defining what a typical system conduct is, choosing the limit to trigger the caution, and preventing false alerts. The clients of the system are typically human, and individuals are hard to anticipate. In the event that the ordinary model is not characterized painstakingly, there will be loads of false alarms and the location framework will experience the ill effects of debased execution [8].

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Artificial Neural Network based Detection:

Now a day, we prefer to use ANN to fight against these threats. A multi-level perceptron, a kind of managed ANN, is prepared utilizing web bundle follows, at that point is surveyed on its capacity to ruin Distributed Denial of Service (DDoS/DoS) assaults. The ANN technique is approved against a recreated IoT arranges.

We used both algorithms of ANN such as Supervised Learning and Unsupervised Learning. The neurons of the ANN are utilized to shape complex theories; the more neurons, the more complex the theories. Assessing the theories is done by setting the info hubs in a criticism prepare and the occasion streams are proliferated through the system to the yield where it is delegated ordinary or bargained. At this stage the inclination plunges is utilized in order to push the mistake in the yield hub back through the system by a back spread handle keeping in mind the end goal to assess the mistake in the covered up hubs. The angle of the cost – capacity can in this way be figure. Neural system framework experiences preparing so as to take in the example made in the framework [9].

IV. FUTURE ENHANCEMENT

For future advancements, more assaults might be acquainted with test the unwavering quality of our technique against assaults what's more, enhance the exactness of the structure. Moreover we will explore other more profound neural systems, for example, the repetitive and convolutional neural system approach.

V. CONCLUSION

The proposed Intrusion discovery framework in view of human insusceptible framework utilizes signature based and inconsistency based location methods. Every time an assault is distinguished, another set of era is added to the indicators dataset. As false positives diminish, append detection increases. Consequently the general identification rate expands which at last increments the functional productivity of the system to an adequate level. Also, the proposed IDS system assesses hubs participation and gives an effective method for appropriately utilizing the algorithms of simulated insusceptible framework. These solutions help to avoid DDoS attacks in IoT. By using the machine learning ANN we have found that it has better detection and prevention capacity as compared to previous techniques. Because of the complex structure of the ANN it helps to fight against the attacks [10]. The forward and backward propagation helps to computer errors and minimize them in other to identify and avoid the attacks.

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AUTHORS
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Impact of Drought on Food Security in West Pokot County, Kenya

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Abstract

Drought and food security are of global concern and require urgent interventions to ensure that they do not jeopardize the lives of many people and the ecosystem. West Pokot County is among the most prone counties to droughts that threaten food security in the area; this is exacerbated by climate change. The main objective of this study was to examine the impact of drought on food security in West Pokot County. The study used mixed research designs including descriptive survey and evaluation. Respondents were identified through random and purposive sampling methods. Questionnaires were used to collect data from 398 respondents randomly selected from different strata of the stakeholders in the drought management and food security sector. Interview guides were used to collect data from key informants, and focus group discussions. Quantitative data obtained from relevant institutions was analyzed using SPSS package. The results reveal that 96% of the respondents who planted maize had no harvest during the recent drought of 2015, 2.6% of the respondents who planted sorghum received some harvest, while 32% indicated that growing of drought-tolerant crops and limiting the portion size at meals time were suitable coping strategies used to reduce the effects of drought on food security. These results are useful in developing mitigation measures to reduce risks from drought and enhancing the community's resilience to drought and food insecurity.

Index Terms

Household livelihoods, food security, coping strategies, drought resilience, ASALs

I. INTRODUCTION

Drought is naturally occurring climatic variability. With the changing climate, droughts are likely to become more severe and occur more often. Drought in contrast to aridity, affects almost all climates in the world (WMO, 2006). The situation is exacerbated in many parts of the world by the prolonged droughts. During the period (2007/08) a third of the 35 million people in Kenya were said to be in a state of food insecurity (GOK, 2009). Drought has become more frequent and more severe in recent years, and this is projected to increase in extent and severity. Drought ranks as the single most common cause of severe food shortages, particularly in developing countries and represents one of the most important natural triggers of malnutrition and famine. It affects the four dimensions of food security- availability, stability, access, and utilization (FAO, 2011). Food security in Africa has substantially worsened over the last 30 years, with high population and food demand growth consistently exceeding modest agricultural production growth (Byerlee and Eicher, 1997).

It is estimated that about 800 million people are food insecure, about 180 million (or 23%) live in Sub-Saharan Africa (Anderson, 2001). Drought has plunged East Africa into the worst food security crisis that Africa has faced in 20 years. More than 11.5 million people are currently in need of food aid in Djibouti, Kenya, Somalia, and Ethiopia (IGAD, 2008). In January 2014, the Government of Kenya declared a national drought disaster, with an estimated 10.6 million people affected. After the poor performance of the long rains between March and May 2014 in the semi-arid and arid zones, the drought situation continued to affect both pastoral and marginal agriculture-based livelihood zones and the impact on household food availability as well livestock productivity, the situation continued to worsen and to the increase in food prices (IFRC, 2014).

Household food insecurity is a critical issue in Kenya due to its magnitude, especially in ASALs that comprise 88% of Kenya’s land area (Gitu, 2004). The semi-arid and arid lands of North Rift and Northern Kenya are prone to drought and have suffered recurrent extreme climatic conditions with long-term devastating effects on livelihoods according to the Agency for Technical Cooperation and Development (ACTED, 2013).

Frequent drought episodes have gripped most parts of West Pokot, with the worst hit areas being Pokot North and Pokot Central. Most dams and water pans in West Pokot remain dry and all the little water collected has since been exhausted. Most permanent rivers including Suam, Kanyagareng in Pokot North and Sighiya, and Wakor in Pokot Central normally dry up during severe drought (RedCross, 2011). The drought situation has aggravated livestock health related epidemics, which has subsequently affected the health of communities and most people dependent on livestock products. Women and children are the most vulnerable, since they have been

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migrated to Uganda, leaving them with no source of food except reliance on relief food (NDMA, 2014).

Droughts are likely to occur, and are relatively chronic particularly in the predominant pastoral zones of Pokot north and Pokot central sub-counties. High poverty levels that stand at 69% in the county expose the population to high drought risks as their coping capacities are compromised. Overdependence on livestock coupled with insecurity makes the community more susceptible to drought and other livelihood shocks. Access to forage resources and markets for both livestock and food commodities is majorly constrained by insecurity related to cattle rustling (ACTED, 2013). This study was aimed at examining the impact of drought on food security in West Pokot County, Kenya.

II. MATERIALS AND METHODS

2.1 Study area

The study was carried out in West Pokot County that is one of the 14 Counties in the Rift Valley region. It is situated in the North Rift along Kenya’s Western boundary with Uganda border. It borders Turkana County to the North and North East, Trans Nzoia County to the South; Elgeyo Marakwet County and Baringo County to the South East and east respectively. The County lies within Longitudes 34° 47’ and 35° 49’ East and Latitude 10° and 20° North. The County covers an area of approximately 9,169.4 km² stretching a distance of 132 km from North to South (Figure 2.1). Pokot community is the predominant community in the County, Sangwer is the second largest community, and the Turkana, Luo, Kikuyu and Luyha are the minority in the county. The main social-economic activities in the West Pokot County are pastoral and agriculture. According to the (IEBC 2012), the County has four constituencies namely Kacheliba, Sigor, Kapenguria and Lelan (NDMA 2013).

![Figure 2.0 map of West Pokot County](source: Drought Early Warning Bulletin – West Pokot County)
2.2 Research design and sampling strategy

The study adopted (Lambert, 2013) conceptual framework model that explores the food security learning framework which focuses on eight core and critical dimensions in the realization of food security.

2.2.1 Research design

The study employed descriptive survey and evaluation research designs. This study adopted stratified random sampling in determining the sample size for different wards, simple random sampling for departmental representatives and purposive sampling for key informants.

2.2.2 Sampling Strategy

The sample size of 398 respondents was obtained using a simplified formula (Yamane 1967).

\[ n = \frac{N}{1 + N(e^2)} \]

Where:
- \( n \) = Sample size
- \( N \) = is the total population
- \( e \) = is the error margin

The sample size consisted of 118 respondents from each of the 3 wards, 4 from NDMA, 16 from the County line departments, 6 UN representatives, 6 NGOs representatives and 12 key informants giving a total of 398 respondents. Data collection methods included Primary sources including, focus group discussions (FGDs), observation checklists, interview schedules and questionnaires. Secondary sources included use of relevant documents and reports. Quantitative data was analyzed using SPSS and MS Excel software packages.

III. RESULTS AND DISCUSSIONS

3.1 Demographic characteristics of West Pokot County

Analyses of demographic characteristics (Table 3.1) indicate that majority (275) 69.1% of the respondents were male, while (123) 30.9% of the respondents were female. About 24.3% of the respondents were in the age bracket of (18-25) years, 59.5% in (25-35) years, (43) 10.8% in (35-45) years and (22) 5.4% in (45 and above) years respectively (Table 4.1). The results indicate that in terms of occupation 15% of the respondents were farmers, 2% were businessmen, 40% were pastoralists, 20% were unemployed, 6% were self-employed, and 17% were employed.

Table 3.1 Demographic characteristic of West Pokot County

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>30.9</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>69.1</td>
</tr>
<tr>
<td>Occupation</td>
<td>Business</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Pastoralists</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Self employed</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Employed</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>37.5</td>
</tr>
<tr>
<td>Education</td>
<td>Primary</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>College/University</td>
<td>12.5</td>
</tr>
<tr>
<td>Respondents age bracket</td>
<td>25-35</td>
<td>59.5</td>
</tr>
<tr>
<td></td>
<td>35-45</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>45 and above</td>
<td>5.4</td>
</tr>
</tbody>
</table>

3.2 Household Livelihoods in West Pokot County

When asked about the main livelihood sources, the respondents indicated that livestock keeping, farming and business were their sources of livelihood. The results show that 42% of the respondents strongly agreed that they rely on livestock keeping for livelihood, 35% on farming and 23% on business as their source of livelihood. From the focus group discussion held, it was revealed that there was a problem of dependency syndrome among people where people severely rely on relief food. The community members complained about the government not responding to their needs in time. The results indicated that in terms of occupation, 15% of the respondents were farmers, 2% were businessmen, 40% were pastoralists, 20% were unemployed, 6% were self-employed, and 17% were employed. The results also showed that during the survey, more men were willing to respond to questionnaires compared to women. The study highlighted the need to educate the community on growing drought-tolerant crops. The respondents supported the government initiative to reclaim land under irrigation. The study found that the respondents supported the government initiative to reclaim land under irrigation as it was suggested that the government need to initiate irrigation schemes and encourage stocking after drought. The community members appealed to the government to increase employment opportunities. They were educated to engage in volunteer activities due to lack of employment opportunities. It was pointed out that the government needs to initiate irrigation schemes and encourage stocking after drought.
market for livestock and food needs to be enhanced and corruption reduced.

3.3 Maize Yield Production

The study indicated that whenever there is drought maize yield reduces drastically. In all the years that west Pokot has experienced drought it has had adverse impacts on food security. This is because drought impacts on agriculture include decreased crop and livestock production, increased risk of food and water shortages, increased risk of malnutrition and high risk of water- and food-borne diseases.

Figure 3.2: Maize yield productions 2010-2015

The results are in agreement with FAO (2013), which states that in the event of drought communities or farmers are expected to experience a decrease or even crop failure. Drought represents a constant threat to world food security. It causes income losses because several sectors can be affected. It also causes shortfalls in food production and lead to substantial increases in imports to meet local needs, which can result in increased fiscal pressure on county and national budgets. Drought normally results in poor harvests that threaten food security and livelihoods from household to national level, to varying degrees according to the extent that the family or nation depends on agriculture for its food and income. Farmers who produce inadequate food to achieve production self-sufficiency must resort to other sources of entitlement to feed their families (Ichara, 2012).

This study indicates that during 2011 and 2014, yield production went down because of inadequate crop harvests that impacted negatively on farm outputs, the study therefore agrees with (Nyandiko, et al., 2012), who reported that drought and climate change had disastrous consequences on maize production. The climate change induced droughts of 1982, 1992, 2000, 2003, 2007 and 2009 were aked havoc on maize production and food security in Kenya. In Kenya’s ASAL areas, crop yield such as maize, beans and sorghum vary according to the annual climate of the area. ASAL areas in Kenya are particularly vulnerable to climate variability and change due to dependence on rainfed subsistence farming. These areas are affected by widespread poverty, diseases, rising human population and low adaptive capacity (ACTED, 2013).

3.3 Analysis of maize yield production in west Pokot County

The mean maize yield in west Pokot County in 2014 was west Pokot 786.7 Kg/acre; in Pokot South 280 Kg/acre, Pokot Central 229.0 Kg/acre while in Poko North 194.8 Kg/acre respectively giving the overall mean of 372.6 Kg/acre. The highest maize yield obtained was 890.75 Kgs/acre in West Pokot (2010) while the lowest yield was 20.8 Kg/acre in 2011 observed in North Pokot sub-county (Table 3.2). From the analysis, the highest observed maize yields are in west Pokot County (Mean = 987 Kg/acre) while North Pokot realized the lowest average maize yield 20.8 Kg/acre. The findings revealed that there is wide variability in maize yields in the four sub-counties over the period (2011-2014). Yield variability is strongly influenced by the impact of drought and climate change and change in ASALs particularly of north and central Pokot Sub-counties.
Table 3.2: Maize yield descriptive summary for West Pokot County (kg/acre)

<table>
<thead>
<tr>
<th>Sub-County</th>
<th>Lowest Yield</th>
<th>Highest Yield</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pokot North</td>
<td>20.8 (2011)</td>
<td>678 (2012)</td>
<td>657.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1035.8</strong></td>
<td><strong>3210</strong></td>
<td><strong>2174.2</strong></td>
</tr>
</tbody>
</table>

**Source:** Field data, (2016)

The trend over the 2011-2014 period showed that maize yields have been declining sharply in all Sub-counties. Pokot North Sub-county had the highest variation in maize yield with 657.2 kg deviation difference, while West Pokot had the lowest deviation of 437 kg. The study further indicated that from 2010-2015 there were two drought years that 2011 and 2014 where the sub-counties indicated low yield. The 2011 drought was a national crisis that called for “Kenyans for Kenya” initiative that spearheaded contribution to those who were adversely affected by drought especially Turkana County.

3.4 Comparative analysis of Maize and Sorghum production in West Pokot County

The study revealed that communities in West Pokot normally plant maize and sorghum. Comparing the two crops, key informants and community members reported that those who planted sorghum received some harvest during drought periods as compared to those who planted maize. Although it was also noted that when there is good rainfall those who plant maize receive good harvest, this is because the size of the land allocated to maize is bigger than that of sorghum Figure 3.3 overleaf.

![Figure 3.3: Comparison of yield production in West Pokot County](image)

This study agrees with (FAO, 2013), which states that during drought, water-resistant crops that can withstand the harsh climatic condition, it also indicates that areas prone to drought need to plan crops like sorghum, cassava, millet, groundnuts, and green grams (FAO, 2013). The drought episodes in addition to occasional climate variability reduce crop yields, undermine livelihood strategies and enormously contribute to a downward spiral of increasing poverty and food insecurity (ILRI, 2010). Analysis of climate and crop yields can provide critical information to farmers and other stakeholders on adaptation mechanisms to forestall and mitigate climate change in Kenya’s ASALs Counties. The study found that 96% of respondents who planted maize had no harvest during the 2014 drought, 2.6% of respondents who planted sorghum harvested very little from their farms, and 1.4% of respondents who planted green grams harvested at least more than one tin (2 kg). Table 3.3
Table 3.3: Comparison of crops that were harvested during drought (2014)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Respondents</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>382</td>
<td>96</td>
</tr>
<tr>
<td>Sorghum</td>
<td>10</td>
<td>2.6</td>
</tr>
<tr>
<td>Greengrams/ground nuts</td>
<td>6</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>398</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Source:** Field data, (2016)

These findings revealed that those farmers who planted maize were severely affected by drought because they recorded a high percentage of responses with no harvest compared to other crops that were planted by the respondents. While those who planted sorghum, greengrams and ground nuts reported that they had poor harvests.

These findings are similar to NDMA (2013) that recommended that farmers need to embrace drought-tolerant crops that withstand the harsh climatic conditions in the area. According to NDMA, arid and semi-arid counties need crops that withstand the climatic conditions of those counties for example cassava, sorghum, millet, greengrams and ground nuts. The report also agrees with Ichara, (2012), who established that poor harvests threaten food security and livelihood from households on national level in varying degrees based on the extent that the family owns the land. Farmers who produce inadequate food to achieve self-sufficiency in production must resort to other sources of entitlement to feed their families. The study found that among the four sub-counties, Pokot North recorded lowest yield production compared to other sub-counties. This is because Pokot North normally experiences low rainfall compared to other sub-counties, Figure 3.4.

Figure 3.4: Yield production (2010-2015) in sub-counties

The study is in agreement with results from (NDMA 2013), indicating that pastoralist areas in west Pokot experience low rainfall compared to areas that practice mixed farming and agro-pastoralism. Based on ranking of vulnerability to drought and severity of impact of drought, north Pokot was ranked as the worst affected. This study revealed that increase in prices of food products could be attributed to scarcity of the commodity within the internal normal supply sources to the markets. This leads to much reliance on external (outside the Counties) market to replenish the stocks in the major markets within the county. The study found that 80% of the respondents mentioned livestock production as their main source of food security. 73.30% indicated that selling of wild fruits, vegetables and termites was their main source of food security. 67.50% relied on selling charcoal production. Of the studied respondents only 13.30% indicated crop production to be their main source of their food security Figure 3.5 overleaf.
These findings indicate that the main source of livelihoods for most of the respondents is animal production. The findings are consistent with Adan (2015) who found out that livestock is the mainstay of the economy of the arid and semi-arid counties and contributes over 60% to food security in the county. The main livestock types found in the county are the indigenous cows, goats, sheep, camels, and donkeys. Crop failure was reported to be the worst immediate impact of drought on people's livelihoods by 68% of the respondents. The respondents further reiterated that crop failure (Figure 3.6) was their major drought-related problem, of which 68.8% of them referred to it as the main cause of food shortages while 64.2% of the respondents reported water scarcity and 72% of the respondents indicated that drought impacts heavily on their health, particularly malnutrition.
The findings indicate that malnutrition cases were adversely reported as the main cause of the drought. The results further showed that during drought, the area normally experiences malnutrition problems. The findings concur with Kenyan demographic health surveys (KDHs, 2014) that revealed worst Pokot cases had the highest percentage of malnutrition cases that was at 45% nationally. The Kenya Red Cross Society (2011), initiated assessment and reported that the lack of resources, coupled with severe water scarcity leading to exceptionally large migrations, heightened clustering of livestock, death of livestock, increased malnutrition rates among the young, changing diets (eating only once a day), and resurgence of conflicts, as communities compete for fast dwindling resources.

According to Red Cross (2011) the North Rift, Northern Kenya, and southern Ethiopia have witnessed increased frequency and intensity of droughts and this has resulted in heavy losses of livestock, increased numbers of inter-ethnic conflicts and loss of lives (Habitat, 2009).

Results from the study indicate that 74% of the respondents stated that the drought occurrence trend in West Pokot County is worsening. This is in tandem with a study by Belyehara (2012), whose results indicate that since 1960s each drought episode in Africa has been more severe than the previous one causing humanitarian crisis in the continent. Even though majority of the respondents revealed that drought is worsening, Sheffield (2012), asserted that more realistic calculations, based on the underlying physical principles that take into account changes in available energy, humidity and wind speed, suggest that there has been little change in drought over the past 60 years.

The Sendai framework of action (2016), which focuses development, strengthening and implementation of relevant policies, plans, practices and mechanisms need to aim at coherence, as appropriate, across sustainable development and growth, food security, health and safety, climate change and variability, environmental management and disaster risk reduction agendas. Disaster risk reduction is essential to achieve sustainable development (SFDRR, 2016).

### 3.5 Milk Production

Every respondent indicated that during drought, animals produce less milk compared to the wet season. In Kapchok, respondents indicated that production of milk reduced by 80%, in Riwosowet respondents indicated that milk production reduced by 75% and in Lomuti, it reduced by 84%. This study was in agreement with NDMA (2016) findings, which indicated that during drought, milk production decreased, and this was attributed to the fact that there was a constraint in access to pasture in terms of the distance covered and partly due to migration to smaller extents of that meant few animals from themilkings herds remained behind within the households. The deterioration in animal body condition especially cattle was due to the depletion of pasture in the most sites especially in Pokot where central grazing meant animals trekking long distances in search of pasture. During this season, the body condition of goats and camels deteriorated slightly due to constraints in accessing browse and good quality pasture.

### IV. Conclusions and Recommendations

Drought is the major cause of food insecurity in West Pokot County. It is shown that maize farmers are most severely affected by drought because it leads to crop failure as compared, to other crops such as sorghum, green grams and groundnuts that are drought tolerant. Drought also affects animal produce leading to production of less milk compared to the wet season. Prolonged drought negatively impacts on food security resulting in, topopyrincrease, which affects communities participation in socio-economic and political processes. Drought increases household vulnerability to the extent of futurer climatological shocks and food insecurity. It hastened the tendency of pushing pastoralists out of their production systems, forcing them to move to urban centers where food distribution, health, sanitation and water supply may be more readily available. The study recommends that there is need for the government to initiate irrigation schemes and encourage stocking after drought in order to support communities whose animals are suffering. Capacity building through educating the community on the importance of livestock rearing as opposed to commercial farming systems, forcing them to move to urban centers where food distribution, health, sanitation and water supply may be more readily available. The study recommends that there is need for government to initiate irrigation schemes and encourage stocking after drought in order to support communities whose animals are suffering. Capacity building through educating the community on the importance of livestock rearing as opposed to commercial farming systems. The study recommends that there is need for government to initiate irrigation schemes and encourage stocking after drought in order to support communities whose animals are suffering. Capacity building through educating the community on the importance of livestock rearing as opposed to commercial farming systems. The study recommends that there is need for government to initiate irrigation schemes and encourage stocking after drought in order to support communities whose animals are suffering. Capacity building through educating the community on the importance of livestock rearing as opposed to commercial farming systems. The study recommends that there is need for government to initiate irrigation schemes and encourage stocking after drought in order to support communities whose animals are suffering. Capacity building through educating the community on the importance of livestock rearing as opposed to commercial farming systems.


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Stimulated Brillouin Scattering in ion implanted semiconductor plasmas having SDDC

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Abstract: A high power laser propagating through ion implanted semiconductor plasma undergoes stimulated Brillouin scattering (SBS) arises due to nonlinear current density and acousto-optical strain of the medium in third-order optical polarization. We have considered that the negatively charged colloidal grains (CGs) are embedded in semiconductor plasma by means of ion implantation. By considering net negative charge of the CGs, we present an analytical study of the effects of CGs on threshold intensity, effective susceptibility and Brillouin gain characteristics. It is found that as the charge on the CGs builds up, the Brillouin gain and threshold are significantly modifies the characteristics for the onset of SBS processes.

Index terms-stimulated Brillouin scattering (SBS), colloidal grains (CGs), strain dependent dielectric constant (SDDC)

1. Introduction:
Stimulated Brillouin scattering (SBS) has numerous applications in diverse areas ranging from optical phase conjugation, real-time holography, optical storing and pulse compression for laser-induced fusion. In laser induced fusion experiments, the SBS is of great concern because it significantly redirects the pump energy away from the target and adversely affects the energy absorption. It is therefore, desirable to minimize SBS process in these experiments [1-5].

The origin of SBS lies in the effective third-order optical susceptibility of the medium. In SBS phenomenon, the maximum scattering occurs in the backward direction [6]. Semiconductors are particularly the most promising materials with highest probability of large third-order nonlinear optical phenomena to occur and are used for fabrication of sophisticated optical devices [7].

Ion implantation a process in which use of ions is made to dope and modify semiconductor materials. The colloids that act as third species or foreign particles are the result of the implantation of any metal ion inside the medium. Colloidal plasmas are a new and fascinating field of plasma physics. These colloids acquire a negative charge through the sticking of high mobility free electrons on them. The negatively charged colloidal grains (CGs) are assumed to be of uniform size and smaller than both the wavelength under study and the carrier Debye length [8-9].

In the present paper, we investigate the effects of negatively charged CGs on the SBS through third order optical susceptibility, originating from induced current density and acousto-optical polarization, in a transversely magnetized n-type ion implanted semiconductor plasmas. The presence of charged CGs in semiconductor plasma medium add new dimensions to the analysis presented in n-doped magneto-active semiconductors with strain dependent dielectric constants (SDDC). It is found that ion implantation modifies the properties of material.

2. Theoretical Formulation:
We have considered the well-known hydrodynamic description of a homogeneous, ion-implanted n-type semiconductor plasma having SDDC (for which $k_\alpha l \ll 1$, $k_\alpha$ and $l$ being the acoustic wave number and mean free path of an electron, respectively). In order to make an analytical study of the threshold pump field,
threshold intensity and effective gain constant of Brillouin cell made of a homogeneous, ion-implanted n-type crystal. The theoretical formulation starts with the derivation of the total current density \( \vec{J} \) for the resonant Stokes’s component arises due to nonlinear interaction of the waves, followed by deduction of the effective Brillouin susceptibility through nonlinear polarization arising due to nonlinear induced current and acousto-optical strain. We apply the pump electric field \( \vec{E}_0 \exp[i(k_0 x - \omega_0 t)] \) parallel to the acoustic wave \( \vec{k}_a \) (along the x-axis), and dc magnetic field \( \vec{B}_0 \) normal to \( k_1 \) (along the z-axis).

The basic equations are employed for analysis:

\[
\frac{\partial v_0}{\partial t} + \nu v_0 = -\frac{e E_{\text{eff}}}{m} \tag{1}
\]

\[
\frac{\partial v_1}{\partial t} + \nu v_1 + \left( v_0 \frac{\partial}{\partial x} \right) v_1 = -\frac{e}{m} \left( E_1 + v_1 \times B_0 \right) - \frac{k_B T}{mn_{0e}} \nabla n_1 \tag{2}
\]

\[
\frac{\partial^2 u}{\partial t^2} = \frac{c}{\rho} \frac{\partial^2 u}{\partial x^2} - \frac{\varepsilon g E_{\text{eff}}}{\rho} \cdot \frac{\partial E_1^*}{\partial x} \tag{3}
\]

\[
\frac{\partial E_1}{\partial x} = -\frac{n_1 e}{\varepsilon} + gE_{\text{eff}} \frac{\partial^2 u^*}{\partial x^2} \tag{4}
\]

and

\[
P_{ao} = -\varepsilon g E_{\text{eff}} \nabla u^* \tag{5}
\]

where \( E_{\text{eff}} = E_0 + v_0 \times B_0 \).

Equations (1) and (2) represent the zeroth and first order oscillatory fluid velocities of electrons with effective mass \( m \) and charge \( e \); \( \nu \) is the collision frequency. In equation (1), \( E_{\text{eff}} \) represent the effective electric field which includes the Lorentz force \( v_0 \times B_0 \) in presence of external magnetic field \( B_0 \).

Equation (3) is the continuity equation, where \( n_0 \) and \( n_1 \) are the equilibrium and perturbed carrier densities. In III-V semiconductor plasmas (i.e. \( n_{0e} \approx n_{0h} \approx n_0 \)) embedded with CGs, the electrons and holes from all directions colloidal with CGs and get stick onto them. However, greater number of electrons sticks onto the CGs as compared to holes in given time interval. The charge imbalance parameter is defined as \( \delta_d = \frac{Z_d en_{0d}}{n_{0h}} \).

The plasma is quasi neutral and the conservation of particle number density must always holds. Thus charged should be hold: \( n_{0e}e = n_{0h}e - Z_d en_{0d} \)

Where \( n_{0d} \) is concentration of CGs and \( Z_d \) is charge state of colloids. [10-12].

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The equation (4) describes the lattice vibration in ion implanted semiconductor plasma in which $\rho, u$ and $c$ being mass density of the crystal, lattice displacement and crystal elastic stiffness, respectively. The space charge field $\overline{E}$ is determined by the Poisson’s equation (5) in which $\overline{D} = \varepsilon \overline{E}(1 + gS)$ and $\varepsilon = \varepsilon_0 \varepsilon_s$ where $\overline{D}$ is the electric displacement, $\varepsilon_s$ is dielectric constant in absence of any strain, $S \left( \frac{du}{dx} \right)$ and $g \left( \frac{\varepsilon_s}{3} \right)$ is coupling constant due to SDDC. Equation (6) shows that the acoustic wave generated due to acousto-optic strain.

The interaction of the pump with the generated acoustic wave produces an electron density perturbation, which in turn drives an electron plasma wave and induces current density in the Brillouin active medium. In an n-type semiconductor, this density perturbation can be obtained by using the standard approach [13]. Differentiating equation (3) and using Equations (1) and (5), we obtain.

$$\frac{\partial^2 n_i}{\partial t^2} + \nu \frac{\partial n_i}{\partial t} + \omega_p^2 n_i + \frac{\delta_d \omega_p^2 k^2 \varepsilon g E_{\text{eff}} \varepsilon^*}{e} = i \kappa n_i \overline{E}$$

$$\text{(7)}$$

Where, $\omega_p^2 = \left[ \varepsilon_p \left( \omega_p^2 + \frac{k^2 \mu T}{m} \right) \right]$, $\omega_p^2 = \left( \frac{e^2 B_0}{m^2} \right)$ and $\overline{E} = \frac{e E_{\text{eff}}}{m}$

Here, $\omega_c$ is cyclotron frequency and $\omega_p$ is the plasma frequency of the medium. We neglect the Doppler shift under the assumption that $\omega_0 >> \nu >> k_0 v_0$.

The perturbed electron concentration $n_i$ will have slow and fast components, such that $n_i = n_s + n_f$. The slow component is associate with the low frequency acoustic wave $\omega_a$, while the fast component with high frequency electromagnetic wave $\omega_0 \pm \omega_a$. Considering only the Stoke’s component of the scattered electromagnetic wave into account we shall have $\omega_1 = \omega_0 - \omega_a$ and $k_1 = k_0 - k_a$. For spatially uniform laser irradiation $|k_0| \approx 0$ yields $k_1 = k_a = k$ (say) we obtain the following coupled equations from equation (7) under rotating wave approximation (RWA),

$$\frac{\partial^2 n_s}{\partial t^2} + \nu \frac{\partial n_s}{\partial t} + \omega_p^2 n_s = i \kappa n_f \overline{E}$$

$$\text{(8a)}$$

$$\frac{\partial^2 n_f}{\partial t^2} + \nu \frac{\partial n_f}{\partial t} + \omega_p^2 n_f + \frac{k^2 \delta_d \omega_p^2 g E_{\text{eff}} \varepsilon^*}{e} = i \kappa n_s \overline{E}$$

$$\text{(8b)}$$
Equations (8a) and (8b) indicate that the slow and fast components of the density perturbations are coupled to each other via the pump field. Thus, it is obvious that the presence of the pump field is the fundamental necessity for SBS to occur.

The slow component \(n_s^*\) may be obtained from Equations (4) and (8) as

\[
n_s^* = -\frac{mk^2 \delta \omega, e^2 g^2 E_{\text{eff}} E_1}{e^2 \rho \left(\omega_n^2 - k^2 v_n^2\right)} \left[1 - \frac{\left(\Delta^2 + i \omega_n \nu\right)\left(\Delta^2 - i \omega_n \nu\right)}{k^2 E^2}\right]^{-1}
\]

(9)

where \(\nu_n = \sqrt{\frac{\epsilon}{\rho}}, \Delta_a^2 = \left(\omega_p^2 - \omega_n^2\right)\) and \(\Delta_1^2 = \left(\omega_p^2 - \omega_1^2\right)\).

It is evident from the above expression that \(n_s^*\) strongly depends upon magnitude of the input pump intensity. The density perturbation thus produced subsequently affects the propagation characteristics of the generated waves.

The Stoke’s component of the induced current density may be obtained from the relation

\[
J(\omega_1) = \delta_d n_0 e v_{1x} + n_s^* e v_{0x}
\]

(10)

The preceding analysis under RWA yields

\[
J(\omega_1) = -\frac{i \delta_d n_0 e^2 E_1}{m(\omega_1^2 - \omega_c^2)} + \frac{ik^2 \delta \omega, e^2 g^2 \omega_0^2 |E_0| E_1^2}{\rho \left(\omega_n^2 - k^2 v_n^2\right) \left(\omega_0^2 - \omega_1^2\right)} A
\]

(11)

where \(A = \left[\frac{k^2 E^2 - \left(\Delta^2 + i \omega_n \nu\right)\left(\Delta^2 - i \omega_n \nu\right)}{k^2 E^2}\right]^{-1}\) and \(E_{0x} = \frac{e}{m} (E_{\text{eff}})_x = \frac{e E_0 \omega_0^2}{m(\omega_0^2 - \omega_1^2)}\)

Thus \(\left(E_{\text{eff}}\right)_x = \frac{E_0 \omega_0^2}{\left(\omega_0^2 - \omega_1^2\right)}\)

(12)

The first term of the equation (11) represents the linear component of the induced current density and the second term represents nonlinear coupling amongst the three interacting waves via total nonlinear current density. The induced polarizations as the time integral current density can be written as

\[
P_{\text{ad}}(\omega_1) = \int J(\omega_1) dt = -\frac{k^2 \delta \omega, e^2 g^2 \omega_0^2 |E_0| E_1^2}{\rho \omega_n^2 \left(\omega_n^2 - k^2 v_n^2\right) \left(\omega_0^2 - \omega_1^2\right)} A
\]

(13)
The origin of the SBS process lies in that component of $P_{cd}(\omega_i)$ which depends on $|E_0|^2 E_i$. The third-order susceptibility corresponding to $P_{cd}(\omega_i)$ is known as Brillouin susceptibility ($\chi_B^{\text{cd}}$). Now, the threshold pump amplitude for the onset of SBS may be obtained by setting $P_{cd}(\omega_i) = 0$ (i.e. $A = 0$) in equation (13), this condition yields,

$$|E_{0th}| = \frac{m}{e k} \left(1 - \frac{\omega_p^2}{\omega_0^2}\right) \left(\Delta_0^2 + i \omega_a \nu\right)^{1/2} \left(\Delta_1^2 - i \omega_a \nu\right)^{1/2}$$

(14)

Therefore, the interaction between the pump and the centro-symmetric crystal will be dominated by the SBS phenomena at a pump power level well above the threshold field $E_{0th}$. The corresponding pump intensity can be obtained by using the relation

$$I_{th} = \frac{1}{2} \eta e_o c |E_{0th}|^2$$

(15)

The Brillouin susceptibility due to induced current density is

$$(\chi_B^{\text{cd}}) = -\frac{\varepsilon k^2 \delta_a g^2 \omega_0^4}{\rho \omega_a \left(\omega_a - k_a v_a\right) \left(\omega_0^2 - \omega_c^2\right)^2} A$$

(16)

It is clear from above expression that $(\chi_B^{\text{cd}})$ is a function of material parameters such as carrier concentration $n_0$, via plasma frequency $\omega_p$, charge imbalance parameter $\delta_a$, and $B_0$ via cyclotron frequency $\omega_c$. Besides the Brillouin susceptibility $(\chi_B^{\text{cd}})$, the system also possesses an acousto-optical polarization $P_{ao}(\omega_i)$ due to the interaction of the pump with acoustic wave generated in the medium. The acousto optical polarization is obtained from equations (4) and (6) as

$$P_{ao} = -\frac{k^2 \varepsilon^2 g^2 \omega_0^4 |E_0|^2 E_i}{\rho \left(\omega_a^2 - k_a^2 v_a^2\right) \left(\omega_0^2 - \omega_c^2\right)^2}$$

(17)

The induced polarization due to acousto-optic interaction, is given by

$$P_{ao}(\omega_i) = \varepsilon (\chi_B^{\text{ao}}) |E_0|^2 E_i$$

(18)

Where $(\chi_B^{\text{ao}})$ is Brillouin susceptibility due to acousto-optic polarization. Again by keeping the pump intensity well above the threshold, the Brillouin susceptibility for acousto optic process is obtained from equations (17) and (18) as,

$$(\chi_B^{\text{ao}}) = -\frac{\varepsilon k^2 g^2 \omega_0^4}{\rho \left(\omega_a^2 - k_a^2 v_a^2\right) \left(\omega_0^2 - \omega_c^2\right)^2}$$

(19)

From equations (15) and (17) we obtain the effective Brillouin susceptibility as,

$$(\chi_B^{\text{eff}}) = (\chi_B^{\text{cd}}) + (\chi_B^{\text{ao}})$$

(20)

$$= -\frac{\varepsilon k^2 g^2 \omega_0^4}{\rho \left(\omega_a^2 - k_a^2 v_a^2\right) \left(\omega_0^2 - \omega_c^2\right)^2} \left[1 + \frac{\delta_a g^2}{\omega_a \omega_0} A\right]$$

(21)

Equation (21) may be separated into real and imaginary parts $(\chi_B^{\text{eff}}) = (\chi_B^{\text{eff}}) + i(\chi_B^{\text{eff}})$ as,
\[
\left[ \chi_B \right]_{\text{eff.}} \text{real.} = -\frac{\epsilon k^2 g^2 \omega^4}{\rho \left( \omega^2 - k^2 v_a^2 \right) \left( \omega^2 - \omega_c^2 \right)} \left[ 1 + \frac{\delta_d \omega_p^2}{\omega_c \omega_m} \left[ k^2 \tilde{E}^2 \left[ k^2 \tilde{E}^2 - \Delta_c^2 \omega_c^2 - \omega_c \omega_c \nu^2 \right] + \nu^2 \left[ \omega_c \Delta_c^2 - \omega_c \Delta_c^2 \right] \right] \right]
\]

(22)

and

\[
\left[ \chi_B \right]_{\text{eff.}} \text{imag.} = -\frac{\epsilon k^2 g^2 \omega^4}{\rho \left( \omega^2 - k^2 v_a^2 \right) \left( \omega^2 - \omega_c^2 \right)} \left[ 1 + \frac{\delta_d \omega_p^2}{\omega_c \omega_m} \left[ v k^2 \tilde{E}^2 \left[ \omega_c \Delta_c^2 - \omega_c \Delta_c^2 \right] + \nu^2 \left[ \omega_c \Delta_c^2 - \omega_c \Delta_c^2 \right] \right] \right]
\]

(23)

The effective Brillouin gain coefficient \([g_B]_{\text{eff.}}\) of SBS process in ion implanted semiconductor crystal can be computed by employing the well known relation,

\[
[g_B]_{\text{eff.}} = -\frac{k}{2E} \left[ \left[ \chi_B \right]_{\text{eff.}} \text{imag.} \right] \left| E_0 \right|^2
\]

(24)

3. Results and Discussion:

The numerical calculations are performed for the n-type semiconductor sample (BaTiO\textsubscript{3}) at 77 K duly irradiated by 10.6 \(\mu\)m CO\textsubscript{2} laser.

The following material parameters have been considered as follows: \(m = 0.0145m_0\) (\(m_0\) being the free electron rest mass), \(m_d = 1.67 \times 10^{-27}\) kg, \(\varepsilon_s = 2000\), \(\rho = 4 \times 10^3 \text{kg.m}^{-3}\), \(\eta = 3.9\), \(n_0 = 10^{25} \text{m}^{-3}\), \(\nu = 5 \times 10^{11} \text{s}^{-1}\), \(\omega_c = 1.78 \times 10^{13} \text{s}^{-1}\), \(\omega_a = 1.6 \times 10^{13} \text{s}^{-1}\), and \(v_a = 3 \times 10^3 \text{m.s}^{-1}\)

The threshold characteristics are illustrated in figures 1 and 2. Figure 1 shows the variation of threshold intensity \(I_{th}\) with wave number \(k\). The \(I_{th}\) decreases abruptly as the \(k\) increases in ion implanted semiconductors with chosen values of charge imbalance parameter \(\delta_d\). It can be seen that at \(k \approx 1 \times 10^7 \text{m}^{-1}\) the intensity is \(I_{th} \approx 5.1 \times 10^{13} \text{Wm}^{-2}\). The \(I_{th}\) decreases abruptly with wave number \(k\) up to \(k \gg 4 \times 10^7 \text{m}^{-1}\) and then afterwards decreases slowly. It is evident from the figure that as the fraction of negative charge stick on to the CGs \(\delta_d\), decreases (i.e. \(\delta_d \approx 1 > 0.90 > 0.80\)), the \(I_{th}\) gets lowered.

Figure 2 depicts the variation of threshold pump fields \(E_{th}\) with the function of cyclotron frequency \(\omega_c\). The value of the ratio \(\frac{\omega_c}{\omega_0}\) can be changed for various value of the cyclotron frequency \(\omega_c\). It is found that initially at the ratio \(\left(\frac{\omega_c}{\omega_0} \approx 0.477\right)\), the threshold pump field is \(E_{th} \approx 1.48 \times 10^6 \text{Vm}^{-1}\). As we increase the \(\omega_c\), the \(E_{th}\) decreases slowly. When \(\omega_c\) become nearly equal to \(\omega_0\) (i.e. \(\omega_c \approx \omega_0\)), the threshold pump field gets the minimum value at \(E_{th} \approx 8.84 \times 10^4 \text{Vm}^{-1}\) for the chosen value of \(\delta_d\). The increase in cyclotron frequency (i.e.
\( \omega > \omega_0 \), the \( E_{th} \) also increases gradually for all value of \( \delta_d \). The decrease in fraction \( \delta_d \) negative charge stick on to the CGs, the \( E_{th} \) values gets reduced as shown in figure.

**Figure 1** Variation of threshold intensity \( I_{th} \) Vs wave number \( k \).

**Figure 2** Variation of threshold pump field \( E_{th} \) with magnetic field [in terms of \( \frac{\omega_c}{\omega_0} \)] when \( E_0 = 5 \times 10^7 \text{Vm}^{-1} \).

The dependence of effective real susceptibility \( [\chi_{eff}^r]_{real} \) on magnetic field [via cyclotron frequency \( \omega_c \)] is shown in figure 3. The magnitude of \( [\chi_{eff}^r]_{real} \) decreases abruptly with increases in the value of ratio \( \frac{\omega_c}{\omega_0} \).

It is found that when \( \omega_c \approx \omega_0 \) [i.e. at the ratio \( \frac{\omega_c}{\omega_0} \approx 1 \)] the \( [\chi_{eff}^r]_{real} \) attains minimum value \( [\chi_{eff}^r]_{real} \approx -1.65 \times 10^{-10} \text{V}^2\text{m}^{-2} \). On increase in ratio \( \frac{\omega_c}{\omega_0} > 1 \) there is increase in \( [\chi_{eff}^r]_{real} \). Afterward for further value of \( \frac{\omega_c}{\omega_0} \approx 1.3 > \) , saturates the \( [\chi_{eff}^r]_{real} \). The decrease in charge imbalance
parameter $\delta_d \ll 1$ the minimum value of susceptibility also shifts toward higher. Figure 4 represents the variation of the effective susceptibility with respect wave number $k_0$. It can be seen that the effective susceptibility $\chi_{\text{eff. real.}}$ usually decreases with increase wave number $k_0$.

![Figure 3](image1)

**Figure 3** Effective susceptibility $\chi_{\text{eff. real.}}$ Vs cyclotron frequency $\omega_c$ at $E_0 = 1 \times 10^8 \text{V}m^{-1}$ and $n_0 = 10^{25} \text{m}^{-1}$.

![Figure 4](image2)

**Figure 4** Variation of effective susceptibility real $\chi_{\text{eff. real.}}$. Vs wave number $k_0$ at $E_0 = 1 \times 10^8 \text{V}m^{-1}$.
The dependence of effective Brillouin gain via $\frac{\omega_p}{\omega_0}$, on carrier concentration ($n_0$) is shown in figure 5. It is seen that gain is nearly independent of $n_0$, but on the higher value ($>10^{25} \text{ m}^{-3}$) of $n_0$ when $\omega_p^2 > \omega_0 \omega_1$, the gain increases rapidly with small increase in $n_0$.

The roll of charge imbalance parameter $\delta_d$ shows unusual characteristics initially when ($>5 \times 10^{25} \text{ m}^{-3}$) the gain is high for $\delta_d = 1$ but at $<5 \times 10^{25} \text{ m}^{-3}$ gain is high for $\delta_d = 0.80$.

![Figure 5](image)

Figure 5 Variation of effective Brillouin gain $[g_B]_{eff}$ with carrier concentration [ in terms of $\frac{\omega_p}{\omega_0}$] when $E_0 = 5 \times 10^7 \text{ Vm}^{-1}$.

4. **Conclusion:** In present analysis, we have analytically studied the influence of CGs on the threshold intensity, effective susceptibility and Brillouin gain of the Stokes component. It is observed from the study that significant change in threshold and gain characteristics when the charge imbalance parameter is slightly changed. The presence of CGs plays a strong catalyzing effect in changing the Brillouin gain and the threshold value.

5. **References**
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Determinants of Insurance Company profitability in Ethiopia (case study on Nile Insurance, Dire Dawa Branch)

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Abstract- Every business organization faces a problem which hinders its objective for which it is established. So, like any business organization Nile Insurance Company faces many problems which affects its profitability and the main purpose of this study is to assess factors affecting profitability of Nile Insurance Dire Dawa branch. To do so, a discrictive research design together with primary and secondary data were applied and data were collected form 319 active customers inaddition to the interview made with branch manager. The result shows size, leverage, tangibility of asset, loss ratio/ risk, firm growth and managerial efficiency are identified as significant determinants of profitability hence Liquidity and age of the company have medium significant determinants of profitability in addition to brand preference and perceived quality which have high impact on insurance selection process by customers.

Index Terms- Insurance, perceived quality ,brand preference, leverage, tangibility of asset.

I. INTRODUCTION

The best performance of any industry in general and any firm in particular plays the role of increasing the market value of that specific firm coupled with the role of leading towards the growth of the whole industry which ultimately leads to the overall success of the economy. Measuring the performance of financial institutions has gained the relevance in the corporate finance literature because as intermediaries, these companies in the sector are not only providing the mechanism of saving money and transferring risk, but also helps to channel funds in an appropriate way from surplus economic units to deficit economic units so as to support the investment activities in the economy (Hifaz, 2011).

Having the above, Insurance companies are the one that play significant role in the service-based economy and its services are now being integrated into wider financial industry. Insurance companies (both private and public) consisting the organizations which provides life, fire, accident, causality and many other forms of insurance. The main objective of all insurance companies is maximizing their profit because one goal of financial management is to maximize the owner’s wealth and profitability is very important determinants of performance, in the work of (Ngoyen, 2006) and (Hailu,2007).Though it will be affected with firm-specific factors and external afectors too play crucial role in influencing insurance companies’ profitability. It is therefore essential to identify what are these factors and how they help insurance companies to take actions that will increase their profitability and investors to forecast the profitability of insurance companies.


This study were focused on the micro level (internal to the company) factors of profitability. Because the absence of empirical studies in Dire Dawa about factors affecting profitability of insurance companies is then what motivated to make this study on what factors affect the profitability of insurance companies. While taking into consideration the absence of empirical inquiry to the factors affecting insurance companies’ profitability, this study attempts to work on such untouched empirical evidence in Dire Dawa Through assessing internal factors affecting profitability of insurance company in case of Nile insurance, Dire Dawa branch and further strive

✓ To discover the micro level (internal) factors that affects the profitability of the Nile insurance company.
✓ To know the relationship between the identified factors and profitability.
✓ To identify the strength of Nile insurance company
✓ To give suggestions or recommendations based on the findings of the study.

II. LITRETURE REVIEW

1.1. Introduction

According to Hifza Malik (2011) insurance plays a crucial role in fostering commercial and infrastructural businesses. Michael Koller (2011) in his investigation identified that insurance companies are playing the role of transferring and sharing of risk which can create confidence over the occurrences of uncertain event though it affected by different factors.e. internal factors which are under the control of the management of banks
and external factors those are beyond the control of the management(Renbao Chen et al.,2004).

Renbao Chen et al. (2004),ported firm specific factors affecting property/ liability which are general insurers and life/ health insurance profitability separately that again provide valuable guidelines for insurers financial health. This is because life/ health insurance companies are different from property/ liability insurers in terms of operation, investment activities, vulnerability and duration of liabilities. Life insurers are said to function as financial intermediaries while general insurers function as risk takers Renbao Chen et al. (2004).

1.2. Profitability

The term profit can take either its economic meaning or accounting concept which shows the excess of income over expenditure viewed during a specified period of time. Michael Koller (2011) argued that profitability is the most important and reliable indicator as it gives a broad indicator of the ability of an insurance company to raise its income level(Kaur and Kapoor, 2007).

According to Hamad Ahmed Ali Al-Shami (2008) there are different ways to measure profitability such as: return on asset (ROA), return on equity (ROE), and return on invested capital (ROIC). ROA is an indicator of how profitable a company is relative to its total assets. whereas ROE measures a company’s profitability which reveals how much profit a company generates with the money shareholders have invested.

ROIC is a measure used to assess a company’s efficiency in allocating the capital under its control in profitable investments. This measure gives a sense of how well a company is in using its money to generate returns. However, most researchers in the field of insurance and their profitability stated that the key indicator of a firm’s profitability is ROA defined as the before tax profits divided by total assets. Philip Hardwick and Mike Adams (1999), Hafiz Malik (2011) are among others, who have suggested that although there are different ways to measure profitability it is better to use ROA.

1.3. Profitability and its determinants

Hifaz Malik (2011) investigated the determinants of profitability in insurance companies of Pakistan. Specifically, the effects of firm specific factors (age of company, size of company, volume of capital, leverage ratio and loss ratio) on profitability proxies by ROA. The findings show that there is no relationship between profitability and age of the company and there is significantly positive association between size of the company and profitability. The result also shows that the volume of capital is significantly and positively related to profitability. Loss ratio and leverage ratio showed negative but significant relationship with profitability.

Dr. Amal Yassin Almajali (2012), investigated the factors that mostly affect financial performance of Jordanian Insurance Companies. The results showed, Leverage, liquidity, Size, Management competence index have a positive statistical effect on the financial performance of Jordanian Insurance Companies. Ćurak et al. (2011) examines the determinants of the financial performance of the Croatian composite insurers, between 2004 and 2009. The finding reveals that company size, underwriting risk, inflation and return on equity have a significant influence on insurers’ profitability.

Ana-Maria and Ghiorghe (2014), analyze the determinants of the financial performance in the Romanian insurance market during the period 2008–2012 it shows the financial leverage in insurance, company size, growth of gross written premiums, underwriting risk, risk retention ratio and solvency margin ave significance effect.

Sylwester Kozak (2011) in Poland, Hamadan Aahmed Ali Al-Shami (2008) in United Arab emirates (UAE), Swiss Re (2008) in Egypt conducted their research concerning determinants of profitability in general insurance companies where as Naveed Ahmed, Zulfqar Ahmed, Ahmed Usman (2011) in Pakistan, Adams M., Hardwick P. and Zou H., (2008) in Canada, Desheng Wu Z., Sandra V. and others conducted their study on determinants of life and health insurance companies. Hence, most of the researchers focused on internal factors affecting profitability and most of the factors considered are age of company, size of company, leverage ratio, growth rate, volume of capital, tangibility of assets and liquidity ratio which is also used in this study too.

III. MATERIAL AND METHOD

1.4. Research design

A descriptive research design together with mixed approach were used to describe characteristics of object, people, groups, organizations, or environments and map out the characteristics and perceptions of the respondents and provide an accurate snapshot of the surveyed market (focus area), so as to find out internal factors that affect profitability of Nile insurance in dire Dawa branch (Zikmund et al., 2010.).

Survey was design to seek out information on age of the company, liquidity, and leverage and capital volume effect on profitability of the Insurance company (Ezeani 1998).

1.5. Sample Design and sampling method

This study drawn a sample from Nile insurance customer data base and list of responses were selected randomly and 319 respondents which is 20% of the population was selected. Probability sampling was used as a sampling method of this research. From that simple random sampling were applied to obtain a required sample (Zikmund et al., 2010, pp 369). Whereas, According to Sekaran (2009), sample size 30-500 is already adequate for most of the research. Also, Doubling sample sizes will double the cost but it will not double the accuracy of sample data (Janet, 2005:108).So one can infer that the relationship between larger sample size and sampling error is not proportional. In general the size of sample is depending upon the types and purpose of the research (Catherine, 2007:56).

1.6. Data collection techniques

Both interview and structured questionnaire were used to study the determinants of insurance company profitability.

1.7. Data preparation, Analysis and Interpretation

The collected data were processed, analyzed and interpreted to report the result of research finding of selected company and both descriptive and inferential sattistical techniques were used .
IV. DATA ANALYSIS AND DISCUSSION

1.8. General Information of Respondents’

Age groups were taken as a sample. From the total number of respondents 40.1%, 35.6% and 22.3% were 18-35, 36-50 and >50 respondents respectively and 44.2% and 55.8% were male and female correspondingly. Particularly 41.1%, 37.6% and 21.3% male respondents were taken from 18-35, 36-50 and >50 age groups and 39.3%, 37.6% and 23.0% female respondents were obtained from 18-35, 36-50 and >50 age groups.

<table>
<thead>
<tr>
<th>Table 4.1: Profile of Respondents’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>18-35</td>
</tr>
<tr>
<td>36-50</td>
</tr>
<tr>
<td>&gt;50</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Source: survey data 2016

4.2. Insurance company preference based on gender

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Gender Of Respondents</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the company</td>
<td>Male</td>
<td>141</td>
<td>3.0496</td>
<td>.47003</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>178</td>
<td>3.4663</td>
<td>.34643</td>
</tr>
<tr>
<td>Premium amount</td>
<td>Male</td>
<td>141</td>
<td>3.7092</td>
<td>.72249</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>178</td>
<td>3.3034</td>
<td>.64977</td>
</tr>
<tr>
<td>Geographical proximity</td>
<td>Male</td>
<td>141</td>
<td>3.7648</td>
<td>.43373</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>178</td>
<td>4.0281</td>
<td>.40805</td>
</tr>
<tr>
<td>Perceived Quality</td>
<td>Male</td>
<td>141</td>
<td>3.9362</td>
<td>.60164</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>178</td>
<td>3.9017</td>
<td>.65324</td>
</tr>
<tr>
<td>Brand Preference</td>
<td>Male</td>
<td>141</td>
<td>4.0473</td>
<td>.60760</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>178</td>
<td>3.9925</td>
<td>.57348</td>
</tr>
</tbody>
</table>

Source: survey data 2016

Based on the table, age of the company for male was lower than female with mean of 3.0496 where as regarding to premium amount, males are highly conscious than females with mean of 3.7092 and also geographical proximity of the product are much more considered by females than male with mean 4.0281. However, on consideration of perceived quality both male and females are scoring the highest mean with 3.9017. Meanwhile on brand preference, though there is no significant difference between gender, males are considering higher than females.

4.3. Brand preference based on age category using 4 determinants

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Age category</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the company</td>
<td>18-35</td>
<td>128</td>
<td>4.3464</td>
<td>.42071</td>
</tr>
<tr>
<td></td>
<td>36-45</td>
<td>120</td>
<td>4.3764</td>
<td>.44716</td>
</tr>
<tr>
<td></td>
<td>&gt;50</td>
<td>71</td>
<td>1.1451</td>
<td>.09867</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>319</td>
<td>3.2821</td>
<td>.45499</td>
</tr>
<tr>
<td>Premium amount</td>
<td>18-35</td>
<td>128</td>
<td>4.9766</td>
<td>.49879</td>
</tr>
<tr>
<td></td>
<td>36-50</td>
<td>120</td>
<td>4.9944</td>
<td>.07389</td>
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<tr>
<td></td>
<td>&gt;50</td>
<td>71</td>
<td>2.2488</td>
<td>.55981</td>
</tr>
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<td></td>
<td>Total</td>
<td>319</td>
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<td>.71102</td>
</tr>
<tr>
<td>Geographical proximity</td>
<td>18-35</td>
<td>128</td>
<td>4.8672</td>
<td>.43690</td>
</tr>
<tr>
<td></td>
<td>36-50</td>
<td>120</td>
<td>3.6292</td>
<td>.44051</td>
</tr>
<tr>
<td></td>
<td>&gt;50</td>
<td>71</td>
<td>1.7934</td>
<td>.39688</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>319</td>
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<td>.43892</td>
</tr>
<tr>
<td>Perceived Quality</td>
<td>18-35</td>
<td>128</td>
<td>3.2676</td>
<td>.45483</td>
</tr>
</tbody>
</table>
As shown in Table 4.7, from Age category of 18-35 and 36-45 with (Mean = 4.3464, SD = .42071) and mean = 4.3764, and SD = .44716 respectively are influenced by age of the company. While, the influence of premium amount in the preference of insurance company were in age group greater than 45 is low. Like premium amount, in the case of geographical proximity 18-35 and 35-45 age groups attain the highest score (Mean = 4.3464, SD = .49879 and 4.9944 SD = .07389). Showing they are more perceived quality and the name of insurance company highly affects their preference. However as the age greater than 45 are less conscious about brand preference. Also, from the dimension of emotional value, age group between 18-35 and 36-45 score Mean = 4.8672, SD = .44051 and mean =3.6292, SD= .44051. Showing perceived quality of the product highly affect purchase decision of insurance.

### 4.5. Independent Sample T-Test of Male and Female in Their insurance company brand Preference

<table>
<thead>
<tr>
<th>Determinant</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Mean Difference</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived quality</td>
<td>Male</td>
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<td>.60760</td>
<td>.05477</td>
<td>.825</td>
<td>.972</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4.0473</td>
<td>.57348</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source, survey data 2016

The results of independent samples t-test on perceived quality between male and female explained that there is no significant mean difference between male and female respondents (mean difference = .05477 and t = .825, P > 0.05).

<table>
<thead>
<tr>
<th>Determinant</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Mean Difference</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the company</td>
<td>Male</td>
<td>141</td>
<td>3.0496</td>
<td>-.41665</td>
<td>-8.801</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>178</td>
<td>3.4663</td>
<td>.34463</td>
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</tr>
<tr>
<td>Premium amount</td>
<td>Male</td>
<td>141</td>
<td>3.7092</td>
<td>.40585</td>
<td>5.272</td>
<td>.188</td>
</tr>
<tr>
<td></td>
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<td>178</td>
<td>3.3034</td>
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<td>Geographical proximity</td>
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<td>141</td>
<td>3.7648</td>
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<td>-5.566</td>
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<td>178</td>
<td>4.0281</td>
<td>.40805</td>
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<tr>
<td>Perceived Quality</td>
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<td>141</td>
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<td>178</td>
<td>3.9017</td>
<td>.65324</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources survey data 2016

From the results of independent sample t-test, there is significant mean difference between male respondents age of the company and female respondents age of the company (t=-8.801, P < 0.01). Also the results of t-test on premium amount between male and female respondents identified that there is no significant mean difference between male respondents premium amount consideration and female respondents premium amount consideration though males are bit higher than females mean score (t=.527, P > 0.05). For geographical proximity the results of independent samples t-test shows, there is mean difference between male respondents geographical proximity and female respondents’ geographical proximity (t=-5.566, P > 0.05). Showing females are much concerned with geographical proximity. Finally, for perceived quality, the independent samples t-test on reflected that there is no significant mean difference between male perceived quality and female respondents’ perceived quality (t=.485, P > 0.05).

### Variation between insurance Profitability of the Company and Determinates

#### Table 4.6. ANOVA between each determinant

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Between Groups</th>
<th>Σ²</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>Technical provision risk</td>
<td></td>
<td>2.151</td>
<td>2</td>
<td>1.075</td>
<td>5.337</td>
<td>.005</td>
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<tr>
<td>Within Groups</td>
<td></td>
<td>63.679</td>
<td>316</td>
<td>.202</td>
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<tr>
<td>Total</td>
<td></td>
<td>65.830</td>
<td>318</td>
<td></td>
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<tr>
<td>Size of the company</td>
<td></td>
<td>53.192</td>
<td>2</td>
<td>26.596</td>
<td>78.125</td>
<td>.000</td>
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<tr>
<td>Within Groups</td>
<td></td>
<td>107.574</td>
<td>316</td>
<td>.340</td>
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</tr>
</tbody>
</table>

Sources: survey data 2016
A one-way ANOVA tests whether the means of all the groups are the same. The test whether the groups' mean are the same is represented by the F-ratio. For Technical provision risk the value of F-ratio is 82.521 and the significant value for F-ratio (.000) is less than 0.01. Therefore, there is significant difference between three age groups; for Size of the company the result shows that the value of F-ratio is 5.337 and the significant value for F-ratio is .05 which is exactly equal to the desired significant level in statistical term. Hence, there is significant mean difference between age group of 18-35, 36-45 and greater than 45 respondents on their Branch Company. Finally For perceived quality, the result shows that (F-201.841, p < 0.01) and the mean difference between three ages groups respondents is significant. This indicates that the consideration of perceived quality as a preference factor by different age groups is not the same.

**The Significant Factor That Affect company profitability**

The translation of level ranking and degree of importance were analyzed based on the criteria of Best (1977: 174) The score between 1.00-1.80 mean least important The score between 1.81-2.61 least important (Low) The score between 2.62-3.41 mean average important (Average or Medium) The score between 3.42-4.important The score between 4.22-5.very important.

Table 4.6 explains the mean and standard deviation score of each element in the dimensions and also the average mean and standard deviation score of the four broad determinants of insurance company profitability. As of the table, from the total 4 factors that affect insurance company profitability, technical provision of risk score the highest mean (4.04), tangibility of asset is the second determinant of purchase decision by scoring 4.03 mean values. Liquidity factor and number of customer are ranked at the 3rd and 4th step by accounting 3.48 and 3.28 mean values.

**4.6 Relationship of Antecedents and profitability**
The relation between liquidity and profitability is positive and although the quantitative research indicates that the geographical proximity.

Perceived quality, age of the company, premium amount, and even profitability have significantly affected respondents and even profitability. The descriptive statistics show there is no significant determinant have significantly affected by age and gender of the company.

According to the interview result, the major causes of liquidity factor is measured by claims outstanding to equity were high. The interview showed that there are factors that can influence and a number of factors are mentioned by the interviewee about determinant of Nile insurance profitability. Despite many determinant factors, however, the most common determinants of profitability include variables such as lack of innovative products or investment opportunity and fear of risky investments by insurance company themselves, technical reserve, liquidity, company age, size, leverage, competitors, and tangibility of assets. All affect the profitability of the company and the manager portrayed that they are subject to unpredictable but significant demands for cash. When a disaster such as a hurricane or earthquake occurs, insurers must be able to start making payouts very quickly in order to avoid major hardship to policyholders.

According to the interviewees, major causes of liquidity risk are sometimes premium is not collected as expected, when the company has no clear cash management policies, lower rate of interest at bank for time deposit.

Table 4.6 portrays the association between each determinant and Nile insurance profitability. The result depicts that there is significant correlation between the size of the company and its profitability (r = 0.165) as well as between technical provision risk and profitability (r = 0.201).

**1.9. Interview analysis.**

The interview showed there are factors that can influence and a number of factors are mentioned by the interviewee about determinant of Nile insurance profitability. Despite many determinant factors, however, the most common determinants of profitability include variables such as lack of innovative products or investment opportunity and fear of risky investments by insurance company themselves, technical reserve, liquidity, company age, size, leverage, competitors, and tangibility of assets. All affect the profitability of the company and the manager portrayed that they are subject to unpredictable but significant demands for cash. When a disaster such as a hurricane or earthquake occurs, insurers must be able to start making payouts very quickly in order to avoid major hardship to policyholders.

According to the interviewees, major causes of liquidity risk are sometimes premium is not collected as expected, when the company has no clear cash management policies, lower rate of interest at bank for time deposit.

### V. CONCLUSION AND RECOMMENDATION

**1.10. Conclusion**

The descriptive statistics show that there is no significant difference between number of respondents however each determinant have significantly affected by age and gender of the respondents and even profitability have significantly affected perceived quality, age of the company, premium amount, and geographical proximity.

Although the quantitative research indicate that the relation between liquidity and profitability is positive and significant implying that more liquid insurance have higher profitability, all other things held constant, if current assets pay insurance firm’s current liabilities, it will have direct positive impact on profitability. Regarding the impact of liquidity on profitability, the interviewees revealed that insurance firm in nature must be liquid to meet claims obligation, to avoid loss of business and damage to public image which is consistent with the previous empirical findings (Amal, 2012 and Chen & Wong, 2004).

Although the number of customers has an impact on the profitability of insurance companies in addition to technical provision risk showing that the coefficient of technical provision which is measured by claims outstanding to equity was high. According to the interview results, the major causes of inadequate provision problems are lack of optional reserve arrangement such as claims fluctuation reserve, absence of reserve for man-made or moral hazard and this may lead to overstatement of current year’s profit but actually not.

Competitor companies have an impact on the profitability of their company and there are active competitor company near or found in the country the customers or users of Insurance Service will tend to use their service this in turn affects the company’s profitability. Further leverage ratio of insurance companies has significant impact on financial performance/profitability/of Nile insurance companies.

Empirical evidences with regard to Size of company found to be statistically significant relationship. Although the unstructured interview manger said that size of company affects the profitability of Insurance Company which is consistent with Jay Angoff Roger Brown (2007). This reveals that performance of large size insurance companies is better than small size companies.

Age of insurance companies has a medium impact on profitability of insurance companies and has strong relationship with customers and good governance experience so it has an impact on profitability. The interview result indicates that insurance companies increase underwrite premium to increase the underwriting profit without increasing their capital, which may result an excess of liabilities over assets, sometimes referred to as capital deficit. It follows then that the smaller the equity base in relation to the liabilities of the company, the lower the company’s ability to absorb unforeseen shocks and unable to guarantee repayment to all claimants. The interview result suggested that adequate capital is the principal element to kick of business, insure continuous operation, sustainability and growth of the business and to increase retention capacity of the insurers.

**1.11. Recommendation**

The organization should committed on building its financial strength and quality of delivering service which boost overall image that affect profitability. Also it should be work on expansion of its branches in different places so that it will increase its customer number and degree of conveniences. Finally it should work on competitors handling techniques and strategies in addition to taking appropriate financial strategic measures for each problems.

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Gene Optimized Multi-Objective Proof Accumulator for Reporting Admissible Evidence of Suspect in Cloud Forensic Services

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Abstract- Cloud forensics involves acquisition, analysis, and reporting the information about the incidents and criminal activities. Cloud computing cause significant challenges for reliable digital-forensic investigations due to several major issues. The cloud forensics is the digital forensic reporting the collected and isolated data while protecting the privacy of information and confidentiality. In order to report the evidence and prove the crime activities inside the cloud, a Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is introduced. The main objective of the GOMOPA technique is reporting the collected and isolated data to the accumulator for identifying the malicious user. In GOMOPA technique, cloud forensic investigator submits the evidence of the malicious activity, proof of integrity, provenance information, proof of data possession, time stamp information and location information to the multi-objective proof accumulator. These multi-objective functions are optimized through the gene based approach. The GOMOPA technique determines the malicious user by validating the investigated evidence with the real suspect which is manipulated by the Cloud Service Provider (CSP). Therefore, GOMOPA technique efficiently identifies the suspect who launches the malicious activities over the cloud infrastructure. This helps to improve the confidentiality of the cloud users’ log files and preserving the several cloud users who are the malicious users. Experimental evaluation is performed using CloudSim network simulator to show the performance of GOMOPA technique in terms of investigation accuracy, processing time and confidentiality rate compared to the state-of-the-art works.

Index Terms- Cloud computing, Cloud forensics, reporting the evidence, gene optimization, Multi-objective Proof Accumulator, Cloud Service Provider, confidentiality.

I. INTRODUCTION

A significant growth of the cloud data storage and the heterogeneous environment of the cloud computing creates challenges in the cloud forensic investigation as identification, collection and reporting the proof about the malicious users. The reporting is concerned with the presentation of collected evidence to the court of law. The various cloud forensic research works present various solutions on reporting the evidence in different cloud deployment models to identify the malicious user. Our proposed method considers analysis the multiple objectives and reports the evidence to identify malicious activities.

In [1], a secure-Logging-as-a-Service (SecLaaS) was introduced to preserve different logs generated for the actions of virtual machines running in clouds and ensures the confidentiality and integrity of such logs. However, the investigation analysis was not performed effectively in the cloud infrastructure. A Forensic Open-Stack Tools (FROST) was designed in [2] but it performed only a data acquisition phase and other phases of the process affected by cloud computing were not addressed.

An incorporated (iterative) conceptual digital forensic approach was designed in [3] based on McKemmish and NIST. However, it failed to validate the evidence made by integrated approach. A distributed data store for GRR Rapid Response was introduced in [4] that utilize the object model to store and retrieve forensic data. But, the storage space was not reduced.

A Finite state machine (FSM) automata theory was introduced in [5] with computer’s virtual machine history. But, it failed to maintain the logical components for a cloud digital investigation. An Integrity verification methods was developed in [6] for secure outsourced computations in cloud computing. However, it failed to find the illegal activities efficiently.

A design and performance of a cloud-based security center for network security forensic investigation was introduced in [7]. But, the forensic analysis was not improved effectively. A current network forensic method (C-NFMs) was designed in [8] for cloud computing using strengths, weaknesses, opportunities, and threats (SWOT) Analysis. However, it was ineffective to prove the different network thread in cloud environment.

The several tools were designed in [9] to provide the digital forensic investigators for collecting the digital evidence from the devices. However, malicious user identification was remained unsolved. The results of a widely distributed survey on basic issues in the emerging area of cloud forensic were presented and analyzed in [10]. But, an effective cloud forensics analysis was not performed.

The issues presented in the existing research works such as more time to identify the malicious user, lack of integrity and confidentiality, fine illegal activities, more storage space. In order to address such kind of issues in cloud computing, an efficient multi objective optimization model is presented to identify the malicious user in forensic analysis with minimum time.

The contribution of the research work is structured as follows. A Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is introduced in cloud forensic services to report the admissible evidence for indentifying the malicious user.
with minimum time. Initially, the multi objectives are analyzed with the cloud user log files. Then, the gene based optimization approach is used to find the optimal solution. This confirms that the user who creates the malicious activities inside the cloud environment. This helps to improve the confidentiality rate.

The rest of the paper is arranged in following structure. In Section 2, Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is explained with neat diagram. In Section 3, experimental settings are described and the analysis of results explained in Section 4. In Section 5, introduces the reviews related to the research works. The conclusion of research work is presented in section 6.

II. GENE OPTIMIZED MULTI-OBJECTIVE PROOF ACCUMULATOR TECHNIQUE

In cloud computing, Cloud service providers (CSP) offers different types of services to the several cloud users. A few cloud users frequently use the similar type of services based on pay-per-what-they-use and other users takes the confidential information from cloud users. Therefore, Cloud requires protection from these malicious activities and CSP monitors customer Virtual Machine (VMs) and detect malicious users. In order to perform the investigation on cloud infrastructure, the evidence of the malicious user is identified and collected. Then, the evidence is analyzed using forensic tools and presented to court of law for proving the crime activities. With this objective, Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is introduced. The architecture diagram of the GOMOPA technique is shown in figure 1.
Figure 1 shows the Architectural diagram of the Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique. The aim of the GOMOPA technique is to find the malicious user by validating the evidence with real suspect. This process is functioned by the cloud service provider (CSP). The CSP verifies the cloud log files which are stored in virtual machine to identify the malicious activities. The Multi objective functions are integrity, data possession, provenance information, time stamp information and location information. After submitting the evidence to the multi objective proof accumulator, the gene optimization approach is applied to identify the optimal solution (i.e. exact malicious user). This helps to improve the investigation accuracy and confidentiality rate. The brief explanation about the GOMOPA technique is presented in next sections.

2.1 Analysis of Multi objective function
The first step in the design of GOMOPA technique is the submission of the evidence (i.e. cloud user log files) to multi-objective proof accumulator by the investigator. The investigator submits the evidence about the malicious cloud user activities, evidence of integrity, provenance information, proof of data possession, time stamp and location information. Collected evidence about the malicious cloud user activities need to be preserved. Preserving the data is maintaining data integrity. In Data integrity, original data is not to be varied until the entire investigation process completed.

Figure 2 Cloud forensic models for crime investigation

Figure 2 shows the cloud forensic model for investigating the crime to identify the malicious user in cloud environment. Initially, the collected log files (i.e. evidence) are extracted by the investigator. Then, the extracted information is presented with real suspect to identify the malicious user. During the investigation process, multiple objectives are analyzed such as proof of integrity, provenance information, proof of data possession, time stamp information and location information.

2.1.1 Proof of integrity

In order to maintain the integrity of the evidence, a part of event related information is listed in chain of custody register which consists how, where and who launches the malicious activity over the cloud infrastructure. Chain of custody is the entire history of a portion of evidence. In ancient days, the chain of custody is based on filling in document forms or electronic forms which includes the name of investigators, a brief description of the evidence under inspection and a hash code. In recent days, chain of custody software is used closer with authenticity if the format allow the creation and maintenance of random metadata about fingerprint of evidences (what), events (how), digital signature (who), time stamping (when) and location (where). Therefore, this helps to better accepted and understood by court. Chain of custody maintenance is necessary for the forensic analysis that is functioned on a particular criminal case.

The malicious activities inside the cloud are identified by CSP and it facilitates the service to the authorized user. In any criminal investigation, the strength of information derived from inspection of the physical proof depends completely upon the care with which the evidence is preserved from contamination. In other words, if the evidence is not accurately handled, or stored, its value may be destroyed. Hence, it is important that the evidence is stored in a way that helps to guarantee their integrity. Then, the chances are increased that valuable information is extracted by examination and the proof is to be considered admissible in court proceedings. The integrity defines the original data is not changed up to the evidence submitted in front of law.

2.1.2 Provable data possession (PDP)

The PDP contains proof of data possession to prove whether the investigator possessed the actual evidence or not. These evidence are submits to proof accumulator. Content of the accumulator is the evidence of past data possession. An accumulator is a probabilistic data structure to prove whether a cloud user is a normal or not. In GOMOPA technique, tiger hash storage as a proof accumulator to store the information. Tiger/128 and Tiger/160 makes a hash length of 128 and 160 bits to offer compatibility. The tiger hash storage is used for secured cloud service provisioning and also achieving the higher confidentiality rate. The confidentiality is to guarantee the system only the authorized user receives the message from cloud server. One tiger hash stores the proof of all the cloud user log files of one static IP for a particular day. Accumulator stores the membership information in terms of a bit array. During the data possession generation, a cloud user transfers a file to server and creates the new log files in cloud environment. After getting an updated file, the CSP obtains the storage information of that specific user. The CSP hash the log files including the user

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Information and create the bit position from the hash value as well as updates the tiger hash with the current bit position. After that, the CSP store the updated tiger hash in the storage space. At the end of each day, the CSP retrieves the tiger hash entry of every cloud user \( (D_U) \). Then, CSP hash the \( D_U \) and sign with its private key. Therefore, the proof of the data position (PDP) of that day is generated as,

\[
PDP = \langle H(D_U), \text{Sign}_{PK}(H(D_U)), T \rangle
\]  

From (1), where \( H(D_U) \) is the hash entry of every cloud user, \( \text{Sign}_{PK} \) is the signature of \( H(D_U) \) with private key of the CSP, \( T \) is the time of proof generation. While increasing the number of cloud user log files, proof of data possession time gets increased and reduced the false positive probability during the malicious user identification. After computing the proof of data possession, CSP broadcast the proof of data possession with its public key on the web. The CSP keeps the information of entry of each cloud user with its private key secret to itself.

### 2.1.3 Data Provenance Information

Provenance information is an essential feature for forensic analysis which describes the history of digital evidence. The secure data provenance method is used for digital forensics investigation with trusted evidence in cloud environment. This scheme proves that cloud data evidence is acceptable in court of law. The provenance scheme is used to preserve the records’ integrity. It also satisfies the general data security properties and ensures the trustworthiness.

A GOMOPA technique handles a Provenance Store to store data provenance which is handled by CSP. Moreover, the proposed scheme stores the fundamental evidence similar to the data provenance.

![Figure 3 Data provenance in cloud](image)

Figure 3 shows storing and searching data provenance in cloud environment. From the figure, Cloud User is a person who takes action and generates data provenance. It is handled in the trusted environment. An investigator is the one who reviews the actions taken by a cloud User. An investigator also verifies data provenance up to the origin and detects who launches the malicious activity on the source data. It is managed in the trusted environment.

CSP controls the source data and its equivalent data provenance in the cloud environment. In provenance method, a user performs an action on the source data and they forward the equivalent data provenance to the Provenance Store. Then, the investigator sends a query to the Provenance Store and a result obtained as the Response. The representation of the provenance information is shown in table 1.

![Table 1 Representation of provenance information](image)

From the table 1, review represents the version number. Data and time indicates when the event is occurred. User ID denotes who perform the action. An action column provides the information of activities taken on the source data. It is separated into four sections such as Name, Reason, Explanation and Location. Name illustrates what action is performed. Reason describes why the action is performed. Explanation provides more details that contain how the action is taken. Location.
designates where the action is performed. Prior review represents the version number of the action taken on the similar source data previously. Hash is the transformation of current source data into a usually shorter fixed-length value after the action has been taken using tiger hash function. This helps to avoid the forge ability. Signature is accomplished after signing the hash of the above fields with the private key of the user who performs the action. This guarantees the confidentiality and avoids the repudiation.

2.1.4 Time stamp analysis

A timestamp is a series of information identifying when a crime event occurred in cloud environment. Generally, it provides date, time of day, and small fraction of a second. When the CSP publishes the proof of data possession day by day, the generation time of evidence is identified. It may either accurate generation time or a time range in which evidence is presented. Every record includes a stamp, time field and to report the evidence time. In Cloud Forensic investigation, time keeping state evaluation plays a significant role in Cloud Computing. A secure time-stamp verification protocol runs between the VMs. The time stamp information comprises the event recorded by year, month, day of the week, day, hour, minute, second and milliseconds. These times are then converted to Universal Coordinated Time (UTC) uses the local computer’s time zone and daylight savings location. After that, the location of the crime incident is identified. Then the investigator extracts evidence and presents it to the court for trustworthiness verification.

Therefore, the objective functions proof of integrity, provenance information, proof of data possession, and the time stamp information are submitted to the proof accumulator. Then these objective functions are optimized based on the collected evidence through the gene based approach. Based on the gene optimization, the proposed GOMOPA technique investigates the collected evidence to identify the malicious user with real suspect.

2.2 Gene optimization to identify malicious user in cloud forensic services

Gene optimization approach provides population of multiple objective functions for providing the confidently direct to attain an optimal solutions at each generation. Optimization is a process of creating optimal evidence to prove the crime activities and identify the malicious user with real suspect. In GOMOPA technique, Multi-objective optimization aims to find a set of most feasible evidence in view of multiple objective functions and constraints. Therefore, the optimal solution is achieved by an accurate fitness assignment approach. Based on the fitness value, the proposed GOMOPA technique facilitates the determination of the malicious user by validating the investigated evidence with the real suspect which is performed by the CSP.

A gene optimization has several parameters, operators and processes which decide its arrival to an optimal solution for identifying the malicious user inside the cloud environment. Therefore, the optimization is a major concern for determining the optimal solution from the entire feasible solutions. Gene optimizations are implemented as chromosome-like data stored in cloud service provider. The fitness function is the measure of the quality of a particular solution. The fitness function is used to determine the most optimal solution from a multiple objective solution in a population. These objective function are optimized through the gene operators selection, crossover and mutation.

Every iteration, the number of evident (i.e. gens) are analyzed to find the malicious user. In general, every genes contains more than one objective functions, the choice of which gene is selected based on the information through the fitness calculation.

\[
\text{fitness function} = \text{identify the malicious user based on multi objective function (2)}
\]

The investigation is carried out based on the objective function. Therefore, the malicious user is identified through the optimal evidence information which is stored in proof accumulator. If the evidence is not qualified to identify the malicious user, then the optimization is carried out through the selection, crossover and mutation operators. Finally, then the court is verified and detect the malicious user with the evidence of a real suspect.

Selection: In GOMOPA technique, the selection process in gene optimization is used to select the most objective function determined by the fitness function. The objective functions which are not optimal are removed.

Crossover: The crossover process in gene optimization is used to exchange characteristics between two different solutions. The pairs of solutions to alternate the uniqueness are selected randomly, until an entirely new generation of solution is attained. The newly generated results are used for performing the mutation operation to identify the malicious user based on the objective function. Let us consider, two genes \( G_1 = \langle x_1, x_2, x_3, x_4 \rangle \) and \( G_2 = \langle y_1, y_2, y_3, y_4 \rangle \) with the chromosomes \( x \) and \( y \).

![Figure 4 crossover process](www.ijsrp.org)
As shown in figure 5, the mutation operation is performed and the new offspring chromosome value of the gene $x_4$ is changed with the exact chromosome of $y_3$. Mutation is the process of randomly interchanging the chromosome for creating the new offspring to increase the fitness value. If the newly offspring is failed to satisfies the fitness threshold, it is removed and the iterations gets repeated. The mutation process is used to avoid the local minimum and it searches for the global optimal solution. Therefore, the GOMOPA technique effectively determines the malicious user by obtaining the investigated evidence with the real suspect which is handled by the CSP. The GOMOPA technique efficiently identifies the real suspect who launches the malicious activities over the cloud infrastructure. The algorithmic description of the GOMOPA technique is described as follows to improve malicious user identification accuracy with minimum time in cloud forensic environment.

**Mutation:**

The mutation operation in gene optimization alters some bits of chromosome in a newly generated offspring. The changes occurred in the bits to confirm the evidence with the real suspect to identify the malicious user. The generated offspring are included into the population and the least chromosomes with low fitness values are removed from the population.

**Input:** No. of genes (i.e. evidence). Two parent gene with chromosomes $G1 = <x_1, x_2, x_3, x_4>$ and $G2 = <y_1, y_2, y_3, y_4>$

**Output:** identify the malicious user in cloud

**Step 1:** Begin

**Step 2:** For each investigated evidence

**Step 3:** Calculate the fitness value

**Step 4:** if (fitness $\geq$ threshold) then

**Step 5:** Number of iteration has been completed and identify the malicious user

**Step 6:** Selecting more optimized objective function in each iteration

**Step 7:** Perform crossover operation generates new solution

**Step 8:** Perform mutation operation

**Step 9:** Obtain the global optimized solution to identify the malicious user

**Step 10:** End if

**Step 11:** End for

**III. EXPERIMENTAL EVALUATION**

An effective Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is introduced using java language with CloudSim network simulator. The CloudSim simulator uses Amazon EC2 dataset to identify the malicious user. The CloudSim simulator performed on Cloud environment provides different cloud services with the presented resources. The particular toolkit is selected as a simulation platform in Cloud environments. The Cloudsim requires minimum time to identify the malicious user in cloud forensic environment. The performance evaluation of GOMOPA technique compared with existing approach SecLaaS Scheme [1] and A Forensic Open-Stack Tools (FROST) [2]. The following metrics such as, investigation accuracy, processing time and confidentiality rate are evaluated to improve the performance of GOMOPA technique.

**IV. RESULT ANALYSIS**

To perform the analysis of the proposed Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is compared with existing SecLaaS Scheme [1] and A Forensic Open-Stack Tools (FROST) [2]. Experimental analysis is carried out with different parameter such as investigation accuracy, processing time and confidentiality rate using Amazon EC2 dataset. Performance is evaluated along with the following metrics with help of tables and graph values.

4.1 Impact of Investigation accuracy

Investigation accuracy is measured as the ratio of the number of malicious user identified to the total number of cloud users. It is measured in terms of percentage (%). The mathematical formula for investigation accuracy is measured as follows,
Investigation accuracy = \frac{(\text{No.of cloud users} - \text{No.of malicious users})}{\text{No.of cloud users}} \times 100 \quad (3)

Table 2 Tabulation for investigation accuracy

<table>
<thead>
<tr>
<th>Number of cloud users</th>
<th>Investigation accuracy (%)</th>
<th>GOMOPA</th>
<th>SecLaaS scheme</th>
<th>FROST</th>
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<td>85.10</td>
<td>68.52</td>
<td>65.75</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7 shows the analysis of Investigation accuracy with respect to number of cloud users. For the experimental evaluation, the number of cloud user is varied from 10 to 100. While increasing the number of cloud user, the investigation accuracy gets increased in proposed GOMOPA technique than the existing methods. This is because; Gene Optimized Multi-objective Proof Accumulator effectively proves the malicious activities. In GOMOPA technique, the investigator presents proof of malicious activity, evidence of integrity, provenance information, evidence of data possession, time stamp information and location information to the multi-objective proof accumulator. Then the proposed gene optimization is performed to attain the optimal solution based on the fitness function. In gene optimization, the evidence with the multiple objective functions is selected and performs the crossover operation to generate a new optimal solution. Finally, Mutation is performed to detect the exact malicious user identified with real suspect who launches the malicious activities over the cloud infrastructure with the evidence of real suspect. This process is repeated until the entire evidence is validated. This helps to improve the investigation accuracy. Therefore, the investigation accuracy is considerably increased by 9% and 28% compared to existing SecLaaS Scheme [1] and FROST [2] respectively.

4.2 Impact of processing time

Processing time is defined as an amount of time taken to detect the malicious user based on reporting the admissible evidence. The processing time is measured as follows,

\[ PT = \frac{\text{Number of cloud users} \times \text{Time (identify the malicious user)}}{\text{seconds}} \quad (4) \]

From (4), where \( PT \) is the processing time which is measured in terms of milliseconds (ms).

Table 3 Tabulation for processing time

<table>
<thead>
<tr>
<th>Number of cloud users</th>
<th>Processing time (ms)</th>
<th>GOMOPA</th>
<th>SecLaaS scheme</th>
<th>FROST</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>18.24</td>
<td>25.12</td>
<td>30.12</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>22.45</td>
<td>30.14</td>
<td>33.48</td>
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<td>30</td>
<td>25.54</td>
<td>33.47</td>
<td>36.14</td>
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<td>40</td>
<td>30.12</td>
<td>38.11</td>
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<td>50</td>
<td>33.54</td>
<td>42.55</td>
<td>44.25</td>
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</tr>
<tr>
<td>60</td>
<td>38.46</td>
<td>45.47</td>
<td>48.79</td>
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</tr>
</tbody>
</table>
As shown in table 3, processing time is measured based on the number of cloud users in cloud environment. Among the several users, the time taken to identify the malicious users is reduced in proposed GOMOPA technique compared with existing SecLaaS Scheme [1] and FROST [2]. The result of the processing time is shown in figure 8.

As shown in table 3, processing time is measured based on the number of cloud users in cloud environment. Among the

<p>| | | |</p>
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<tr>
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<tbody>
<tr>
<td>70</td>
<td>40.25</td>
<td>48.78</td>
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<td>80</td>
<td>45.35</td>
<td>51.47</td>
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<tr>
<td>90</td>
<td>48.75</td>
<td>53.42</td>
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<tr>
<td>100</td>
<td>55.69</td>
<td>56.13</td>
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</tbody>
</table>

As shown in table 3, processing time is measured based on the number of cloud users in cloud environment. Among the

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<tr>
<td>100</td>
<td>55.69</td>
<td>56.13</td>
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As shown in table 3, processing time is measured based on the number of cloud users in cloud environment. Among the

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<td>100</td>
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<td>56.13</td>
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</table>

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As shown in table 3, processing time is measured based on the number of cloud users in cloud environment. Among the

Table 3 is attached.

\[ \text{confidentiality rate} = \frac{\text{Number of log files are protected}}{\text{Number of cloud log files}} \times 100 \] (5)

**Table 4 Tabulation for Confidentiality Rate**

<table>
<thead>
<tr>
<th>Number of cloud log files</th>
<th>Confidentiality rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOMOPA</td>
<td>SecLaaS scheme</td>
</tr>
<tr>
<td>5</td>
<td>79.35</td>
</tr>
<tr>
<td>10</td>
<td>82.45</td>
</tr>
<tr>
<td>15</td>
<td>83.64</td>
</tr>
<tr>
<td>20</td>
<td>85.11</td>
</tr>
<tr>
<td>25</td>
<td>87.42</td>
</tr>
<tr>
<td>30</td>
<td>89.69</td>
</tr>
<tr>
<td>35</td>
<td>90.10</td>
</tr>
<tr>
<td>40</td>
<td>92.77</td>
</tr>
<tr>
<td>45</td>
<td>94.36</td>
</tr>
<tr>
<td>50</td>
<td>95.42</td>
</tr>
</tbody>
</table>

Table 4 clearly describes the confidentiality rate with the number of cloud user log files. Higher confidentiality rate is achieved in GOMOPA than the existing SecLaaS Scheme [1] and FROST [2].
As shown in figure 9, measure of confidentiality rate is obtained with number of cloud user log files. From the figure, it is clearly evident that the proposed GOMOPA improves the confidentiality rate than the existing methods. This considerable development is obtained by optimizing the multi objective function which is stored in proof accumulator. While reporting the evidence (i.e. log files), the proposed GOMOPA significantly protects the multiple log files from the unauthorized access. In GOMOPA, gene optimization approach determines the malicious user by validating the investigated log files as the evidence of a real suspect. This process is functioned by the CSP. This helps to preserve the privacy level of the cloud user log files simultaneously ensures confidentiality. Therefore, the GOMOPA technique protects the evidence as the cloud user log files from the unauthorized access. This helps to improve the confidentiality rate by 17% and 43% as compared to existing SecLaaS Scheme [1] and FROST [2] respectively.

Therefore, a Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique improves the malicious user identification by reporting the evidence and to show the crime activities within the cloud.

V. RELATED WORKS

An architecture of cloud computing was designed in [11] using various tools in different locations that reduce the chance to seize the information. But, it failed to conduct forensic investigation on cloud. The GOMOPA effectively performs the investigation on cloud forensic and improves accuracy to identify the malicious user.

A Security Information and Event Management (SIEM) approach was introduced in [12] to collect the proof for cloud forensics investigation. However, the optimization of the evidence was not solved for forensics purpose. The gene optimization is used in GOMOPA to select the optimal evidence.

A digital forensics investigation procedure and the digital forensics as a service (DFaaS) model were analyzed in [13]. But, the multiple objective functions were not investigated. The GOMOPA improves the investigation accuracy with minimum time.

A Cloud Forensics Investigation Team (CFIT) was presented in [14] to improve the trustworthiness of the CSP. But, it failed to identify the malicious user effectively. The GOMOPA efficiently identifies the malicious user in cloud environment.

An efficient analysis of cloud forensics challenges, their feasible solutions relating to various phases of the forensic process, and brief analysis of the selected results was presented in [15]. But the secure provenance played a critical part in cloud forensics. The GOMOPA effectively perform the data provenance to identify the history of evidence.

A novel digital forensics construction for RSA signature in cloud computing was introduced in [16] to achieve the privacy. However, it requires large storage space for storing multiple files. The GOMOPA uses less storage space for storing the log files using tiger hash storage function.

A forensic triage as a real-time calculation difficulty with particular technical requirements was formulated in [17]. But an investigation on multiple objective functions in cloud forensic remained unaddressed. The GOMOPA significantly performs the investigation on multiple objective functions to identify the malicious user.

In [18], an overview of multiple challenges was created through digital forensics in cloud environment. However, it failed to identify who launch the malicious activities in cloud environment. The GOMOPA effectively identified the malicious activities with the evidence of real suspect.

The description of cloud computing with the computer forensic was explained in [19] but the integrity was not achieved effectively. The GOMOPA obtains higher integrity rate through the entire process.

A novel secure provenance method was introduced in [20] based on group signature and attribute-based signature process. However, an effective investigation was not carried out. The GOMOPA performs efficient investigation to identify the accurate malicious user based on reporting the admissible evidence.
As a result, Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique reports acceptable proof of suspect in cloud forensic services for identifying the malicious user inside the cloud environment.

VI. CONCLUSION

A Gene Optimized Multi-objective Proof Accumulator (GOMOPA) technique is introduced to report the acceptable evidence and identify the malicious user in the cloud. In GOMOPA, cloud forensic investigator reports the evidence of malicious activities and multiple objective functions to the proof accumulator. An accumulator contains multiple objective functions. These objective functions are optimized through the gene based approach. Among the multiple functions, the GOMOPA optimizes the global optimum solution to identify the malicious user through the fitness calculation. Then, the optimization operators such as selection, crossover and mutation are carried out to identify the user who initiates malicious activities with the evidence of real suspect. In addition, the GOMOPA secures the confidentiality of the cloud users’ log files. Experimental evaluation is carried out the proposed GOMOPA to evaluate the performance parameters such as investigation accuracy, processing time and confidentiality rate with cloudSim simulator. The result shows that the GOMOPA technique improves investigation accuracy with minimum processing time and also improves the confidentiality rate than the state-of-the-art methods.

REFERENCES


AUTHORS

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Second Author – Dr. M. Sundara rajan, Assistant Professor, Department Of Computer Science Government Arts College, Nandanam

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Mid Upper Arm Circumference for age as a measure of undernutrition among underprivileged children in Delhi

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*Assistant Professor, Lady Irwin College,
**Associate Professor, Lady Irwin College

Abstract- MUAC is used as an indicator for assessing acute undernutrition among children below five years of age. WHO child growth standards (2006) have given age related z-scores for both boys and girls for MUAC for identification of acute undernutrition among children below five years. A total of 4737 observations for MUAC had been made on 2305 children below 6 years of age living in an urban slum of Delhi in this cross-linked study. MUAC was measured using fibreglass tape sensitive to the nearest mm using standard technique. MUAC z-scores (MUACZ) were computed using WHO child growth standards and nutritional status was assessed. Median MUACZ for both boys and girls was much lower than median value of MUAC for boys and girls in WHO Child Growth Standards (2006). There was no significant difference in mean values of MUAC between the boys and girls upto 4 years of age. It was observed that 53.9% of the children (age-combined) were undernourished (below -2SD MUACZ), of which 11.2 % had severe acute malnutrition (below -3 SD MUACZ). The single cut-off point for MUAC <12.5 cm underestimated the prevalence of undernutrition was 32.6% among children in the study. This clearly indicated that MUAC-for-age using WHO Child Growth Standards would help in identifying the burden of acute undernutrition among underprivileged children.

Index Terms-MUAC, MUAC z-scores, weight-for-height, WHO Child Growth Standards, undernutrition

1.INTRODUCTION

Undernutrition during childhood has implications on growth potential and the risk of morbidity and mortality in later years of life (Alderman et.al, 2003). Chronic under-nutrition in childhood is linked to slower cognitive development and serious health impairments later in life that reduce the quality of life of individuals (Scrimshaw, 1996). Repeated infections and inadequate food intake result in acute forms of undernutrition which can be corrected with timely referral and adequate dietary intake. Improved child health and survival has far reaching implications for the better development of future generations (WHO, 1986).

Wasting is used as an indicator for acute undernutrition, often assessed by weight-for-height and Mid-Upper Arm Circumference (MUAC). MUAC is commonly used as a measure for subcutaneous fat and muscle mass in children. Reduced food intake subsequently reduces subcutaneous fat and muscle mass which tend to decrease MUAC. MUAC has been observed to correlate better than weight-for-height with lean mass ratio(Myatt and Duffield, 2007). LMR is the ratio of estimated mass of limbs to estimated mass of trunk. Compared with weight-for-height, a sensitivity of 24.6% and a specificity of 94.8% had been reported for MUAC (Joseph, 2002) and it appears to be a better predictor of childhood mortality than weight-for-height (Briend, 1986).

Over the years MUAC is being used as an age independent criterion for assessing acute undernutrition among children. Simplicity in measurement and easy interpretation has resulted in its use as a diagnostic criterion to identify acute undernutrition among preschool children during emergencies or where the precise age is not known. For screening of severe acute malnutritionamong children aged between 6 months and five years MUAC <11.5 cm is used as a criterion in both facility based and community based management programme (GOI, 2011). Some studies conducted in urban slums of Delhi have raised concerns regarding use of single cut-off based MUAC as a screening tool for identification of SAM children (Dasgupta et.al., 2013; Chand and Shah, 2015). It has been pointed out that MUAC as a screening tool should not be identifying less children than WHZ (the ‘gold standard’).

WHO child growth standards (2006) standards had given age related standards for MUAC for children upto five years of age. This paper analyses the data on MUAC of children belonging to low income families against this yardstick.

II. METHODOLOGY

A cross-linked study was designed as it allows follow-up over a relatively wide age range within a relatively short time span (Kowalski and Anderson, 1979) and provides an opportunity to make up for the sample loss, by enrolling new subjects at any requisite age points (Goldstein, 1987). It was carried out in Northwest Delhi on children below 6 years belonging to low income families availing services from Anganwadi centres (AWCs) of Integrated Child Development Scheme of the Government of India. The sample size was calculated from the findings of baseline survey on prevalence of undernutrition (9%, BMI-for-age <-2SD) among children and 25% morbidity. It was estimated to be 5066, at 95% level of significance and 80% power precision.

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The data were collected at three month intervals (total of 12 contact points) for a period of three years from August 2006 to April 2010 from six AWCs located in an urban slum of Haiderpur, Northwest Delhi. A total of 2305 children availing services from these AWCs were enrolled during the study. On an average, number of children covered in each round was 527 ± 64 providing a total of 6334 set of independent observations in twelve rounds. Multiple observations were available for each child at different intervals during the study, each observation was assumed to be an independent observation and was analyzed cross-sectionally (n = 6334).

A pre-tested questionnaire was used to elicit information from the primary caregivers (mothers/grandmothers/fathers) on socioeconomic and demographic profile at the time of enrolment of the children in the study. The data included family type, family size, religion, education level, occupation and per capita income of the family members, type of house, source of drinking water and toilet facility. The economic status was assessed by obtaining information on various economic assets like ownership of house, mode of transport, cooking utensils, and mode of entertainment accessed by the families of the children. Age was calculated by subtracting the date of birth from the date of interview. Information on date of birth was obtained from immunization cards if available or by asking at least one parent using a calendar of local events or from AWW’s records. The WHO Anthro software was used to randomly assign a date in case of those children (18.2%) for whom only month and year of birth was available. For analyses, age was grouped in to twelve months intervals.

Anthropometric measurements was obtained using standard equipments and techniques. Weight was measured on UNICEF SECA scale with 100 g sensitivity. Recumbent length was measured using infantometer and height using wall mounted microtoise. Mid upper arm circumference (MUAC) was measured to the nearest mm on the left arm using a fibreglass tape with vernier attachment (Ramachandran, 1986). It was measured for the children above 3 months of age and who willingly allowed the measurement to be taken without crying. A total of 4737 observations were made for MUAC during the study period. All instruments were calibrated from time to time before each round. Quality control was maintained in each round by taking measurements in duplicate for every tenth child. Total Error of Measurement (TEM, Uljaszek and Deborak, 1999) was not significant and an excellent concordance was observed between the duplicate readings for MUAC measurements.

Data Analysis

The data were organized and systematically tabulated in Microsoft Excel 2007 and SPSS 16.0 software was used for data analysis. Mean, median and SD of MUAC for each age group and sex was computed. WHO Anthro software (2006) was used to obtain z-scores for weight-for-age (WAZ), Height-for-age (HAZ), weight-for-height (WFH) and MUAC-for-age (MUACZ) for all children. The prevalence of undernutrition was computed using WHO Child Growth Standards (2006). The assessment of nutritional status using MUAC was also done using single cut-off point classification (WHO, 1983) and by age and sex specific criteria for MUAC by WHO, 1995 based on US children in addition to WHO Child Growth Standards (2006) for comparison (Table 1). All results were tested at 5 % level of significance.

<table>
<thead>
<tr>
<th>Classification</th>
<th>MUAC (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO, 1983 (age and sex independent)</td>
<td>MUAC &lt;12.5 cm - Severely undernourished</td>
</tr>
<tr>
<td></td>
<td>MUAC between 12.5-13.5cm - Mild to moderate undernutrition</td>
</tr>
<tr>
<td></td>
<td>MUAC &gt;13.5 cm - Normal/satisfactory</td>
</tr>
<tr>
<td>WHO, 1995</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Boys (MUAC cm)</td>
</tr>
<tr>
<td>2+ year</td>
<td>13.6</td>
</tr>
<tr>
<td>3+ year</td>
<td>13.8</td>
</tr>
<tr>
<td>4+ year</td>
<td>14.1</td>
</tr>
<tr>
<td>5+ year</td>
<td>14.2</td>
</tr>
<tr>
<td>WHO, 2006</td>
<td></td>
</tr>
<tr>
<td>Undernutrition</td>
<td>Boys (&lt;-2SDMUACZ)</td>
</tr>
<tr>
<td>Severe undernutrition</td>
<td>Boys (&lt;-3SD MUACZ)</td>
</tr>
</tbody>
</table>

III. RESULTS

General profile of the households

Household members of 75 % families were living in one room rented houses with shared toilet facilities. Only 18.2 % had own flush at home. Majority of the families (90%) of the children were living as nuclear families with mean family size of 4.9 ± 1.21 members. Illiteracy levels were higher in mothers (58.2 %) as compared to fathers (25.1%). Fathers were employed as unskilled labourers, small vendors and rickshaw pullers. Majority of the mothers were housewives and only 12% of the mothers were gainfully employed. Half of the families had monthly per capita income between Rs. 1000- Rs. 1500.

MUAC profile of children
A total of 4737 observations were made on children during the study period. The mean, median and standard deviation for MUAC of boys (n=2295) and for girls (n=2442) is given in Table 2. There was no significant gender difference in mean MUAC at all ages up to the age of 4 years except at 12-23 months of age. Other studies also reported that the gender differences became evident at the age of 4 years. This could be due to the result of differential rate of fat deposition at this site between the sexes (Mandal and Bose 2009, Kaur et al 2005). Studies conducted on 1-5 years old children living in Silchar, Cachar district in Assam (Shareef and Manoj, 2016) and on 3-5 years old children from Chapra district, West Bengal (Biswas et al., 2010) had reported no significant gender difference between the two sexes.

Table 2: MUAC (cm) profile of underprivileged children (n=4046)

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>BOYS</th>
<th>GIRLS</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Mean Δ</th>
<th>% Δ</th>
<th>‘t’-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-11 m</td>
<td>146</td>
<td>11.9</td>
<td>11.7</td>
<td>0.95</td>
<td></td>
<td>136</td>
<td>11.7</td>
<td>11.6</td>
<td>0.91</td>
<td>0.1</td>
<td>1.18</td>
</tr>
<tr>
<td>12-23 m</td>
<td>406</td>
<td>12.5</td>
<td>12.5</td>
<td>1.01</td>
<td></td>
<td>453</td>
<td>12.3</td>
<td>12.3</td>
<td>1.04</td>
<td>0.2</td>
<td>1.64</td>
</tr>
<tr>
<td>24-35 m</td>
<td>488</td>
<td>12.9</td>
<td>13.0</td>
<td>1.11</td>
<td></td>
<td>502</td>
<td>12.8</td>
<td>12.9</td>
<td>1.09</td>
<td>0.1</td>
<td>0.52</td>
</tr>
<tr>
<td>36-47 m</td>
<td>463</td>
<td>13.4</td>
<td>13.5</td>
<td>1.14</td>
<td></td>
<td>570</td>
<td>13.4</td>
<td>13.5</td>
<td>1.23</td>
<td>0.0</td>
<td>-0.09</td>
</tr>
<tr>
<td>48-59 m</td>
<td>426</td>
<td>13.8</td>
<td>13.9</td>
<td>1.19</td>
<td></td>
<td>456</td>
<td>13.6</td>
<td>13.7</td>
<td>1.27</td>
<td>0.2</td>
<td>1.13</td>
</tr>
<tr>
<td>60-71 m</td>
<td>366</td>
<td>14.0</td>
<td>14.1</td>
<td>1.38</td>
<td></td>
<td>325</td>
<td>13.8</td>
<td>14.0</td>
<td>1.11</td>
<td>0.1</td>
<td>0.53</td>
</tr>
<tr>
<td>0-71 m</td>
<td>2295</td>
<td>13.1</td>
<td>13.1</td>
<td>1.32</td>
<td></td>
<td>2442</td>
<td>13.1</td>
<td>13.1</td>
<td>1.31</td>
<td>0.0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*, unpaired t-test between boys and girls, t-value significant at p<0.05

The median MUAC values for both boys and girls in the present study were parallel but much lower as compared to their respective median MUAC values of WHO Child Growth Standards (2006) for 3-60 months of age (Figure 1). The trend in gender difference of the present study is similar to the WHO standards (2006) for MUAC from 3 to 36 months of age. However, unlike the WHO standards, the girls in the present study continued to have lower median MUAC even after the age of 47 months.

Assessing nutritional status using MUAC-for-age as an index

The nutritional status of children based on MUAC-for-age using WHO Child Growth Standards (2006) is presented in Table 3. It was observed that 53.9% of the children (age-combined) were undernourished (below -2SD); with boys-58.1% and girls-50.1%. Further, in the present study, MUAC-for age (<-2SD, 53.9%) identified maximum number of undernourished children slightly less than Height-for-age (<-2SD, 55%) as compared to weight-for-age (<-2SD, 44%), weight-for-height (<-2SD, 16%) and BMI-for-age (<-2 SD, 13%). It clearly showed weight-for-height underestimated the prevalence of acute undernutrition at high rate of stunting.

The prevalence of undernutrition in the present study was higher than the 0-5 years old children (36%) living in urban coastal areas of Orissa (Chakarbarthy et al, 2008) and 3-5 year children residing in Chapra Block, Nadia District, West Bengal (Biswas et al, 2010). The West Bengal study also reported higher prevalence of undernutrition among boys (38.49%) as compared to girls (32.22%). In the present study also, the prevalence of undernutrition was higher among boys as compared to girls at all ages (Table 3).

The maximum prevalence of undernutrition was in first two years of life on the basis of MUAC-for-age and which decreased with increase in age (Table 3). This was reported by other studies as well (Kumar et al, 2006, Kaur et al, 2005).

Table 3: Nutritional status of children using MUAC-for-age as an index with WHO Child Growth Standards (2006)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Boys</th>
<th>Girls</th>
<th>Total (boys + girls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n &lt;-2SD</td>
<td>%</td>
<td>n &lt;-2SD</td>
<td>%</td>
</tr>
<tr>
<td>0-71 m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Comparison of prevalence of undernutrition using MUAC with other classification

Table 4: Assessment of undernutrition in children using MUAC (n=4046)

<table>
<thead>
<tr>
<th></th>
<th>MUAC&lt; 12.5 cm</th>
<th>WHO 2006 (&lt;-2SD)</th>
<th>WHO 1995 (&lt;-2SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>31.5</td>
<td>58.1</td>
<td>68.6</td>
</tr>
<tr>
<td>Girls</td>
<td>31.2</td>
<td>50.1</td>
<td>59.8</td>
</tr>
<tr>
<td>All</td>
<td>32.6</td>
<td>53.9</td>
<td>64</td>
</tr>
</tbody>
</table>

Most of the studies conducted on Indian children had used either single cut-off classification or WHO 1995 MUAC-for-age classification, therefore for comparison, analysis has also been done with these two classification systems (Table 4).

It was observed that single cut-off classification (MUAC<12.5 cm) underestimated the rates of undernutrition (32.6 %) as compared with WHO child growth standards (2006) in 3-60 months old children. Agewise prevalence of undernutrition clearly showed that single cut-off classification overestimated rates of undernutrition in children of 6-12 months of age group (Figure 2), and after that it underestimated the rates of undernutrition as compared with WHO child growth standards (2006). These results were comparable to those obtained from children residing in Punjab (38.5%, Kaur et al, 2005), Kolkatta (28.6%, Chatterjee and Saha, 2008) and Orissa (36 %, Chakarbarthy et al, 2008). However, a study conducted on 9-36 months old children residing in east Delhi showed much higher rates of undernutrition (73 %, MUAC< 12.5 cm).

WHO 1995 (based on US children) overestimated the prevalence of undernutrition in 2-5 year old children as compared to WHO Child Growth standards (2006). In the present study, about 64 % of children were identified as undernourished using WHO 1995 classification for MUAC-for-age (Table 4). The findings were consistent with the rates of undernutrition in 2-5 year old children (64.5 %) living in rural areas of West Bengal (Mandal and Bose 2009).

All age-gender combined prevalence of severe undernutrition (<-3SD MUACZ) was 11.2 % in the present study which is comparable to 1-5 year old children (17%) living in Silchar district of Assam (Shareef and Manoj, 2016) and much higher than 3-5 year old children residing in West Bengal (3.7%, Biswas et al., 2010). In comparison, the number of children with severe acute malnutrition in the present study, with single cut-off point (MUAC <11.5) cm was slightly higher (13.1 %).

IV. CONCLUSION

The combined age-sex prevalence of undernutrition among young underprivileged children living in a slum of Delhi was much higher as assessed by MUACZ as compared to Weight-for-height index. The fixed cut-off point for MUAC makes it relatively simple index, but it ignores age related changes. Currently available evidences indicate that MUAC is the best in terms of ease, age independence, precision, accuracy, sensitivity and specificity and screening for severe malnutrition (Joseph, 2002; Bobby,

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MUAC-for-age to be used as an indicator for assessing acute undernutrition among young children. In the present study, the age and sex independent classification for 6-59 months, overestimated undernutrition in younger age groups (0-1 years) and underestimated in older age groups (1-5 years). The WHO, 1995 Classification was based on <-2SD cut-offs of US based children, which overestimated the burden of undernutrition among children at all ages as compared to age and sex related WHO Child Growth Standards (2006) values. However, more scientific evidence is required for validity of MUAC-for-age to be used as an indicator for assessing acute undernutrition among young children.

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