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Staff Nurses Synergistic Attitude towards Institutional Vision, Mission and Goals Using Bloom's Taxonomy: An Input to Operations Planning

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Abstract: Equally important with having a goal and direction in an institution like a hospital is how the people in this institution work together to achieve this. This “togetherness” is aptly expressed in the concept of synergy. To achieve this synergy among all stakeholders of educational institutions, there should be a common ground, in which they align themselves with the institutional vision and mission. The study determines the extent of synergy among staff nurses with institutional purpose as reflected in their understanding of the institution’s vision, mission, goals, and core values in the order of thinking skills of the Bloom’s taxonomy. The result of the study shows that the level of understanding of staff nurses of their institution’s VMGCV ranges from high to a higher extent. The demographic variables such as gender, age, and educational attainment do not affect staff nurses’ understanding of their institution’s VMGCV. The length of service of staff nurses in an institution makes them better understand their institution’s VMGCV. And the knowledge of the institution’s VMGCV results to proper understanding, application, analysis, evaluation and creation of staff nurses of things relevant to the fulfillment of their institution VMGCV.

Keywords: *Institutional Vision, Mission, Goals, Synergistic Attitude, Bloom’s Taxonomy and Operations Planning, Organizational Direction*

Introduction

Equally important with having a goal and direction in an institution like a hospital is how the people in this institution work together to achieve this. This “togetherness” is aptly expressed in the concept of synergy. This operationalizes what Collins (2001) meant with “right people in the right bus” (Collins, 2001).

Synergy is defined as “the interaction of elements that when combined produce a total effect that is greater than the sum of the individual elements” (Retrieved from [www.dictionary.reference.com/ browse/synergy](http://www.dictionary.reference.com/browse/synergy) on February 27, 2018). To achieve this synergy among all stakeholders of educational institutions, there should be a common ground, in which they align themselves with the institutional vision and mission. Whatever the context, the point is the same: If an organization wants to move forward, it needs to develop and understand an agreed on purpose, in educational institutions—the vision, mission, goals and core values. Having strong vision and mission statements can help stakeholders in school reach such a common understanding (Gabriel and Farmer, 2009).

This study aims to produce an output that could help in operations planning in the clinical setting. This output determines the extent of synergy among staff nurses with institutional purpose as reflected in their understanding of the institution’s vision, mission, goals, and core values in the order of thinking skills of the Bloom’s taxonomy. Through this descriptive, comparative, correlational research, this purpose may be achieved.

Statement of the Problem

This study answers the question, how do the staff nurses understand their educational institution’s vision, mission, goals and core values. To answer this, the following questions need to be answered:

1. What is the demographic profile of respondents according to:
 - 1.1 Age
 - 1.2 Gender
 - 1.3 Educational level
 - 1.4 Number of years working as staff nurse in the hospital.

2. To what extent is the staff nurse’s understanding of the vision, mission, goals and core values, as to:
 - 2.1 Remembering
 - 2.2 Understanding
 - 2.3 Applying
 - 2.4 Analyzing
 - 2.5 Evaluating
 - 2.6 Creating

3. Is there a significant difference in the level of understanding of staff nurses about vision, mission, goals, and core values as to knowledge, skills, and attitude/value when grouped according to profile variables?

4. Is there a significant relationship among orders of thinking skills?

Review of Related Literature

Planning for a Dream

It is inevitable that each institution or organization wants to achieve something great but when it comes to priorities and aspects of greatness, institutions are divided. Whatever these wants are every institution should start from dreaming. Greenleaf (1977), the author of a book on servant leadership put it, “not much happens without a dream. And for something great to happen, there must be a great dream” (p. 16, cited in Saffold, 2005). For a dream to be fulfilled planning should be done and this plan begins with the development of a clear sense of purpose or mission. It begins with today’s realities, but its focus must always be on tomorrow’s opportunities (Saffold, 2005).

Synergy, Integration, Alignment and Attunement in Hospitals

One of the most important aspects of management in any organization is unity of command and direction (Venzon, 2010; Lunenburg and Ornstein, 2012). This unity is needed towards organizational development and improvement despite internal and external challenges. Theorists argued that the complex process of [institutional] improvement and development will be successful only if it involves everyone throughout the organization (Arnold and Flumerfelt, 2012; Dufour & Eaker, 1998; Fullan, 2001; Liberman & Miller, 2004) and this will include the staff nurses. Nutt and Backoff (1992) as cited in Saffold (2005) asserted that people have the tendencies to pursue goals that are individualistic therefore there is always a need to weld even a group of like-minded people into a team with a common purpose. Pascarella and Frohman (1990) put it:

An organization driven by purpose can override the tendencies to become complacent and stagnant. Purpose can provide the vitality, direction, and flexibility so often lacking in ... organizations. Purpose can help set limit for the organization so it can focus its strength and resources on its best products, markets, and opportunities... Then members of the organization can clearly understand the purpose, make a commitment to it, and live by it... The purpose will set the direction for what the organization wants to accomplish and provide guidance for implementation. (Cited in Saffold, 2005)

Synergy can also be expressed as organizational integration, which can be a result to a “focused deployment of strengths and resources, matched with commitment and effort from personnel” (Saffold, p. 92). It is important to observe that organizational integration is not only something technical like coordination of objectives, policies, budgets, and activities but also a very personal one. Citing Harrison in Pascarella and Frohman (1990), Saffold argued that well-integrated institutions have both “alignment and attunement.” Alignment is a deep and voluntary commitment to the organization’s goals in which members find personal fulfillment through investing their personal efforts into the organization’s activities. Attunement on the other hand is a sense of shared responsibility and mutual concern. Nanus (1992) posited: “There is no more powerful engine driving an organization toward excellence and long-range success than an attractive, worthwhile, and achievable vision of the future, *widely shared* (italics mine).”

The institution’s vision, mission, and goals make this synergy a reality as these would guide every aspect of the institution’s undertaking, from planning, organizing, directing, and evaluating.

Vision and Mission

An organization’s vision sets out the reasons for its existence and the “ideal” state that the organization aims to achieve; the mission identifies major goals and performance objectives. Both are defined within the framework of the hospital’s philosophy, and are used as a context for development and evaluation of intended and emergent strategies. One cannot overemphasize the importance of a clear vision and mission, including goals, core values and philosophy; none of the subsequent steps will matter if the organization is not certain where it is headed (Lerner, 1999; Mintzberg, 1994; Rowley, Lujan, & Dolence, 1997; Saffold, 2005). A Vision is an

aspiration description of the desired mid or long term achievements of an organization, by those involved or affected by it. A Vision

asks – ‘Where are we going?’ or ‘Are we there yet?’ It is the end destination on an organization’s roadmap – what it hopes to become; the client outcome it wants achieve; the market position it wants to assume; the impact it will have; the capabilities it plans to develop; and the activities it plans to pursue (McFarlane,2013;Saffold,2005).

While vision focuses on the future, mission concentrates on the present, a mission statement defines the fundamental purpose of an organization. It identifies who the organization is, what it does, and who it serves. Where a vision statement is aspirational, a mission statement is more practical. The mission statement should communicate, in an easily understandable manner, what the organization does and possibly for whom (McFarlane, 2013; Saffold, 2005).

Organizational values identify the principles and ethics by which the organization and its members conduct themselves and their activities. One’s organization’s values can be deep rooted and hard to articulate. Often, they are the product of tradition and the attitudes and actions of founders and /or influential leaders, imitated and passed on until they are second nature, so changing them is not easy (McFarlane, 2013).

Conceptual Framework

This study cascaded from the concepts on strategic planning particularly synergy of those involved in an organization. A plan should produce vision, mission, goals and core values that would serve as a compass as well as blue print for the purpose of an institution’s existence to be realized (Bryson, 1988; Bolman and Deal, 1991; Lerner, 1999; McFarlane, 2013).

Realignment and integration with institution’s purpose entails profound understanding. Understanding in this study refers to learning of staff nurses about the purpose in various levels of thinking skills, namely: knowledge, comprehension, application, analysis, synthesis, and evaluation (Corpuz and Salandanan, 2011; Metfessel, Michael, and Kirsner, 1969). Bloom (1956) as cited by Corpuz and Salandanan listed originally instructional objectives in the cognitive domain that are arranged from lowest to the highest level. They are as follows: knowledge or recall; comprehension; application; analysis; synthesis; and evaluation. Learning and understanding should operate along these levels of thinking skills.

Research Paradigm

Figure 1 shows the research paradigm used in this study—the Input-Process-Output model. In this study, the input refers to the students profile variables such as age, gender, year level and school/department and the institutional vision, mission, goals and core values. These will undergo a process of assessment of level of understanding using a researcher-made tool as guided by the learning objectives of Blooms Taxonomy.

After assessment, the data will undergo comparative and correlational studies using appropriate statistical formula. The output will serve as an input to institutional academic strategic and operational planning, primarily on students’ aspects.

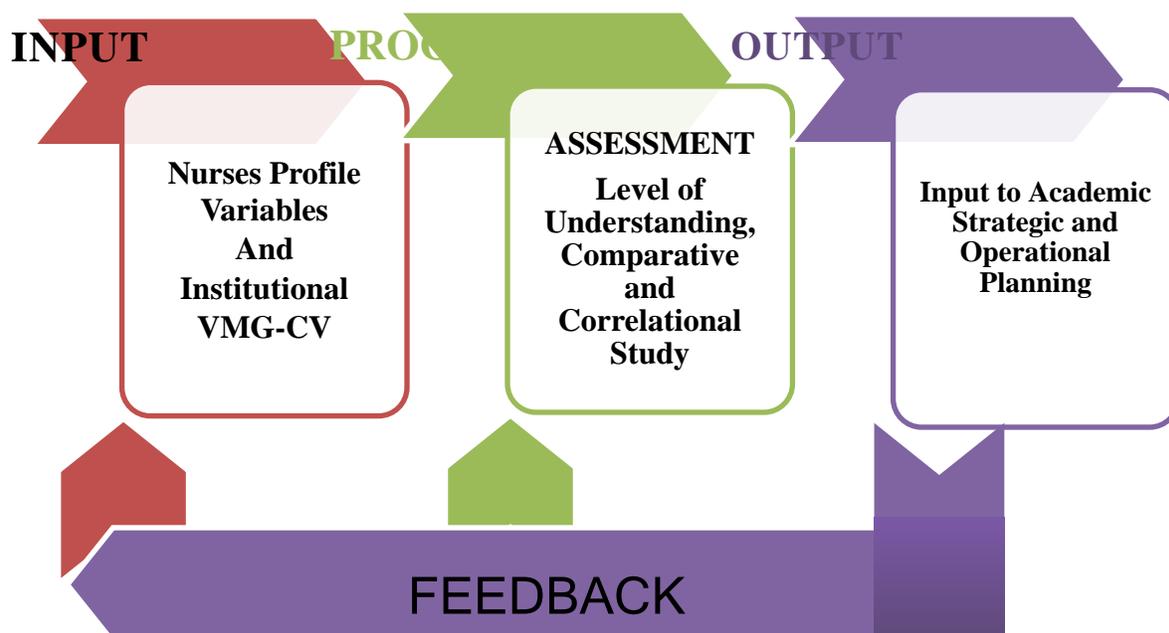


Figure 1. Research Paradigm

Methodology

This study will utilize the descriptive, comparative, correlational design of research. The study will be conducted in a selected hospital in Saudi Arabia. Simple random sampling will be used to enlist participants of this study. A researcher-made questionnaire ($\alpha=.987$) will be used. This questionnaire underwent content, face and construct validation by educational management expert. The questionnaire is divided to two parts: the demographic profile and the Likert-scale type of questionnaire that asks the level of understanding of students with the institution’s vision, mission, goals and core values. Part 2 of the questionnaire is divided into various levels of thinking skills. The questionnaires will be distributed to staff nurses chosen for the study. Using Microsoft excel, the data will be encoded but later on copied to the SPSS for further statistical computing.

Results and Discussion

As to the demographic profile

Table 1. Summary of the Demographic Profile of Participants (n=308)

Demograph	Frequency	Percentage (%)
Gender		
Male	21	6.8
Female	279	90.8
Missing	8	2.6
Total	308	100
Age		
21-25 years old	25	8.1

26-30 years old	108	35.1
31-35 years old	91	29.5
Above 35 years old	79	25.6
Missing	5	1.8
Total	308	100
Educational Attainment		
Bachelor's Degree	273	88.6
Master's Degree	3	1
Missing	32	10.4
Total	308	100
Length of Service		
Less than a year	38	12.3
1-3 years	91	29.5
4-6 years	49	15.9
More than 6 years	122	39.6
Missing	8	2.6
Total	308	100

Table 1 shows the summary of the demographic profile of the participants. To start with, female comprises the majority of participants at 279 (90.8%). Likewise, majority of the participants belong to the age group 26-30 years old at 108 (35.1%) and this is followed by those belonging to the age group 31-35 years old at 91 (29.5%) and those above 35 years old at 79 (25.6%). Similarly, majority of the participants are bachelor's degree holder at 273 (88.6%) and only 3 (1%) have master's degree.

As to the extent of staff nurses understands of the institution's vision, mission, goals and core values

Table 2. Summary of Staff Nurse's Understanding of VMGC (n=308)

Thinking Skills	Mean	SD	QI
Remembering	3.38	.85	To a high extent
Understanding	3.45	.86	To a higher extent
Applying	3.48	.86	To a higher extent
Analyzing	3.35	.86	To a high extent
Evaluating	3.40	.84	To a higher extent
Creating	3.13	1.00	To a high extent
Legend: 1.00-1.79- To no extent			
1.80-2.59- To a certain extent			
2.60-3.39- To a high extent			
3.40-4.19- To a higher extent			
4.20-5.00- To the highest extent			

Among the thinking skills, applying came in as the highest skill being utilized by the participants relative to the institution's VMGCV ($x=3.48\pm.86$, to a higher extent), followed by understanding ($x=3.45\pm.86$, to a higher extent), then by evaluating ($x=3.40\pm.84$). The lowest among the thinking skills is creating, which is the highest thinking skill according to Bloom's taxonomy ($x=3.13\pm.1$).

As to the difference on the level of understanding of staff nurses about VMGCV when grouped according to profile variables

Table 3. Differences of Level of Understanding as to Gender

Cognitive Level	F-value	dF	p-value	QI	Decision
Remembering	.05	1,298	.82	NS	Retain Ho
Understanding	.23	1,298	.64	NS	Retain Ho
Applying	.09	1,298	.77	NS	Retain Ho
Analyzing	.14	1,298	.71	NS	Retain Ho
Evaluating	.45	1,298	.50	NS	Retain Ho
Creating	.54	1,298	.46	NS	Retain Ho

Table 3 reflects the reason why the null hypothesis has been retained or accepted because in all thinking skills, level of understanding is not influenced by gender, in particular: remembering ($F_{1,298}=.05$, $p=.82$), understanding ($F_{1,298}=.23$, $p=.64$), applying ($F_{1,298}=.09$, $p=.77$), analyzing ($F_{1,298}=.14$, $p=.71$), evaluating ($F_{1,298}=.45$, $p=.50$), and creating ($F_{1,298}=.54$, $p=.46$).

Table 4. Differences of Level of Understanding as to Age

Thinking Skills	F-value	dF	p-value	QI	Decision
Remembering	2.53	3,299	.06	NS	Retain Ho
Understanding	2.42	3,299	.07	NS	Retain Ho
Applying	2.16	3,299	.09	NS	Retain Ho
Analyzing	1.29	3,299	.28	NS	Retain Ho
Evaluating	.58	3,299	.63	NS	Retain Ho
Creating	.69	3,299	.56	NS	Retain Ho

Likewise, Table 4 demonstrates that age has no effect to remembering ($F_{3,299}=2.53$, $p=.06$), understanding ($F_{3,299}=2.42$, $p=.07$), applying ($F_{3,299}=2.16$, $p=.09$), analyzing ($F_{3,299}=1.29$, $p=.28$), evaluating ($F_{3,299}=.58$, $p=.63$), and creating ($F_{3,299}=.69$, $p=.56$). Thus, null hypothesis has been retained or accepted.

Table 5. Differences of Level of Understanding as to Educational Attainment

Thinking Skills	F-value	dF	p-value	QI	Decision
Remembering	1.37	1,274	.24	NS	Retain Ho

Understanding	2.35	1,274	.13	NS	Retain Ho
Applying	2.49	1,274	.12	NS	Retain Ho
Analyzing	.05	1,265	.83	NS	Retain Ho
Evaluating	.10	1,265	.75	NS	Retain Ho
Creating	.04	1,265	.85	NS	Retain Ho

It can be gleaned from Table 5 that educational attainment has also no influence to the level of understanding of the VMGCV as to remembering ($F_{1,274}=1.34$, $p=.24$), understanding ($F_{1,274}=2.35$, $p=.13$), applying ($F_{1,274}=2.49$, $p=.12$), analyzing ($F_{1,265}=.05$, $p=.83$), evaluating ($F_{1,265}=.10$, $p=.75$), and creating ($F_{1,265}=.04$, $p=.85$). Thus, null hypothesis has been retained or accepted.

Table 6. Differences of Level of Understanding as to Length of Service

Thinking Skills	F-value	dF	p-value	QI	Decision
Remembering	4.97	3,296	.00	S	Reject Ho
Understanding	3.09	3,296	.03	S	Reject Ho
Applying	2.92	3,296	.04	S	Reject Ho
Analyzing	4.22	3,287	.01	S	Reject Ho
Evaluating	3.27	3,287	.02	S	Reject Ho
Creating	3.83	3,287	.01	S	Reject Ho

Table 6 shows significant results of the level of understanding according to thinking skills relative to length of service as length of service influence largely the participants understanding of the VMGCV, as to remembering ($F_{3,296}=4.97$, $p=.00$), understanding ($F_{3,296}=3.09$, $p=.00$), applying ($F_{3,296}=2.92$, $p=.00$), analyzing ($F_{3,287}=4.22$, $p=.00$), evaluating ($F_{3,287}=3.27$, $p=.00$), and creating ($F_{3,287}=3.83$, $p=.00$). Thus, null hypothesis has been rejected, since there is a significant difference on the level of understanding relative to length of service. Post hoc analysis (Tukey test) shows that those working more than six years have higher understanding when compared to those working less than six years ($p=.00$). Thus, the longer the length of service is, the higher level of understanding a staff nurse has of the institution's VMGCV.

As to relationship among thinking skills

Table 7. Correlation Among Cognitive Levels

Thinking Skills	r-value	p-value	QI	Decision
Remembering and Understanding	.87	.00	Positive Very Strong Correlation	Reject Ho
Remembering and Applying	.79	.00	Positive Strong Correlation	Reject Ho
Remembering and Analyzing	.79	.00	Positive Strong Correlation	Reject Ho
Remembering and Evaluating	.80	.00	Positive Very Strong correlation	Reject Ho
Remembering and Creating	.63	.00	Positive Strong Correlation	Reject Ho

Multiple correlation of the thinking skills show positive and strong to very strong correlation among thinking skills. It can be gleaned from Table 7 that the correlation between remembering and understanding is positive and very strong ($r=.87, p=.00$), remembering and applying is positive and strong ($r=.79, p=.00$), remembering and analyzing is positive and strong ($r=.79, p=.00$), remembering and evaluating is positive and very strong ($r=.80, p=.00$), and remembering and creating is positive and strong ($r=.63, p=.00$). This implies that a high level of a thinking skills results also to high level of another thinking skill. For instance, if one remembers one's VMGCV he can also understand, apply, evaluate, and create well.

Conclusions and Recommendations

The following are the conclusions and recommendations as a result of this study:

1. The level of understanding of staff nurses of their institution's VMGCV ranges from high to a higher extent.
2. Demographic variables such as gender, age, and educational attainment do not affect staff nurses' understanding of their institution's VMGCV.
3. Length of service of staff nurses in an institution makes them better understand their institution's VMGCV.
4. Knowledge of the institution's VMGCV results to proper understanding, application, analysis, evaluation and creation of staff nurses of things relevant to the fulfillment of their institution VMGCV.

The following are hereby recommended:

1. Create a program to enhance better understanding of staff nurses of their institution's VMGCV such as enhancement program revisiting their institution's VMGCV, making the VMGCV more visible to staff nurses, and regular monitoring of staff nurse's understanding of VMGCV.
2. Salary enhancement package for staff nurses to stay longer in the institution.
3. Future researchers to equally recruit participants as to age, gender and educational attainment to see whether these demographic profiles really influence level of understanding.

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The Importance and Advantages of E-Banking Services

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Abstract- With the era of globalization and skip sectors limits areas and services homelands and territories sacrifice the duty of the banks, the study of the evolution of technological culture are at their customers and understand the degree of acceptance of these electronic services to adopt development strategies in technology and information systems to keep pace with this development. The recent period has witnessed a rapid transformation from the traditional form of banks in transactions into electronic format, where the international network of information plays a key role as an intermediary for monetization business electronic banking services and therefore the banks need to a number of equipment and ingredients to the success of its role in promoting the electronic banking operations and development, which is to providing legal and legislative structure and the availability of expertise and human competencies, especially those working in the field of information and internet technology as well as the security of the information and programs that are the customer a special incentive to provide along with the commitment on the part of the bank and the existence of the trust of IT crimes and manipulation of data, programs and others, confidentiality of information and privacy and security as well as social acceptance The bank's customers to new developments and accommodate the desired payback. It is for the growth and development has become the electronic service and customer satisfaction concern for organizations where service has become the focus of interest in customer satisfaction and a permanent research and identify the needs and expectations of the customer and provide a service satisfaction.

Index Terms- globalization, service satisfaction, customers

I. INTRODUCTION

E-banking services are of extreme importance in the banking system, which is the economy, including doing the funding, support and activation and activation of economic processes and facilitate the integration process of global economic processes in order to keep pace with every development witnessed in and take advantage of all the proposed solutions and identify the level of electronic banking services offered banks and the extent of the point of view of the customers, the importance of the study lies in the following:

1. Thread recent study is a new scientific approach its quality and shows the importance of the reality and the use of electronic banking services in the Republic Bank.
2. Clarify the concept of e-banking services and the degree of satisfaction of the customer.

3. Clarify the importance of electronic banking services in banks in the success of its work and achieve its goals.

The banking markets are keenly competitive in winning and retaining customers by offering the best banking services. In order to achieve this, banks are adopting a strategic management to improve the quality of banking services provided to build a long-term mutual trust relationship between the bank and its customers and customer satisfaction on them. In order to achieve the objectives of the study, the questionnaire was prepared and distributed to the study community, which is represented by the customers of the Goumhuriya Bank (the number of customers of Beni Waleed branch is 13000 and the number of customers of Souf Al-Jeen branch is 11700). The researcher was distributed 300 questionnaires to the customers of the Goumhuriya Bank in the Beni Waleed city - Beni Waleed branch and Souf Al-Jeen branch. The results showed that there is a high level of the quality of the electronic services. There is also an increase in the quality of the relationship between the customer and the bank and the existence of a positive relation to the quality of the electronic services in general at the level of quality between the customer and the bank (satisfaction, confidence and commitment).

The study recommended the importance of increasing trust between the bank and its customers by increasing the focus on the efficiency between the customer and the service provider because the cost of maintaining the current customer is less than winning a new customer and achieving full customer satisfaction by further improving the quality of service provided to them and maintaining the level of efficiency and reliability of the quality of services. Electronic banking need work to increase attention to the subject of privacy to maintain customer data and information.

In order to ensure the success of the bank in providing outstanding customer service and satisfaction, it will continue to study the analysis and measurement of satisfaction with the service provided and allow the measurement process thus:

- Get feedback about customer satisfaction with the bank and its services and ways of interacting with them.
- Providing open and constructive dialogue on areas of power and weakness in service.
- Good identification and diagnosis of customer needs and expectations for service delivery levels.
- Providing a measure of the stability of future development situations and opportunities.
- An objective baseline for incentive systems, performance evaluation and training.

(Monin (J) La certification qualite dens les services, 2011, AFNOR)

The Bank examines customer satisfaction based on the following dimensions of reliability, responsiveness, safety, empathy, concrete, and depends on several methods to measure customer satisfaction including:

- Surveys (questionnaire) is one of the most used sources in order to obtain opinions, preferences, trends and levels of customer satisfaction from the service and can be applied either by mail, telephone, or personal interview to a number of clients representing the studied community.

- Customer complaints and criticism: These are important sources, which depend on customer satisfaction The more the number of criticisms provided by the service is a sign of customer dissatisfaction, and therefore the bank to analyze complaints in order to identify weaknesses in services and work on the treatment according to the expectations of customers.

- Letters of thanks and appreciation: which in turn reflect the level of customer satisfaction and appreciation in the service from sources of competitive advantage and focus in advertising campaigns.

- Monitoring the behavior of customers: that by observing the behavior and behavior of customers during or after access to the service can be valuable information on their preferences.

The world today live in an era called the phase information age, and now some call it named the era of knowledge where the attributes and features of this era and its mechanisms and standards radically different from all of the above, therefore imposes all of the commentary, the need for taking concepts and new mechanisms and renewable. He was the most dangerous raised this era the emergence of competition basic fact determines the success or institutions failed, including the banks, hence banking institution in a position to become bound by the hard work and continued to gain competitive advantages for the possibility of improving its position in the market or even maintain them in the face of competing pressures, the electronic banking services are considered an element governor in the conditions of competition acute between the various banks where the style quality electronic services that would enable banks to gain a competitive edge to survive and continue in light of the changing environment resulting from renewed economic climate conditions. Importance of research is reflected largely the relationship between the bank and the customer, which is seeking banks to gain access to the client's satisfaction and do more for it, and they say that customer satisfaction is the ultimate goal of business organizations can not be attained only by providing the best services, which must carry the value to the customer compared to the amount paid by the criticism and dissatisfaction condition for the survival of the enterprise activity. Electronic banking service is a modern concepts that urges organizations and financial institutions, especially banks to consider customers as partners and build with them a long-term intimate relationships and keep their old customers by providing excellent services to them, as many of the services the success depends on the creation-based customer and sustain relationships or interact with customers in such a way

to appease them and especially those who use the service by repeating the length of time, and here I have to the service provider that the steps to build confidence and achieve customer satisfaction, and here I had to banks or were necessary urgent for banks to keep pace with the tremendous development in the world of the internet, which has become a pillar every individual and society, institution or organization.

Interaction between satisfaction and quality

The current development of ISO standards drives quality managers in institutions to integrate customer satisfaction into their work environment, which can display some of the necessary elements that allow:

1. Setting the measurement of customer satisfaction within the operations of the institution, especially its relationship to quality.
2. Develop a work plan in order to make it more effective.

The chronology of the relationship between the client and the organization can be clarified in four stages:

1. At the beginning: the future client has expectations, and thanks to the process of listening to the client can the institution to convert these expectations to the desired quality can be illustrated as follows:

Based on the questions of the study identified, the following hypotheses can be formulated:

The first main hypothesis:

There is statistically significant relationship between the quality of electronic services according to the following dimensions: Website - Interaction - Reliability - Privacy - Security - Responsiveness - Efficiency - Empathy and satisfaction.

The second main hypothesis:

There is statistically significant relationship between the quality of electronic services according to the following dimensions: Website - Interaction - Reliability - Privacy - Security - Responsiveness - Efficiency - Empathy and commitment.

The third main hypothesis:

There is statistically significant relationship between the quality of electronic services according to the following dimensions: Website - Interaction - Reliability - Privacy - Security - Responsiveness - Efficiency - Empathy and confidence.

II. THE SUB-HYPOTHESES

The first sub-hypothesis:

There is a low level of quality of electronic services according to the following dimensions: Website - Interaction - Reliability - Privacy - Security - Responsiveness - Efficiency - Empathy in the Goumhuriyya Bank

The second sub-hypothesis:

There is a low level of satisfaction, commitment and confidence for customers of the Goumhuriya Bank.

Environment, Society and Study Sample

1 - **Study Environment:** The study environment is in the branches of the Goumhuriya Bank in Bani Waleed and Souf Al-Jeen (Bani Waleed branch and Souf Al-Jeen branch).

2 - **Community of the study:** The study community is represented in the customers of branches of the Goumhuriya Bank in Beni Waleed in Libya

Sample of the study - Because of the difficulty of communication with all respondents of the community, therefore was selected a random sample of class customers of the branches of the Goumhuriya Bank in Beni Waleed in Libya. In order to have the appropriate size of the sample then it was used the following law of determination sample size (Tashotush, 2001, p. 85).

Where n represents the size of the sample and N represents the size of the community and B represents the amount of error that can be tolerated and P represents the

assumed ratio $Z_{(1-\frac{\alpha}{2})}$ and the tabular value of the normal distribution table and the meaning level.

Assuming that B = 0.05, P = 0.5 to make the sample size as large as possible and at the meaning level $\alpha = 0.05$, we find

$Z_{(1-\frac{\alpha}{2})} = Z_{(0.975)} = 1.96$ that , and then determine the size of the sample as follows:

$$n = \frac{Np(1-p)Z^2_{(1-\frac{\alpha}{2})}}{(N-1)B^2 + P(1-P)Z^2_{(1-\frac{\alpha}{2})}}$$

$$n = \frac{Np(1-p)Z^2_{(1-\frac{\alpha}{2})}}{(N-1)B^2 + P(1-P)Z^2_{(1-\frac{\alpha}{2})}} = \frac{24700 \times 0.5 \times 0.5 \times (1.96)^2}{24699 \times (0.05)^2 + 0.5 \times 0.5 \times (1.96)^2} = \frac{23721.88}{62.7079} = 378$$

Using the proportional distribution method in the following random sample, the sample size was distributed to the bank branches using the following law (Tashtotush, 2001, p. 116):

$$n_i = n \times \frac{N_i}{N}$$

Where n_i represents the size of the sample taken from class i (section i) and N_i represents the size of the class I (section I) and N denotes the size of the community.

III. RECOMMENDATIONS

The study reached a number of conclusions, the most important are as follows:

1. There is a rise in the quality of e-services.
 - There is a high level of quality of electronic services according to the dimension of the website.
 - There is an increase in the level of quality of electronic services according to the dimension of the interaction.

- There is a high level of quality of electronic services according to the dimension of the reliability.
 - There is a rise in the quality of electronic services according to the dimension of the privacy.
 - There is a rise in the quality of electronic services according to the dimension of the security.
 - There is an increase in the level of quality of electronic services according to the dimension of the responsiveness.
 - There is an increase in the level of quality of electronic services according to the dimension of the efficiency.
 - There is a rise in the quality of e-services according to the dimension of the empathy.
- 2 - There is an increase in the quality of the relationship between the customer and the bank as:
- There is a high level of customer satisfaction.
 - There is a high level of confidence.
 - There is a high level of commitment.

3 - There is a positive relation between the level of the quality of the electronic services in general and the level of

quality of the relationship between the customer and the bank (satisfaction, confidence and commitment) as 84.27% of the change in the quality of the relationship between the customer and the bank (satisfaction, confidence and commitment) is due to the change in the quality of electronic services in general if the level of quality of the relationship between the customer and the bank (satisfaction, confidence and commitment) is only affected by the quality of the electronic services in general. whereas :

- There is a positive relationship between the level of the quality of the electronic services and the level of the satisfaction, as 79.74% of the change in the level of the satisfaction is due to the change in the quality of e-services if the level of the satisfaction is affected only by the level of the quality of the electronic services.

- There is a positive relationship between the level of the quality of the electronic services and the level of the confidence, as 72.93% of the change in the level of the confidence is due to the change in the quality of e-services if the level of the confidence is affected only by the level of the quality of the electronic services

- There is a positive relationship between the level of the quality of the electronic services and the level of the commitment, as 76.39% of the change in the level of the commitment is due to the change in the quality of e-services if the level of the commitment is affected only by the level of the quality of the electronic services

IV.

DATA COLLECTION TOOL

The researcher relied on the questionnaire to obtain the data that helps him to test the hypotheses of the subject of the study, where he designed a questionnaire form. In order to verify the validity of the questionnaire, the validity method of the content was used in the form of the validity of the arbitrators. The questionnaire form was presented in its initial form to the supervisor of the thesis, who gave his comments on the questionnaire and the scale used. The questionnaire was also presented to a selection of specialists in management science. After the opinions and observations of all these specialists were collected on the sections of the questionnaire, the necessary amendments were made either by deleting or adding in the paragraphs until the picture that was prepared for the application was reached. It comprises three main sets of questions:

Group I: It includes 6 personal questions, including gender, scientific qualification, age and period of dealing with the bank, experience and career.

Group II: It includes 40 statements about the levels of dimensions of the electronic services in the bank under study divided into these statements, as follows:

1. Six statements about the level of the electronic services quality according to the dimension of the website.
2. Five statements about the level of the electronic services quality according to the dimension of the interaction.

3. Five statements about the level of the electronic services quality according to the dimension of the reliability.

4. Five statements about the level of the electronic services quality according to the dimension of the privacy

5. Five statements about the level of the electronic services quality according to the dimension of the security.

6. Five statements about the level of the electronic services quality according to the dimension of the responsiveness.

7. Seven statements on the level of quality of electronic services according to the extent of efficiency.

8. Eight statements about the level of the electronic services quality according to the dimension of the empathy.

Group III: It includes 21 statements about the level of the quality of the relationship between the customer and the bank under study divided into these statements, as follows:

1. Nine statements about the level of customer satisfaction.

2. Six statements about the level of confidence.

3. Six statements about the level of commitment.

After the arbitration process, the researcher distributed 300 questionnaire forms to those selected from the clients of the branches of the Goumhuriya Bank of the Republic in Beni Waleedd in Libya as in Table (4.3). After a period of time, a questionnaire form was obtained for lack of response. Table (4.3) shows the number of distributed and retrieved questionnaire forms and the percentage retrieved from each branch and from all branches.

V. CONCLUSION

The study reached a number of conclusions, the most important are as follows:

1. There is a rise in the quality of e-services.

- There is a high level of quality of electronic services according to the dimension of the website.

- There is an increase in the level of quality of electronic services according to the dimension of the interaction.

- There is a high level of quality of electronic services according to the dimension of the reliability.

- There is a rise in the quality of electronic services according to the dimension of the privacy.

- There is a rise in the quality of electronic services according to the dimension of the security.

- There is an increase in the level of quality of electronic services according to the dimension of the responsiveness.

- There is an increase in the level of quality of electronic services according to the dimension of the efficiency.

- There is a rise in the quality of e-services according to the dimension of the empathy.

2 - There is an increase in the quality of the relationship between the customer and the bank as:

- There is a high level of customer satisfaction.

- There is a high level of confidence.

- There is a high level of commitment.

3 - There is a positive relation between the level of the quality of the electronic services in general and the level of quality of the relationship between the customer and the bank (satisfaction, confidence and commitment) as 84.27% of the change in the quality of the relationship between the customer and the bank (satisfaction, confidence and commitment) is due to the change in the quality of electronic services in general if the level of quality of the relationship between the customer and the bank (satisfaction, confidence and commitment) is only affected by the quality of the electronic services in general. whereas :

- There is a positive relationship between the level of the quality of the electronic services and the level of the satisfaction, as 79.74% of the change in the level of the satisfaction is due to the change in the quality of e-services if the level of the satisfaction is affected only by the level of the quality of the electronic services.

- There is a positive relationship between the level of the quality of the electronic services and the level of the confidence, as 72.93% of the change in the level of the confidence is due to the change in the quality of e-services if the level of the confidence is affected only by the level of the quality of the electronic services

- There is a positive relationship between the level of the quality of the electronic services and the level of the commitment, as 76.39% of the change in the level of the commitment is due to the change in the quality of e-services if the level of the commitment is affected only by the level of the quality of the electronic services

RECOMMENDATIONS

The researcher recommends the following:

1 - Emphasize the importance of the efforts exerted by the bank's management in improving the quality of banking service, especially electronic service.

2 - The researcher recommends the management of the bank to increase the dissemination of the culture of electronic banking services among its customers and to indicate its importance and advantages in the speed of completion of transactions and meet their wishes.

3 - Interest in improving the quality of services provided to customers in order to be able to compete in the future and the services provided by the level of ambition by knowing the views of customers around.

4 - The bank's management should pay great attention to customer satisfaction by selecting skilled employees to provide service and gain customer satisfaction, either by introducing them or designing a training program for them to provide them with the skills required to provide the services.

5 - The results show that the level of reliability and reliability of the quality of electronic banking services of the bank is high, so the researcher recommends the need to maintain this high level.

6 - The bank's administration should increase the interest in how to facilitate the work procedures, reduce the time of service delivery and increase the customer's response by motivating the employees and giving them the required empowerment to perform their work with quality. The deal

should be based on partnership and employees should try to obtain information, suggestions and problems of customers.

7 - In order to achieve customer loyalty, the researcher recommends that the bank's management maintain and maintain the existing customers by increasing the focus on efficiency between the customer and the service provider because the cost of maintaining the current customer is less than winning a new customer and maintaining it for a longer period through which the customer's sense of loyalty towards the bank is increased, promoting it and winning new customers.

8 - Work to increase the creation of an atmosphere of confidence and confidence in his apartment with customers.

9 - The bank should increase the interest in the subject of privacy to maintain customer data and information.

10 - The researcher recommends the bank to pay attention to achieving commitment to its customers, based on a policy to seek to provide full and new banking services that allow the adoption of all operations provided by the customer.

The statistical methods used in the description and analysis of data

1. *Test Kronbach Alpha (α) of the truth and stability (Bayati, 2005, p. 49)*

The Kronbach Alpha test is a test that shows the reliability of the responses of the sample items to the measured questionnaire terms on a single scale where the larger alpha coefficient values are greater than 0.60 indicating the reliability of the sample responses.

2. *Relative distribution (Palm, 2002, p. 158):*
The relative distribution method is used to describe the nature of the responses of the sample items to a given question. If the scale used is a five-point scale, the description is as follows:
A - If the percentage of answers to the sample items is high in (strongly disagree), it indicates that the degree of approval is very low.
B - If the percentage of answers to the sample items is high in (disagree), it indicates that the degree of approval is low.
C - If the percentage of answers to the sample items are high in (neutral), it indicates that the degree of approval is medium. If the percentage of answers to the sample items is high in (OK), it indicates that the degree of approval is high.
D- If the percentage of answers to the sample items are high in (strongly agree), it indicates that the degree of approval is very high.

This method is therefore used to describe the answers of the sample of the study sample on each of the questionnaire statements.

3. *Wilcoxon on-test (Ashour, 1995, p. 29)*

The Wilcoxon on test is used to test the statistical hypotheses related to the average of the study population. If the sample data is descriptive and can be ordered or quantified and does not follow normal distribution, this test is used to test the degree of approval of each questionnaire statement.

4. *Z test around the average (Baldawi, 1997, p. 332)*

The Z test is used around the mean to test the statistical hypotheses related to the average population if the sample data is

a large quantity and also size of the sample . This test is therefore used to test the sub-assumptions of the study.

5. The correlation coefficient (Pearson) (Dawood, 2004, p. 15)

This parameter is used to determine the type and degree of relationship between two quantum phenomena, both of which follow the normal distribution.

Data analysis and test hypothesis study

After collecting the questionnaire forms, the researcher used the numeric method in encoding the data where the answers were encoded

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Understanding the Role of Business Intelligence in Digital Marketing

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Abstract-This document reflects upon Digital marketing, the need for using Business Intelligence in Digital Marketing, the framework for Business Intelligence practices and Business Intelligence from Web Analytics. It talks about the essence of Digital marketing and the various roles of a Digital marketing executive. It then reasons about incorporating Business Intelligence tools and methodologies in regular digital marketing practices which is essential to enhance productivity and maximise gains for any marketing campaign. It then suggests a framework to model Business Intelligence from the point of Data accumulation and provides a brief understanding of the decision-making process. Lastly, web analytics and its suitable usage in analysing data sets is also talked about in this paper. The primary focus of this research is to highlight how useful and indispensable Business Intelligence is to Digital marketing.

Index Terms- Digital Marketing, Business Intelligence, Need for Business Intelligence, Business Intelligence Framework, BI from Web Analytics

I. INTRODUCTION

Digital Marketing caters to a diverse set of customer needs through numerous marketing channels such as search engines, email, blogs, social network, and product websites to create an effective advertising and communication ecosystem. It can be a separate entity or be a part of traditional marketing efforts. Since the interaction of the client to the product from the initiation phase takes place on a digital domain, data harnessing of such communications is automated but can be difficult to handle at the same time. Digital marketing is an umbrella term for the marketing of products or services using digital technologies, mainly on the Internet, but also including mobile phones, display advertising, and any other digital medium[1].

Data driven decisions are valued more in any organisation, thereby it becomes essential to pass every business effort through an analytical tunnel to measure and predict outcomes fairly. Business Intelligence provides an optimised environment to execute such operational assessment. This research is aimed at understanding how Business Intelligence tools can be used in amalgamation with Digital marketing campaigns and elaborates the study by suggesting a framework for such an association.

II. DIGITAL MARKETING

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Digital Marketing caters to a diverse set of customer needs through numerous marketing channels such as search engines, email, blogs, social network, and product websites to create an effective advertising and communication ecosystem. Consequently, there is a good amount of data generation, analysis and recycling being done in order to establish a lucid marketing structure. Most businesses opt for starting with Search Engine Optimisation (SEO) to boost the organic traffic received on their blogs and websites. A data driven SEO strategy might involve mapping out the possible traits of a generic consumer and then focusing on targeting the customer later by optimising the on-page meta descriptions rather than plainly focusing on repetitive content.

Social media has managed to create a biosphere of its own with customers accessing these platforms daily. The focus of digital marketers mainly lies in finding a suitable methodology to interact with these consumers on Facebook, Twitter, YouTube, LinkedIn and Instagram. Social media, apart from playing a very important role of being a platform of live consumer presence, is also a new home for advertisers of the digital domain. Pay-per-Click which used to have a base only on search engine pages, has now found home in Facebook news feed and other micro blogging websites as well. Social media has allowed brands to have a direct consumer interaction via influencers who interact with them in return of affiliate marketing links creating mutually benefiting associations. Digital Marketing apart from focussing on drawing attention thrives greatly on being able to measure the Key Performance Indicators (KPIs) as a marketing campaign progresses from initiation and up towards the sales cycle.

<p>SEO</p> <ul style="list-style-type: none"> • Site visits • Conversions • Impact 	<p>Social Media</p> <ul style="list-style-type: none"> • Followers • Engagement • Feedback 	<p>PPC</p> <ul style="list-style-type: none"> • CTR • Conversion • Cost per Acquisition
<p>Email</p> <ul style="list-style-type: none"> • Delivery frequency • mails opened • Conversion 	<p>Content/Blog</p> <ul style="list-style-type: none"> • Content visits • Bounce back • Shares 	<p>Referrals</p> <ul style="list-style-type: none"> • Retrieved • Site visit • Revenue

Figure1: KPI indicators

III. NEED FOR BUSINESS INTELLIGENCE

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Business decisions rest on the ability of the manager or the team to work on the project at hand by carefully collecting and scrutinizing all the information associated with the business idea.

Having to process abundant information manually can invariably result in partial understanding of subject matter and can lead to actions that incur losses. To avoid this and to maintain an organized workflow, data handling structures better known as Business Intelligence can be employed in routine Digital marketing efforts as a best practice. Business Intelligence refers to technologies and practices that aid in data accumulation, synthesis and its study to present fruitful business information to maximise gains and to avoid losses. The agenda of Business intelligence is to mechanize the process of decision making and reduce the chances of error in judgement. BI tools when handled by experts can procure exemplary solutions in the digital marketing sphere. The main tasks of marketing analytics are to explore customer sales: the effectiveness of a marketing campaign includes the complicated tasks of forecasting, segmenting and jointly analyzing the accounting data alongside data coming from web, mobile, and geographical systems (GIS)[2]. Studying customer behaviour is complex and requires to be done regularly. Often, digital marketers are expected to be one step ahead in predicting what the customer desires. A thorough analysis of consumer reactions can be processed using relevant BI tools to scan a great number of consumer feedback left on websites and on social media. Moreover, an organisation's primary aim is to always satiate the customers, but at the same time, it is also essential to acknowledge how its competitors are building their next move. A single product can be developed under varying nomenclature by several companies, here, Business intelligence enables the developers to study competition and then initiate a final decision. BI does not restrict the marketer to only think of the product at hand but encourage the decisions to be well integrated with the likes of the entire company. Data from digital marketers translate further to various levels of the company and BI makes it more comprehensive by breaking the matter into charts, graphs which can be understood by both technical teams and non-technical managerial strata in the workforce.

It's common for a digital marketer to be flooded with indefinite amounts of data absorbed from various sources, thereby, it becomes essential to give attention to the absolute superior documents. For this purpose, the BI interface is expected to highlight problems in dire need of a solution so that data sets can be examined swiftly, and accurate monetisation of data can be deciphered. An all integrated Dashboard lends such a support to the marketing executive. A CRM system is a good example of a platform which provides information pertaining to every lead in the sales funnel, every action initiated by the lead and its journey towards a successful sales conversion. It also categorises leads based on demographic, region, gender etc. As important as it is to focus on the key performance indicators (KPI) at this point, a digital marketing executive also has the responsibility to analyse the return on investment (ROI) from the campaigns he or she has generated which solely decides the continuation or shelving of a marketing idea. BI tools are agile in examining the time a

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potential customer is spending in the marketing environment, what advertisements they gravitate towards, the Click through rates (CTR) and consequently the Cost per Click (CPC).

Fundamentally all challenges faced in the digital marketing environment can be resolved using BI tools as it possesses the capability to be in tune with the dynamic changes experienced by digital media and can provide real-time solutions to reach a final, more promising output.

IV. BI FRAMEWORK FOR ONLINE MARKETERS

Main objectives of employing Business Intelligence tools in Digital marketing are:

- 1) To conduct research and identify right data
- 2) To keep a check on Return on investment (ROI) from campaigns to justify their existence

While collecting data is no longer a problem, building an effective framework to process it is the real challenge. However, a few pointers can be outlined that lay the idea of this amalgamation in succession:

- 1) Handling data collected – The accumulated data can be broadly classified as Unstructured and structured. A digital marketer receives data from numerous sources which are available in raw form to be processed. Most of this data is structured and can be analysed by exporting or integrating social media and analytics engines using BI tools and performing various analytical operations and visualizations with slice and dice, drill down, drill through, filtering and other analytical operations. The content generated and written by users on various social media platforms is not structured, and to access and analyse this data, a business must apply semantic analytics to derive quantifiable data from these unstructured data and make confident decisions[3].

- 2) Source and Segregation– Once the data is assembled, it is essential to retreat to its source and analyse what is it trying to convey. For instance, every feedback form generated on a social platform isn't valuable information. Consequently, not all data needs to be processed. Segregation is essential to identify necessary tools that will break it down in further iterations of analysis.

- 3) Identifying metrics of judgement- Each type of data needs to be analysed across a set of parameters that evaluate its authenticity to reflect upon the subject matter at hand. Statistical data acquired from page visits, clicks, likes, shares, feedback, comments are some specifications which are analysed to evaluate data from social media networks

- 4) Creating a dashboard- In order to analyse trends in the parameters developed previously, firms use Dashboards that can reciprocate and provide numerous customization options to the executive. With the help of a dashboard an executive can align all the metrics in a proper fashion and draw conclusions from them.

- 6) Establishing correlation- One thing to identify here is the need of a variable in that specific frame of time. Sometimes an otherwise primary element may not have any implications on

the result that we want to arrive at. If correlation is not handled with absolute caution, one might end up with irrelevant modelling done between several ambiguous variables.

V. BUSINESS INTELLIGENCE FROM WEB ANALYTICS

From the perspective of developing an efficient marketing strategy, the Internet provides better insights into sometimes hidden and unavailable data regarding customers, their impacts on business, consumer behaviour and buying decisions[4]. Analysing data procured from the web becomes imperative when a marketing campaign is executed over web-based platforms, namely blogs, websites and social media sites. First step in this process is to infuse the tracking tool with the website source code after which the outcomes generated can be exported to a suitable file format. Obtaining Business intelligence from of a statistical analysis software can buttress the harnessing of useful business information at this point. Sometimes this is plainly used to generate comprehensive displays for otherwise dense subsets that may not be vividly understood by all strata in management. The extent to which one decides to use such tools is entirely in the hands of the analytics expert working for the digital team. Progressing from seemingly linear to much complex correlations of subsets is what makes using intelligence tools productive. Good content is directly proportional to the success of a website. Business intelligence procured from analysis of consequent web sessions from the consumer end matters greatly in the construction of a website. It provides a skeleton to the web engineers to improvise on the theme and code of the web platform. A website becomes a profit generation environment when it becomes monetised with advertisers pitching in to display their content. Not all ads can be of direct relevance on a landing page and this can be judged with drawing patterns in visits and time duration of a session. Every form of communication happening between a client and the website is logged and preserved in the analytics software. Google analytics is a platform that is increasingly being used to monitor web-based content. It's a linear application to run and can be used for examining blogs as well as websites.it provides comprehensive data correlations and helps to alter queries.

VII. CONCLUSION

Digital marketing in addition to being a part of most marketing efforts is also a method that can be used in various connotations. Many marketers are progressing towards real time execution of market penetration and thereby a need for the use of Business Intelligence stems in. Business Intelligence with its range of optimization tools and correlation capabilities is certainly what every marketer should incorporate in his or her efforts.

Using BI can be a bit challenging for marketers not technically versed with analytical science but due to the presence of a huge array of tools, this aspect can easily be dealt with. Business Intelligence is proven to provide a performance boost and sets a promising path for reaping greater profits.

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Intra-Regional Exchanges and Economic Growth in Central African Economic and Monetary Community Countries (CAEMC)

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ABSTRACT

The aim of this paper is to find the link between intra regional exchanges and the economic growth of the CAEMC area. To achieve this aim, the temporal series of econometric was applied in consideration of the foreign direct investment, human capital, demography and the quality of the institutions as variables of control. Afterwards, the Johansen Test of cointegration had been applied to avoid a kind of deceptive regression backed by a model of errors adjustment. Contrary to common ideas broadly shared on the positive incidence of the integration on growth, the study concludes that the exchanges among CAEMC countries have a weak negative impact on the economic growth within the area. Two major reasons could explain this situation: the weaknesses of these exchanges due to bad quality of the institutions and mostly their broken structure.

Key words: economic growth, intra regional exchanges, regional integration, CAEMC, model of growth.

INTRODUCTION

In a world marked by globalization, the CAEMC countries suffer from the narrowness of their national markets, the weakness of regional and sub-regional institutions, insufficient human development, and the deterioration of their terms of trade, permanent conflicts and a poor business climate. In this context, strengthening regional integration is seen as a vehicle for economic growth. In the economic literature, the authors agree to say that sub-regional integration, and thus liberalization of trade between member countries of a sub-regional organization, when it is designed and implemented in an appropriate manner, is a powerful engine of economic growth. However, sub-regional trade agreements are at odds with the WTO principle of non-discrimination, as participants liberalize trade between themselves by excluding non-members from markets of interest. These agreements are mainly motivated by the willingness of member countries to keep market opportunities for themselves and to gain competitive advantages in comparison to non-members.

Trade between member countries of the CAEMC area represents only less than 2% of their foreign trade. As a result, this area remains the least integrated of the African continent in terms of intra-community trade flows, despite its economic potential. (NouwoueNjofang G., 2013).

International institutions (IMF and World Bank) most often advise countries to open their economies for a higher growth rate. This view is supported by several reports on global development (World Bank, 1987, 1991, 1999-2000) that have tried to demonstrate that outward-oriented trade policies have been more successful in achieving growth than autarkic policies. Some authors, however, have expressed doubts about the scientific validity of this statement (Singer and Gray, 1988) hence the existence of a debate on the effects of foreign trade, including intra-regional trade, on economic growth.

In the same vein, African Development Bank views regional integration as the driving force behind inclusive growth in Africa. However, they recognize that the contribution of regional integration to the continent's economic growth remains weak. This is mainly due to the weakness of intra-regional trade, the lack of quality infrastructure and the lack of skilled labor (AbebeShimeles, 2013).

On the other hand, a study based on econometric modeling using the VAR model specified on panel data shows that the overall contribution of a Central African country to integration explains in the long term 16.96% of the variation of its economic growth (Baricako J., DagbaNdongo GX, 2014).

The idea that international trade would be beneficial for all is now unanimous among economists. With regard to the CAEMC countries, the impact of the current drop in oil prices (all CAEMC member countries are oil producers, except CAR) have highlighted the dependence of CAEMC countries on trade with Western countries as well as the weakness of intra-regional trade. A priori the last impact on economic growth in the region is assumed to be weak. But the problem is to see in which direction an increase of intra-regional trade influences the economic growth of the sub-region.

In this context, the present article seeks to answer the following questions: has trade between CAEMC member countries significantly influenced the economic growth of this area? If this is not the case, what are the measures likely to boost the impact of intra-regional trade on the economic growth of the CAEMC countries?

The two main assumptions on which the article is based are:

- As the degree of openness to intra-regional trade increases, the rate of economic growth also increases. Any measure implemented to reduce the barriers to trade between CAEMC countries contributes positively to the economic growth of the area;
- The second working hypothesis is that improving the quality of CAEMC institutions increases the positive impact of intra-regional trade on the economic growth of this area.

The purpose of this study is to determine the impact of intra-regional trade on the economic growth of the CAEMC member countries.

The study is structured, in addition to the introduction and conclusion, in three sections. The first section is devoted to the review of the literature. The second section links the growth dynamics to the regional integration of the CAEMC countries. The third section presents the econometric model and the results of the study.

I. REVIEW OF THE LITERATURE

Adam Smith (1776) and David Ricardo (1819) are the first to lay the foundations for a growth theory, based on the integration. For Adam Smith, the wealth of nations, that is, economic growth comes from specialization and therefore the division of labor that improves productivity. For him, any country has an interest in specializing in production or productions for which it has an absolute advantage, that is to say, with which it has relatively lower production costs. For his part, David Ricardo speaks in terms of comparative advantages and believes that each country must specialize in the production in which it has the highest comparative advantage or comparative disadvantage. In this case, even a country that has absolute disadvantage, producing all goods at higher production costs than its partner, can profit from free trade, provided that it specializes in the production of the good of which the relative internal cost is lower than that of his partner.

In the same vein, John Maynard Keynes (1936) assumes that intra-regional trade affects the economic growth of each country and the entire sub-region through foreign trade, so exports and imports between member countries of the economic area. For this reason, Keynes considers that imports cannot be considered as fixed. They vary according to the level of activity. Periods of strong growth correspond to important imports. In the short term, the relationship between intra-regional trade and growth depends on the multiplier mechanisms. The use of the foreign trade multiplier reveals the relationship between community trade and growth. The idea of export-led growth has been reinforced by the demonstration of a possible "virtuous circle" between increased productivity and export competitiveness.

Other authors have developed econometric models to find the link between integration and growth. Thus, the Heckscher-Olin-Samuelson model demonstrates that integration promotes growth if and only if each country specializes in the production and export of the good for which it has abundant factors of production and, consequently, low production costs. It must therefore import the good which production requires a rare factor. This form of specialization leads to equal factor costs in different countries, since in each country the cost of the abundant factor will increase, while that of the rare factor will decrease.

Krugman (1991) used a model in which all nations and exogenous trade blocs were symmetrical to show that the level of global economic welfare was decreasing. Conversely, if there are initially only a few trading blocs, with limited exchanges between them, most of the growth being linked to trade within the blocks, the consolidation into a small number of blocks can increase trade, and therefore growth

In the same vein, Michael Porter believes that integration promotes growth provided it is based on specialization based on the principle of competitive (or comparative) advantage. Free trade is a source of competitiveness by allowing companies to improve their quality / price ratio.

Other studies are less enthusiastic about intra-regional trade. Levy (1997) used the Heckscher-ohlin model to show that sub-regional trade agreements could undermine the political support for further liberalization of multilateral trade.

According to the study by Levine and Renelt (1992), the causal relationship between openness and growth is through investment. If openness to international trade provides access to capital goods, this will lead to long-term growth. A country liberalizing its trade will attract foreign investment flows. However, this may lead to a decline in domestic investment due to stronger international competition and the net effect remains ambiguous.

The authors, who are interested in the link between regional trade and growth in Africa, and particularly in the CAEMC area, are unanimous on the positive link between these two variables. This is how Frankel et al. (1995) consider that the establishment of many preferential trade agreements (PCAs) at the sub-regional level on each continent is likely to decrease the economic value of CPAs.

According to a study by UNCTAD (2013), intra-African trade can contribute to Africa's growth and sustained development by making it less vulnerable to global shocks, helping it to diversify its economy, improving competitiveness of its exports and creating jobs. To take full advantage of this trade, states should strengthen their productive capacities and support

entrepreneurship in order to stimulate intra-regional trade. For the authors of this report, there are several reasons which explain the Africa's poor regional trade performance, including the fact that regional mainstreaming efforts at the continental level have so far focused more on eliminating poverty.

Other researchers have shown that Africa does "too little" trade and focuses on intra-regional rather than global trade. Fouratan and Pritchett (1993) indicate that trade between African countries is not below expectations. The share of sub-Saharan Africa in intra-regional trade is 8.1% on average, while the gravity model predicts a slightly lower average to 7.5%.

FoudaEkobena S.Y. (2014) used the generalized moments method (GMM) to assess the impact of CAEMC intra-regional trade on the economic growth of this area and its implications for food security during the period 1990-2010. This study led, among other things, to the conclusion that, although it represents only a small part of its foreign trade, intra-regional trade has a positive impact on the economic growth of the CAEMC area.

Ferdinand Bakoup and David Tarr (2000) quantitatively evaluated the impact of CAEMC on the Cameroonian economy. The two authors came to the conclusion that the Cameroonian economy is growing between 0.41% and 0.62% of its GDP thanks to trade with other CAEMC countries. Also these authors consider that the deepening of the tariff barriers has a negative influence on the economic growth, even if, considering the low level of imports, its quantitative impact seems rather weak. However, Cameroon's access to regional partner markets accounts for about a quarter of the contribution of exports to its growth, with the remaining three-quarters accounting for exports to the rest of the world. In the opinion of these authors, Cameroon would gain more from unilateral liberalization than from implementation of the CAEMC agreements.

II. SITUATION OF INTRA-REGIONAL TRADE AND ECONOMIC GROWTH OF CAEMC COUNTRIES

The purpose here is to present the intra-regional trade situation and analyze the economic growth of the CAEMC zone over the period 1992-2016.

1. Intra-regional trade situation

It is often acknowledged that the most reliable form of regional trade agreement is that which establishes a free trade area. To the extent that this free trade area can have a protectionist (if not a protectionist) effect for third countries, this can have a positive effect on growth. For example, garments produced in Cameroon will be able to benefit from duty-free access to the Chadian market provided that Cameroonian textile companies (or companies based in Cameroon) producing cotton-based fabrics bring this input from Chad. Thus, these textile companies are obliged to buy cotton in Chad to be entitled to the treatment reserved to the CAEMC member countries. As a result, Chadian and Cameroonian production of cotton and clothing has increased (A. Ngakosso, 2005).

However, if we compare the intra-community trade of the CAEMC member countries with those of the other African economic groupings, we notice that the commercial effectiveness remains weak. To appreciate the intra-CAEMC exchanges, our analysis was based on a comparative study of intra-regional trade of CAEMC and six (6) other Regional Economic Communities (RECs) targeted (ECOWAS, CASEC, ECCAS, COMESA, SADC, UMA, WAEMU).

Comparing ECCAS trade with other RECs means asking the question: what is the level of shares (absolute or relative) of intra-CAEMC trade in the RECs' sphere and what their relative impact on regional integration is?

The table below gives us an overview of the low level of intra- CAEMC trade.

Table 1: Comparison of CAEMC trade with other RECs

Zones	x				y				z			
	%		Rank		%		Rank		%		Rank	
	E	I	E	I	E	I	E	I	E	I	E	I
ECCAS	1,6	3,1	6 th	6 th	3,4	13,2	6 th	6 th	1,5	3	6 th	6 th
ECOWAS	7,5	10,4	3 rd	2 nd	13,3	14,2	4 th	5 th	6,8	5,7	4 th	4 th
CASEC	0,8	2,4	7 th	7 th	3,2	15	7 th	3 rd	0,7	1,9	7 th	7 th
COMESA	6,9	5,8	4 th	4 th	16,1	14,8	1 ^e	4 th	7,5	10,4	2 ^e	2 ^e
SADC	11,7	14,8	2 nd	1 st	14	17,8	2 nd	2 nd	11,6	14,8	1 st	1 st
WAEMU	13,5	10	1 st	3 rd	13,5	28,4	3 rd	1 st	3,8	9,9	3 rd	3 rd
UMA	3,3	3,9	5 th	5 th	5,2	6,7	5 th	7 th	0,1	3,9	5 th	5 th

Source : www.croset-td.org/Echanges commerciaux et intégration économique régionale des pays de la CEMAC

E: Exports; I: Imports X: Percentage of individual exports and imports in relation to total intra-Community exports and imports
Y: Percentage of intra-EU exports and imports in relation to total exports and imports of Africa; Z: Percentage of intra-EU exports and imports in relation to all world exports and imports.

More generally, in view of this table, CAEMC and ECCAS are in the last positions both from the point of view of imports and exports.

This situation can be attributed to the total lack of coordination of "commercial" policies, and of harmonization with other economic policies, which has generated dysfunctions that are incompatible with the objectives of regionalization. Added to this is the lack of will to improve the communication channels necessary for exchanges. To consolidate the adjustment process underway in the CAEMC countries, a regional reform program (RRP) has been put in place, which includes three components:

- tax and customs policy;

- the transport and transit policy;
- financial policy.

As a result, new tax instruments have been put in place, namely: turnover tax (TCA), excise duties (DA), generalized preferential tax (GPT), tax Common Market (TCM) with its four categories of products. These measures include, among others:

- the relaxation of the instruments of the tariff policy and the indirect taxation;
- the uniform distribution of the tax burden;
- the simplification of structures;
- improving yields.

All these measures are aimed at eliminating tariff barriers to intra-Community trade and harmonizing policies on exemptions or taxation of products in order to offset the complexity of the tax system decried by the IMF and the World Bank.

The tax and customs component of the CAEMC Regional Reform Program (PRR) was approved in Libreville in December 1991. But, more than three decades later, one wonders whether the reforms have made it possible to new impetus to intra-regional trade. In the opinion of some experts (Bell Jacques Eugène, 2012, for example) tax and customs reforms have not allowed a new impetus for intra-community trade in CAEMC, because the temporary surcharges have not disappeared. They continue to apply (even today) to certain products such as cigarettes in Gabon and Congo, cement, soap, oils and sugar in Gabon, wheat flour, concrete reinforcing bar and polypropylene bag in Cameroon.

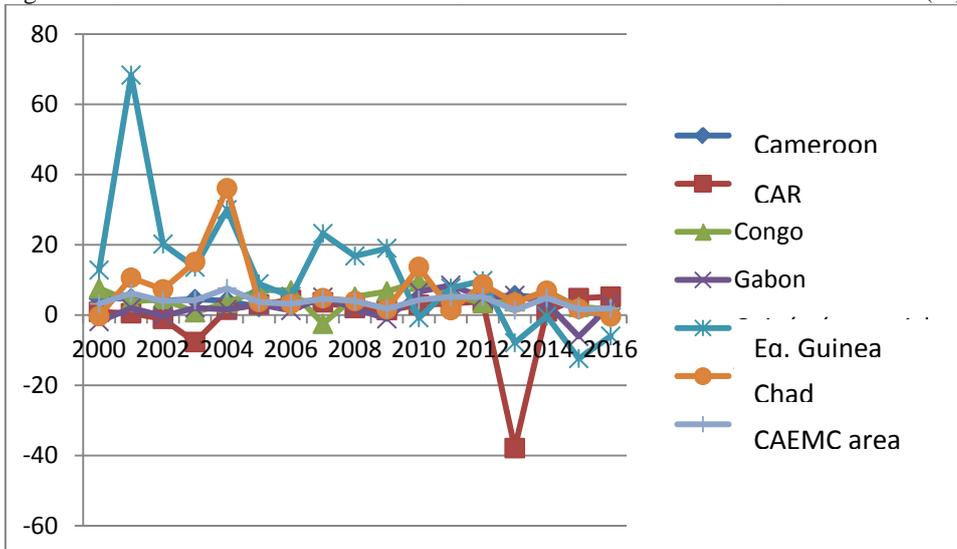
Imports of certain products are still subject to restrictions, as is the case in Gabon with sugar and in Cameroon with ferment flour and sugar. Cameroon submits subsidized imports of sugar and flour at reference prices.

Moreover, according to Bell Jacques Eugène the evolution of the yields of the various taxes in relation to the total customs receipts remains compromised by exemptions and the recourse to the safeguarding measures. The shortfalls resulting from exemptions and tariff changes remain significant, which greatly compromises the productivity of the new instruments and certainly the intra-community trade and economic growth of the States of the sub-region.

2. Analysis of the economic growth of CAEMC.

The six CAEMC country member economic activities are naturally linked to the evolution of oil prices on the world market, even if other parameters such as the dollar exchange rate and the country's production volume also influence production value. Indeed, oil occupies the largest share of GDP in all CAEMC countries, except for the CAR. The figure below traces the fluctuations observed in the evolution of the economic growth of each of the six CAEMC member countries from 2000 to 2016.

Figure 1: Evolution of the GDP of the CAEMC member countries from 2000 to 2016 (%)



Source: IMF (2014), Report on Common Policies of StateMembers

This graph shows that during this period Equatorial Guinea grew faster than other countries in the region. This growth, which peaked in 2001 (69%), is explained by the rise of this country in oil production, becoming the third producing country in sub-Saharan Africa. However, this growth has shown a downward trend until becoming negative from 2014. Chad is the second most dynamic economy in the zone because, again, of the oil discovery realized during the period in study. But since 2012 this country is experiencing a slowdown in growth due to the decline in oil prices.

The three oldest oil producing countries of Cameroon, Congo and Gabon have experienced relatively low growth rates and economic activity fluctuations. Gabon has suffered mainly from the decline in oil production, while the Congo was plagued in the early 2000s by an armed conflict. For its part, Cameroon, which is the main economy of the sub-region (40% of the CAEMC GDP), was more successful in dampening the shock generated by the fall in oil prices because of the relatively diversified economy.

The CAR, the weakest economy in the CAEMC area (2% of GDP), is the only country whose average growth has been negative during this period. In particular, there is a drop in national production of 40% between 2012 and 2013 due to recurrent armed conflicts.

III. THE ECONOMETRIC MODEL

The degree of openness to intra-regional trade is measured over the period 1992-2016. This is the sum of intra-Community imports and exports to GDP. We consider this index as our variable of interest, the other variables, namely investments, foreign direct investment, human capital, demography and quality of institutions will be considered as control variables.

1. The growth model and the methodology analysis

This is to present in turn the model of growth and the methodology of analysis of the study data.

a) Growth model

In 1992, Mankiw, Romer and Weil estimated for a panel of countries the following empirical equation, directly derived from the Solow-Swam model.

$$\ln \frac{Y_i}{L_i} = a + b[\ln(\sigma_i) - \ln(n + g + \delta)] + u_i \quad \text{avec } b = \frac{a}{1-a} \quad (4)$$

Where i denotes the country index and u_i the residual of the estimate. They use y_i / L_i , the real GDP per capita of working age population; σ_i the average share of private investment in GDP; n , the growth rate of the working-age population over the same period; finally, $g + \delta$ was set at 0.05 for all countries.

The equation would be correct but would be only the reduced form of a more complex model in which PGF depended on a second accumulative factor H , which the authors call human capital, for example in the form of the following production function:

$$Y = AK^\alpha H^\gamma L^{1-\alpha-\gamma} \quad (5)$$

We assume that $\alpha + \gamma < 1$ and that K and H depreciate at the same rate δ . Physical capital and human capital are accumulated according to the respective savings rates σ_k , σ_h and σ . The model works exactly like the Solow model, but with an additional factor. The stationary levels of per capita production, capital per capita and savings per capita are deduced from them:

$$Y^* = \left[\sigma_k^\alpha \sigma_h^\gamma \right] \frac{1}{1-\alpha-\gamma} (n + g + \delta)^{\frac{\alpha+\gamma}{1-\alpha-\gamma}} \quad \text{and} \quad k^* = \left[\frac{\sigma_k^{1-\gamma} \sigma_h^\gamma}{n+g+\gamma} \right] \quad (6)$$

The empirical equation deduced from the model is now:

$$\ln \frac{Y_1}{L_1} = a + b_k \ln(\sigma_{k1}) + b_h \ln(\sigma_{h1}) - (b_k - b_h) \ln(n_1 + g + \delta) + u_i \quad (7)$$

$$\text{with } b_k = \frac{a}{1-\alpha-\gamma} \quad \text{and} \quad b_h = \frac{\gamma}{1-\alpha-\gamma}$$

b) Methodology of analysis

We use time series econometrics. The adopted methodology is a two-step approach. The unit root tests will be performed first, then we will perform Johansen cointegration tests to avoid spurious regressions followed by error correction model.

We use cointegration to estimate our model which is of the following form:

$$\text{Log}_{i,t} = \alpha_i + \beta \log X_{i,t} + \varepsilon_{i,t}$$

The dependent variable represents the logarithm of the GDP for the country i at the date t , $X_{i,t}$ represents the set of explanatory variables of our model. It is first the variable of openness to intra-community trade, then the other variables, namely investment, foreign direct investment, demography, human capital and the quality of institutions.

For econometric estimation, we used the Eviews software.

2. Analysis of control variables

a) Investment and Foreign Direct Investment (FDI)

The investment is the acquisition of fixed capital. All economic theories consider it as a major factor of growth. On the other hand, they oppose its determinants and how it affects growth (Bouloud, 2013).

Adam Smith (1776) and David Ricardo (1819) are the first to lay the groundwork for a theory of growth. Both show growth as a result of the accumulation of capital, that is to say, the quantity of instruments available to workers. Adam Smith believed, moreover, that the mechanism that tends to propel the economy towards indefinite growth rests on the division of labor, that is to say the primary international specialization.

In the middle of the 20th century, Domar E. (1946) shows in an article that developing countries have low growth because of an insufficient stock of capital. This low level of capital means that the level of investment is low. What makes Lewis W. Arthur (1954) say that the central fact of economic development lies in the rapid capital accumulation.

It is in this context that Rostow (1960), in the stages of growth, describes the take-off stage as proceeding from an increase in investment of 5 to 10% of income. It shows that a \$ 4 billion increase would be required to drive steady growth in Asia, Africa and Latin America.

For Keynes and his followers, investment is an essential component of aggregate demand, and it is mainly through aggregate demand that it is a growth factor. Since 1931, Kahn has demonstrated that investment has a multiplier effect on growth.

As for foreign direct investment (FDI), several authors, including Borensztein and De Gregorio (1995) have shown that they have a positive impact on growth. For these authors, investments made by foreign multinational firms can improve the overall efficiency of an economy through the availability of technological and organizational knowledge transferable to the rest of the economy.

It is therefore necessary, in this study devoted to the link between intra-regional trade and growth, to test the hypothesis of a positive effect of investment and foreign direct investment (FDI) on growth.

b) Human capital

By the early 1960s, Becker had articulated his theory of human capital that presented education and vocational training as investments that rational individuals sought to optimize. In this line, Lucas considers that the stock of knowledge (that is human capital) is a growth factor. That is why we will test the effect of school enrollment on economic growth.

c) Demography

The population has a positive effect on economic growth. It determines the size of the market and the level of consumption. The latter, as a component of aggregate demand, has a multiplier effect on the level of production (J.M. Keynes, 1936).

By the years 1950-1960 there was a strong demographic growth which is explained by the combination of two phenomena: an increase in life expectancy (and thus the decline in mortality) and the maintenance of high fertility. With the exception of Africa, this demographic surge has had a positive effect on economic growth by playing on labor, consumption and investment. We will also test the hypothesis of a positive effect of demography on economic growth.

d) Quality of institutions

Easterly William (2001) points out that bad public policies can be at the root of a poverty trap if they lower the returns that the private sector is entitled to expect. The latter, if faced with catastrophic policies, will not invest in the knowledge and skills that the nation needs to grow production. The nature of the African state is such that it compromises productive activity. Thus, in CAEMC countries, there are unproductive and rent-seeking activities that undermine economic growth (L. Mayeko, 2013).

The quality of the institutions appears in this study alongside the traditional variables that influence growth because institutions play a key role in the integration of the CAEMC economies.

3. Empirical results

The unit root test used is that of Dickey-Fuller augmented. The results of the test on the different variables are summarized in Table 2.

Table 2: Dickey and Enhanced Fuller Test (ADF)

Variables	test condition	Without constant and trend	Constancy	Constant and trend	Stat ADF	Critical values	Decision
GDP	1st influence factor	yes	No	No	3,436863	-1,9498	I (1)
Investment	1st influence factor	yes	No	No	4,372591	-1,94995	I (1)
Human capital	1st influence factor	yes	No	No	4,036181	-1,9501	I (1)
Demography	1st influence factor	yes	No	No	6,000000	-1,9501	I (1)
Quality of institutions	1st influence factor	yes	No	No	7,631976	-1,9501	I (1)
Degree of openness	1st influence factor	yes	No	No	5,643361	-1,9503	I (1)
Foreign direct investment	1st influence factor	yes	No	No	4,191944	-2,4462	I (1)

Source: Author from the results of the Eviews software.

Concerning the Johansen cointegration test, the summary of the cointegration test, as well as the estimates of the short-term coefficients of the various variables, are presented in the tables 3 and 4 estimations.

Table 3: Summary of the Johansen cointegration test

Value	Trace statistics	Critical value	probability
0,795513	152, 1323	111,7805	0,0005

Source: The author from the results of Table 1

Table 4: Error Correction Model (Short Term Model)

Endogenous variable: Logarithm of GDP		
Exogenous variables	Elasticité	T-Student
D [Logarithm of GDP (-1)]	0,454568	2,503005
D [Logarithm of the investment rate]	0,359069**	3,821240
D [Logarithm of human capital]	-0,214309	-1,003267
D [Logarithm of demography]	-0,208039	1,013948
D [Logarithm of openness degree]	-0,215180	-1,528416
D [Logarithm of the quality of institutions]	0,217181	0,205312
D [Logarithm of FDI]	0,006098	0,688039
Residue delayed by one period	-0,756513*	-1,868594
Constant	0,025518	0,964759
R ² global quality indicator	0,677698	0,964759
Fisher's statistics	4,993873	4,056712
Probability (Fisher)	0,001914	0,006491
ARCH (1 delay)	0,766809*	0,718936
Probability associated with ARCH test	0,390260	0,406526
Number of observations	22	21

* denotes significant coefficients at the 10% threshold

** indicates significant coefficients at the 5% level

Source: The author, from the results obtained by the software Eviews

The R squared shows that 96, 47% of the GDP variability is explained by the variability of the exogenous variables. The explanatory power of the model is very satisfactory taking in a count the nature of the variables.

The diagnostic tests show that the model is not tainted by an autocorrelation and autoscedasticity bias, as shown by the ARCH test performed by admitting a shift of orders one in the variables.

The short-term results show that three variables have a significant impact on the economic growth of the CAEMC countries at about 5% threshold. This is the investment and lagged GDP of a period and the quality of the institutions. So, when investment increases by 1%, economic growth increases by 0.35%. When GDP lagged by one period increases by 1%, economic growth increases by 0.45%. Also, an increase in the institutional quality index of 1% results in an increase in growth of 0.21%. These results are consistent with the existing literature as these variables are necessary conditions for economic growth.

Human capital and demography also negatively explain the rate of economic growth. Thus, likewise an increase of the population of 1% sweeps a decline along the growth of 0.20%. The variable of interest, the rate of opening to the intra-regional trade explains negatively the economic growth of the CAEMC zone. An increase in the intra-regional trade openness rate of 1% results in a GDP decrease of 0.21%. This situation can be explained by the fact that five of the six CAEMC member countries export mainly oil and that trade between countries in the zone consists almost exclusively of agricultural products whose prices have trended downwards over the long term. There was no link between the exporting enclave between countries of the region and human capital. This situation did not allow a rise in the value chain in intra-regional exports. As a result, the increase in exports did not generate additional revenue.

Other studies have yielded similar results (Sarkar, 2005 and Bouloud, 2013). As a result, we believe that improving the quality of institutions, increasing human capital and the additional investment generated by improving the overall business climate are key variables for the qualitative growth of trade between countries in the CAEMC region. These variables will make intra-regional trade a powerful factor of economic growth.

So, the econometric results of our article do not confirm our first hypothesis. In fact, the increase in trade between CAEMC countries did not have a positive impact on the economic growth of this area because, on the one hand, of the small volume of these exchanges and, on the other hand, part of their disastrous structure. This contrasts with economic theory and the generally accepted view of financial institutions (IMF and World Bank) of a positive relationship between economic integration and growth. However, some empirical studies support the results we have obtained (Harrison 1996, Rodrick 1999, Bouloud 2013).

The results of the econometric application confirm our second working hypothesis, namely that the quality of the CAEMC institutions has a positive effect on the impact that intra-regional trade could have on economic growth. In fact, the higher the index of the quality of institutions, the higher the rate of economic growth.

CONCLUSION

This article feeds the debate on the effects of intra-regional trade on economic growth. In the present study, the variable intra-regional trade (import plus export in the region on overall GDP) is used as a variable of interest, investment rate, human capital, demography, quality of institutions and FDI as control variables.

Trend analysis shows that the control variable has not significantly changed. Trade between CAEMC member countries hardly exceeded 2% of their foreign trade over the study period.

The cointegration test reveals that the variable of interest had a negative impact on the economic growth of the CAEMC area. The origin of this negative trend is to be found in the obstacles to regional integration and, in particular, the predominance of oil production in the economy of the region. To this must be added the lack of sub-regional integration infrastructure and a business climate that is not conducive to the development of private initiative. On the other hand, certain control variables have had a positive effect on economic growth. These are, in order, the following factors: GDP lagged by one period, investment, and the quality of institutions.

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Knowledge and Practice of Personal Hygiene among Senior Secondary School Students of Rural Areas: An Innovative Study

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Abstract- Personal hygiene is defined as self-care application to maintain their health. Proper knowledge and practices of personal hygiene plays an important role in avoiding diseases like Diarrhea, Dysentery, Vomiting, Dental caries, Pyorrhea, Itching problems, Skin diseases etc, The senior secondary school students in rural areas kishanpur, supaul, Bihar, do not understand what is good or bad of Personal hygiene.

This research has done on 100 students (Girl-60 & Boys-40) randomly Selected. Survey and practice month's methods are used for this study. Data were collected and analyzed based on descriptive. Study design 100 types of questions designed to investigate for personal hygiene Knowledge and practices of senior secondary school students.

In this research ,14-17 age group students were participated .the result is 97% students want to live personally hygiene and 64% accept about it hack of knowledge is major problem . This result shows than 34% student had inspired about personal hygiene by teachers whereas T.V. and newspaper only affect 31% & 26% respectively 14% student only use sun glam for eye safety and 8% always suffer from eye water discharge problem. It is also found that due to lack of proper mouth wash 83% students yellowish teeth, 21% suffers from Dental carries. 35% suffers from "red patches" problems in genital organ area. They do not know proper washing of genital organ. It is major habit and health problem.

In rural areas illiteracy is root cause of all problems. Teachers can play a pivot role to educate students and school is the appropriate place for personal hygiene. "school health education programme" and awareness through slogan, drama, acting, quiz competition etc factors influenced personal hygiene behavior.

Index Terms- Personal hygiene , Rural Senior secondary school students, knowledge and practice, school health education programme.

I. INTRODUCTION

“Hygiene” words derived from Greek word “Hygeia” which means goodness of health, cleanliness and sanitation, Personal hygiene means personal care including Hair hygiene, Nasal hygiene, Eye hygiene, Oral hygiene, Hand

hygiene, Body Skin hygiene, Personal cloths hygiene etc. The maintain of personal cloths hygiene is affected by many reasons like personal, social, health, psychological and simply as a way of life. Poor knowledge practice and attitudes to personal hygiene among senior secondary school students in rural area Kishanpur Supaul Bihar, is major problem. Due to lack of personal hygiene communicable diseases appear among students. The knowledge of personal hygiene are very necessary for students. Health is the key factor in senior secondary school. The teacher is the guardian and mentor of students and plays a significant role in the “school health education programme” The results from the students will help to understand the factor influencing the personal hygiene behaviors in secondary school's student and overcome from barriers.

II. METHOD

This study has completed at senior secondary school, Kishanpur Supaul, Bihar India. In this research 100 students (Girls 60 & Boys -40) selected on the basis of random sampling technique. Data were collected and analyzed based on descriptive study design. A well organized 100 different design. A well organized 100 different types of question designed for it. Research key (Question is filled by students)

III. DEMOGRAPHICS

(I) Personal information :-

- a) Name b) Class c) Date of birth
d) Academic qualification of parents e) Religion

(II) General information

- (i) What is personal hygiene? yes / no.
(ii) Do you want live in personal hygiene? Yes/no.
(iii) Awareness is necessary for it. Yes/no.
(iv) Personal hygiene affects community hygiene. Yes/no
(v) Personal hygiene is symbol of the best personality. Yes/no
(vi) Due to lack of knowledge personal hygiene It increases diseases. Yes/no

(vii) Form which sources you get information about personal hygiene.

- (a) Parents (b) books (c) Teacher
(d) Radio T.V (e) Newspaper (f) Other sources

Note : - You can choose more than one options.

(viii) For what causes we don't pay attention about personal hygiene.

- (a) Lack of knowledge.
(b) Lack of time
(c) Ignore of work
(d) Other regions.

(ix) In which way , you you want to see your ideal person.

- (a) Very smart and proper hygienic
(b) Dirty
(c) Hygiene and Dirty (As so as)
(d) I cannot tell.....

Hair hygiene :- Hair hygiene of head on the basis of data of Jan 2018- Aug 2018).

Present or absent of :-

- (a) Dandruff (b) Hair fall (c) Lices or louse
(d) Dirty (e) Luster of hair (f) Other information.....

Face hygiene :-

Do ,you follow it ?

- (i) Washing of face from clean water.
(ii) Touching of face with dirty hand.
(iii) Too wash face before sleeping.
(iv) Use mustard, coconut or other oil on face.
(v) To wash face with soap.
(vi) Remove pimples.
(vii) Presence of black spot on face.

(Note- Use code :- 1 =always, 2 :- Sometime, 3:- Never)

(viii) Which type of cream or powder used by you for in face.

- a) Cosmetic B) Ayurveda c) Homemade (Ubitain)
d) other things

* Eye hygiene :

Do you follow it ?

- i) To wash ego from cleaned and fresh water
ii) Use for cotton made handkerchiefs
iii) Use of U.V. protected goggles
iv) Ocular discharge
v) Water discharge from eye
vi) Eye sight problem
vii) Other problems-----

(Note-Use code 1= Always, 2 = sometimes 3=Never)

• Ear and nose hygiene

Do you follow it ?

- i) To wash ear and nose from cleaned and fresh water
ii) Washing of ear and nose during bath ear discharge.
iii) Presence of was inside ear.
iv) Ear discharge
v) Nose discharge
vi) Use of mask at dirty places
vii) Other problems.....

(Note-Use code 1= Always, 2 = sometimes 3=Never)

• Mouth and teeth hygiene

Do you follow it?

- i) Cleaning of mouth, teeth and tongue regularly.
ii) To wash out remain food particles from teeth gap.
iii) Put dirty hand, pen or other things inside mouth.
iv) Use " Datun" of neem, mango, Gauva etc
v) Use florigenic toothpaste
vi) Other interactions.....

(Note-Use code 1= Always, 2 = sometimes 3=Never)

Observation

- i) Yellowish teen
ii) Dental cavities
iii) Gum bleeding
iv) Mouth smelling
v) Knowledge of proper mouth washing clean tongue

(Note- Use code 1=Present, 2= Absent)

• Hand Hygiene

Do you follow it ?

- i) Hand washing after toilet.
ii) Hand washing before eating
iii) Hand washing before eating dry fruits like biscuits, Bhujia, Almond, Chips etc
iv) Hand washing after eating
v) To touch body and other parts like Eye, Ear, Mouth, Genital parts etc with dirty hand.
vi) Hand washing before cooking.
vii) Hand washing after cleaning dirty places.
viii) Proper hand washing.
ix) Other information.

(Note- Use code- 1= Always.

2=something, 3=Never)

x) Which type of objects used by you for hand washing?

- a) Soap b) Soil c)
Ash d) Other thing

Nail hygiene.

Do, you follow it?

- i) To cut nail with teeth.
ii) Cutting of nail twice times within a week.
iii) To wash nail with soap.
iv) Bleeding from root nails.
v) Breaking of nail.
vi) Other information:-

(Note-Use code-1=Always

2=Sometimes 3=Never)

Observation

- i) Shape and size of nail.
ii) Presence of dirty inside nail

(Note=use code - 1=present)

2=Absent

Body skin gugi one

Do, you follow it?

- i) Use soap for taking bath.
ii) Anele with mistral oil
iii) To mop body with rough towel.
iv) Concern doctor for advice counting to need)
v) Other information.

(Note - use code- 1=always.

2=sometimes 3= never)

Genital organ hygiene

Do, you follow it?

- i) To wash genital organs with clean and fresh water daily.
- ii) To wash anus after toilet.
- iii) To wash penis or virginal.
- iv) Red patches around genital area.
- v) Other information.

Note – Use code -1= Always.

2= Sometimes 3= Never.

Feet hygiene.

Do, you follow it?

- i) Daily washing of feet property.
- ii) Washing of feet after walking, playing etc.
- iii) To was gap between two fingers.
- iv) Use of mustard oil before cross from dirty water during rainy reason.
- v) Sole glimmering.
- vi) Any other information.

Note – Use code -1= Always.

2= Sometimes 3= Never.

Personal cloth hygiene.

Do, you follow it?

- i) Use of cotton made under garments.
- ii) Use loose under garments.
- iii) Daily wash of undergarments.
- iv) To use towel, undergarments personally
- v) Any other information.

Potato hygiene Experiment.

For this experiment three boiled potato has taken. First was used as control, second was used touching with dirty hand and third potato was touched after washing hand properly. Data was collected during six days.

IV. RESULTS

In this study 100 students (Boys = 60 & Girls = 40) Participated of 14-17 years age group.

The ability to define personal hygiene was significantly higher among girls (97.25%) (39 of 40) as compared to boys (27%) (16 of 60). The average knowledge of personal hygiene recorded among girls 89% that is higher than boys 86.5%. It is also recoded that 94% students. Get knowledge of personal hygiene from their teachers 88% from parents where as Radio, T.V. and new papers only explore knowledge 57% lack of proper knowledge of personal hygiene is major issue among 64% students. But, it is good sign that 64% students. But, it is good sign that 94% students, But, it is good sign that 94% students want to see their ideal person as very smart and proper hygiene.

Hair fall problem was higher among girls (70%) (28 of 40) than that of boys (33.3%) 20 of 60) students touches own face with dirty hand 54% where as 9% always do like that. Among them. Girls (64.4%) used more cosmetic cream than boys (16.6%) and 50% girls used Ayurveda cream and home made cream (ubttan)

but only 35% boys do like that. 24% students suffer from regular discharge some times where as 44% from water discharge from eyes sometime. 40% students sometimes from opaqueness' but 04% always.

It is major problems. It was reported that only 14% use U.V. protected goggle regularly. 44% students never use mask form protection dust. It also may for protection dust. It also may cause allergy and other respiratory tract problems.

Mouth and teeth hygiene are also very important for us. It is reported that 52% students don't known proper mouth washing uses pieces of braches of tree like mango, Neem, Guava etc. for teeth washing where as, 41% always use fluoride rich toothpaste. In observation, of mouth and teeth hygiene, it has seen students' suffer from yellow. Teeth 83%, Dental cavities 21 % gum bleeding 28 %, Mouth smelling 28 % hand hygiene is also a major part of our attitude only 35% students used to hand wash before taking dry fruits. 40% students do not know proper knowledge of hand wash it was seen 26% students always and 52% sometime touches own body parts like eyes nose genital organs etc. with dirty hand. In rural areas due to awareness 82 % use soap for hand wash 12% student cut own nails with teeth. It is good habit that 92% students use to soap for bath students are not serious for genital organs hygiene among them 60% never wash penis or vagina after urine discharge red patches were reproduced around genital organ area 12% always and 45% something sole glimmering problem was found among 31% students Undergarment washing with soap problem has retracted among 42% students 63% students use to cotton made undergarments regularly but 31% use sometimes.

In potation hygiene experiment it is respected that maintains it is reported that micro-organism grows more colony in dirty touched hand with respect to washed hand touched potato and control.

V. DISCUSSION AND CONCLUSION

Children are "Leader of changing" They come to school and read were after than they explore their knowledge in their family, friends and society For every students teachers are ideal person in their life. And teachers are guardians of them in school so it is necessary to educate students about personal hygiene schools are appropriate places, for it to follow this persons students become able to defeat communicable discard it is the best service to build healthily nation this students will become able and responsible citizen.

VI. FUTURE SCOPE

"School health education programme" is beneficial for students School can organize quiz, plays, essay, painting competition etc hygiene related seminar can also organized for awareness

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Optical Properties of Dye Solutions for Dye-sensitized Solar Cell

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Abstract- The dye sensitizer plays an important role of absorption photons in the ultra-violet, visible and infrared regions of solar spectrum. So, the dye sensitizer has to be broad absorption band, non-toxicity, stability and good matching of HOMO/LUMO levels of the dye with the bottom edge of conduction band of semiconductor and the redox potential of electrolyte. It is necessary to make the good chemical bonding between the semiconductor and the dye for effective electron transfer. In this work, the optical properties of natural dyes extracted from the leaves of Henna, Teak and Burmese iron-wood have been studied by UV-VIS spectroscopy to improve the efficiency of dye-sensitized solar cell. The band-gap energies of dye solutions are about 1.8 eV. According to the light harvesting efficiencies of different natural dyes, Henna and Teak strongly absorb the high-energy photons in UV region, and they can also absorb the photons in the visible region up to 700 nm. Furthermore, Teak has the broader absorption range and can absorb the photons in NIR region. But Burmese Ironwood dye cannot absorb high energy photons in the UV and visible regions. It was found that Henna dye possesses more LHE(%) than Teak and Burmese Ironwood.

Index Terms- band-gap, DSSC, HOMO, IPCE, LHE(%), LUMO

1. INTRODUCTION

Serious environmental problem called global warming can cause due to the large amount of carbon dioxide emission by combustion of fossil fuel. And then no viable method has been found to dispose of the dangerous nuclear fuel wastes yet. So, the searching for clean and sustainable energy resources has become an urgent work for human beings.

The sun is a very abundant and democratic source of energy that can be freely and directly supplied to our home. If the small fraction of sun light could be converted to alternative and usable energy forms, there would be no worry about the energy supply line. So, solar energy is the perfect clean energy resource to solve the serious environmental problem, and the searching for affordable solar energy technology is one of the hottest research fields all over the world.

In dye-sensitized solar cell (DSSC), the absorption of high energy photons in the UV and visible region is important for the dye sensitizer. Broader absorption band is an essential fact of dye solution. And then the good adhesion must exist between the semiconductor and the dye sensitizer. And the HOMO level of dye needs to match with the redox potential of electrolyte and LUMO level is for the conduction band of semiconductor.^{[1-6][10,11,13]}

In this work, optical properties, band-gap energy and light harvesting efficiency (LHE%) of dye solutions extracted from Henna, Teak and Burmese Ironwood leaves have been analyzed by UV-VIS spectroscopy.

In DSSC, the incident photon-to-current conversion efficiency (IPCE) is determined by LHE%.

$$IPCE = LHE \Phi_{inj} \eta_c$$

Φ_{inj} = the quantum yield of electron injection

η_c = the collection efficiency of the injected electrons at the back contact

If Φ_{inj} and η_c are close to 100%, IPCE is equal to LHE. Fig 1.1 shows the structure and operation principle of TiO₂ based DSSC.^[15-17]

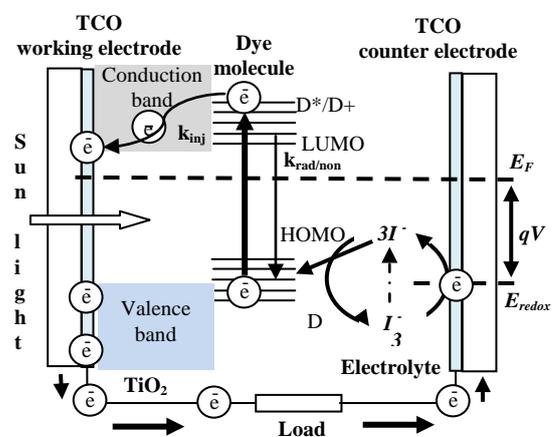


Fig 1.1 Structure and operation principle of TiO₂ based dye-sensitized solar cell

II. BACKGROUND THEORY

2.1. UV-VIS Spectroscopy

Ultraviolet visible (UV-VIS) spectroscopy is the absorption spectroscopy in the ultraviolet-visible spectral region. The absorption in the visible range directly affects the perceived color of the chemical involved. Absorption of UV-VIS radiation causes electronic transitions from the ground state to the excited state in atoms or molecules. The minimum energy required for electronic transition from the valence band to the conduction band is known as the band-gap energy. So, measuring the band-gap energies for the materials used in photovoltaic cell is important.

Beer-Lambert law states that the absorbance of a solution is directly proportional to the concentration of the absorbing species in the solution and the path length.

$$A = \epsilon \cdot c \cdot L = \log_{10} \frac{I_0}{I}$$

A = absorbance

ϵ = molar absorptivity or extinction coefficient

c = concentration of the absorbing species

L = path-length

I_0 = intensity of light before passing through the sample
I = intensity of light after passing through the sample

$$\%T = \frac{I}{I_0} \times 100\%$$

T = transmittance

I_0 = intensity of light before passing through the sample

I = intensity of light after passing through the sample

The reflectance (R) of the sample can be evaluated by the relation.

$$R + T + A = 1$$

R = reflectance

T = transmittance

A = absorbance

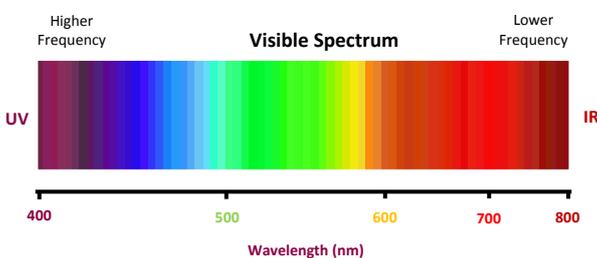
The light harvesting efficiency (LHE%) of dye solutions can be calculated from the absorbance data by using the formula.^[14]

$$\%LHE = (1 - 10^{-A}) \times 100\%$$

LHE = light harvesting efficiency

A = absorbance

The absorption edge is the point on the absorption spectrum with minimum energy required for electronic transition. The wavelength at the absorption edge can be used to calculate the energy band-gap of the solution. Fig 2.1 shows visible spectrum of electromagnetic radiation.



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When white light passes through or is reflected by a colored substance, some photons with certain wavelengths are absorbed. The remaining light will appear as the perceived color as shown in Fig 2.2. Table 2.1 is the relationship between absorbed color and perceived color. UV-VIS spectrophotometer is shown in Fig 2.3.^{[7-9][12]}

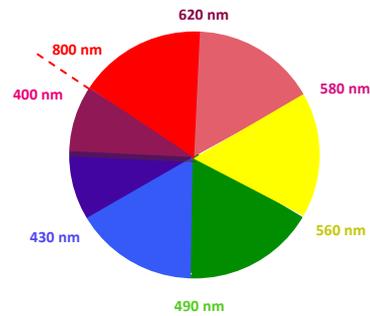


Fig 2.2 Color wheel

Table 2.1 Relationship between absorbed and perceived colors

Absorbed wavelength	Absorbed color	Perceived color
380-420 nm	Violet	Yellow-green
420-440 nm	Violet-blue	Yellow
440-470 nm	Blue	Orange
470-500 nm	Blue-green	Red
500-520 nm	Green	Purple
520-550 nm	Yellow-green	Violet
550-580 nm	Yellow	Violet-blue
580-620 nm	Orange	Blue
620-680 nm	Red	Blue-green
680-780 nm	Purple	Green



Fig 2.3 Photograph of UV-VIS spectrophotometer

III. EXPERIMENTAL DETAILS

3.1. Preparation of Dye Solutions

50 g of the leaves in Fig 3.1 were cut into small pieces first and grounded using motor and pestle for 30 min. After that, the powder was mixed with 50 ml of ethanol for 3 h and the solution was filtered by the paper filter. Fig 3.2 shows the natural dye solution. The colors of Henna, Teak and Burmese Ironwood are yellowish-orange, brownish-red and greenish-yellow respectively.^[18]



Fig 3.1 Henna, Teak and Burmese Ironwood leaves



Fig 3.2 Natural dye solution

3.2. UV-VIS Spectroscopic Analysis

The point on the absorption spectrum of a solution which represents the minimum energy required for electronic transition from the valence band or HOMO (highest occupied molecular orbital) level to the conduction band or LUMO (lowest unoccupied molecular orbital) level is the absorption edge of the solution. The wavelength at the absorption edge can be used to calculate the energy band-gap of the solution. According to the absorbance spectra, all solutions have the same strong cut-off point with the same band-gap energy.

IV. RESULTS AND DISCUSSION

4.1 Optical Properties of Henna dye, Teak dye and Burmese Ironwood dye

The absorption photon of dye solution in the UV, visible and IR regions of solar spectrum is important for DSSC. So, the broader absorption band and the good matching of HOMO/LUMO levels of the dye with the bottom edge of conduction band of semiconductor and the redox potential of electrolyte give the high efficiency of DSSC. According to absorbance spectra and light harvesting efficiencies, high concentration gives the broader range of

light absorption. Henna strongly absorbs the photons in UV and visible regions of the wavelength between 250 nm and 700 nm as shown in Fig 4.1. The strong cut-off point is at 690 nm and the band-gap energy of Henna is about 1.8 eV. The photons in UV, visible and NIR regions can be absorbed by Teak dye. The strong cut-off point is at 688 nm and the band-gap energy of Teak is about 1.8 eV. Burmese Ironwood can strongly absorb the violet color only in the visible region because of its yellowish-green color in appearance. On the other hand, Burmese Ironwood cannot strongly absorb the high energy photons in UV region as shown in Fig 4.5.

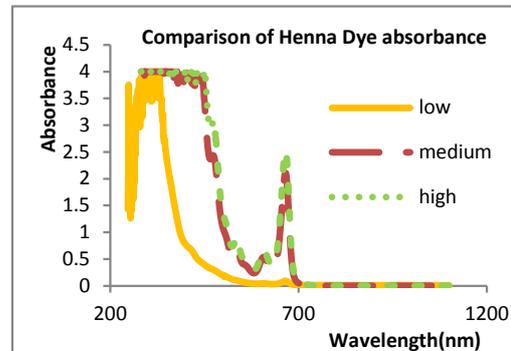


Fig 4.1 Absorbance spectra of Henna dye

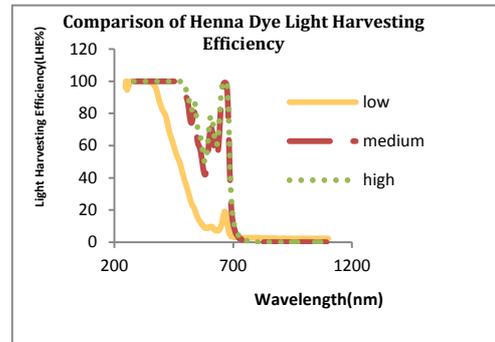


Fig 4.2 Light harvesting efficiencies of Henna dye

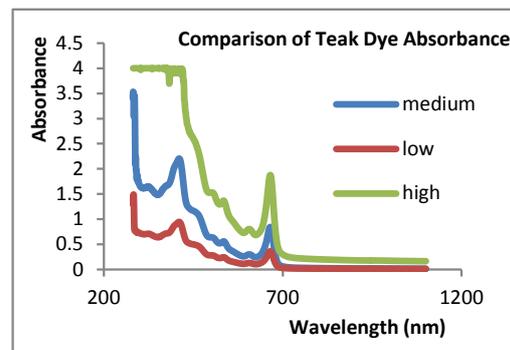


Fig 4.3 Absorbance spectra of Teak dye

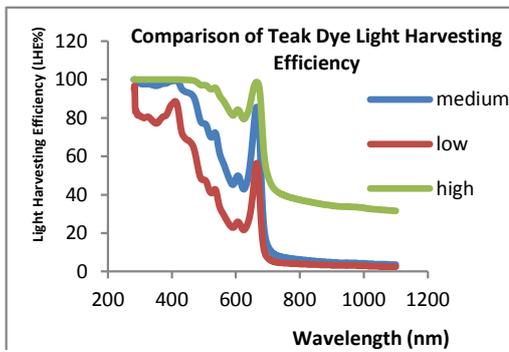


Fig 4.4 Light harvesting efficiencies of Teak dye

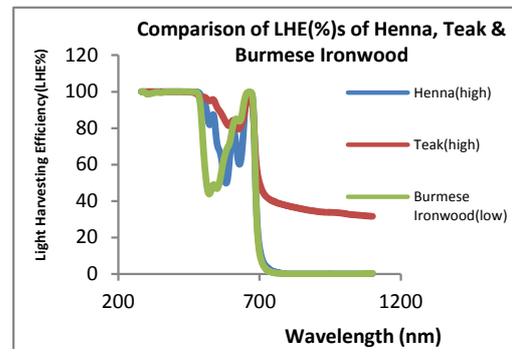


Fig 4.8 Comparison of light harvesting efficiencies for three dyes

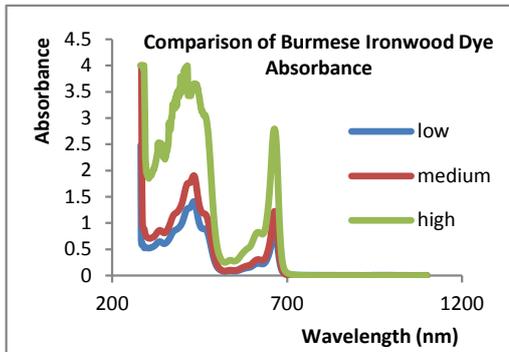


Fig 4.5 Absorbance spectra of Burmese Ironwood dye

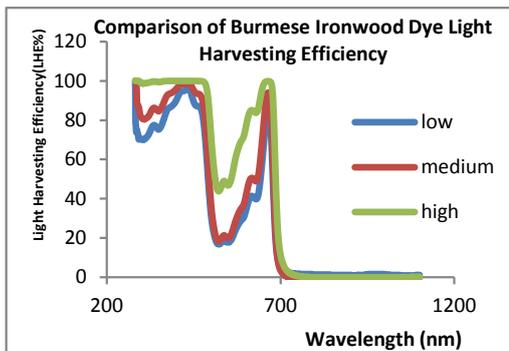


Fig 4.6 Light harvesting efficiencies of Burmese Ironwood dye

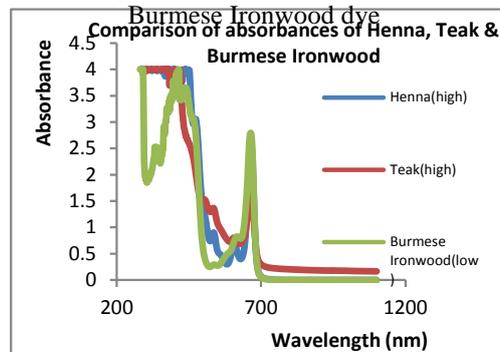


Fig 4.7 Absorbance comparison for three dyes

V. CONCLUSION

The optical properties and the band-gap energy of dye solutions extracted from three leaves have been studied by UV-VIS spectroscopy. Broader absorption band is the key factor of dye solution in DSSC. In UV and visible region, Henna and Teak leaves strongly absorb the high energy photons. In Fig 4.8, Teak with high concentration shows broader absorption range and it can absorb the photons in NIR region. But Burmese Ironwood cannot absorb high energy photons in UV and visible region. According to the optical properties of dye solutions, dye with low concentration cannot absorb high energy photons, and high concentration gives high absorption photon. But high concentrated dye becomes more sticky and greasy, and causes series resistance R_s in DSSC. And then pH control should be made to increase the performance of DSSC. The efficiency of DSSC depends on the dye extracting temperature. But the temperature should not exceed the optimum value because of the decrease of the stability of anthocyanin at high temperature greater than the optimum value.

Since the strong cut-off point of all dyes is the wavelength of about 700 nm and the band-gap energy is 1.8 eV.

APPENDIX



Henna Tree

Teak Tree

Burmese Ironwood Tree

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Durability Performance of Cow-Bone Ash (CBA) Blended Cement Concrete in Aggressive Environment

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Abstract-This study assessed the durability of cowbones-ash blended cement concrete in aggressive environment. The experimentations covered the; production of cowbone ash (CBA) from waste cowbones, physical and chemical characterisation of the cowbone ash and the production of cowbone ash blended cement concrete (CBABC) mixes containing; 0%, 10%, 20% and 30% CBA as partial replacement of cement. Uniform water to binder ratio of 0.50 along with concrete mix ratio 1:2:4 was adopted. The CBABC cubic specimen of sizes 100mm by 100mm by 100mm were exposed to aggressive and non-aggressive conditions. The specimens were tested for compressive strength after 28 days curing duration.

The oxide composition revealed that the CBA is rich in Calcium oxide content with a value of 63.86% by weight. The CBABC mixes displayed enhanced workability as the proportion of CBA increases. For the non aggressive curing condition, the CBABC concrete containing 0%, 10%, 20% and 30% CBA content exhibited average compressive strength of, 23.92 N/mm², 25.18 N/mm², 21.36 N/mm² and 20.86, N/mm².

The compressive strength of both the conventional concrete (containing 0% CBA content) and CBABC concrete specimens reduces with exposure to aggressive condition. Comparatively in terms of compressive strength, the CBABC mix containing 10% CBA content displayed higher resistance to aggressive condition than all other mixes containing; 0%, 20%, and 30%, CBA content. At 28days of exposure to HCl (aggressive curing condition) CBABC containing 10% CBA exhibited 21.56 N/mm² (representing 86% of its original strength when cured in water), and it displayed 13.97 N/mm² (being 55% of its original strength) upon exposure to H₂SO₄. Thus, Cowbone ash blended cement containing 10% replacement of CBA content has the optimum potential for application in aggressive environment and especially in hydrochloric acid prone environment. The findings of this study indicate the potential applicability of the innovative 10% CBABC as a durable alternative to the conventional Grade C25 concrete mixes in hydrochloric (HCl) acid prone environment.

Index Terms- Cowbones ash, Concrete, Compressive strength, Durability, aggressive environment, hydrochloric acid (HCl), Sulphuric Acid (H₂SO₄).

I. INTRODUCTION

In the creation of the built environment, a concrete structure is expected to maintain its design strength and serviceability requirement throughout its design life. However, the ability of concrete structures to fulfil this requirement often gets aborted by their application in aggressive environment and consequent chemical/acid attack. Concrete containing ordinary Portland cement are susceptible to deterioration when exposed to acid attack due to the high alkalinity of the Portland cement.

At pH value below 6.5, acidic substances including, carbonic acid, sulphuric acid, hydrochloric acid e.t.c causes deterioration and decomposition of concrete with increase severity as the pH value lowered down to 4.5. The product of hydration of cement 'calcium hydroxide' (Ca(OH)₂) is the active compound which is mostly affected during acid attack [1]. Ca(OH)₂ is highly soluble and it leaches out of the concrete when exposed to acidic solution, thereby creating room for rapid penetration of the acidic solution into the pores of the concrete [2].

To increase the resistance of concrete in aggressive environment, literatures [3];[1] had recommended the use of pozzolan blended cement or blastfurnace slag blended cement (amongst other remedies) as a way of reducing the quantity of Ca(OH)₂ in the hydrated cement paste. Recently the use of cow bone ash (CBA) as supplementary cementitious material in concrete production had been reported. For example, [4] and [5] have previously reported that the compressive strength of concrete increases appreciably at 10% optimum percentage replacement of cement with CBA.

Therefore, considering the expected reduction in quantity of Ca(OH)₂ that partial replacement of cement with CBA is expected to cause couple with the fact that CBA usually contains high content of calcium oxide (CaO) in its oxide composition, this study investigated the durability performance of CBA blended cement concrete in aggressive condition. It is expected that the outcome of this study may provide information on the applicability or otherwise of CBA blended cement in aggressive environment.

II. MATERIALS AND METHODS

A. Materials

The materials used for the production of concrete in this research were, cement, sand, granite, Cow bone ash (CBA), water and acidic curing media.

1) *Cement*: The cement used was ordinary Portland cement (grade 43) free of lumps which met all the requirements of [6].

2) *Cow-bone Ash*: The Cow bones ash (CBA) used in this study was systematically produced from locally obtained cow bones. The procedure adopted for preparation of the CBA includes; washing of cow bones to remove dirt, drying of waste cow bones to surface dried condition and heating of the dried cow bones in muffle furnace at temperature of 915°C (being the reactivity temperature range) and grinding of the heated cow bones to powdery ash. The resulting CBA was sieved through BS sieve No 200 and the oxide composition of same was determined using X-Ray Fluorescence, XRF test. Particle size distribution, bulk density and specific gravity of the CBA were also determined in accordance with [7] and [8] respectively.

3) *Fine aggregate and Coarse Aggregate*: Locally available sand which conformed to the requirement for concrete production was used as fine aggregate in this research. Crushed granite of 20mm particle size which satisfied the requirement of [9] for concrete production was used as the coarse aggregate in this research.

4) *Water and Acidic Curing Media*: The water used for mixing the constituent material of the concrete was distilled water which conformed to the requirement set out by [10]. The same type of water was employed for the curing of the concrete cubes in normal curing condition and for preparation of the acidic media. Hydrochloric acid (HCl) solution and Sulphuric acid (H₂SO₄) solution were used for simulating the aggressive curing condition for assessing the durability of the CBA blended cement concrete produced in this study. Concentrated acidic solutions of the HCL and the H₂SO₄ were separately prepared to pH values of 1.09 each. 5% concentration of HCl and H₂SO₄ acid solutions corresponding to pH value 1.09 were obtained by dissolving 1250 ml of the respective acids in 23.75 litres of distilled water

B. Experimental Procedures

1) *Mix Proportioning and Preparation of concrete specimens*: A nominal concrete mix ratio of 1:2:4 cement, fine aggregate and coarse aggregate along with water cement ratio of 0.5 was adopted for this study. The constituent materials were batched by weight for measurement accuracy. CBA was used to partially replace cement in the concrete produced. The levels of percentage replacement of cement with CBA were at; 0%, 10%, 20%, and 30%. The concrete mixes produced were designated as; Portland cement concrete (PCC) for 0% replacement of cement with CBA and Cowbone ash blended cement concrete (CBABC) covering subcategories; CBABC1, CBABC2, and CBABC3 mixes corresponding to 10%, 20%, and 30% replacement of cement with CBA respectively. The detail of the mix proportioning of materials for the concrete mixes is presented in Table 1. The concrete cubes samples were cured for 28days in three different curing media including; distill water (simulating exposure to normal/non aggressive condition), Hydrochloric acid (HCl) solution of 5% concentration and sulphuric acid (H₂SO₄) solution of 5% concentration (both acidic curing media simulating exposure to aggressive condition). For each curing media/exposure conditions investigated, three (3) concrete cubes samples were produced

and tested, the average values of the results was computed and reported.

TABLE 1

MIX PROPORTIONING OF MATERIALS FOR PRODUCTION OF CONCRETE MIXES

Concrete Designation	CBA Content (%)	Mass of Constituents in (kg)			
		Cement	CBA	Fine Agg.	Coarse Agg.
PCC	0	18.60	0.00	37.20	74.40
CBABC1	10	16.74	1.86	37.20	74.40
CBABC2	20	14.88	3.72	37.20	74.40
CBABC3	30	13.02	5.58	37.20	74.40

*Note: Agg. represents aggregate

2) *Slump Test*: The slump test is a measure of the consistency of fresh concrete and a means of identifying discrepancies in the uniformity of concrete mixes fluidity. The slump test was thus carried out in accordance with the [11] to determine the effect of CBA blended cement on the workability of the concrete mixes.

3) *Compressive Strength Test*: Compressive strength is the capacity of a material or structure to withstand loads tending to reduce its size. Compressive strength of concrete is one of the major properties that are affected when the hydration product of Portland cement is attacked by the acidic substances present in aggressive environment [12]. Thus, compressive strength test was carried out on each of the; PCC, CBABC1, CBABC2 and CBABC3 concrete specimens cured in each of the three curing media. Three cubes were tested at the age of 28 days for each of the mixes. The compressive strength test was carried out on hardened cured concrete cubes. The test was conducted in accordance with procedures recommended by [13]. The effect of exposure to the different acidic solutions at 5% concentration on the compressive strength of the CBABC was assessed by comparing the compressive strength of the concrete in water curing medium with those of the acidic curing medium.

III. RESULTS AND DISCUSSION

The results obtained from the; chemical characterisation of material, slump test and the compressive strength tests are discussed in this section.

A. Chemical and Physical Properties of CBA

The cementitious characteristic of a calcined ash is usually indicated by its oxide composition. The chemical analysis of CBA (Table 2) shows that the total percentage composition of Iron oxide (Fe₂O₃ = 0.025%), aluminium oxide (Al₂O₃ = 13.21%) and silicon dioxide (SiO₂ = 19.02%) was found to be 32.26%. This is less than 70% minimum requirement recommended by [14] required for a cementitious material to be regarded as pozzolana. Thus, oxide composition of CBA used in this study does not satisfy the requirement for pozzolanic materials, it can however be regarded as a cementitious filler/additive considering its high CaO content which was found to be 63.86% by weight. The specific gravity and bulk density of CBA were found to be 1.29 and 1.13g/cm³ respectively. The specific gravity exhibited by the CBA is less than the known specific gravity of cement which is 3.15 [1], thus CBA can be regarded as a lightweight and voluminous material. The practice of batching CBA by weight rather than by volume is recommended during usage as supplementary cementitious material because more of its volume will be needed to replace equal weight of cement in concrete.

TABLE II
CHEMICAL AND PHYSICAL CHARACTERISTICS OF THE CBA

Chemical Properties of CBA	
Elemental Oxides	% Weight
SiO ₂	19.02
Al ₂ O ₃	13.21
CaO	63.86
Fe ₂ O ₃	0.025
Na ₂ O	0.86
MgO	1.01
K ₂ O	0.05
Cuo	0.015
Fe	0.016
LOI	0.90%
Physical Properties of CBA	
Specific Gravity	1.29
Bulk Density	1.13g/cm ³
Particle size range	75µm- 1.18mm

B. Slump Values of Cowbones Ash Blended Cement Concrete

Table 3 shows the results of the slump test carried out on the fresh concrete with varying percentage of CBA. The results shows that the slump value of the concrete mixes increases with increasing CBA content, the PCC mix which contained 0% CBA content displayed 30mm slump value while the CBABC mixes containing 10, 20 and 30% CBA content displayed 33mm, 37mm and 40mm slump value respectively. Slump value of a freshly mixed concrete is an indication of its flow and overall workability. Thus, the increasing slump value with increasing CBA content implies that the mixes became wetter and more workable as the CBA content increases. This may be attributed to the higher fineness and low specific gravity of CBA compared to the specific gravity of cement. This result is similar to findings of previous study [15] in which workability of concrete was found to increase steadily with incremental addition of CBA. For all the mixes prepared in this study, the slump values range from 30mm to 40mm which can be classified as slump S1 in line with [16].

TABLE III
SLUMP TEST RESULT OF CBA BLENDED CEMENT CONCRETE

Concrete Designation	CBA content (%)	Water/binder ratio	Slump (mm)
PCC	0	0.5	30
CBABC1	10	0.5	33
CBABC2	20	0.5	37
CBABC3	30	0.5	40

B. Compressive Strength of Concrete Specimen in Aggressive and Non Aggressive Cuing Media

The summary of the 28 days average compressive strength displayed by each of the mixes in aggressive and non aggressive condition is presented in Table 4.

TABLE IV
COMPRESSIVE STRENGTH OF CBA BLENDED CEMENT CONCRETE IN AGGRESSIVE AND NON-AGGRESSIVE CONDITION

Concrete Designation	CBA Content (%)	Average Compressive strength (N/mm ²) @ 28 days		
		Normal Curing Condition H ₂ O (Distil)	Acidic/aggressive Curing Condition	
			HCL Solution	H ₂ SO ₄ Solution
PCC	0	23.92	17.43	10.81
CBABC1	10	25.18	21.56	13.97
CBABC2	20	21.36	16.04	10.75
CBABC3	30	20.38	14.12	8.23

1) *Compressive Strength of Concrete Specimen Cured in Water:* The average compressive strength for each replacement level of cement with CBA at 0%, 10%, 20%, and 30%, for 28 days curing age is presented in Table 4. The compressive strength improves as the CBA content increased from 0% to 10% and thereafter the strength reduced gradually until the CBA content reaches 30%. In all the mixes produced, 10% CBA replacement level appears to be the optimum replacement level of CBA in concrete, as CBABC1 mix displayed 5%, 17% and 21% higher average compressive strength compared to the PCC, CBABC2 and CBABC3 mixes respectively. The average compressive strength exhibited by the CBABC1 satisfies the 25N/mm² standard cube compressive strength recommend by British standard for Grade C25/C30 concrete at 28 days curing age. Also, this result is in line with those reported by previous study [4];[5] regarding the optimum percentage replacement of CBA in concrete. This means that at 10% CBA content, CBA blended cement concrete is capable of exhibiting higher compressive strength compared to conventional Grade C25 concrete. Also, the average compressive strength of 20 N/mm² obtained at 30% replacement level shows that CBA can be used effectively up to 30% replacement level in cement for production of lightweight concrete. This may be attributed to the high CaO content of the CBA which may have caused a slight strength increase through reduction of the total pore volume as some of the liquid water are converted to solid form [2].

2) *Compressive Strength of Concrete Specimen Cured in Acidic Media:* The results of compressive strength of concrete specimen produced with cement partially replaced with CBA and immersed in acidic curing media, (namely; hydrochloric (HCL) and sulphuric acid (H₂SO₄) solutions of 5% concentrations is presented in Table 4. Among the two acidic solutions used in evaluating the durability of Cowbones ash blended cement concrete; HCl caused the least deterioration to the concrete strength for all mixes while utmost damage/deterioration was caused by H₂SO₄. However, the concrete mix which contained 10% CBA content (CBABC1) displayed the highest resistance to the deteriorating effect of both acidic solutions. After 28 days exposure to respective HCL and H₂SO₄ solutions, CBABC1 displayed 21.56 N/mm² and 13.97 N/mm² which represents 86% and 55% of its original strength when cured in water media. At 28days of curing in HCL, all other mixes including the; PCC, CBABC2 and CBABC3 displayed 73%, 75% and 68% of their original strength respectively. Also, at 28days of curing in H₂SO₄, the PCC, CBAC2 and CBABC3 respectively displayed 45%, 50% and 39% of their original individual strengths. Thus, 10% replacement level of cement with CBA appears to be the optimum replacement requirement for better durability

characteristics in CBA blended cement concrete. Durability improvement of CBA appears to be more effective in resisting HCL acid attack rather than H₂SO₄ acid attack. Amongst other possible reasons, the enhanced resistance of CBABC to HCL attack may be attributed to the weak acidity of HCL compared to the H₂SO₄.

IV. CONCLUSION

The compressive strength of concrete produced with cement partially replaced with CBA in different acidic media of Hydrochloric acid of sulphuric acid solutions has been studied. Concrete made from cement blended with Cowbone ash (CBA) displayed reduced compressive strength when immersed in hydrochloric and sulphuric acid solution. Comparatively, apart from displaying the highest average compressive strength among all the mixes tested in normal curing condition, the CBA blended cement concrete containing 10% CBA content displayed the highest resistance to deteriorating effect of the acidic solution retaining 86% of its original compressive strength. The resistance of the 10% CBA content CBABC concrete was higher in Hydrochloric acid compared to the Sulphuric acid. It can therefore be deduced that CBA blended cement containing 10% CBA is effective in mitigating the effect of chemical attack by HCL on concrete.

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Indigenous Languages and the Question of Development in Postcolonial Africa: Focus on Nigeria

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Abstract: In recent years, many postcolonial territories in Africa are increasingly becoming concerned about fostering sustainable development. As many of these postcolonial nations are struggling to improve their economic and related developmental indicators, it is important to underscore the vital role of language as a catalyst for empowerment and sustainable development. This paper focuses on the relationship between language and sustainable development with a special focus on Nigeria. It examines in some detail the various ways in which the diverse linguistic resources of Africa could be harnessed to engineer and sustain such development in the 21st century. We argue that far from being an obstacle to Africa's development, multilingualism is a resource that can be harnessed in the service of the continent. And, in view of the vital link between multilingualism, language and development, we propose a model of unity in diversity, acknowledging the view of language as an economic resource with attributes comparable to other natural resources available and deployable by nations, such as Nigeria.

Keywords: Language, African languages, sustainable development, linguistic inclusion

1. Introduction

A major area of current concern with respect to Africa as a whole is the sustainability of development processes and outcomes. Yet it seems that fundamental questions about the potency of language and literacy are ignored in the pursuit of sustainable development in Africa as a whole. Partly, this is as a result of the understandable focus on such econometric indicators as GDP, GNP, capital flows, oil receipts and related financial information. However, there is another critical variable relating directly to human capital development, which is the ability of an economic system to provide an appreciable level of 'quality of life' for all of its citizens (Sen, 1999). Thus, in addition to low inflation, a healthy foreign reserve and net flow of goods and services into a country, the level of participation, representation and inclusion of citizens in a functioning democracy is an essential element of sustainable development. Note, however, that the variables of quality of life and democracy are values that optimally thrive in highly literate societies. Hence, the important role played by open discussion in the language that is widely understood by all (Buba, 2006). Nettle and Romaine (2000:166) noted how "...the problem of sustainable development is more likely to be solved if indigenous systems of knowledge and languages are valued and brought into play." Adegbite (2004:13) pointed out that the lack of development of (African) countries, such as Nigeria, is partly attributable to the understated role of African languages and cultures in people's daily transactional discourses. And it is arguable whether any accelerated and sustainable development of Africa can be realised in the 21st century, while we ignore these diverse linguistic resources of our nations. Surprisingly, it is a recurring problem that African governments, policy makers and

planners appear to fail to notice that languages, particularly our indigenous languages, possess the greatest potentials and capacity to enhance our development as individuals and societies (Bodomo 1996; Buba 2006). This is more evident when viewed in the context of literacy and the attendant rapid social and economic advancement that accompanies high literacy rate in a nation state (Collier, 2008).

This paper is an attempt to explore further how the diverse linguistic resources of Africa could be deployed to foster sustainable development in the continent, particularly in our focus country, Nigeria. We begin by unpacking the key concepts (i.e. 'language' and 'sustainable development'), as well as establishing their linkage. The discussion moves on to provide a synopsis of the language situation in Nigeria as an example of the multilingual nature of Africa. Focusing on language as a resource and a tool, it examines in some detail the various ways in which Nigerian languages could promote sustainable development (Everett, 2012). We then discuss the need to strengthen the teaching and use of African languages in the promotion of literacy (Buba, 2010; RTI, 2010). Finally, we conclude with a call for the conservation of all African languages, which we see not just as a moral issue about sustaining diversity and cultural identity, but also as a hugely important economic measure in the march for rapid development in an emerging developing country such as Nigeria (Sen, 1999; Bunza, 2006).

2. On Language and Sustainable Development

In the context of this paper, we view language very much as a tool, in the sense of Everett (2012), for communicating values, beliefs, ideologies and the attendant knowledge systems that is packaged therein. Sustainable development (hereafter, SD) on the other hand, has been seen from different perspectives. Some see it as "a globally endorsed positive change that encourages ecological, sociocultural, political and economic dimensions but with context-bound implementation strategies" (Mavesera 2010:76). Buba (2006:i) views SD as a process that has to do with "continuity and positive change as well as the involvement of the citizenry in activities that will lead to the nourishing of a country's economy." His argument is hinged on what other scholars have seen as a multidimensional process involving positive changes in the social structure and improvement in people's quality of life, which result in reducing inequalities and increasing participation in the discourses of (local) development (Sen, 1999). SD is also seen as concerned with harnessing the indigenous knowledge and initiatives of the African people to enhance both current and future potentials to meet human needs and aspiration. Seen from this perspective, then, SD in the African context is intertwined with languages of the African peoples, because such languages, as Egbokhare (2004:507) noted "hold the key to the heart of the people and consequently their knowledge and treasures."

Furthermore, if the economic objective of SD is "to achieve economic growth by increasing productivity..." (see Brundtland Report, 1987: 2; Beder, 1996:18), then language is central to achieving such a goal, because as Crystal (2000) observes, it is part of the

resources people can draw upon in order to increase the value of their potential contribution to productivity, hence to sustainable development. Also, if SD may be described in terms of enhancing the well-being of citizen as well as improving national economic growth (Sen, 1999; Buba, 2006), then it requires the full participation of the target community. Development that is done to people has negligible impact and value on sustainability.

2.1 The Language Situation in Africa

Some of the most multilingual and multi-ethnic societies in the world are located in Africa.

Nigeria (400+) and the Cameroon (250+) are in the top 10 most diverse nations in the world. In addition to the hundreds of indigenous languages, most of which have not been reduced to writing, there are a handful of 'super-languages', serving either as official languages of government, education, science & technology and the economy, e.g. English, French & Arabic, or as languages of wider social interaction within and across African speech communities, e.g. Amharic, Swahili, Hausa, Ibo, Yoruba, Krio & Pidgin and speakers for these languages number into tens of millions (Crystal, 2000). There are other 'state-wide' languages, such as Nupe, Gbagyi, Kanuri, Ijaw, etc, all in our focus country, Nigeria, the population of which is also counted in the millions. At the other end of the written language spectrum are smaller languages with a fairly large currency in big towns and at local authority level. These include Igede, Edo, Bini, C'lela and Ikwerre. And it is this complex picture of plurality and diversity that appears to entrench a language-deficit perspective on African countries such as Nigeria. The argument is that in this very intricate societal layering lies conflicts and confrontations, which are inimical to any kind of developmental initiative or strategy, let alone sustainable development as a cornerstone of public policy (Brann 1993). However, this needs not be the case, as we shall show elsewhere.

The issue of what to do with the numerous languages in Africa and Nigeria in particular, need not cause endless debates, so long as there is the political will to properly utilize the benefits that the nation can derive from appropriating the abundant linguistic resources for sustainable national development. Countries with similar language problems like Tanzania, South Africa, Malaysia, Singapore, Canada, did not only succeed in addressing the issue successfully, but have also invested in their languages.

The emergence of South Africa as a science and technological giant of Africa, for example, might not be unconnected to, among other things, an effective language policy. Buba (2006:8) reports that "it is in recognition of the need for indigenous languages to be part of the rapidly expanding technological environment that eleven (11) indigenous languages (representing 98% of the population) were adopted as official languages". He further reports that South Africa's government sees the language policy framework as fundamental to the management of "... diverse language resources and the achievement of government's goal to promote democracy, justice, equity and national unity" (see the South African Constitution, Section 6, Act No. 108 of 1996).

Another noteworthy nation is Tanzania which has achieved a considerably high degree of democratization through deliberate language choice and language policy (Mazrui, 2005). This has resulted in the replacement of English with Swahili as the sole language of parliamentary business, which has enabled Tanzanians to have greater chance of participating in political and legislative matters. Ordinary Tanzanians could now compete for parliamentary seats, as they could use their Swahili oratorical skills effectively to seek the votes of the electorate.

Thus the extent to which a multilingual society can enjoy the gains of language diversity will depend largely on its language policy, among other factors. The fact is that linguistic diversity need not always be a serious disadvantage (Elugbe, 1985; Bamgbose, 1991). Undoubtedly, the Nigerian linguistic situation may look peculiar, but it is not unique. It is true that Nigeria is faced with linguistic and other diversities but, in the midst of these diversities often lies our strength.

3. Language and Sustainable Development in Africa

The most important resource of every nation is its citizens. This explains why institutional paradigms of development in Africa (UN-NADAF document, 1996) seem to put indigenous African peoples at the center of the development process. As a result, issues such as participation, representation and inclusion of citizens in development processes and outcomes are seen as an essential element of sustainable development in Africa. Thus, this is where the language factor weighs in heavily on issues of development thinking in Africa. Bodomu (1996:3) argues that if development involves the appropriate transformation of the socio-cultural, political and economic systems of a society (UN-NADAF document, 1996) and if language is seen as a repository and a tool for the expression and communication of these very socio-cultural, political, economic and belief systems of the society, then it goes without saying that a successful conceptualization and implementation of this societal transformation can only be achieved through the use of people's indigenous languages because, these are the languages that hold the key to the heart of the people and consequently their knowledge and treasures (Egbokhare 2004, Adegbite 2004).

Validation of our indigenous systems of knowledge is vital to Africa's development because, it can help us to utilize and improve upon our health (and related therapeutic) practices, craft and traditional industries, agriculture, and so on. Generations to come will also be able to learn about indigenous tools for agricultural development, smithing, mining and drugs development and administration (Bunza, 2006). Africa's development can therefore be sustained if we do not neglect our indigenous languages and cultures. In a personal communication, the District Head of Gummi in Gummi Local Government, Zamfara State, Alhaji Abubakar Bala Gamo, noted that "...when we just take what is from outside assuming that it must be better, it leaves us worse off. Western knowledge should reinforce and build upon traditional knowledge, not replace it". Unfortunately, this vital message of African Renaissance seems to fall on deaf ears, as we downplay and undermine our languages and cultures in preference for what is perceived as a 'global

culture'. Olarewaju (1999:7) is probably correct when he asserted that "no matter the premium we place on English language it will always remain foreign as it is not ours...."

Our inclination towards this exogenous language seems to be one of the major factors responsible for the present linguistic predicament of many younger ones (especially those in urban areas) who appear to be neither proficient in the indigenous language(s) nor in the foreign ones as observed by an education specialist working with the Universal Basic Education Commission in Sokoto. He noted that "many parents prefer to take their children to English only schools and rarely spend time teaching the local language to them". Williams (1971:6) noted that "language deficiency is at the root of the poverty cycle because, it underlines educational disadvantage and from there the vicious poverty cycle is completed and perpetuated." It also seems to act as a barrier to acquisition of functional skills that would guarantee gainful self-employment, eradication of poverty and re-orientation of our values.

Furthermore, Africa's economic dependency may be linked to, among other things, our inability to utilize local languages to tap the indigenous knowledge base of the Africans. African people may be able to participate in serious businesses and other important economic activities or financial transactions if our indigenous languages are used in such processes. Some of the people interviewed in Sokoto (Sokoto State, Nigeria) as part of the qualitative interviews related to our research lamented that they are finding it difficult to use Automated Teller Machines (ATMs) and related benefits from the current "cashless/cashlite" microeconomic policies of Nigeria simply because they are not literate in English and no provision has so far been made for the use of our indigenous languages in the implementation of such policies. Active participation of this significant percentage of the population of Nigeria in these essential economic activities could certainly contribute immensely to the development of our economy. Bringing financial inclusion to the citizens is necessary for the development of a country's economy because, as Ansre (1976:3) noted "...the greater the number of those who benefit from it, the better" for the nation. Hence, there is the need to get rid of factors such as 'language barrier' which restrict people from active participation in national economic activities.

Sustainable development also "ought to be preceded by the opportunity for all 'stakeholders' including the end users to participate in the process of governance, because that is the source of improved quality of life for the people and the creation of a friendly environment in which social and economic activities take place" (Buba 2006:5). However, the entrenchment of an exogenous language in governance process has created a situation in which majority of citizens have been excluded from active political participation due to language barrier resulting from bad language policies in many African countries (Bamgbose 2005, Buba 2006). In Nigeria, for example, due to English language requirement, many citizens can only vote but cannot be voted for. This practice appears undemocratic and not ideal for sustainable national development. It has also created a situation that distanced the ruling elites from the larger populace, and this is seriously frustrating initiatives to get local people involved in developmental projects. Unsurprisingly,

people tend to identify more with development programmes and policies that are crafted and communicated in their local languages than when such activities are communicated in a foreign language. The language(s) that the majority of Nigerians understand well is certainly not English. According to Brann (1993: 639-656), more than two-third of Nigerians can speak and understand Hausa, Igbo and Yoruba. Even in the first author's cursory survey, over many years, of language use among students taking a course on multilingualism, only once did he encounter a student who could not speak one of these three 'national' languages of Nigeria! Yet many development initiatives have been rolled out in Nigeria with plans and strategies for implementation written in English alone. This often makes it difficult for ordinary people to understand, appreciate and participate in such development processes and outcomes.

In addition, the use of an exogenous language in education has become a formidable and impenetrable barrier to access to knowledge and information to a greater part of the Nigerian society by ostracizing the language of environment, thereby disengaging them from the business of education, as highlighted by one of the interviewees, who works for an educational NGO in Sokoto. He noted the rate at which students fail public examinations mainly as a result of deficiency arising from the language of teaching and learning. For example, a 2010 report from the National Examination Council (NECO) shows that only 1.8% of the total number of candidates that sat for the Senior Secondary Certificate Examination passed the required five credits including English and Mathematics (*Dailytrust newspaper*, March 17, 2010) - a staggering 98.2% failure rate! This unacceptable level of failure may be blamed on several factors of which the students' poor mastery of the language of instruction is a strong candidate (see NECO Chief Examiner's Report, 2010). Thus, no matter how well a student understands an idea, a concept or a process, if he or she cannot properly expressed it in the language of instruction, he/she would score lower marks or even fail (Bunza, 2006).

The confinement of the role of the mother tongue as medium of instruction to the lower level of education in many African countries could be seen as basically a perpetuation of the colonial master plan by our policy makers and planners. Adebisi (2006:20) reported that "colonial authorities discouraged the teaching of indigenous African languages because of their acute awareness of the power of language." It seemed almost certain they were aware that non-utilisation of African languages as media of educational instruction will ultimately reduce African societies to the status of recipients rather than contributors of knowledge. It is, therefore, important to find ways of experimenting with indigenous languages as media of instruction in at least some of our schools, thereby complementing English language which still serves as the sole source of knowledge (western or formal) in the country.

Expanding the use and teaching of African languages may also serve as a means for the promotion of literacy which is undoubtedly the single most important indicator of a country's journey into the top-tier economies of the world. As the 'juicer' of development, literacy mixes the three major factors of development- people, policies and programmes and make them interact to foster sustainable

development. It is capable of transforming the lives of people, allowing them to make informed choices and empowering individuals to become agents of change.

4. Conclusion

Our aim has been to show that language is at the heart of the process of inclusive and sustainable development; that language use and choice are key components in the determination of the extent to which individuals and communities make meaningful contribution to national development, hence to sustainable development. We argued for the recognition of language as an economic resource with attributes comparable to other natural resources available and deployable by a nation. Of course, the empowerment of the African languages cannot be at the expense of exogenous languages such as English. That would imply certain reversal of the very little development that is currently taking place. Rather, our view of multilingualism includes all languages, local and foreign, big and small. Taken together, they are capable of enhancing social and economic inclusion, hence the promotion and entrenchment of the principles of sustainable development. Linguistic inclusion can complement and propel political inclusion, as well as facilitate socio-economic empowerment. These are the optimal conditions favourable for the eradication of poverty, ethnic and gender inequalities and inequities, culminating in an inclusive and sustainable development.

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Identification of pathogen responsible for angular leaf spot disease of *Momordica charantia* and evaluation of biological control system

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Abstract

The present investigation was conducted for morpho-physiological and molecular detection of the causal agent responsible for angular leaf spot disease of *Momordica charantia* and its biological control technique. The pathogen of the devastating disease was isolated and cultured on Lauria and Bertani (LB) agar medium. The pathogen was characterized by a series of biochemical and molecular methods. Isolated bacteria showed positive and negative responses in biochemical tests. Molecular detection of the isolated bacteria was performed by polymerase chain reaction (PCR) using specific primers which amplified approximately 1400bp size of DNA fragment clear cut band. 16S rDNA gene sequencing of the bacterial isolate showed 86% similarities with the original sequence of *Pseudomonas syringae*. In antibiotic assay, cefixime showed highest 17.0±0.5mm diameter zone of inhibition against the isolated bacteria. Methanolic extracts of *Azadirachta indica* and *Allium sativum* revealed the highest 10.0±0.6mm diameter zone of inhibition against the isolated pathogenic bacteria. The antagonistic activity of soil bacteria, *Rhizobium* from *Vigna mungo* showed prominent zone of inhibition against the isolated bacterial strain. The present investigation would be helpful for detection and control of the devastating disease.

Key words: *Momordica charantia*, Angular leaf spot disease, Detection, Control system

1. Introduction

Momordica charantia, a member of the Cucurbitaceae family, commonly known as bitter gourd, or bitter melon thrives in humid and subtropical regions around the world [1]. Although this massive beneficial vegetable is well adapted to a wide range of climates, there are two varieties of the bitter gourd available in Bangladesh. The small sized variety is called “Ucche”, while the large sized variety is locally known as “Korolla”. Nutritionally, bitter gourd fruits are good source of carbohydrates, proteins, vitamins, and minerals and have the highest nutritive value among cucurbits [2, 3]. The active constituents of bitter melon are not definitively determined, but numerous studies have confirmed that it contains alkaloids, glycoside, peptides, acids, cucurbitins, charantin, cucurbitacins, momordine, momorcharins and proteins [4]. In Ayurvedic medicine, it has been used for indigestion, intestinal gas, menstrual stimulation, wound healing, inflammation, fever reduction, gonorrhoea, hypertension, as a laxative and emetic [5, 6]. Along with therapeutic usages, the revolutionary plant has also versatile applications in the food industry [7]. However, direct yield losses caused by pathogens, animals and weeds, are altogether responsible for losses ranging between 20% and 40% of global agricultural

productivity [8-11]. Like other living organisms, bitter gourd plants are also susceptible to numerous devastating diseases. The diseases of vegetables involve the harmful deviation or alteration from the normal functioning in the physiological processes. Several bacterial, fungal, and viral diseases adversely affect the worldwide cucurbit production. Among the diseases, angular leaf spot, caused by the gram-negative bacterium *Pseudomonas syringae*, is one of the most prominent disease in bitter gourd [12]. The small, round, water-soaked spots appear on leaf tissue, and expand until they are confined by veins, giving them the characteristic angular look. It spreads rapidly when conditions are moist and ambient temperatures are between 75 and 82°F (24-28°C). The angular leaf spot disease may cause significant yield losses in both greenhouse and field production [13] which results in severe economic loss to farmers of cucurbits [14]. In order to protect the crop from the yield reducing disease and increase the production level, it has become a burning issue to find out appropriate control measure so that the farmer can manage the deleterious disease properly. Hence, the present research work was aimed to study the isolation, characterization and evaluation of its suitable control systems.

2. Materials and methods

2.1 Collection of plant material

In the present investigation, disease infected leaves of bitter gourd plant were collected carefully from farmers' field in Naogaon district, Bangladesh. The samples were placed in sterile polyethylene bags, properly labeled, transported to the lab and analyzed immediately thereafter. The symptoms were identified on the basis of diseased symptoms by Bangladesh Council of Science and Industrial Research (BCSIR), Binodpur, Rajshahi.

2.2 Isolation of causal organism

Disease infected leaves with spot symptoms were washed with sterilized distilled water, and then treated with 0.5 % solution of hypochlorite [15] for 1-2 min to remove the contaminants, rinsed with sterile distilled water. Then the samples were cut with sterile scalpel and weighed approximately 1gm that was immersed in sterilized saline buffer and vortexed strongly. Then it was serially diluted 10 folds and 100µl of diluted sample was plated on LB agar plates and incubated at 37°C. The bacterial single colonies were further streaked on fresh LB agar plates to procure isolated colonies.

2.3 Morphological and biochemical characterization

The isolated bacteria were identified based on colony characteristics, gram staining methods and by various biochemical tests as given by Bergey's [16] Manual of Determinative Bacteriology.

Gram staining test: Gram staining is the most common staining technique used diagnostically within both the research laboratories and in clinical setting to differentiate between Gram positive and Gram negative bacteria [17, 18] based on the physical properties of their cell walls [19]. The cell wall of Gram-positive organisms retain s crystal violet-iodine complex after treatment with alcohol and appears purple, whereas gram-negative organism decolorize s following such treatment and appears pink.

SIM (Sulphide-Indole-Motility) medium test: SIM medium enables differentiation of bacteria on the basis of hydrogen sulfide production, indole production, and motility [20, 21]. In the medium, peptonized iron and sodium thiosulphate are the indicators of H₂S production. This H₂S reacts with peptonized iron to form black precipitate of ferrous sulphide [22, 23]. Casein peptone, another component of SIM Medium, is rich in tryptophan. The organisms possessing the enzyme tryptophanase degrade tryptophan to indole. Indole is detected upon the addition of Kovac's reagent. SIM medium is a semi-solid that extensively used in the determination of bacterial motility [24]. The semi-solid nature of this medium allows easy visual determination of motility which appears as growth extending outward from the original line of inoculation.

Simmon's citrate test: Simmon's citrate agar is used for differentiating gram-negative bacteria on the basis of citrate utilization [25]. Initially, the citrate medium was developed by Koser [26] containing ammonium salt as the only nitrogen source and citrate as the

only carbon source. Later on Simmons [27] modified Koser's formulation by adding agar and bromothymol blue [28]. The citrate test is performed by inoculating microorganism into the above mentioned synthetic media, where bromothymol blue is used as an indicator. Use of citrate results in the creation of carbonates and bicarbonates as byproducts, thus increasing the pH of the medium [29] responsible for the change of the medium colour from green to blue and this is considered as positive test.

Kligler iron agar (KIA) test: Kligler iron agar is a combination of the lead acetate medium described by Kligler [30] and Russells Double Sugar Agar [31]. It is used for the differentiation of microorganisms on the basis of dextrose and lactose fermentation and hydrogen sulfide production in a laboratory setting. At first, we suspended 52 g of the medium in one liter of distilled water that was heated with frequent agitation and boiled for one minute to completely dissolve the medium into water. Then it was distributed into test tubes and autoclaved for 15 minutes at 121°C. After autoclaving, the medium containing test tubes were kept into laminar air flow hood in a slanted position. After cooling and solidifying the medium, isolated colony was taken from the pure culture plate and stabbed it into the butt of the medium. Then it was streaked back on the surface of the agar slant and incubated these test-tubes with loosened caps for 18-24 hours at 35±2°C in an aerobic atmosphere.

Tween 80 hydrolysis test: The test was performed by inoculating purified bacterial culture according to Sierra [32] method. In the procedure, Tween 80 was added to the molten media followed by pouring it into petri dish. Then the isolate was streaked on a medium and incubated at 37°C for seven days to observe opaque milky precipitate/milky crystal formation.

Triple sugar iron (TSI) agar test: The triple sugar iron (TSI) test is one type of biochemical test that is commonly used to determine the ability of the microorganism to ferment sugars and the production of hydrogen sulfide. The media used contains agar, phenol red, 1% lactose, 1% sucrose, 0.1% glucose, as well as sodium thiosulfate and ferrous sulfate or ferrous ammonium sulfate. All of these ingredients were mixed together and allowed to solidify in the test tube at a slanted angle to prepare TSI slant. After that a sterilized straight inoculation needle was used to touch the top of a well-isolated bacterial colony and inoculated the bacteria by stabbing through the center of the medium to the bottom of the tube and then streaking on the surface of the agar slant. After inoculation, the test tubes were loosely capped and incubated at 37°C in ambient air for 18 to 24 hours.

Urease test: The urease test is used to determine the ability of an organism to split urea, through the production of the enzyme urease. Two units of ammonia are formed resulting alkalinity in the presence of the enzyme, and the increased pH is detected by a pH indicator. The medium was cooled to 50 to 55°C and aseptically added 100 ml of filter-sterilized urea base to the cooled agar solution and mix thoroughly. Finally the medium were distributed to sterile tubes and slanted the tubes during cooling until solidified.

MacConkey agar test: MacConkey agar is a selective and differential culture media designed to isolate Gram-negative and enteric bacteria, particularly members of the family Enterobacteriaceae and the genus *Pseudomonas*, based on the ability of lactose fermentation. In the experiment, the components (peptone, proteose peptone, lactose, bile salts, sodium chloride, neutral red, crystal violet and agar) of MacConkey agar were suspended into appropriate amount of purified water and mixed thoroughly. Then it was heated with frequent agitation and boiled for 1 minute to completely dissolve the components. Then it was autoclaved at 121°C for 15 minutes. After solidifying the medium into laminar air flow hood, the experimental bacterial single colony was streaked on the plate of MacConkey's agar and incubated it at 37°C.

Potassium hydroxide (KOH) test: For the KOH solubility test, one or two bacterial colonies were aseptically taken from petri-dish of pure cultured bacteria with a sterilized tooth pick or an inoculating wire loop and placed the colony onto a clean microscopic slide, mixed with 3% KOH solution for 1 minute and observed for the formation of a thread-like mass. The test was performed according to Halebian *et al.*, [33].

Mannitol salt agar test: Mannitol salt agar is a commonly used selective and differential growth medium in microbiology. If an organism can ferment mannitol, an acidic byproduct is formed, causes the phenol red in the agar to turn yellow [34].

Catalase test: Catalase is a ubiquitous antioxidant enzyme that degrades hydrogen peroxide into water and oxygen [35]. Several pathogens produce catalase in order to defend themselves against attacks by hydrogen peroxide, a weapon commonly used by the host's immune system, in addition to oxidative stress. At first, a clear and sterilized microscopic slide was placed inside a petri dish. Using a sterile inoculating loop, a small amount of bacterial colonies from 24-hour pure culture was placed onto the microscopic slide. Then, 3% of hydrogen peroxide (H₂O₂) solution was added to the slide containing isolated bacteria and mixed with it. Production of bubbles indicated the presence of catalase enzyme in the bacteria [36].

2.4 Antibiotic susceptibility testing

In microbiology laboratories, agar disk diffusion is routinely used for testing common, rapidly growing bacterial pathogens [37]. The susceptibility of bacterial isolate against antibiotic was determined by the disc diffusion method which uses antibiotic impregnated wafers (disk) to test whether the particular bacteria is susceptible to specific antibiotic or otherwise [38]. In this method, 0.1 ml of a 10⁻² dilution of each bacterial culture was smeared evenly onto the surface of the Petri-plate containing about 25 ml LB agar medium. After that the disk of filter paper impregnated with a standard concentration of an antibiotic was placed to the plate surface [39]. Plates were incubated for 16–18 hours in ambient air at 37°C before the results determined. The bacterial strains resistant to a specific antibiotic grow up to the margin of disk. The diameter of zone of inhibition must be measured and result read from the Kirby Bauer chart as sensitive, intermediate or resistant. Total seventeen types of commercially available and frequently prescribed standard antibiotics namely, amoxycillin, ampicillin, azithromycin, cefixime, cefotaxime, clarithromycin, doxycycline erythromycin, gentamycin, kanamycin, nalidixic acid, neomycin, penicillin, rifampicin, streptomycin, tetracyclin and vancomycin were used to assess antibiotic susceptibility against the isolated bacterial strain.

2.5 Screening for the antimicrobial potential of the plant extracts

Different plant extracts are commonly used which are considered natural sources of antimicrobial agents, regarded as safe and easily degradable [40]. The present study was aimed at evaluating the *in vitro* antimicrobial activity of plants extracts such as *Allium sativum*, *Azadirachta indica*, *Cassia alata*, *Coccinia grandis*, *Hibiscus rosa-sinensis*, *Ficus racemosa*, *Psidium guajava* and *Moringa oleifera* against the isolated bacterial strain. The specific plant parts (10 grams of powdered sample) were dissolved in 100 ml of methanol in a conical flask, plugged with cotton wool and then kept on a rotary shaker at 190–220 rpm for 24 hours. The supernatants were collected slowly and evaporated in wide mouthed evaporating bowls at room temperature for 2–3 days till the total final volumes were reduced to one fourth of the original volumes of the solvent that was used which giving the concentration of 400 mg/ml [41]. Finally the extracts were stored at 4°C refrigerator in airtight bottles. In the study, leaves were used to prepare plant extracts for the plant samples neem, ringworm shrub, scarlet gourd, common fig, guava and drumstick whereas bulb and flower were used in case of garlic and China rose, respectively. Antibacterial activity of the selected plants parts was carried out by the disc diffusion method [42]. At first, the different plant extracts were dissolved in methanol at a concentration of 100 mg/mL and filtered through 0.45 µm sterile filter membranes. Then, 100 µL of bacterial broth culture were spread over plates containing LB agar media. After that discs (6 mm in diameter) impregnated with 30 µL of the extracts solutions (1 mg/disc) were placed on the surface of the LB agar plate. Two control discs were also used containing methanol and kanamycin (30 µg/disc) as negative and positive controls, respectively. The plates were incubated for 24 hours at 37 °C, and the zone of inhibitions were measured with the help of mm scale.

2.6 Screening of antagonistic activity of soil bacteria

The demand to discover newer and safer bio-control agents with lesser side effects are increasing day-by-day [43]. Soil is a natural reservoir for the microorganisms with their antimicrobial products and provides an excellent resource for the isolation and identification of therapeutically important products [44]. Agar well diffusion method [45] was used to assess the antagonistic activity of soil bacteria against the phyto-pathogenic bacteria. Total four types of soil bacteria namely, *Brevibacillus*, *Pseudomonas*,

Rhizobium from *Cicer arietinum* and *Rhizobium* from *Vigna mungo* were used as antagonistic microorganisms. Agar well diffusion method is widely used to estimate the antagonistic activity of microbial extracts [46]. Firstly, the pathogenic bacterial isolate was incubated in LB broth at appropriate temperature for 24 hrs. Petri dishes containing 20 ml of LB agar medium were prepared previously and inoculated with 0.1 ml of 24 hours incubated bacterial broth culture. Then, three wells were made into the agar medium with a sterile cork borer or a tip and filled with different amounts of soil bacterial culture broth like 20 μ l, 30 μ l, and 40 μ l. After the incubation, Petri dishes were incubated at 37°C for 24 hrs. The diameter of inhibition zone was observed and measured manually with the help of mm scale which determined the antagonistic activity of the soil bacteria.

2.7 Molecular characterization of isolated bacteria

After studying the morphology and biochemical characters, the molecular techniques are applied for the better classification and identification of the isolated bacterial strain.

DNA extraction: For DNA isolation, a single colony was inoculated in LB broth and grown for overnight at 37°C. The genomic DNA was isolated from these fresh cultured colonies by using the CTAB (N-cetyl-N, N, N trimethyl ammonium bromide) method described by Murray [47] and Thompson [48]. After that the DNA was suspended into TE buffer. The spectrophotometer was then used to quantify the isolated DNA followed by electrophoresis on 1% agarose gel.

PCR analysis: The 16S rDNA sequence was amplified from the isolated genomic DNA by PCR reaction in a thermo cycler (Nyx, Technic, Inc., USA), using the two universal primers 27F (5'-AGAGTTTGATCCTGGCTC-3') and 1492R (5'-TACCTTGTTACGACTT-3'). The total volume of components for PCR was 25 μ L containing nuclease free ddH₂O 15 μ L, dNTP mix 1.0 μ L, forward primer 1.0 μ L, reverse primer 1.0 μ L, DNA template 1.5 μ L, MgCl₂ 2.5 μ L, Taq buffer B 2.5 μ L and Taq polymerase 0.5 μ L. Thermocycling parameters were 95°C for 5 min, 35 cycles of 95°C for 40 s, 65°C for 1 min, and 72°C for 2 min; a final extension step at 72°C was added for 10 min, followed by cooling to 4°C until the sample was recovered.. The length of amplified PCR products were then examined by 1% gel electrophoresis where 0.5x TBE (Tris-borate-EDTA) running buffer was used in agar gel and finally visualized under a UV trans-illuminator.

Purification of PCR products, sequencing and phylogenetic analysis: The amplified DNA was then purified by agar gel electrophoresis method using AccuPrep® Gel Purification, Bioneer kits. After that the purified products were sequenced in sequencing service laboratory, National Institute of Biotechnology (NIB), Bangladesh, using bacterial gene specific primers 27F (5'-AGAGTTTGATCCTGGCTC-3').

The sequences was compared with their respective type strains using the BLASTN program in the GenBank nucleotide database (<http://www.ncbi.nlm.nih.gov/BLAST>). Finally, phylogenetic tree was constructed based on the Maximum Likelihood method.

3. Results

3.1 Isolation and purification of bacteria

The infected leaves samples produced turbid condition in LB liquid media after 16 hours of incubation at 37°C indicated the bacteria were grown. From liquid culture, subculture were done by streaking onto the LB agar medium in 90 mm petri dishes. The bacterial isolate was partially identified based on colony morphology and purification done by further streaking method. The colonies were creamy white in color. The size and shape of colonies were found to be small to medium, convex, and mucoid.

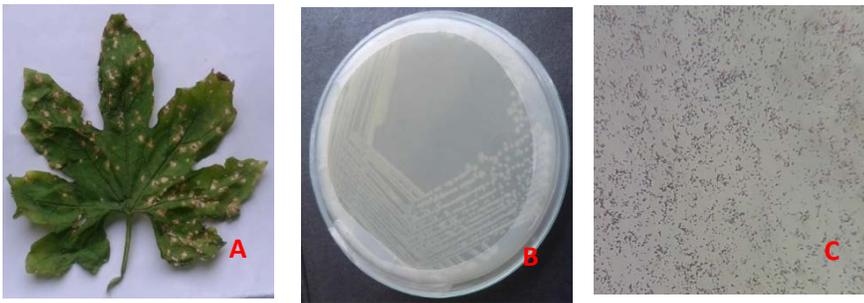


Figure 1: Showing the plant sample, isolation of causal organism and gram staining (A) angular leaf spot disease of bitter melon, (B) Isolated bacterial pure colonies and (C) Gram negative bacteria

3.2 Morphological and biochemical characterization of isolated bacteria

In gram staining test, the isolate bacterial strain was rod shaped and pinkish in color when stained with counter-stained by the safranin that was the indication for gram negative bacterium (Figure: 1 C). In SIM-medium (Sulphide-Indole-Motility medium) test, the isolated bacteria did not produce any red or pink color band on the top of tube containing SIM medium after adding Kovac's reagent and no black precipitation formed as no H_2S was produced. Finally, the isolated bacterial strain showed motility in the medium after 48 hours of incubation. As a part of the biochemical test for the identification of bacteria, citrate test was performed based on the citrate metabolism ability of the strain. The isolated bacteria showed positive result in Simmon's citrate agar, because the colour of medium changed from green to royal blue, which indicated the isolated bacteria were capable to utilize citrate. Kligler iron agar is a complex medium that contains a large amount of lactose and a very small amount of glucose; a pH indicator (yellow in acid and red in base); and iron, which is precipitated as a black sulfide if H_2S is produced. In the study, no H_2S was produced, but the resulting yellow colour showed that the isolated pathogen was lactose and glucose fermenting bacteria. In tween 80 hydrolysis test, the inoculating medium showed crystal precipitation by hydrolyzing tween 80. Esterase hydrolyzed the tween and subsequent precipitation with the calcium chloride appeared as a turbid zone around the bacterial colonies. Change in the colour of TSI medium pointed out towards the positive result where yellow colour of both slant and butt indicated the isolated bacteria were glucose and lactose fermented microorganism. It produced a large amount of acid which turned the phenol red indicator into yellow colour in both butt and slant, but no H_2S was formed in the medium. The bacterial isolate was incubated into the urease media at $37^\circ C$ and the result was observed after 48 hours of incubation. The agar slant remained yellow and the isolated bacteria did not hydrolyze urea. So, urease test was negative for the isolated bacteria. In MacConkey agar test, the isolated bacteria were grown on MacConkey agar medium which indicated that they were gram-negative enteric bacteria. It also showed that it was capable of fermenting lactose producing pink color around the colony. In potassium hydroxide (KOH) test, the bacterial smear became a viscous, stringy, sticky mess within 15 seconds when picked up with a loop that confirmed positive result. In mannitol salt agar test, the bacteria fermented mannitol and resulting acidic byproduct responsible for the phenol red in the agar to turn yellow. The catalase test was performed to identify organisms that produce the enzyme- catalase. This enzyme detoxifies hydrogen peroxide by breaking it down into water and oxygen gas. After inoculating the bacteria with hydrogen peroxide on the clean slide, the bubbles resulting from production of oxygen gas clearly indicated that the strain produced positive result for catalase production.

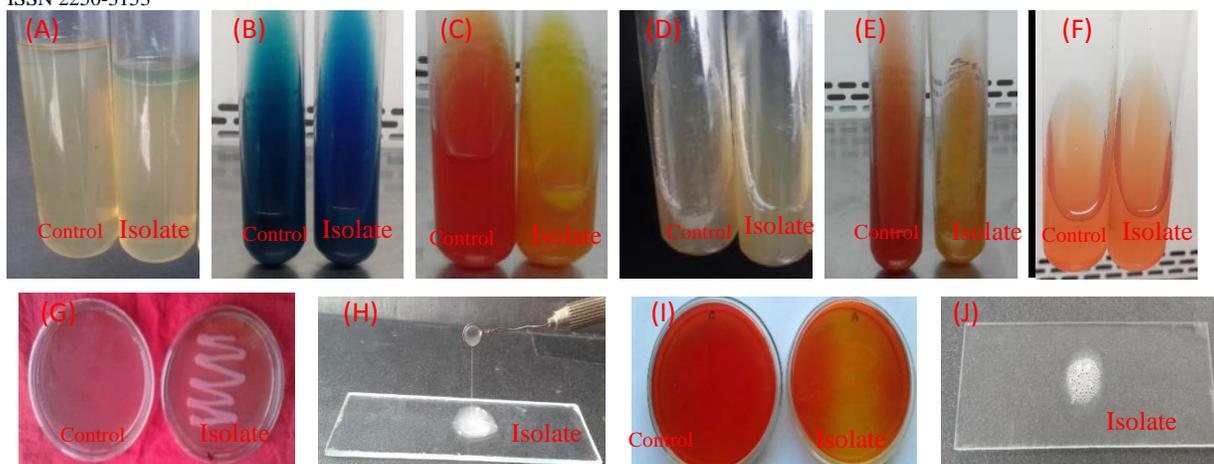


Figure 2: Showing

biochemical characterization of isolated bacterial strain; (A) SIM medium test, (B) Simmon's citrate test, (C) Kligler Iron agar, (D) Tween 80 test, (E) Triple sugar iron test, (F) Urease test, (G) MacConkey agar test, (H) KOH solubility test, (I) Mannitol salt agar test and (J) Catalase test.

Table 1: Biochemical tests of isolated bacteria in different media

Name of the test	Response	Appearance	Remarks
Gram staining	-(ve)	Small, rod shaped, pink color colony	Pink color confirmed it was gram negative bacteria
SIM-medium test	+(ve), -(ve)	Motile, no H ₂ S and indole production	The bacteria was motile and did not produce any indole and H ₂ S
Simmon's citrate test	+(ve)	Royal blue color was produced	Isolated bacteria was capable to utilize citrate
Kligler iron agar test	+(ve)	Color changed from red to yellow	Acid was produced in test tube
Tween 80 test	+(ve)	Turbid zone around the colonies	The bacterial isolate was capable to hydrolyze tween 80
Triple sugar iron test	+(ve)	Yellow slants and butt	Isolated bacteria fermented glucose and lactose, but no gas and H ₂ S were formed
Urease test	-(ve)	Slant was yellow	It did not hydrolyze urea to ammonia
MacConkey agar test	+(ve)	Pink colour around the colony	Capable to ferment lactose
Potassium hydroxide test	+(ve)	Viscous and thread like slime	Isolated bacteria was gram negative
Mannitol salt agar test	+(ve)	Yellow colour around the colony	Mannitol was utilized
Catalase test	+(ve)	Presence of oxygen bubbles	Isolated bacteria produced catalase enzyme

3.3 Molecular characterization of isolated bacteria

Genomic DNA revealed sharp high molecular weight bands of DNA (Figure 3A). The sequence of 16S rDNA region of the bacterial strain was then amplified using universal bacterial specific primers 27F and 1492R through PCR. 16S rDNA amplified length was around 1400bp (Figure 3B). The data analysis revealed that the 16S of rDNA sequence of isolated bacterial strain showed 86% similarity with the original sequence of *Pseudomonas syringae*.

3.4 Phylogenic analysis

The 16S rDNA sequences of related bacterial strains were downloaded in FASTA format from GenBank. After that the downloaded data were aligned to construct phylogenetic tree (Figure 3c).

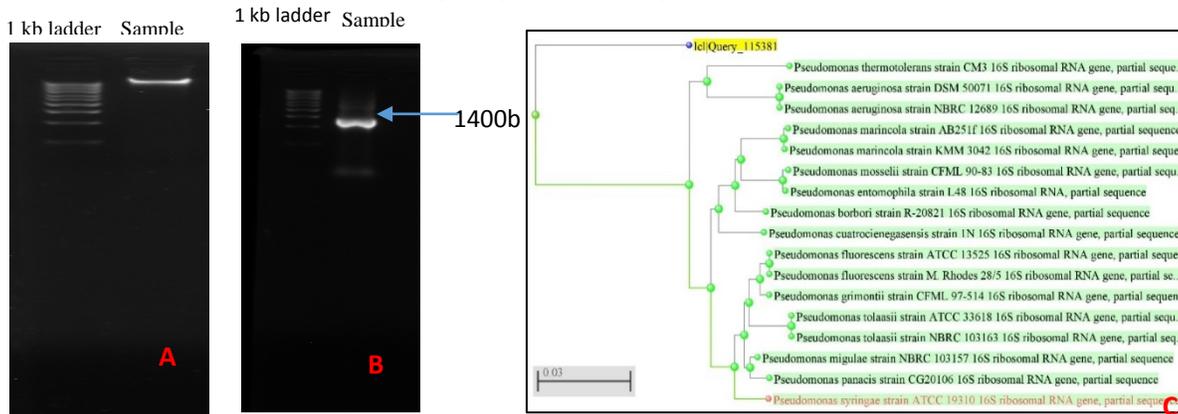


Figure 3: PCR amplification and phylogenetic tree, A) bacterial genomic DNA B) PCR product using agarose gel electrophoresis and C) Phylogenetic tree of isolated bacteria

3.5 Antibiotic susceptibility testing

The result showed that the pathogenic isolate was susceptible to cefixime, gentamycin 30 and intermediate resistant to nalidixic acid, cefotaxime, gentamicin 10, streptomycin, but resistant to amoxycilin, ampicillin, azithromycin, clarithromycin, doxycycline, erythromycin, kanamycin, neomycin, penicillin, rifampicin, tetracyclin and vancomycin.

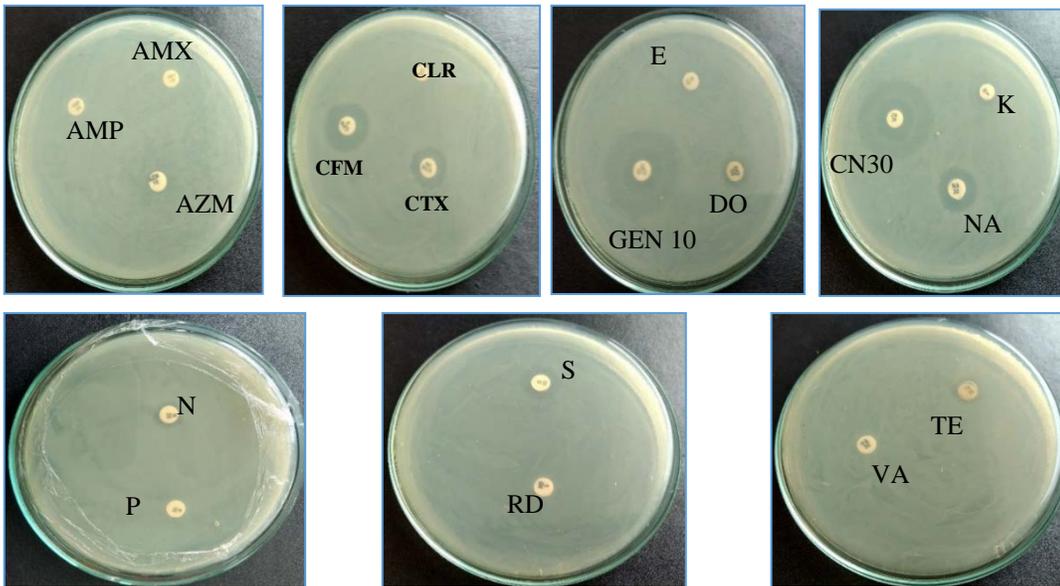


Figure 4: Antibiotic susceptibility testing against bacterial isolate

Table 2: Antibiotic susceptibility test of isolated bacteria

Name of antibiotic	Disc potency (µg/disc)	Zone of inhibition (mm)	Response
Amoxycillin	10µg	6±0.0	Resistant
Ampicillin	10 µg	6±0.0	Resistant
Azithromycin	15 µg	6±0.0	Resistant
Cefixime	5 µg	17±0.5	Susceptible

Cefotaxime	30 µg	13±0.4	Intermediate
Clarithromycin	15 µg	6±0.0	Resistant
Doxycycline	30 µg	8±0.2	Resistant
Erythromycin	15 µg	6±0.0	Resistant
Gentamycin	10 µg	13±0.3	Intermediate
	30 µg	15±0.4	Susceptible
Kanamycin	30 µg	8±0.2	Resistant
Nalidixic acid	30 µg	14±0.6	Intermediate
Neomycin	30 µg	8±0.3	Resistant
Penicillin	10 µg	6±0.0	Resistant
Rifampicin	5 µg	6±0.0	Resistant
Streptomycin	10 µg	12±0.3	Intermediate
Tetracyclin	30 µg	8±0.2	Resistant
Vancomycin	30 µg	6±0.0	Resistant

3.6 Screening for the antimicrobial potential of the plant extracts

The highest antimicrobial activity was found 10±0.5mm diameter of inhibition zone at 30 µl/disc concentration by methanolic extract of *Azadirachta indica* and *Allium sativum* respectively, against the isolated bacteria. Besides that *Moringa oleifera* and *Coccinia grandis* showed 8±0.4mm and 8±0.3mm diameter zone of inhibition at the concentration of 100µl/disc. On the other hand, *Cassia alata*, *Hibiscus rosa-sinensis*, *Ficus racemosa* and *Psidium guajava* showed no anti-bacterial activity against the isolated bacterial strain (Table not given).

3.7 Screening of antagonistic activity of soil bacteria

In antagonistic activity of soil bacteria, the *Rhizobium* from *Vigna mungo* showed 8.0±0.2mm zone of inhibition at 40µl/well concentration but others did not show any remarkable activity.



Figure 5: Showing the soil bacteria and antagonistic activity A) *Pseudomonas*, B) *Rhizobium* from *Cicer arietinum*, C) *Rhizobium* from *Vigna mungo*, D) *Brevibacillus*, E) co-culture of *Rhizobium* from *Vigna mungo* against isolated bacteria

4. Discussion

Bitter melon, *Momordica charantia* L. is one of the most popular vegetable of Cucurbitaceae family in the tropical and subtropical countries [49, 50]. Bitter melon is commonly attacked by a number of diseases that are of national importance and cause important economic losses in this vegetable [51, 52]. Angular leaf spot of bitter melon is a world widely distributed disease generally

considered to be caused by *Pseudomonas syringae* [53, 54] responsible for 80 to 100% disease incidence in previous epidemics [55] causing severe damage to the yield of bitter gourd [56]. The symptoms of angular leaf spot include small, round to irregular, water-soaked lesions which may or may not have a halo. The foliar lesions of disease infected plant became angular as they grow, and tan to brown in color in matured stage. These symptoms were similar described by Zitter *et al.*, [61].

The bacteria isolated from the disease infected leaves showed similar characteristics of the genus *Pseudomonas* and confirm the characteristics for the inclusion in the group of *Pseudomonas* bacteria [58]. The phenotypic description of the isolated bacteria is the same as genus *Pseudomonas*. The bacterial Colonies found from the angular leaf spot of bitter gourd plant were creamy white, small to medium, convex, and mucoid on LB agar medium. Aksoy, [59] reported that the *Pseudomonas spp.* isolates were able to produce round or circular domed shaped colonies that supports our findings. In our investigation, the isolated bacteria was rod-shaped and showed negative result in Gram staining test which in line with the study of Shila *et al.*, [60] and Scortichini *et al.*, [61]. The concerned bacterial strain didn't produce any indole or H₂S, but showed motility in the SIM medium which was also reported by Hirano and Upper [62].

According to Brown *et al.*, [63], utilization of citrate changes the Simmon's citrate agar medium from green to royal blue, which indicated the isolated bacteria was positive for the test. Our bacteria showed similar result that confirmed the isolated bacteria was capable to use citrate. Kligler iron agar recommended by ISO committee for identification of *Pseudomonas* species [64] showing positive result enabled the differentiation of species of the enteric bacteria. In tween 80 hydrolysis test, the inoculating medium produced crystal precipitation by bacterial isolate through hydrolyzing tween 80 [65]. In TSI agar medium, the isolated bacteria fermented the carbohydrates and its byproduct changed the colour of medium [66, 67]. The colour of medium used for the urease test was not changed after 48h of bacterial inoculation which indicated negative result that was similar with the findings of Bailey and Scott, [68]. In MacConkey agar test, the bacteria were grown indicated that they were gram-negative enteric bacteria. In case of the KOH solubility test, the bacterial colonies produced thread-like mass when mixed with 3% KOH solution [69]. The isolate was capable to utilize mannitol which was similar with the previous study [70]. The isolate was able to produce catalase enzyme in catalase test whereas the study of Carpena *et al.*, [71] proved our finding.

Bactericidal antibiotics induced bacterial cell death by inhibiting synthesis of bacterial cell wall, DNA or RNA, proteins, competitive inhibition of folic acid or act as membrane disorganizing agents [72, 73]. The antibiotic susceptibility assay was examined where the result showed that the pathogenic isolate was highly susceptible to cefixime and gentamycin 30. Akinbowale *et al.*, [74] also observed *Pseudomonas spp.* were sensitive to gentamycin. Our finding was also supported by Hossain *et al.*, [75] where cefixime inhibited the bacterial growth to a great extent [76].

The pathogen was resistant to some antibiotic such as doxycycline, tetracyclin, vancomycin etc. The findings of the present study have been supported by Basak *et al.*, [77], Akter [78] and Chowdhury [79]. *Pseudomonas syringae* showed resistance against doxycycline in their investigations. Tetracycline also didn't have negative effect on the growth of the pathogenic bacteria [80].

The antimicrobial activity exhibited by various plant extracts against harmful bacteria has been demonstrated by several researchers [81-84]. Recently, there have been many reports stated that some plant extracts and safe chemicals become a necessary to control many diseases of vegetable plants [85-88]. In the antibacterial assay, *Azadirachta indica* (neem) and *Allium sativum* (garlic) revealed the highest zone of inhibition against the pathogen among all plant extract used. According to Nahak and Sahu [89], neem extract showed significantly better performance over control of *Pseudomonas syringae* by 41.93%. The study of Guo *et al.*, [90] also showed the antibacterial effect of garlic against *Pseudomonas syringae* which supported our findings.

Antagonistic bacteria play an important role in the suppression of plant diseases, and can be used as biological control agents [91, 92]. In the study, the antagonistic activity of *Rhizobium* from *Vigna mungo* were evaluated as highest antibacterial effects, 8.0 ± 0.2 mm zone of inhibition at $40 \mu\text{l}$ /well concentration. Various strains of *Rhizobium spp.* and *Trichoderma spp.* have been described as effective biological control agents antagonistic to many plant pathogens [93, 94]. Various traits expressed synchronously, or in a controlled sequence, are considered responsible for the action of *Rhizobium* strains as biological control agents [95, 96]. Sequencing of 16S rDNA is a molecular technique for characterization of bacteria and the tool involved is to analyze the phylogenetic relationship of an organism. The nucleotide BLAST search in GenBank using 1389bp of 18S rDNA sequence revealed that the isolated bacteria showed 86% similarity with the original sequences of *Pseudomonas syringae*, as previously observed from partial 16S rDNA sequencing. The phylogenetic tree generated from GenBank proved that this organism genetically related with other organisms.

5. Conclusion

The disease, angular leaf spot is one of the most prevalent disease in bitter melon responsible for huge economic loss of the farmers. The devastating bacterial disease of bitter melon caused by *Pseudomonas syringae* is a Gram-negative, rod shaped motile bacteria. The present study involved isolation, biochemical and molecular characterization of the pathogen followed by assessment of some eco-friendly control measurement through antibiotics, plant extracts and soil bacteria. The antibiotic, especially cefixime, and the medicinal plant extract, neem had benign effect against the bacteria in the study. Besides that *Rhizobium* from *Vigna mungo* also showed prominent inhibitory effects on the phyto-pathogen in the antagonistic test. These biological prevention will ultimately favour safer management of the detrimental bacterial disease.

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Author contributions

MEKC, MAI, BS and MFH designed the experiments, developed the methodology and prepared the manuscript. MEKH, MSA, BS and MFH collected the data and carried out analysis. MSA, MAI and BS assisted with manuscript preparation.

Author statement

All authors read, reviewed, agreed and approved the final manuscript.

Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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Relationship Between Degree of Myopia and Stereoscopic Vision in Junior High School Students

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Introduction

Stereoscopic is the depth perception of an object seen by good binocular vision of both eyes, where 2-dimensional shadows falling on the retina are transformed into 3-dimensional shadows. One factor that causes interference with one's vision is myopia. Myopia is a refractive disorder that has a high prevalence in school-aged children and is likely to affect stereoscopic visual impairment in children.

Method

This research was observational analytic with cross sectional study method. The research subjects were Al-Azhar Medan Junior High School students with myopia refraction abnormalities and then a stereoscopic vision test was performed using Titmus Fly Test.

Results

Of the total 75 children, there were 46 mild myopia, 24 moderate myopia, and 5 severe myopia. The statistical test found a relationship between myopia and stereoscopic vision ($p = 0.001$) and there were significant differences in stereoscopic vision between each degree of myopia ($p = 0.001$).

Conclusion :

There are significant differences in stereoscopic vision between patients with mild, moderate and severe myopia. Stereoscopic vision in children with moderate myopia and severe myopia is worse than children who suffer from mild myopia

Keywords: Stereoscopic vision, myopia, Titmus Fly Test, Children.

1. INTRODUCTION

Stereoscopic is the depth perception of an object seen using good binocular vision of both eyes, where 2-dimensional shadows falling on the retina are transformed into 3-dimensional shadows. Good stereoscopic vision is very useful in assessing and understanding the object being seen. Good binocular vision will have good stereoscopic vision.¹

Impaired stereoscopic vision can interfere a person's activities in daily life, where a person will find it difficult to assess objects that require good three-dimensional or stereoscopic assessment. Good stereoscopic vision is influenced by the good sensory fusion and motor fusion. Clinically, stereoscopic vision examination is often used as an initial screening of eye examination.¹

One of the causes of stereoscopic vision reduction in a person is the presence of refractive abnormalities such as myopia, hypermetropia or astigmatism. This is because the conditions for yielding a good stereoscopic vision are not fulfilled. From some refractive disorders, myopia is a refractive disorder that has the high prevalence.^{2,3}

II. METHOD

This research is a research with a cross sectional study design and approved by the ethics committee of the Faculty of Medicine, University of North Sumatra. The research subjects were third grade students of Al - Azhar Junior High School in Medan who suffered from myopia from June to July 2018. The total sample was 75 students who suffered from myopia included in the inclusion criteria consisting of mild myopia 46 children, moderate myopia 24 children, myopia weight of 5 children. The subjects then performed a stereoscopic vision test using Titmus Fly Test. All data is entered with SPSS (IBM SPSS Statistic for Windows, Version 19.0). One way Anova test (difference in mean stereoscopic vision score between myopia groups) was used for analysis. $p < 0.05$ was considered significant.

III. RESULT

This research was conducted from June 2018 to July 2018 to Al Azhar Junior High School children who met the research criteria. The number of samples in this study were 75 children. This study was divided into three groups: mild myopia, moderate myopia, and severe myopia. In children who met the inclusion criteria, a visual examination and correction of refractive abnormalities are carried out and a stereoscopic test is performed using Titmus Fly Test. In this study several factors that influence stereoscopic vision such as history of eye surgery, infection, eye muscle abnormalities have been excluded so as not to influence the results of the study

Table 4.1. Characteristics of the research subject

Characteristics	n	Percentage (100%)
Characteristics		
• Male	27	36 %
• Female	48	64 %
Age		
• 13 years old	31	41,33%
• 14 years old	40	53,33%
• 15 years old	4	5,33%
Severity of the Miopia		
• Mild	46	61,33%
• Moderate	24	32,00%
• Severe	5	6,66%

In table 4.1 above shows that more girls have refractive disorders that are 48 (64%) compared to boys, 27 children (36%). From the age characteristics it was found that at the age of 14 years the highest number of respondents experienced refractive abnormalities which amounted to 40 children (53.33%), while respondents aged 13 years amounted to 31 children (41.33%) and respondents aged 15 years amounted to 4 children (5.33%) of all respondents. In the degree of myopia, it was found that the mildest degree of myopia was 46 children (61.33%), moderate myopia totaling 24 children (32%), and severe myopia totaling 5 children (6.66%).

Table 4.2. Stereoscopic measurement results

Miopia Groups	n	Stereoscopic vision (arc seconds)		p.
		$\bar{x} \pm SD$	[min-max]	
• Mild	46	26,80 ± 6,652	[20 – 40]	0.0001
• Moderate	24	44,21 ± 11,375	[20 – 63]	
• Severe	5	85,20 ± 20,266	[63 – 100]	

One way Anova test in Table 4.2 above shows a difference in the mean stereoscopic vision score between myopia groups (p = 0.0001). Furthermore, to see the average different stereoscopic vision scores can be seen in Table 4.3.

Table 4.3. Description between groups of myopia with stereoscopic vision

Myopic groups	P
Mild – Moderate	0.0001
Mild – Severe	0.0001
Moderate – Severe	0.0001

From table 4.3 it can be seen that there are significant differences in stereoscopic vision between mild myopia and moderate myopia groups (p = 0.0001). Significant stereoscopic vision differences were also found between mild myopia and severe myopia and between moderate myopia and severe myopia groups (p = 0.0001).

IV. DISCUSSION

Stereoscopic vision is the highest level of binocular vision in humans. Stereoscopic itself is a binocular visual ability that is used for three-dimensional vision resulting from the neural process of stimulation in the retinal area that differs horizontally in the functional area of Panum1,5. The development of stereoscopic vision will gain more development since the age of 5 years. According to Hriros et al., It was found that reduced stereoscopic vision was associated with decreased performance requiring hand and eye coordination and visual motor skills in school-age children.⁴

To produce good stereoscopic vision, there are a number of conditions that must be fulfilled, namely the normal driving muscles of the eye, there are no abnormalities in the peripheral and central visual nerves, no anatomical defects are found and no interference in the refraction field.^{1,5}

In patients with myopia, shadows that occur form greater disparity of the retina which causes a decrease in the formation of shadow fusion which causes a decrease in the level of depth of binocular vision which will ultimately affect stereoscopic vision.³

Titmus stereotest, is one of the contour tests commonly used for stereoscopic tests in children, which can assess various differences from 3000 to 40 arcseconds. Good binocular function is very important for stereoscopic vision development.⁶

In table 4.1, it can be seen that the highest frequency of subjects suffering from myopia is women. By using the chi square test obtained p <0.05. This shows there is a relationship between sex with the occurrence of refractive abnormalities. The results of this study have similarities with the research of Rosman M. (2009) and Favhrian (2009). According to Rosman M (2009) research, refractive abnormalities are more common in women than men (61.1% versus 49.3%). While the results of

Fachrian's research (2009) showed that the number of female respondents (53.2%) was more than men (46.89%). Women have longer eyeball axial lengths, and have a vitreous chamber that is deeper than men. This allows women to have a higher refractive disorder than men.^{7,8}

In table 4.2 shows the relationship between myopia and stereoscopic vision, where the higher the degree of myopia causes shadows falling on the retina are not identical and cannot be fused well, in some literature it is also explained that someone who has a high myopia disorder that is not well corrected and can cause esophoria and exophoria which can aggravate stereoscopic vision. This study is in line with previous studies by Pratjahja which stated that the occurrence of uncorrected refractive abnormalities such as myopia can cause a decrease in the quality of stereoscopic visual acuity.⁵ Also in line with the research of Lai L et al in Taiwan and Kah Chung's research, it is said that myopia is closely related to phoria and tropic events which can interfere with one's stereoscopic vision.

Research similar to this study was conducted by Ju Wen Yang in Taiwan. However, Ju Wen's research emphasizes mild-moderate anisometropia in patients with myopia.¹⁰

In table 4.3 illustrates the relationship between the degrees of myopia with stereoscopic vision, where it was found that the more severe the degree of myopia, the greater the decrease in stereoscopic vision of a person. In some libraries, it is stated that the greater the horizontal retinal disparity that occurs in the Panum area caused by the more severe refractive abnormalities, the lower the depth of stereoscopic vision due to shadows formed in the peripheral area of the Panum area. This study is similar to a study by Chanchal G et al., Which states that myopia > 3D is closely related to a decrease in a person's stereoscopic vision.⁸ Another similar study was conducted by Farid Setiawan et al., The study was conducted on adults whose eye development was perfect and TNO Stereotest was used as a stereotest test that is rarely used in children and found no significant results between mild myopia and severe myopia to stereoscopic vision.¹¹

IV. CONCLUSION

Of the 75 children, it was found mild myopia in 46 children, moderate myopia 24 children, severe myopia 5 children. From the statistical test, there is a correlation between the increase in the degree of myopia and the decrease in stereoscopic vision with a value of $p = 0.001$.

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Basic Oral Health Care Knowledge of Primary Health Workers Appraisal for Oral Health Education Program

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Abstract- Oral health is the most neglected area of public health that needs emphasis on developing global and local policies and intervention on oral health promotion and oral disease prevention. In the country, the Barangay Health Workers (BHWs) as the primary health care service providers must be trained so that they can deliver basic oral health care messages on oral disease prevention and timely referral. This study determined the basic oral health care knowledge among BHWs through descriptive survey method. The validated researcher-made questionnaire was distributed to selected 132 BHWs from different barangays in Ozamiz city. Results revealed that majority of BHWs had no proper oral health training in the last five years. They were highly knowledgeable about the relationship and effects of oral health to general health, structures, and functions of the oral cavity and screening and recognition of observable oral disease and disorders. The BHWs had less knowledge of basic oral hygiene and necessity of dental visit. Statistical analysis showed that the number of years in service and educational attainment among BHWs affect their knowledge on relationship and effects of oral health to general health and necessity of dental visit. When BHWs know the relationship of oral health to general health, they can recognize any observable oral disease and lead them to recommend for a dental visit. The high knowledge of BHWs should be reinforced with training so that they will acquire the necessary competency, skills, and approaches needed to deliver basic oral healthcare messages and referral services.

Index Terms- barangay health workers, healthcare messages, health education, oral health

I. INTRODUCTION

Public health is the effort to promote physical and mental health and prevent disease, injury, and disability at the population level. It is concerned with the health care of all people and concentrates on the health of a population as a whole, rather than the treatment of an individual. [1] It is also the practice of managing threats to the health of the community. [2] In the World Oral Health Report, [3] oral diseases are the major public health problem and that increased emphasis on developing

global policies in oral health promotion and oral disease prevention.

Oral health is one of the most neglected areas of public health. The seeming overlook on oral health was manifested even in the number of WHO staff that totaled 8,000 globally, but only three professional level staff work exclusively for oral health. [4]

The necessity of good oral health is essential since poor oral health has significant social and economic consequences. [5] Poor oral health also has a detrimental effect on the children quality of life, their performance in school and their success later in life: healthy mouth enable an individual to speak, eat, and socialize without experiencing active disease, discomfort, and embarrassment. [6] Accordingly, children who suffer from poor oral health are 12 times more likely to have restricted – activity days, and that more than 50 million school hours are lost annually because of oral health problems which affect children's performance at school.

Many issues impact public oral health, one of the most important is access to dental care. The reasons were numerous: one is that even in developed countries like the U.S. a critical shortage of dentists exists, others include many individuals lack the financial resources or transportation to obtain dental care. Ineffective infrastructure also exacerbates dental health disparities with the practice of dentistry largely remaining in the private sector. Thus, the population who need dental care the most are often left without access to it. [7]

In the Philippines, the main oral health problems are dental caries or tooth decay and periodontal disease or gum disease. [8] These two oral diseases are so widespread that 87% of Filipinos are suffering from tooth decay and 48% have gum disease. [9] Accordingly, the combined ill effects of these two major diseases (except oral cancer) weaken bodily defense and serve as a portal of entry to other more serious, potentially dangerous and opportunistic infections overlapping other diseases present. Such will incapacitate a young victim as in crippling heart conditions arising from an oral infection that may end in death.

Locally, the Community Health Living Standards Survey (CHLSS) revealed that 82.7% of children ages 1-7 years old were not able to have a dental check-up for the past 6 months before the survey. In another study by Misamis University for the Bureau of Local Government Supervision (BLGS) of Department of Interior and Local Government (DENR) : the Citizen Satisfaction Index System (CSIS) of 2013-2014, [10] in both cities of Ozamiz and Oroquieta, basic

dental/oral hygiene got the lowest in 3 categories namely: awareness, availment and satisfaction. This was also aggravated by the study of Misamis Occidental IPHO that the dentist population ratio is one dentist for every two municipalities or an average of 1 dentist to 30,000 population.^[11]

Since dental care and services are often beyond the reach of most individuals globally, the best approach to achieve public oral health care is through Primary Health Care. This study determined the basic oral healthcare knowledge among primary

II. METHODOLOGY

The study employed a descriptive survey method using a researcher-made questionnaire to gather data. The questionnaire composed of six parts: I-basic information; II-training and experience; III-knowledge on oral health among the respondents (relationship and effects of oral health to the general health, structures and functions of the oral cavity and basic oral hygiene); IV-knowledge on screening and recognition of observable oral disease and disorders; V-knowledge on the necessity and practices of dental visit; and VI- availability of oral health providers in the community. Before sampling, the questionnaire was evaluated by three experts and pilot testing was conducted to ensure the reliability and validity of the research instrument.

Questionnaires were distributed to a total of 132 randomly selected Barangay Health Workers from 32 barangays of Ozamiz City. The researchers explained the purpose of the study, anonymity, and confidentiality of responses and the right to participate or refuse to the respondents before the conduct of the survey. To supplement results, the Focus Group Discussion (FGD) was conducted to obtain information and understanding of the basic dental/oral health issues and needs faced by primary health workers or the BHWs regarding primary oral health care in Ozamiz City. The gathered data were analyzed using the descriptive and inferential statistics. The frequency and percentage distribution were used to describe the demographics of BHWs, their training they attended and the different sources of their knowledge and information. Average weighted value (AWV) was computed per knowledge and interpreted as follows: (2.66–3.00 –High Knowledge; (1.33 – 2.65) – Less Knowledge; and (1.00 – 1.32) – No Knowledge.

The significant difference in the knowledge on basic oral health when grouped according to age, civil status, highest educational attainment and number of years in service was determined using the one-way variance analysis (ANOVA). The correlation among different areas of basic oral healthcare knowledge was determined using the Pearson r correlation for $P < 0.05$ and 0.01 .

III. RESULTS

Basic Information of the Respondents

Results of the study show that all the respondents are female and the majority of them belong to 41-50 years old. However, there are several primary health workers belong to “senior citizen” age on which 3% of them aged 70 years old and above. Almost all of the respondents are married and finished their secondary years. Regarding the number of years in service, many primary health workers served for more than ten years followed by those who worked for 1-3 years. A higher number of

healthcare providers in Ozamiz City. Primary health workers of the LGUs in the barangays, locally known as Barangay Health Workers (BHWs) are the primary health service providers. The findings will be utilized as a basis for a community based oral health education program through the BHWs that will address the perceived lack of basic dental/oral health knowledge and low availability of oral health care services among residents in Misamis Occidental.

respondents working mainly as primary health care worker or Barangay Health Care Worker (BHW). Only a few of them have another means of livelihood which include small business, farming, and laundry.

Primary healthcare workers belong to the women’s organization of each barangay. Some of them also participated religious organizations such as Gagmayng Simbahanong Katilingban (GSK), Couples for Christ, IFI org, and Church Council. Several of the respondents are beneficiaries of the government programs including the Pantawid Pamilyang Pilipino Program (4Ps) and Senior Citizen organization. Other BHWs joined the cooperatives and other lending institutions.

Training and Experience

Based on the result, only a few barangay health care workers had attended training for the last five years, and only one claimed that she attended dental care and learned that tooth brushing must be conducted twice a day (Table I).

Table I: Training attended by primary health care workers in the last five years

Trainings Attended	Number of Responses	Sponsoring agency	Skills, Knowledge, and Approaches (SKA) learned and acquired
Family Planning	2	DOH/LGU-CHO	Birth control, Mothers will become healthy
Disaster	2	DRRM	Love for the environment
Nutrition	1	DOH/LGU-CHO	Good nutrition is important.
Dental Care	1	DOH/LGU-CHO	Toothbrush twice a day
Cari	1	LGU-CHO	To determine children with pneumonia
Environmental Sanitation	1	LGU-CHO	How to clean the surrounding
Others : TB DOTS, etc.	2	DOH/LGU-CHO	Avoid cigarette, Prevention of TB, Regular intake of medicine
No Training attended	122		

Knowledge / Awareness of Oral Health

A. Knowledge of Relationship and Effects of Oral Health to General Health

Table II shows that primary health care workers have high knowledge on relationship and effects of oral health to general

health. They considerably know that good dental health leads to a sense of well being and confidence. Respondents also had a high knowledge that pains in the mouth and teeth may lead to an inability to do work and absenteeism. However, respondents had less knowledge that gum diseases can complicate systemic diseases. They were not well versed that periodontitis will have an adverse impact on systemic health.

Table II: Knowledge of PHWs on relationship and effects of oral health to general health

Statements	WV	VI	Rank
1. Gum diseases such as d diseases can complicate systemic diseases such as diabetes, infective endocarditis, and others.	2.23	Less Knowledge	5
2. Mouth maybe a reservoir for bacteria which are causes of dental infections and other infections such as tonsillitis, and increased risk of pneumonia.	2.87	High Knowledge	3
3. Edentulousnesresult to impaired ability to chew and can lead to malnutrition	2.66	High Knowledge	4
4. Good dental /oral health leads to a sense of wellbeing and confidence	2.96	High Knowledge	1
5. The pain of infection in the mouth and teeth result in an inability to do work and absenteeism from school.	2.94	High Knowledge	2
Composite Mean	2.73	High Knowledge	

B. Knowledge of Structures and Functions of the Oral Cavity

In the present study, primary healthcare workers have high knowledge of the structures and functions of the oral cavity. They profoundly know that the mouth can be used to make music and even attract others and express oneself, that teeth are supported by the gums, and that tongue is essential for tasting and speaking (Table III).

Table III: Knowledge of PHWs on structures and functions of the oral cavity

Statements	WV	VI	Rank
1. Out teeth are used for chewing, as well as phonics	2.95	High Knowledge	5
2. Gums support our teeth.	2.98	High Knowledge	2
3. Our tongue is used for tasting and speaking	2.98	High Knowledge	2
4. Our mouth can be used to express ourselves, e.g., anger, happiness, etc.	2.98	High Knowledge	2
5. Our mouth can be used to make music, even attract others	2.99	High Knowledge	1
Composite Mean	2.98	High Knowledge	

C. Knowledge and Awareness of Basic Oral Hygiene

Table IV shows that the majority of primary healthcare workers have less knowledge of basic oral hygiene. They have the least knowledge on the replacement of toothbrushes after every illness. The BHws have high knowledge on the importance of eating fruits and vegetables in the gums and teeth, using of fluoride for stronger teeth and ways in the removal of food debris for good oral hygiene.

Table IV: Knowledge and awareness of PHWs on basic oral hygiene

Statements	WV	VI	Rank
1. Toothbrushing should be done at least Two (2) times a day.	2.14	Less Knowledge	6
2. Tooth brushes should be replaced every 6 months .	2.33	Less Knowledge	4
3. Using fluoride can make your teeth stronger	2.90	High Knowledge	2
4. Sharing of utensils like a spoon with a person who has carries can infect other persons.	2.24	Less Knowledge	5
5. Rinsing water after eating, flossing, and careful and judicious use of mouthwashes and toothpicks facilitates removal of food debris promoting good oral hygiene	2.83	High Knowledge	3
6. Eating fibrous , vitamin C and calcium-rich foods such as fruits and vegetables can help maintain healthy gums and teeth	2.98	High Knowledge	1
7. Tooth brushes should be replaced after every illness.	1.89	Less Knowledge	7
Composite Mean	2.48	Less Knowledge	

Knowledge and Skills on Screening and Recognition of Observable Oral Diseases and Disorders.

Table V shows that primary healthcare workers claimed that they are highly knowledgeable on screening and recognition of observable oral diseases and disorders. They know the different conditions that need to be referred, reported and consulted with the dentist or doctor immediately.

Table V: Knowledge and skills of PHWs on screening and recognition of observable oral disease and disorders

Statements	WV	VI	Rank
1. Any lumps, unusual growth and swelling of the mouth, neck, gums / maxillofacial area.	2.95	High Knowledge	1
2. Bleeding gums, pus and other fluids from tissues in the mouth.	2.95	High Knowledge	1
3. Trush and lesions.	2.83	High Knowledge	5
4. Red, white, yellowish, brownish or unusual color of the mouth area.	2.85	High Knowledge	3
5. Decayed, loose, sensitive, cracked, broken teeth	2.82	High Knowledge	6
6. Any feeling of dry mouth, burning mouth or tongue, and taste disorders/loss of taste, and unusual odor	2.84	High Knowledge	4
7. Saliva has a thick and ropy consistency as opposed to being thin and serous	2.60	Less Knowledge	7
Composite Mean	2.83	High Knowledge	

Knowledge of Necessity and Practices of Dental Visit

In this present study, primary healthcare workers are less knowledgeable about the necessity and practices of dental visit (Table VI).

Knowledge of Availability of Oral Health Service Providers

Among the several oral health practitioners in Ozamiz City, the majority of the primary healthcare workers only knew the dentist in the City Health Office. She is tasked with the tooth extraction in the City Health Office during Mondays and Fridays of the week.

Table VI: Knowledge of PHWs on necessity and practices of a dental visit

Statements	WV	VI	Rank
1. Dental check-up must be made every 6 months	2.46	Less Knowledge	5
2. Pregnant women must visit a dentist as soon as possible	2.76	High Knowledge	3
3. Upon eruption/coming out of temporary teeth of the children	1.52	Less Knowledge	7
4. Dental checkup can help prevent early oral o dental diseases	2.96	High Knowledge	1
5. Dental checkup and can determine treatment needs or correct existing periodontal disease	2.90	High Knowledge	2
6. Any disfigurement/malocclusion of the teeth.	2.67	High Knowledge	4
7. Regular dental check up can save you money.	1.75	Less Knowledge	6
Composite Mean	2.43	Less Knowledge	

Statistical analysis showed that the number of years of service among primary healthcare workers affects their knowledge on relationship and effects of oral health to general health and necessity and practices of dental visit (Table VII). Knowledge of structures and functions of the oral cavity dramatically differs among BHWs from different barangays. Educational attainment affects the knowledge of PHWS on basic oral hygiene and necessity and practices of a dental visit.

Table VII: One-way analysis of variance on the basic oral health care knowledge among the primary health care workers

Knowledge on	P value				
	Age	Civil Status	Highest Educational Attainment	No. of years in service	Barangay/ Residence
Relationship and effects of oral health to general health	.176	.931	.507	.040*	.640
Structures and functions of the oral cavity	.745	.894	.562	.450	.000**
Basic oral hygiene	.994	.163	.018*	.951	.426
Screening and Recognition of observable oral disease and disorders	.007*	.942	.219	.495	.010*
Necessity and Practices of Dental Visit	.831	.383	.044*	.016*	.076

** Highly significant at P<0.05

* Significant at P<0.05

Table VIII shows the correlational analysis among different areas of basic oral healthcare knowledge of primary healthcare workers. When the primary health care workers know the relationship of oral health to general health, they can recognize any observable oral disease and will lead them to recommend for a dental visit or consult the dental practitioners directly.

Table VIII: Pearson correlation analysis of the basic oral health care knowledge on the number of years of service of the primary health care workers.

	Relations hip and effects of oral health to general health	Structures and functions of the oral cavity	Basic oral hygiene	Screening and Recognition of observable oral disease and disorders	Necessity and Practices of Dental Visit
Relationship and effects of oral health to general health	-----	.088	.354	.006**	.090
Structures and functions of the oral cavity	.088	-----	.523	.672	.292
Basic oral hygiene	.354	.523	---	.292	.105
Screening and Recognition of observable oral disease and disorders	.006	.672	.292	-----	.001**
Necessity and Practices of Dental Visit	.090	.292	.105	.001**	----

** Correlation is significant at the 0.01 level and 0.05 level (2-tailed).

Sources of Knowledge and Information

The high knowledge of primary health care workers is mainly from the television Thirty-nine percent answered that their knowledge on oral health directly came from watching television and only 1% of the respondents' information was from the posters, leaflets, and billboards (Fig. I).

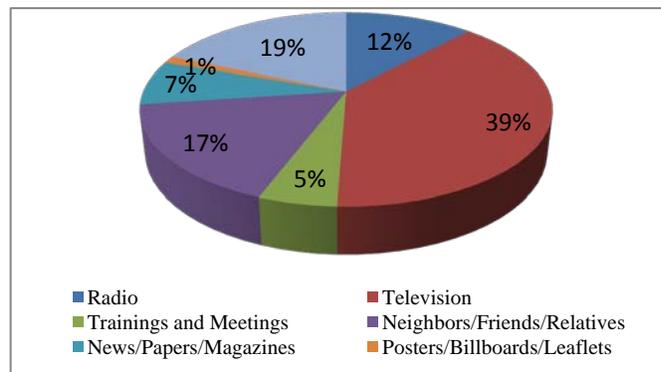


Figure 1: Sources of knowledge and information of primary health care workers

IV. DISCUSSION

The self-rated oral health has a distinctive role in people's perceptions of their overall health. The impairment of oral health quality has direct effects, on the individual's general quality of life and well-being. [12] The self-rated oral health is a significant factor in oral health status as well as overall well-

being among community-dwelling older Japanese people.^[13] In working-age adults, oral health impact can also be associated with the general health for those with more health problems.^[14]

Parents were absent from work due to the oral conditions of their preschool children.^[15] In the Philippines, the primary reason for school absenteeism and dropouts (about 40%) are due to illness on which a toothache is the most common.^[16] School absenteeism is also happening among secondary school students (aged 16-18 years old) in Ha'il Region of Saudi Arabia also due to a toothache.^[17] The unmet therapeutic dental need was associated with increased rates of absenteeism in U.S. school children.^[18]

Periodontitis will have an adverse impact on systemic health. Evidence showed that the inflammation caused by periodontal infections affects not only the direct oral environment but also the systemic organs.^[19] Recent studies have provided insights into the emergence and persistence of dysbiotic oral microbial communities that can mediate inflammatory pathology at local as well as distant sites.^[20] Periodontitis has the strongest association with the diabetes mellitus type 2 and cardiovascular diseases.^[21]

As primary health care service providers, it is vital to know the basic structures and functions of the oral cavity so that it is easier for them to maintain good oral health. They are the one who will provide the oral health messages to the members of the community, and they are most expected to have at least knowledge on the oral cavity.

Toothbrushes and spoons can play a significant role in disease transmission and increase the risk of infection since they can serve as a reservoir for microorganisms.^[22] Toothbrushes were found to be contaminated with twenty strains of bacteria belonging to five different species. These include *Escherichia coli* and *Enterococcus* species (10%), *Staphylococcus aureus* and *Staphylococcus saprophyticus* (20%), and *Pseudomonas aeruginosa* (40%).^[23] Toothbrush must also be replaced every six months, or less since the continuous use of the toothbrush will reduce its effectiveness in the plaque removal leading to increasing rate of gingival inflammation.^[24]

There are many oral health conditions that need to be referred or consulted to oral health practitioners, but the main reason among the people both from rural and urban areas is for emergency treatment.^[25] They only believed that dental check-up would just be of tooth extraction. Since people only go to the dentist mainly for emergency treatment and preferring service with minimal cost, they may not know of other private dentists in the area.

There was much information on oral health provided by television through advertisements, movies, and other programs that reach the broad audience including the primary health care workers. However, not everything what people can see on the television is always right.^[26] There are instances in which reports, programs, advertisements were criticized for the way the stories were presented. A critical analysis is needed by the BHWs in accepting and using the information from the television for better delivery of exact health messages to their constituents.

Training is vital for the development of knowledge and skills of BHWs to be more competent and for them to provide safe care and protection for those who will access the health

care services. It was only before that doctor or a dentist, or any other health practitioner in whatsoever health organization would deliver quality care all alone to satisfy his or her patients.^[27] With the development of healthcare and increasing demand for quality healthcare services at present, there must be a parallel growth of health care providers including the primary health care workers or BHWs.

V. CONCLUSION

The researchers conclude that primary health care workers are highly aware on many areas of oral health. The study suggests that they are open-minded and willing to accept ideas and adopt changes as necessary. Primary health care workers or BHWs were not adequately trained by dental/oral health professionals. Their high knowledge will not translate into the required skills and approaches needed to deliver basic oral health care messages, and referral services. Oral healthcare awareness seminar and training must be conducted with a focus on basic oral hygiene and the necessity and practice of regular dental visit. They should be trained with the basic detection skills on any observable oral disease that will facilitate the referral of clients.

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Enhancing Ambulatory Healthcare Using Health Effectiveness Data

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Abstract: This report presents the Health Effectiveness Data Information Set (HEDIS) as a means to measure health and promote quality care in a Georgia pediatric clinic. The primary factors under evaluation related to patient compliance, outcomes and follow-ups. HEDIS was developed by the National Commission on Quality Assurance (NCQA). The value of the HEDIS model lies in its use of national quality benchmarks and indicators – for a wide variety of health conditions. Traditional models of quality management and control are also presented using selected health centers and related legislation. This report also addresses provisions of the Affordable Care Act which was designed to promote healthcare quality and access; meanwhile reducing healthcare costs. As the Affordable Care Act, continues to unfold, quality models such as HEDIS will be useful in promoting national quality initiatives in various health systems.

Index Terms: Health Quality, HEDIS, Measurement, Quality Control

I. INTRODUCTION

The ASQ Quality Organization defined quality as the characteristic of a product/ service that is free of deficiencies. The organization further states that health providers can use quality improvement techniques to reduce medical errors and help to ensure patient safety.¹ Quality measures can also increase patient handling capacity and flow, which decrease wait times and potentially harmful delays in care. The results include more efficiency, cost effectiveness and better satisfied patients and health workers.²

Most Americans have access to health services. However, in 2007, 8% of adults, 18-64 yrs of age reported that they didn't get needed medical care due to costs.³ Governmental programs such as Medicare and Medicaid were specifically designed to increase access to healthcare services.

On March 23, 2010, U.S. President Barak Obama signed the Affordable Healthcare Act. The new law included comprehensive health insurance reforms that took place by 2014.⁴ The act also includes strategies and concerted efforts to improve the quality of care that Americans receive.⁵ The act has regulatory aspects that pressure markets to improve quality healthcare.⁶

Roskiv and McClellan (2011) purport that better data on the quality of healthcare being delivered in the United States are urgently needed if efforts to reform the nation's healthcare are to succeed.⁷ Quality measurement and reporting have emerged as important tools that providers, health plans, and other stakeholders can use to identify gaps in quality and focus resources on improving care.⁸

II.HISTORICAL OVERVIEW

Quality improvement in healthcare has a long history that includes epic figures such as Ignaz Semmelweis, the nineteenth century obstetrician who introduced hand washing to medical care; and Florence Nightingale, the English nurse who determined that poor living conditions were a leading cause of death of soldiers at army hospitals.⁹ Over the past fifty years, many approaches have been taken to promote quality healthcare with limited success.⁹ The desire to improve quality has prompted an increase in performance measures.¹⁰

Traditional models of quality began in the corporate setting and were later utilized in hospitals and other healthcare settings. The Joint Commission, founded as the American College of Surgeons, is one of the major accrediting bodies promoting healthcare quality and efficiency. Some of the traditional models of healthcare quality include: total quality control, continuous quality improvement, Little Q and Big Q, Performance Improvement, Zero Defects, The DMAIR (Design, Measure, Assess, Improve and Redesign), and Quality Circles / Quality Control.¹¹

III.THEORETICAL FRAMEWORK

The ultimate measure of the quality of the healthcare system is the health status of the community. Determination of quality of health in an area can be derived from indices of unnecessary disease, unnecessary disability and unnecessary untimely death.¹² Many definitions of quality refer to quality control which can be defined as the sending of messages which effectively control the behavior of the recipient. Quality control can also be referred to as a function of the system which provides direction in conformance to a plan, or in other words, the maintenance of variations from system objectives within allowable limits. Components of a control system include:

- A monitored characteristic or operational variable
- A monitoring device or method or
- A standard of performance for each monitored characteristic.¹³

There are extensive accounts of U.S. health care organizations undertaking quality improvement projects or techniques. For example:

CSC Healthcare, a St. Louis based non-profit healthcare system increased its market share to 18% over three years while three of its five competitors lost market share using quality improvement processes. Saint Luke Hospital of Kansas City's financial performance steadily increased for three years and client satisfaction scores ranked Saint Luke 35th out of 4,500 hospitals nationwide. Thibodaux Regional Medical Center, an acute care facility in southern Louisiana implemented an accounts receivable project which increased cash flow by \$2 million per year. An inventory reduction at the medical center achieved an annual cost savings of \$450,000 and a medication management project decreased defects by 42%. Likewise, Baptist Hospital, a Florida based healthcare provider's overall patient satisfaction rate rose into the 99th percentile for several years.²

In the late eighties, with the need for a wider spectrum of quality measures, the National Commission on Quality Assurance (NCQA) was founded.¹⁴ NCQA accredits managed care organizations. It also developed and placed emphasis on measures of population health and overall effectiveness of healthcare called the HealthEffectiveness Data Information Set - HEDIS.¹⁴

HEDIS, specifically, is a tool used by more than 90 percent of American healthcare plans to measure performance on important dimensions. Altogether, HEDIS consists of 75 measures across 8 domains of care. The widespread use of HEDIS makes comparability possible among similar health care organizations.¹⁵

Some of the HEDIS measures address health issues such as:

Asthma Medical Use

Persistence of Beta Blockers

Treatment after a Heart Attack

Controlling High Blood Pressure

Comprehensive Diabetes Care

Breast Cancer Screening

Anti-depressant Medication Management

Childhood and Adolescent Immunization Status

Childhood and Adult Weight / BMI Assessment.¹⁵

IV.CASE EXAMPLE

In 2010, a pediatric clinic located in a semi-rural Georgia community began utilizing HEDIS to assess the quality of care provided to its patients. Many of the clinic's patients were from impoverished families relied on sources such as Peach State to finance their healthcare services. More specifically, health studies have shown an association between income and health.^{16,17} The median household income in county was \$30,934 – as compared to \$41,994 at the state level.¹⁸ More specifically, the CDC reported that 2,605 people died in the county in 1999-2001. The county's death rate was 9 per 1,000, compared with 8 per 1,000 statewide. Cancer rates for the county were also higher than the state rate for the same period.¹⁹

In the general healthcare sector, quality improvement measures such as six sigma, Continuous Quality Improvement and Total Quality Management have been useful in enhancing healthcare quality– and tangentially reducing costs and minimizing diseases.¹¹ The pediatric clinic at the direction of the Medicaid providers, began using HEDIS to track patient compliance, health behaviors, health outcomes and adherence to follow up care schedules.

With a modest staff and a steady stream of patients (up to 120 weekly), the health providers wanted to make sure that their patients were receiving quality care. An electronic record keeping system was used for reviews. The reviews included the currency of pediatric immunizations, physicals, health checks, follow up visits and overall well-being. The health providers emphasized the effectiveness of a random listing of approximately fifty patients in the review cycle. Feedback of the reviews was communicated using HEDIS. Patients with less than optimal outcomes were contacted for re-entry into the pediatric clinic – to increase their treatment compliance levels and promote their health and well-being. While, the system is a quality enhancement / health promotion measure primarily, consequences for non-compliance led to reduced healthcare coverage for the patients. As a major benefit, the system allows for comparison of outcomes with clinics of the same type.

This introductory quality measure (HEDIS) is ongoing with aspirations for steady improvements in patient compliance, health promotion and health care service delivery.

V.SUMMARY

Quality measurement and reporting have emerged as important tools that providers, health plans and other stakeholders can use to identify gaps in quality and focus resources on improving care.⁸ Even so, novel methods and innovations are being explored to address the quality issue in healthcare. Even, the Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA) required the Department of Health and Human Services to identify and publish data on healthcare quality measures for the Children's Health Insurance Program (CHIP) or Medicaid.²⁰

McKethan, et al. 2011,²¹ reported the Beacon Communities' (17 communities) efforts to enhance quality and efficiency in health care using a nationally coordinated collaborative project. Internationally, countries such as Israel have even begun to systematically monitor quality of care.²² Comparability among plans is a central issue in quality measurement.⁸

The Health Effectiveness Data Information Set (HEDIS) provides a broad spectrum of indicators, is widely used and offers comparability among users. A Georgia pediatric clinic is making great strides in its use of HEDIS to improve healthcare quality and patient health. This model may be useful resource for many other healthcare organizations that aim to enhance the level of quality in their institutions.

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Functional Response of Diving Beetles *Dineutus Aereus* (Coleoptera:Gyrinidae) Feeding on Mosquito Larvae *Culex Pipiens* L.(Diptera:Cuilicidae).

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Abstract- This study was conducted to study predatory efficiency and functional response of females diving beetles, *Dineutus aereus*, when feeding on different densities of second and fourth stages of mosquitoes *Culex pipiens* larvae. Larval and pupae stages of mosquitoes were treated with predators. Results were observed 24 after treatment, tests were conducted at temperature at 25 ± 2 °C and humidity of $65\% \pm 5$ and 12 hours of illumination, the water beetles of *D.aereus* showed the maximum average consumption of 219.2 ± 15.23 larva / day for larval stage while the pupae stage showed less consumption than the rest of the stages with an average consumption of 69.6 ± 3.19 larva / day. Water beetles *D. aereus*, showed with 20 larvae from the second phase an average daily consumption of 17.20 ± 1.75 larva / day while 120 larvae of the second stage had an average daily consumption of 70.4 ± 8.87 larva / day, while 20 larvae of the third stage the average daily consumption was 13.5 ± 1.82 larvae / day and 120 larvae from the fourth stage the average daily consumption was 46.5 ± 2.52 larva / day. The increased functional response with increased prey density makes us classified the *D.aereus* predator as type II of Holling (1959) division. The results of the study of the time taken by the predator in the search larvae prey for of the second and fourth stages For mosquitoes *C.pipiens* that with increasing prey density of the rate from 20 to 120 larvae / predator / day led to a gradual decrease in the time of search for prey

I. INTRODUCTION

Biological control is one of the most important components of integrated pest control programs and predators are important biotic agents in reducing populations of insect pests. [1]. Predation of mosquitoes eggs, larvae, and pupae is an essential and important part of eliminating and reducing their numerical density [2]. The larvae and pupae are the most vulnerable to predators, where they are attacked by larvae and adults of water beetles from the family of Dytiscidae of the class Coleoptera [3]. The functional response of the predators was defined as the relationship between predatory density and predation rate within predator and predator system.[4]. It describes the rate at which the predator kills its prey with its different densities, which can determine the predator's efficiency in regulating prey populations, which is an important tool in determining the

success or failure of biotic control program [5]. The second type of functional response in which the prey's death is based on reverse density in which the population is very effective and achieves successful biological control [6]. The mosquito *C. pipiens* is one of the most common types of mosquitoes, if some mosquito larvae survive after predation, they become the most dangerous species in disease transmission [7]. The aims of this study is to show Predatory efficiency and functional response of diving beetles *D.aereus* against the various stage of mosquitoes *C.pipiens*

II. MATERIALS AND METHODS

Mosquitoes breeding

Multiple ponds have been selected in different locations in Salah AL-ddin Governorate where mosquitoes are frequent in these ponds because they are rich in organic matter. After preliminary water survey, different samples of these ponds were taken to cover the area to be studied, by a long-drawn scoop. Larvae and pupae were placed in plastic containers perforated to allow air access and were transferred to the laboratory and emptied into glass basins and supplied with chlorine-free water and yeast to feed larvae (30 mg per basin) and covered with soft membrane. [8]The study was conducted on laboratory conditions at temperatures 25 ± 2 C, relative humidity $65\% \pm 5$ and a 12 hour / day illumination period to the adult stage where mosquitoes were transported to aluminum cages (150 x 100 x 80 cm), designed by the researcher. The adult stages are fed on a concentrated glucose solution 7% continuously and when egg is needed, a pigeon is inserted into the cage because this type of mosquito prefers the pigeon as a source of blood breeding to enable the female to take the blood meal for 12 hours. Plastic vials are then placed inside the cage containing a quantity of water to lay eggs. The eggs are then transferred to metal trays of 30 x 30 cm non-rustic dimensions to breed the larvae after filling them with water and to add food made from bread crumbs and covered with soft membrane to protect them and not to allow any external insects to lay eggs in water. When the larvae reach the fourth stage and before they can not be moved to the white plastic containers covered with the top with a tightly closed hole and when the complete insects are pulled out by a special suction device.

Predators collected

The adult predators water beetles *D. aereus* collected from permanent water ponds and from some drainage channels in Salah AL-ddin Governorate. Predators were collected between December 2017 and July 2018. The predators were kept in the laboratory in glass basins. The dimensions of these glass basins were 60 x 50 x 40 cm. The predators were periodically fed to mosquito larvae until the date of expermination.

Predatory effectivness

To determine the predatory efficacy of predator on the incomplete stages of *C.pipiens* mosquitoes, six treatments were established, four of which included different larval stage of mosquitoes in addition to pupae stage as well as the control . Each treatment included four replicates . Controlled treatment containing the same number of larvae or pupae was without predator. Each tretment is done 300 larvae from each stage of larvae or larvae with one of the predators after being starved for 24 hours in a plastic container 30 x 20 x 10 cm filled with 500 ml of water and 24 hours after counting the number of larvae and pupae .The number of larvae and pupae Consumed by the predator and each larvae or pupae lost are calculated [9].

Functional response to prey density

For the purpose of estimating the functional response, the predator density relationship was used with the predator of the water beetle predators *D.aereus* were used with larvae density of (20, 40 ,60 ,80 ,100 , 120). The same tiend was done with second and fourth stage. as well as a control coefficient. Each treatment included four replicates..The number of larvae killed can be calculated by subtracting the number of larvae before the experiment. After 24 hours of exposure to predators, four replicates were used for the predators and the control treatment without predators. Time can be found in the search for prey according to the equation set by.

$$H_a = a \cdot H \cdot T$$

Where = H_a number of larvae consumed a = number of replicates H = larval density in studied repiate T = time of prey.

Table (1) Effect of Numerical density of prey in the study of the functional response of predator

Predators	The stage of prey	The density of prey
<i>D.aereus</i>	Second star	20,40,60,80,100,120
	Fourth star	20,40,60,80,100,120
	Second star	20,40,60,80,100,120
	Fourth star	20,40,60,80,100,120

III. RESULTS AND DISSCISION

Predatory effectivness

In this study , Table 2:showed predator *D.aereus* the highest average consumption was 219.2 larvae / day from the first stage, while the pupae stage showed less consumption than the rest of the stages with an average consumption of 69.2 larvae / day of *C. pipiens*(Fig.1). The experimental laboratory efficacy of predators of *D. aereus*, showed an increase in the mean stage of the first larval stage and a gradual decline of this medium in other larval ages and in the pupae phase The predatory ability rate of small-sized species has been highest predation rate , because the front legs of small-sized predators are more likely to catch prey [11]. The number of larvae of mosquito larvae significantly decreased, with all the larvae growing from first to fourth of stage . There was a significant difference in the number of pupae that preyed by predator *D. aereus*, . There was no significant difference between the larvae consumed during the second , and third stages, but the difference was significant between the first stages and others stages. The results showed that the mosquito larvae *C. pipiens* by predator *D. aereus*, which was inversely proportional to the larval age under laboratory conditions. The highest predation efficiency was compared stages to the first and second larval stages and significantly decreased the third and fourth larvae for all predators. This was due to the higher nutritional value for the first and second stages compared to the third and fourth stages [12].

Table 2: Mean average efficiency of predator *D.aereus* against *Cx.pipiens* under laboratory conditions

Predator	Larvae stage	Average predator ± standard deviation
<i>D.aereus</i>	First larval stage	219.2 ± 15.23 a
	Second larval stage	132.8 ± 11.81 b
	Third larval stage	122 ± 9.55 b
	Fourth larval stage	93.4 ± 8.2 b
	Pupae	69.2 ± 3.19 c

*Means in the column and attachment with the same letter did not differ significantly (ANOVA test at a significant level of 5%)

These results agree with[13]. which showed that the first and second larvae were more predatory than larvae This study found that the environmental conditions had a significant effect in the daily predation and was very low for the pupae compared to the larvae. The pupae are kept away from the predators . These

results agree with study [14] with a laboratory study that *Cypister tripunctatus* larvae in the second and third phases showed a high predatory ability to all the roles of *C.pipines* mosquitoes. This study agree with the study conducted in a laboratory study and field similar to the current study by [15]

which proved that *Agabus spp* beetles showed a high predatory ability against different larval of *C.pipines* showed an inverse correlation between the size of the predator and the predation process, small-sized predators showed more predisposition than predators of large size. The results of the [16] study on the submersible aquatic beetles *Eretes stictus* and *Dineutes aereus* correspond to the results of the present study, which showed that the first and second phase of *Culex perexiguus* mosquitoes is one of the most larval stages of prey.

IV. FUNCTIONAL RESPONSE

Functional response of predator *D.aereus*, for different densities of the mosquitoes *C.pipiens*

The functional response curve for the second stage of the predator *D.aereus* (Fig. 2) indicated an increase in the number of larvae consumed at a decreasing rate with increasing numerical density as the response curve gradually decreases until stright. The results of the statistical analysis showed that the number of prey consumed by predator increases with the density of these prey in the area around the predator table(3). The predator *D.aereus* the 20 consumed from larvae of the second stage at an average of 17.20 larva / day, and with the predator density increasing around the predator 40, 60, 80, 100 larvae / day The number of larvae consumed by the predator increased by 34.20 , 53.20 , 66.4 ,71.00 larvae / day, respectively. When there were 120 larvae, the predation decreased to a rate of 70.4 larvae / day. The results of the study of the time taken by the predator in the search for the second stage larvae of *C.pipines* showed that with the increase in prey density from 20 to 120 larva / predator / day, the gradua decrease in the time of prey was from 6.00 to 3.52 hours.

Table 3: Average consumption of predator female *D. aereus*, for different densities of mosquitoes *C. pipiens* with in 24 hours

Number of larvae	Larvae stage	Mean number of preyied larvae ± standard deviation	Predator search time for prey / hour
20	Second	17.20 ± 1.75 e	6.00
40		34.40 ± 2.82 d	5.81
60		53.20 ± 3.24 bc	5.58
80		66.4 ± 4.51 ab	4.81
100		71.0 ± 5.63 a	4.29
120		70.4 ± 8.87 ab	3.52

*Means in the column and attachment with the same letter did not differ significantly (ANOVA test at a significant level of 5%)

The functional response curve for the fourth stage of the *D.aereus* (Fig. 3) indicated an increase in the number of larvae consumed at a decreasing rate with increasing numerical density as the response curve gradually decreases until stright. The results of the statistical analysis show that the number of prey consumed by predator increases with the density of these prey in the area around the predator .The table(4) showed that the number of

larvae consumed by the predator was increased with the larvae density of the larvae in the area surrounding the predator. The predator *D.aereus* had 20 larvae of the fourth stage larvae with an average of 13.40 larvae / day, The prey of densities 40, 60, 80, 100 larvae ,The number of larvae consumed by the predator increased by 24.00, 39.60, 46.2, 49.6 larva / day, respectively. When there were 120 larvae, the predation decreased to a rate of 46.5 larvae / day . The results of the study and time taken by the predator in the search for the prey of the fourth stage larvae of *C.pipiens* that with the increase of the density of prey from the rate of 20 to 120 larvae / predator / day led to a gradual decrease in the time of search for prey from 5.59 to 2.61 hours.

Table 4: Average consumption of predator female *D. Aereus*, for different densities of mosquitoes *C. Pipiens* within 24 .

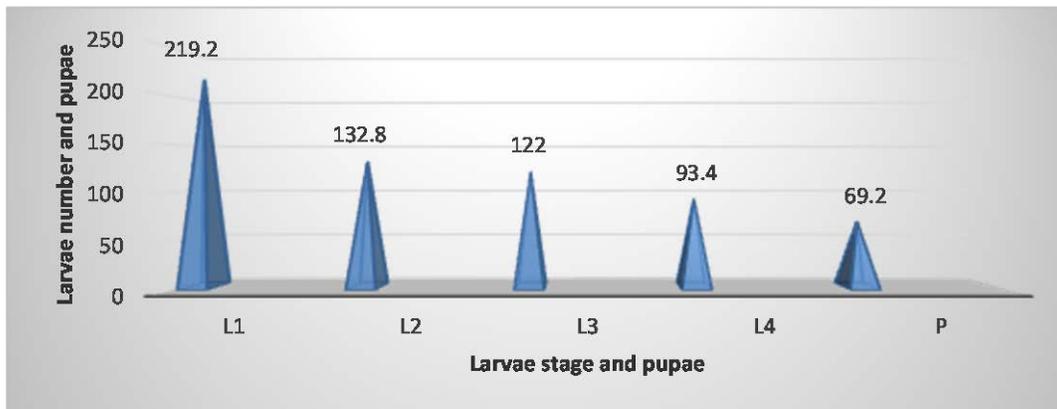
Number of larvae	Larvae stage	Mean number of preyied larvae ± standard deviation	Predator search time for prey / hour
20	Fourth stage	13.40 ± 1.82 e	5.59
40		24.20 ± 1.98 de	4.41
60		39.60 ± 2.53 cd	3.79
80		46.2 ± 3.59 bc	3.09
100		49.6 ± 2.64 a	2.89
120		46.5 ± 2.52 ab	2.61

*Means in the column and attachment with the same letter did not differ significantly (ANOVA test at a significant level of 5%)

The above results indicate that predator *D.aereus* follows the second type II [7] , the convex shape, as predator capacity increases with increased prey density and then reaches limit. The increase in predatory force is dependent upon increased. Number of second and fourth-stage insects of *C. pipiens* consumed by predator *D.aereus* increases exponentially by increasing the density of mosquito larvae but decreasing rapidly as mosquito larvae consumed at the first density are between 20-80 higher than the higher densities, making the curved shape fit into the shape of the pattern. The second type II of the functional response that preys by of different densities of prey, which is determined by the saturation of the predator and the processing time, is an inversely dependent [17]. The present study results are consistent with [18] in terms of the form of functional response or so-called mortality rate, despite the different type of predators used for the current experiments and the type of prey and its development. It is noted that the prey consumes the entire body of the prey in the low densities of the prey in the second and fourth stages to the larvae of mosquitoes, while in high densities we see the consumption of all the prey or part of the prey, leaving the legs, head, and part of the thorax region. This explains the increase in the number of larvae consumed partially or completely by the predator, apparently reaching a certain level kill or consume any larger numbers, which explains the level of the curve at densities between 120 - 80 larva / predator / day .The efficiency of any predator can be varied depending on the type of prey and prey size, as well as other factors such as surrounding temperature, relative humidity, predator density, area

of research, photovoltaic period, and other species of predators and parasites [19]. This study is in agreement with [20] finding that *Eretes griseus* water beetles followed the second model of functional response and reached the highest predisposition rate of 65.21 larvae / day of *Culex quinquefasciatus* at 96 larval densities. This study agrees with [21] To demonstrate the functional response of aquatic beetles *Eretes griseus*, *suturalis Rantus*, *Hydaticus gramicus* in the larvae of *Culex tritaeniorhynchus* and *Aedes albopictus* mosquitoes, *E. griseus*, *R.suturalis*, *H. gramicus* showed functional response of type II at different phase densities of the

Fourth instar of mosquitoes *Culex tritaeniorhynchus* and mosquitoes *Aedes albopic*.



L1: First larval stage L2: Second larval stage L3: Third larval stage L4: Fourth stage pupae
 Figure 1. Mean average efficiency of *D.aereus* on *C.pipiens* mosquitoes under laboratory conditions

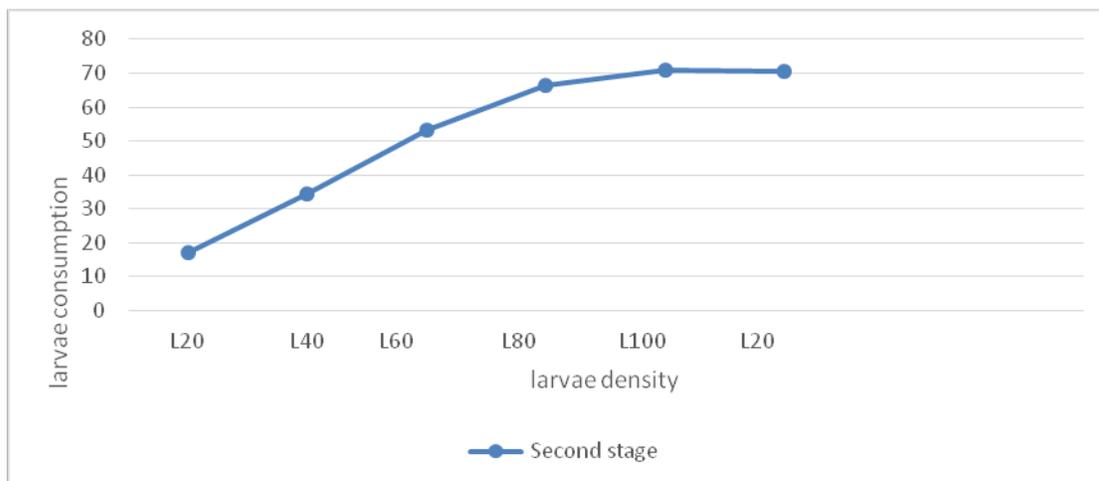
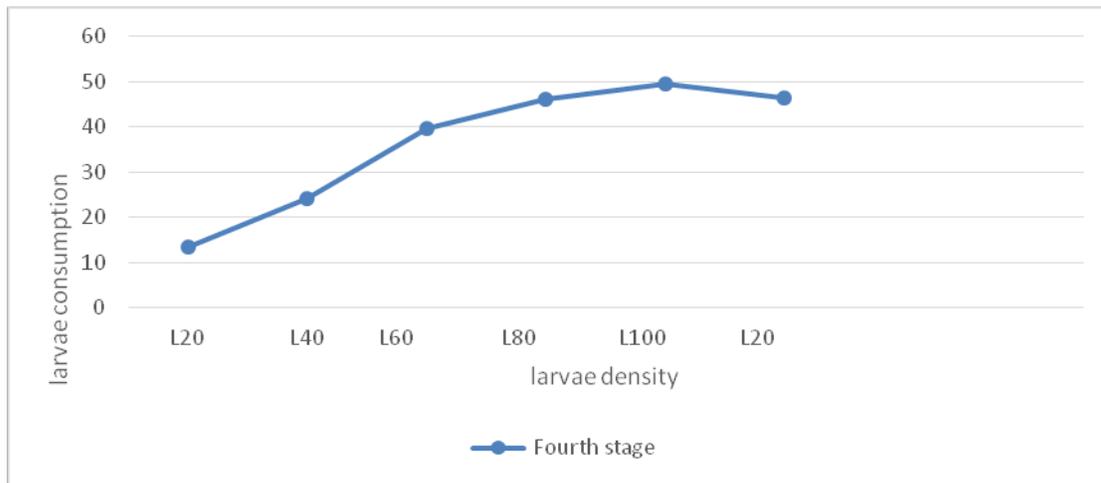


Figure 2. Functional response of *D.aereus* for different densities of second-stage larvae of mosquitoes *C. pipiens*



Figur3. Functional response of *D.aereus* for different densities of fourth-stage larvae of mosquitoes *C. pipiens*

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The Influence of Work Motivation, Organizational Culture, and Work Environment on the Work Discipline of Employees PT Inti Karya Persada Teknik

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Abstract: The phenomenon of declining of work discipline occur at PT Inti Karya Persada Teknik or commonly known as IKPT. IKPT is one of the EPCC (Engineering, Procurement, Construction and Commissioning) company in Indonesia. The purpose of this study was to determine the effect of work motivation (X1), organizational culture (X2) and work environment (X3) on the work discipline (Y) of IKPT employees. The type of research used in this study is descriptive quantitative using the method of linear regression analysis with IBM SPSS 22nd version. The object of this study was all IKPT employees in the home office with 948 total of employees and 123 respondents were determined using the stratified random sampling technique and 95% Slovin. There is a significant effect simultaneously, but partially the results show the significant influence on organizational culture (X2) and work environment (X3) variables on work discipline (Y), but work motivation (X1) has no effect on work discipline (Y).

Key Words: work motivation, organizational culture, work environment, work discipline.

1. Introduction

The quality of work discipline reflects the level of employee's responsibility towards tasks assigned to them, therefore good work discipline is expected to increase productivity and performance of employees. Furthermore, discipline is an important factor in work, where the higher the level of discipline of employees, the higher the work performance will be achieved. On the other hand, if employee discipline is decreasing, besides having an impact on employee performance, it will certainly have a negative impact on the company, especially on products or services produced by the company.

The phenomenon of indiscipline occurs at PT Inti Karya Persada Teknik and commonly known as IKPT. Is one of the EPCC companies (Engineering, Procurement, Construction, and Commissioning) in Indonesia having its address at M.T. Haryono street plot 4-5, Jakarta, the company was founded in 1982 and became the object of this research.

In EPCC business, a project is carried out sequentially starts from Engineering Division for the making a design, planning, and making material requirements project then continues to Procurement Division for the purchasing of the material, then forwards to Construction Division for the construction processing and finally Commissioning for operational testing of the construction results. This shows how important the discipline of work in an EPCC company. Because of that, there is no tolerance for not working in a disciplined manner in IKPT because this will fatally affect the results and project completion time and also the project cost.

From 2017 data, it can be seen that the level of work discipline of employees of IKPT is still low, this can be proven in the table of attendance, tardiness, and lost time as in the following table.

Table 1. Absence, Tardiness and Lost Time of Employees of PT Inti Karya Persada Teknik on 2017

Semester	Absence	Tardiness	Lost Time
January - June	0.01%	8.74%	6.21%
July - December	0.01%	6.82%	7.34%

Source: Human Capital Division of IKPT (2017)

Pre-research was conducted by distributing questionnaires to General Managers, Department Managers, and Work Group Leaders at the IKPT with a total sample of approximately 50 people. From the 16 respondents, the results showed that the three variables that had the greatest influence on work discipline, as much as 27.08% of respondents chose work motivation, 16.67% chose organizational culture, and 16.67% chose the work environment. Especially the three variables have not been implemented properly.

From the illustration, it can be seen that IKPT is currently experiencing serious problems in work discipline, although it may only limited to a small number of employees, but sooner or later will have a negative impact on the attitudes and behavior of other employees, and this will certainly impact the company productivity and performance. According to the urgency above, it is important to be studied scientifically with the aim of 1) to analyze the influence of work motivation on the work discipline of employees of PT Inti Karya Persada Teknik, 2) to analyze the influence of organizational culture on the work discipline of employees of PT Inti Karya Persada Teknik, 3) to analyze the influence of work environment on the work discipline of employees of PT Inti Karya Persada Teknik and 4) to analyze the influence of work motivation, organizational culture and work environment on the work discipline of employees of PT Inti Karya Persada Teknik.

2. Literature Review

Priyono dan Marnis (2008:265) said that motivation is encouragement or energy that can move the body and soul to do something. David McClelland explains the theory of needs that commonly referred to as McClelland's theory of needs, which is that there are 3 facts that influence work motivation (Robbins and Judge, 2014: 207), that is Need for achievement, Need for power and Need for affiliation. Research conducted by Billman (2017), Palupi (2018), Indrawan (2016), Kamsinah (2015), Murwanto and Nugroho (2014), Fangidae (2016), Nugroho (2016), Sugiyatmi, Minarsih and Gagah, (2016), and research conducted by Sihombing (2015) has proven that work motivation has an influence on employee work discipline.

Robbins and Judge (2014:512) stated that organizational culture is something that is related to a system within an organization or company that is held and interpreted together by all members or employees so that it can differentiate an organization with other organizations. Furthermore, there are 7 main characteristics and is the core of organizational culture that is innovation and risk taking, attention to detail, outcome orientation, people orientation, team orientation, aggressiveness, and stability. The research conducted by Sugiharjo, (2016), Damayati and Fakhri (2014), Pribadi and Herlena (2015), Oktaviani and Saragih (2017), Safira (2015) and research conducted by Sudharma (2013) prove that organizational culture has an influence towards employee work discipline.

Sutoyo (2016) said that the work environment is a condition around the workplace both physically and non-physically which has an impact on pleasure, security, and tranquility. According to Sedarmayanti (2001:21) in general the work environment is divided into 2 types, besides Sihombing (2015) also mentions the same thing and that is physical work environment and non-physical work environment. The research conducted by Indrawan (2016), Mujib and Indartono (2015), Murwanto and Nugroho (2014), Nugroho (2016), Yugusna, Fathoni and Haryono (2016), Sugiyatmi, Minarsih and Gagah, (2016), Sihombing (2015) and research conducted by Sudharma (2013), proves that the work environment influences work discipline.

According to Hasibuan (2014:193) in the book Human Resource Management states that discipline is the awareness and willingness of an individual to obey all the rules of the organization or company and the norms that apply. There is 3 dimension of work discipline that is obey the rules of time, do work well and obey the rules and norms.

Based on the theoretical review related to work motivation, organizational culture, work environment, and work discipline as described, the author makes a research framework. The framework aims to provide an overview of the interrelationships between variables studied, to find out the most dominant factors that influence employee work discipline. The framework are as follow:

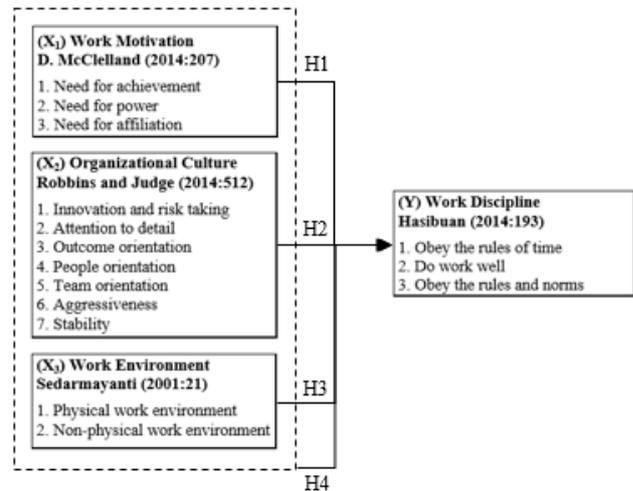


Figure 1. Framework

3. Methods

The type of research used in this study is descriptive quantitative. The object of this study was all IKPT employees in the home office with 948 total of employees and 123 respondents were determined using the stratified random sampling technique and 95% Slovin. Data collection is done by distributing questionnaires to the sample with the Likert scale 1 to 5.

Table 2. Total of Employees of IKPT

Division	NOS	Stratified	Slovin 95%
Project Control and IT	74	6%	5
Construction	102	11%	9
Finance and Asset	41	4%	2
Engineering	432	46%	95
Project	33	3%	1
Corporate Strategy	15	2%	0
Procurement	77	8%	5
Proposal	56	6%	3
Power Plant	21	2%	0
Continued Table 2.			
Human Capital	40	4%	2
Sales and Marketing	12	1%	0
QSHE&S	41	4%	2
Corporate Legal	4	0%	0
Total	948	100%	123

Source: Human Capital Division of IKPT (2018)

The instrument testing is used validity testing and reliability testing as the formula as in Figure 2 and 3. Furthermore, the classic assumption testing is used normality, multicollinearity and heteroscedasticities testing. The good data is if it normally distributed, there is no correlation between independent variables and not heterogeneous and for heteroscedasticity use Glesjer method.

$$r_{xy} = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{\{(\sum x^2) - (\sum x)^2\} \{n(\sum y^2) - (\sum y)^2\}}}$$

Figure 2. Validity Testing

$$r_{11} = \left(\frac{k}{k-1} \right) \left[1 - \frac{\sum \sigma b^2}{\sigma_1^2} \right]$$

Figure 3. Reliability Testing

Researcher used multiple regression analysis to analyze the influence of work motivation, organizational culture and work environment on work discipline of employees of IKPT.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Figure 4. Multiple Regression Analysis

The hypothesis testing used determination testing to find out the percentage of the independent variable simultaneously on work discipline of the employees of IKPT. Moreover used t testing and f testing to find out the influence of the independent variables partially and simultaneously. Besides that, researchers conducted correlation analysis between variable dimensions in order to find the strongest relationship between the independent variable and the dependent variable

$$KD = R^2 \times 100\%$$

Figure 5. Determination Testing

t test is done by comparing t count with t table, if t count is greater than t table then the hypothesis is accepted, means that there is an influence between the independent variable and the dependent variable, as well as the test f. Then if the significance value is smaller than 0.05, there is a significant influence between the independent variable and the dependent variable.

4. Result

The result showed that as many as 88% the employees of IKPT are Engineers, 79% are male, 57% is 20-30 years old, the majority are bachelor as many as 76%, and as many as 48% only have a work period of fewer than 5 years in IKPT. Validity testing showed that the data is valid and reliable as the Table 3 and 4.

Table 3. Validity Testing Result

Indictor	r
Work Motivation (X₁)	
M1. Opportunities for growth and achievement	.64
	3
M2. Appreciation of work results	.76
	8
M3. Employees involved in making decisions	.78
	0
M4. Employees relations are not only in the office	.75
	0
M5. Good relations between superiors and subordinates	.57
	3
Organizational Culture (X₂)	
B1. Opportunity to innovate at work	.49
	3
B2. Accurate and precise on work results	.57

B3. Employees are required to have a good analysis	.64
	2
B4. Job information is presented in detail	.47
	0
B5. Results are not from techniques or processes	.53
	2
B6. The development of HR for optimal results	.65
	7
B7. Focus on developing HR capabilities	.45
	1
B8. There is feedback and criticism to subordinates	.61
	0
B9. An appreciation for outstanding employees	.55
	2
B10. Clear target on team (Project)	.58
	5
B11. There is a solution if there are problem in the team	.77
	8
B12. Good communication and coord. within the team	.72
	4
B13. Clear on the guidelines for task implementation	.69
	3
B14. Competition in achievement is very competitive	.42
	8
B15. Recommend the companies to others	.38
	8

Work Environment (X₃)

L1. Good lighting, temperature of the workspace.	.47
	8
L2. Comfortable workspace for discussion	.57
	4
L3. Existing facilities can support the work	.69
	7
L4. The office is strategic located	.53
	3
L5. Cooperation between employees runs well	.73
	8
L6. Guidance and direction from the superiors	.71
	0
L7. Good relations between employees and residents of the environment	.49
	0

Work Discipline (Y)

D1. I always come and go home according to the rules	.82
	9
D2. I was never absent without information	.79
	7
D3. The task that I am working on is completed on time	.67
	2
D4. I am always at work during business hours	.84
	1
D5. I always obey the rules that apply	.88
	8

Valid if the t no greater than t table (.349)

Table 4. Reliability Testing Result

Variable	Alpha
Work Motivation (X ₁)	.779
Organizational Culture (X ₂)	.744
Work Environment (X ₃)	.741
Work Discipline (Y)	.807

Reliable if the Alpha greater than 0.60

Assumption testing showed that the data is normal, there is no multicollinearity, and no heteroscedasticity as the Figure 6, 7 and 8 below.

One-Sample Kolmogorov-Smirnov Test		
Unstandardized Residual		
N		123
Normal Parameters	Mean	.0000000
	Std. Deviation	1.75425504
Most Extreme Differences	Absolute	.074
	Positive	.074
	Negative	-.053
Test Statistic		.074
Asymp. Sig. (2-tailed)		.097

a. Test distribution is Normal.

Figure 6. Normality Testing

The normality testing showed that the data is distributed normally with the Asymp. Sig (2-tailed) Unstandardized Residual Regression is 0.97, greater than 0.05.

Variable	Tolerance	VIF
Work Motivation (X ₁)	.806	1.240
Organizational Culture (X ₂)	.431	2.321
Work Environment (X ₃)	.464	2.155

a. Dependent Variable: Work Discipline

Figure 7. Multicollinearity Testing

Multicollinearity testing showed that the tolerance value is greater than 0,01 and VIF value is no greater than 0,10. So the result is not shown any multicollinearity between independent variables as the Figure 7 above.

Variable	Sig.
Work Motivation (X ₁)	.087
Organizational Culture (X ₂)	.085
Work Environment (X ₃)	.159

a. Dependent Variable: Work Discipline

Figure 8. Heteroscedasticity Testing

The heteroscedasticity testing was conducted using the Glesjser method, the result showed that the significance value on independent variables is greater than 0,05 as the Figure 8 above. So there is no heteroscedasticity problem. Multiple linear regression testing showed the result as the Figure 9 below. So the regression equation is $Y = 6,181 + 0,062 X_1 + 0,147 X_2 + 0,161 X_3 + e$.

Model	Coefficients			T	Sig.
	Unstandardized Coefficients	Std. Error	Standardized Coefficients		
	B		Beta		
1 (Constant)	6.181	1.523		4.059	.000
Work Motivation	.062	.076	.063	.824	.412
Organizational Culture	.147	.037	.417	4.014	.000
Work Environment	.161	.061	.265	2.647	.009

Dependent Variable: Work Discipline

Figure 9. Multiple Regression Linear Testing

Hypothesis testing conducted with determination coefficient testing, t testing (partial), and f testing (simultaneous). The determination coefficient testing showed that the value of multiple determination coefficient of 0,445. So that the three independent variables together explain the phenomenon that exists only at 44,5% as the Figure 10. The t testing (partial) showed that the work motivation is not influencing on work discipline, but the organizational culture and work environment influence significantly on work discipline as the Figure 9. But simultaneously with used f testing showed that the independent variables simultaneously significant influence on work discipline as Figure 11.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.667	.445	.431	1.77623

a. Predictor: (Constant), Work Motivation, Organizational Culture, Work Environment

Figure 10. Determination Coefficient Testing

Model	Sum of Squares	df	Mean Square	f	Sig.
Regression	301.353	3	100.451	31.839	.000
Residual	375.444	119	3.155		
Total	676.797	122			

a. Dependent Variable: Work Discipline
b. Predictors: (Constant), Work Motivation, Organizational Culture, Work Environment

Figure 11. Simultaneously Testing (ANOVA)

5. Discussion

There is no influence of work motivation on the work discipline of IKPT employees, this is in line and supports the results of research conducted by Shendita (2015) and Susanty and Baskoro (2013), that work motivation does not influence work discipline. The implementation of work motivation at IKPT is was done implemented such as appreciation to outstanding employees and facilities for employees to engage in activities and associations with communities such as IKPT Football and Futsal Club (IFFC), IKPT Domino Club (IDC), IKPT Golf Club (IGC), IKPT Badminton Club (IBC), IKPT Yoga Club (IFY), and IKPT Bicycle Club (IBiC).

However, a good implemented of work motivation at IKPT is not influence on the work discipline employee. Almost 90% of IKPT employees are engineers, with high mobility and productivity tend to make them put aside work discipline, besides that the high hours of overtime certainly have an impact on the physical condition of employees so that it has an impact on attendance, tardiness and work productivity, also the employee tends to absent from working hour to get more rest time. This condition strongly supports the results of this study that work motivation is not able to influence the work discipline of employees of IKPT. Responding to these conditions, management made a policy that is sanctions against employees who are undisciplined and require leaders in each department to be able to be assertive to employees who are not disciplined. This has been proven to increase the work discipline of IKPT employees, especially in the discipline of

obedient time rules, where data delays in the last 3 (three) months have seen a decline from the average of 7.78% per month to 1.13%.

There is a significant influence of organizational culture on the work discipline of IKPT employees, this is in line with the research conducted by Sugiharjo (2016), Damayati and Fakhri (2014), and Pribadi and Herlena (2015).

Around the past four years, IKPT only does a few small projects because of difficulties in getting large projects so that the duration of the project was shorter. This condition has an impact on employee turnover where recruitment is done by adjusting the duration of the existing project, so that it has an impact on the organizational culture. Most IKPT employees are of productive age, this condition is a challenge for the IKPT management to continue to guarantee the application of a good organizational culture. The productive age can be called the millennial generation because it is between the ages of 20-30 years, the millennial generation has a tendency to be difficult to be directed, does not like to be bound by the company regulations and has less loyalty. This certainly influences the existing organizational culture and impacts on the work discipline of the IKPT employees.

In addition, high work mobility and high productivity of work, as well as the high demand for self-development of IKPT employees greatly impact on the conditions of employees both physically and psychologically. Starting from 2016, the IKPT has eliminated the budget for gathering activities, where the activity is very important and needs to be done as a means of refreshing, building a solid work team, strengthening brotherhood relations between employees, improving conflict and friction, building togetherness, and rebuilding enthusiasm for working better in this case is a work discipline. Because if it is related to the correlation analysis between dimensions from each variables, the results showed that there is a relationship between the organizational culture oriented to the team and work discipline especially in obeying the rules of time. Good communication in a team provides a sense of comfort both in personal and professional relationships, so that supporting each other to be able to work with good work discipline in the company and productivity will also increase. This shows the need for gathering activities to rebuild togetherness in a team, department, or project.

Any significant influence of work environment on the work discipline of IKPT employees, this is in line and support with the research conducted by Indrawan (2016), Mujib dan Indartono (2015), Murwanto dan Nugroho (2014) dan Nugroho (2016).

On the results of the correlation analysis between dimensions from each variable, the result showed that there is a relationship between the non-physical work environment and work discipline obeying the rules of time. So to create a good work discipline not only with a good physical work environment, but also a good non-physical work environment. These results are in line with the existing conditions as described in the discussion of the influence of organizational culture on work discipline, where lack of togetherness, communication, good cooperative relations between employees and superiors, and lack of guidance, encouragement or direction from superiors greatly influence the attitude of employees of IKPT in this case work discipline. Differences in background and point of view are the main factors destroying employee cooperation relationships, so things need to be done that can build togetherness between employees and superiors.

Not only with gathering activities, the activities such as competition between departments such as tardiness competition, work target competition, or competition outside of work such as sports.

Furthermore, office locations that are easily accessible using both private transportation and public transportation greatly influence the work discipline of employees especially in obeying the rules of time. The location of IKPT office is very strategic, which is traversed by the Transjakarta lane, inner city toll road and very close to the Cawang station. However, the government program to developing the LRT (Light Rail Transit) transportation infrastructure that crosses the IKPT office impacted in a traffic jam, so that employees had difficulty heading to the office located on M.T. Haryono Street. This condition greatly influences the work discipline especially in obeying the rules of time. Proven, that the good progress on the development of LRT transportation contributes to the increasing work discipline of employees of IKPT on the obeying the rules of time dimensions and that can reduce the level of the employee tardiness.

CSR (Corporate Social Responsibility) activities in the surrounding community seem not maximal implemented. But in the recent of years the company's CSR activities began to be carried out such as making speed bump on road access to the mosque located behind the office, contributing goats and cow at Eid al-Adha, participating in the success of the Republic of Indonesia's Independence Day in the area of RW 014 and Kelurahan Kebon Baru and also donating garbage carts to RT 002. However, CSR activities need to be improved so that the relations between the community and the employees can be comfortable and secure to work in that environment, so that can improve the work discipline of employees of IKPT.

Pre-research that was carried out before the researcher conducted more in-depth research related to the phenomenon of the decline in work discipline of employees at IKPT showed that the work motivation, organizational culture and work environment is not optimal implemented. So based on the pre-research and theoretical review related to work motivation, organizational culture, work environment, and employee work discipline, the author makes a research framework to find out whether the selected variables have an influence on work discipline both partially and simultaneously.

The results of the research conducted show that simultaneously the three variables namely work motivation, organizational culture and work environment have a significant influence on the work discipline of the IKPT employees. However, the three series of variables are only able to explain the phenomenon that occurs in the IKPT that is work discipline of 44.5% while the remaining 55.5% is influenced by other factors that not explained in this study and can be explained in subsequent studies.

In the pre-research results that there are two variables which are quite high but have less than the three selected variables, that is leadership styles and organizational commitment. Researchers assume that both of these two variables are better able to explain the phenomena that occur and have a significant effect, it is based on existing conditions where the management of IKPT takes firm action related to the low of work discipline of the employee through meetings with the leaders and provide an action firmly by terminating employment with employees who violate exceeding the tolerance given by the company. This is proven to improve the work discipline of IKPT employees, especially in the

discipline of obeying of time rules, where the data of tardiness in the last 3 (three) months seen decreasing with an average delay of 7.78% down to 1.13%.

6. Conclusion and Recommendation

The main objective of this study was to determine the influence of work motivation, organizational culture and work environment on the work discipline of employees of IKPT. Based on the results of the research and discussion as previously described, some conclusions can be obtained as follows: 1) Work motivation at the IKPT has no influence on employee work discipline, but work motivation has a positive direction. 2) Organizational culture has a significant influence on the work discipline of employees. The highest value of the relationship between dimensions is the relationship between team-oriented dimensions in the discipline of obeying time rules with the level of the relationship still in the medium category. 3) The work environment has a significant influence on the work discipline of employees of IKPT. The highest value of inter-dimensional relations is the relationship between the non-physical work environment and the discipline of obedient time rules with the level of the relationship still in the low category. 4) Work motivation, organizational culture and work environment together or simultaneously have a significant influence on the work discipline of employees. However, the three series of variables are only explain the phenomenon that occurs at 44.5% while the remaining 55.5% is influenced by other factors not explained in this study.

Based on the research results, the management of IKPT must continue to improve work motivation of the employee, because even if it does not influence to work discipline, it may influence to other dependent variables that not discussed in this study such as employee performance, turn over, and so forth.

There is a high relationship between organizational culture oriented to the team and work discipline obeying the rules of time but has a low scale. So, to improve the work discipline of IKPT employees, management or leaders in teams, departments or projects need to do a number of things that are focused and team-oriented, including: 1) Providing clear and detailed targets and planning in the execution of work, so that employees can carry out work properly and in accordance with the schedule and targets that have been set so as to provide good and optimal results. Management or leaders can use the SMART method (Specific, Measurable, Attainable, Relevant, Time Based) as the basis for determining the work target of the team, department, or project. 2) Need solutions and assistance on every obstacle faced in the team, the work need to refer to the existing BG (Business Guidance), but it needs to be reviewed whether the BG is still relevant to existing conditions. In addition, leaders must be more observant before giving assignments and responsibilities to employees, leaders need to look at employee capabilities and provide training for employees if necessary. Leaders are expected to not be rigid in discussing related obstacles, because the solutions does not only come from the leadership, but from colleagues, experience and results of the training. 3) Communication has an important role in a team, department or project, which acts as a means between different employees and put together to achieve goals. Leaders need to make communication as a culture in the company because the good communication can form relationships, exchange information, resolve conflicts, create job satisfaction, increase motivation, increase productivity and employee discipline.

Then, there is a relationship between the non-physical work environment and work discipline obeying the rules of time. To improve the work discipline of employees of IKPT, management needs to do several things related to the non-physical work environment, including: 1) In building and improving cooperative relations between employees, management needs to do a number of things for its employees, such as: equating vision and mission, building mutual trust, communicating intensively, holding joint activities, understanding their respective roles and responsibilities, having strong commitment and so on. 2) Management needs to do a good assessment by choosing an expert leader in the field of work needed and providing leadership training both inside and outside the company. Because ideal leaders are leaders who are honest, have brain intelligence and emotional who are good, have initiative, are responsible, trustworthy, willing to sacrifice, and love what they lead. 3) Need a PR (Public Reality) to formulate a strategy to maintain good relations with the community around the office, which is proposed in the form of Corporate Social Responsibility (CSR), expected to create closeness and external public trust in the company. Thus, a harmonious relationship between the company and the surrounding community will create a good image of the company. With this positive image indirectly will increase the trust of the members of the company to work comfortably.

To perfect this research, it may be possible to conduct further research for future researchers to conduct research related to the work discipline of IKPT employees using other variables such as workload, work stress, organizational climate or by using organizational commitment and leadership style variables. Based on observations conducted, the two variables, namely organizational commitment and leadership style are able to improve the work discipline of IKPT employees.

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Experimental Evaluation of Noise Emission by Workshop Machines Due To Production Activities

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Abstract- Measurements of background, idle, and production noise generated during production activities of plain turning, drilling, boring, and threading on the Lathe; flat, keyway, rectangular groove, and Tee slot on Shaper; facing, plain milling, slot, gear, and threading on the Milling Machine; sheet metal, plat bar, angle iron drilling on the Pillar Drill machine; solid shaft, sheet metal, square pipe, angle iron, and stainless steel grinding on the Pedestal Grinder; and sheet metal, flat bar, square pipe, and angle iron grinding on the Angle Grinding Machine, were carried out at Engineering workshop of the Federal University of Agriculture Makurdi. Noise dosimeter and sound level meter with model 2310 SL and IEC 61672 type-2 factory calibrated with a resolution of 0.1dB were used. Measurements were taken one meter from the source of noise on each machine, and all the six (6) Machines were switched at the same time to determine the total noise generated. Results showed that the mean noise levels around these machines were lowest from the Lathe Machine which had 85.4dB, and highest for the Angle Grinder which had 107.8dB. This results serves as a standard for these machines when using noise as a diagnostic tool for preventive maintenance which showed that the machines were in good condition. Preventive maintenance at regular interval, are necessary to keep the machines in this condition.

Index Terms- Production noise, mean noise level, preventive maintenance.

I. INTRODUCTION

Noise is sound that is not wanted by the perceiver, because it is unpleasant, loud, or interferes with hearing. Most machinery and manufacturing processes generate noise as an unwanted by-product of their output. Typical examples of noise sources in the workshop include; impact noise associated with punch processes, motors, generators and other electro-mechanical devices, unbalanced rotating shafts, gears, shaping machine, power saws, lathes, grinding machines, drilling machine etc (Anjorin et al, 2015).

Human production activities which require crushing, cutting, riveting, drilling, punching, pressing and drilling, results in the use of machines commonly found in the workshop to generate a lot of noise. The phenomena can transcend several human developments, ranging from breakdown of communication to annoyance and built-up tension. When several of these activities occur simultaneously the level of noise can go beyond being a nuisance, but harmful and inimical to the

production activity. Occupations at highest risk for Noise Induced Hearing Loss (NIHL) include those in manufacturing, construction, transportation, mining, agriculture and military (Ahmed et al, 2000).

High level noise not only hinders communication between workers, but depending on the level, quality and exposure duration of noise, it may also result in different type of physical, physiological and psychological effects on the workers (NIOSH, 1998). The acceptable noise exposure standard in the workplace is 85dB(A) averaged over an eight-hour period (Bies and Hansen, 1996; Schmidt 2005; Norton and Karczub, 2003). This is not to imply that below 85dB(A) a safe condition exist. It simply means that an eight-hour exposure of 85dB(A) is considered to represent an acceptable level of risk to hearing health in the workplace. Noise generated from the workshop causes health and social problems, it causes acute and chronic diseases such as cardiovascular diseases, acoustic trauma, noise induced hearing loss, hindrance communication between the employees, fatigue and loss of concentration. The noise induced hearing loss affects the both ears simultaneously. A person's overall noise exposure may come directly from an individual machine, but noise from other machinery or processes elsewhere in the workshop may also contribute to this.

A number of studies have been carried out to evaluate industrial noise in processing, mining, oil and gas, construction and manufacturing industries and the results show that high percentage of industrial workers were exposed to more than 85dB(A) noise levels (Ydego, 1991; Boateng and Amedofu, 2004; Kisku and Bhargava, 2006; Saadu, 1988; Bockhoff et al, 2003; Lim et al, 2008). In spite of these studies, high noise levels have been taken for granted in industries in developing countries especially Nigeria.

The environment has become heavily polluted by various human activities. Production activities also contribute to this pollution. Establishing the various sources of noise, and establishing measures of regulating same, will go a long way in ensuring that noise and its harmful effects are reduced to nearest minimum.

The aim of this study was to examine the effect of workshop noise as a result of production and operation activities of some machines on the health of workers.

II. MATERIALS AND METHODS

Six machines namely, Lathe (Harrison 600), Shaping, (Elliott 14M), Milling (Ajax 28277), Pillar drill (Brook

Crompton MF5), Pedestal grinder (AJH Bison), and the Angle grinder (Bosch), were used in this study. At the beginning of the experiment, the background, idle, and production noise in various operations was carried out using the sound survey meter, sound level meter, and noise dosimeter respectively. The noise level for each operational duration of 60 seconds was recorded, and the average calculated using Equation 1.

$$N_i = N_m - N_b \dots \dots \dots (1)$$

Where;

- N_i - Idle noise
- N_m - machine noise
- N_b - background noise

The overall noise was calculated using Equation 2 below.

$$O_n = I_n - P_n \dots \dots \dots (2)$$

Where;

- O_n - Overall noise
- I_n - Idle noise
- P_n - Production noise

Three (3) speeds; low, medium and highest speeds were obtained directly from each machine used. The mean speed of the machine is obtained from Equation 3 below.

$$\text{Mean speed} = \frac{(\text{Highest} + \text{Lowest}) \text{ speed}}{2} \dots \dots \dots (3)$$

Production noise was obtained using Equations 4

$$P_n = O_n - B_n \dots \dots \dots (4)$$

Where;

- P_n - Production noise
- O_n - Overall noise
- B_n - Background noise

Noise dosimeter and sound level meter with model 2310 SL and IEC 61672 type-2 factory calibrated with a resolution of 0.1dB were used. Measurements were taken one meter from the source of noise on each machine, and all the six (6) Machines were switched at the same time to determine the total noise generated. From the measurement of the noise, when the difference between the measured background noise level (that is when the machines are turned off), is equal to 10dB or more, the change in the resultant noise level after subtraction of the background noise level is negligible. But when less than 10dB, a correction is made to the noise level reading at a source to make the measured value valid using the addition and subtraction decibel scale. Measurements of sound level were done three times for each machine operation and the average reading was calculated and recorded in tables using Microsoft Excel spreadsheets.

III. RESULTS AND DISCUSSIONS

The result of idle noise levels, lathe operation noise, shaper operation noise, Milling machine operation noise, pillar drill operation noise, pedestal grinder operation noise, angle grinder operation noise, comparison of idle and operation noise levels, and different categories of machine noise levels are presented in figures 1-9.

The idle noise was observed and recorded for each machine and it was found that angle grinder recorded the highest with 97.1dB, followed by pillar drill with 84.1dB and the least was pedestal grinder with 64.7dB as shown in figure 1. The lathe operation noise level was found to be highest when carrying out plain turning of mild steel at 125rpm, with a noise level of 81.7dB, followed by threading at 125rpm with a noise level of 80.3dB and lowest when carrying out boring operation at 40rpm with a noise level of 73.6dB as shown in figure 2. The shaper operation noise level was found to be highest when machining a keyway at 70 strokes/min with a noise level of 83.3dB, followed by machining a T-slot at 45 strokes/min with a noise level of 80dB and lowest when machining a flat surface at 19 strokes/min with a noise level of 78.5dB (See Fig. 3). The milling machine operation noise level was found to be highest when carrying out gear milling on mild steel at 320rpm, with a noise level of 81.9dB, followed by thread milling at 1140rpm with a noise level of 80.1dB and lowest when carrying out plain milling operation at 48rpm with a noise level of 75.6dB (See Fig. 4). The pillar drill operation noise level was found to be highest when drilling on a 2mm thick angle bar mild steel at 3600rpm, with a noise level of 89.2dB as shown if figure 5. This was followed by 2mm sheet metal at 87.5dB and lowest when drilling on wood at 480rpm with a noise level of 81.9dB. The pedestal grinder operation noise level was found to be highest when grinding 1mm thick hollow square pipe with a noise level of 93.5dB, followed by 10mm diameter shaft with a noise level of 91.6dB and lowest when grinding on a 0.5mm thick stainless steel, with a noise level of 84.6dB (See Fig.6). The angle grinder operation noise level was found to be highest when carrying out 10mm metal slab cutting operation with a noise level of 99.6dB as shown in figure 7, and the lowest was found when carrying out a 10mm diameter shaft grinding operation with a noise level of 84.9dB. During the idle mode operation as shown in figure 8, pedestal grinder recorded the least noise level with 64.7dB while the highest was angle grinder with 97.1dB. However in the working operation, the least noise was found in milling machine with 86.1dB while the highest was found in the angle grinder with 107.8dB. The result of the total noise when all the machines were running was 108.4dB as shown in figure 9. With the lathe machine turned off and the rest running simultaneously, there was no significant effect on the total noise level as it was still 108.4dB. The same was applicable when the shaper and the milling machine were turned off. This insignificant change or zero change in the total noise shows that the lathe, shaper and the milling machine each contribute less than 30% to the total noise level. The results also showed the angle grinder to have the highest/loudest noise level amongst the six (6) machines which when it is turned off, the total noise level dropped to 99.8dB. This can be attributed to the voids and spaces between the grains of the abrasive wheel of the grinding disk having coarser grain size.

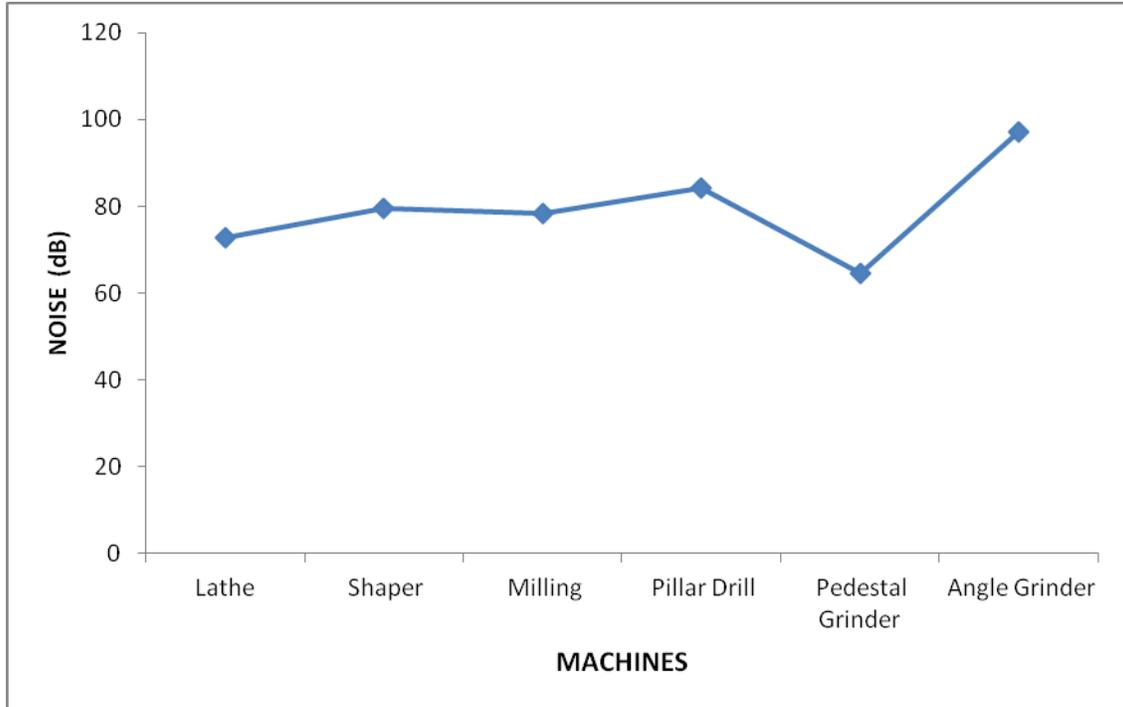


FIGURE 1: Idle Noise Level for the Machines

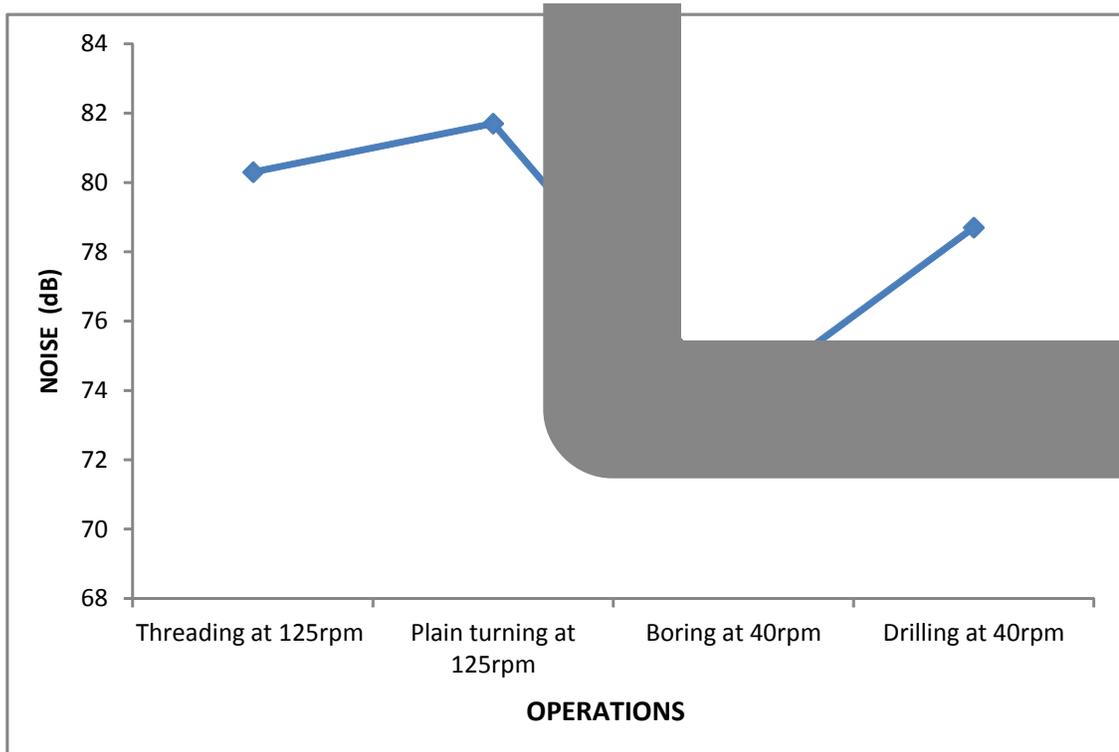


FIGURE 2: Lathe Operation Noise Levels

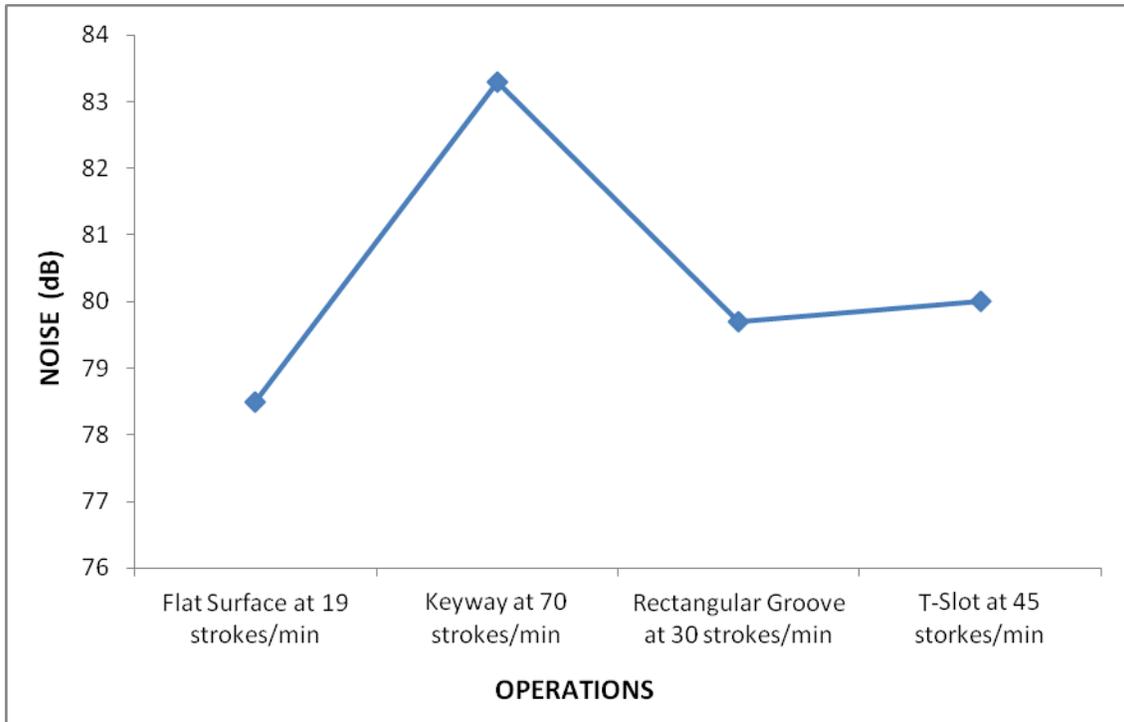


Figure 3: Shaper Operation Noise levels

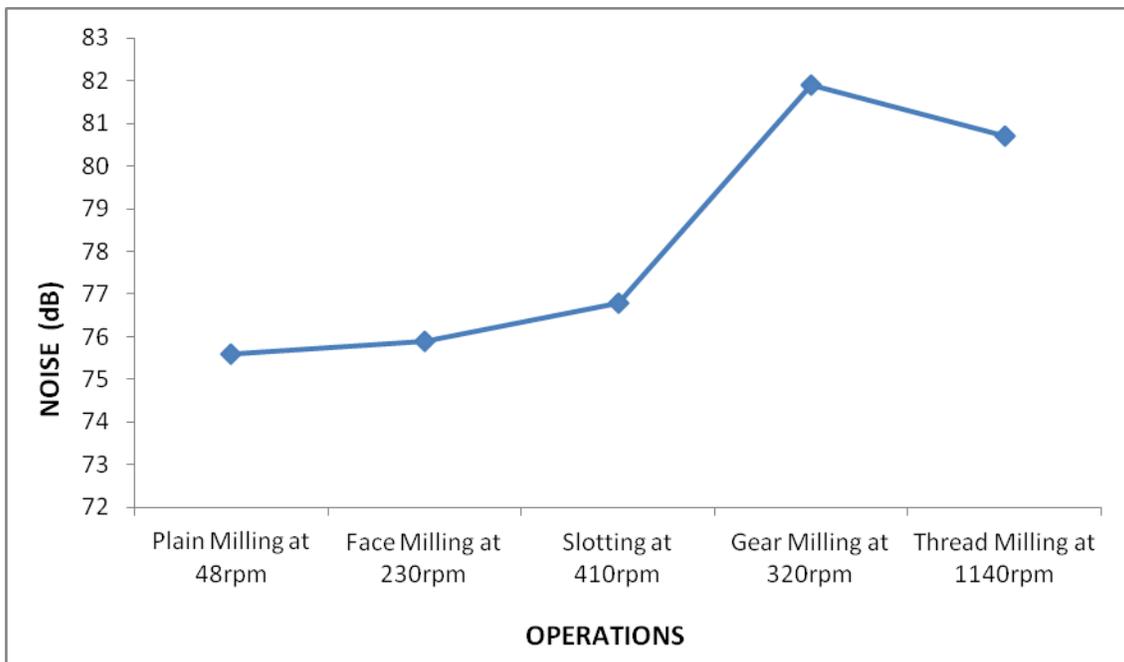


FIGURE 4: Milling Machine Operation Noise Levels

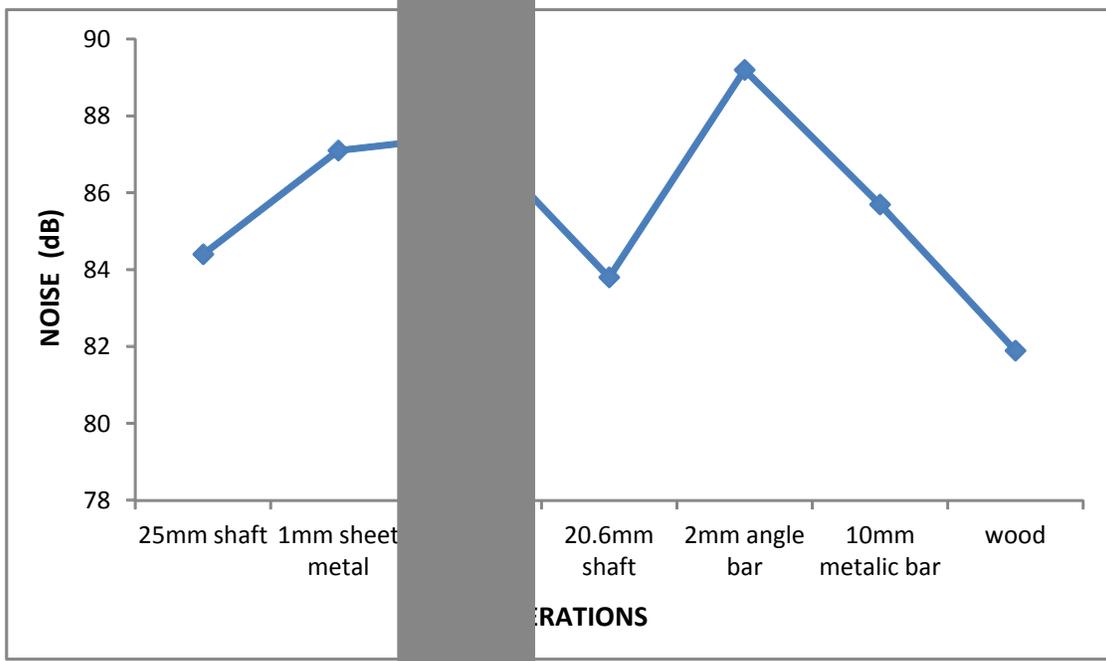


FIGURE 5: Pillar Drill Operation Noise Levels

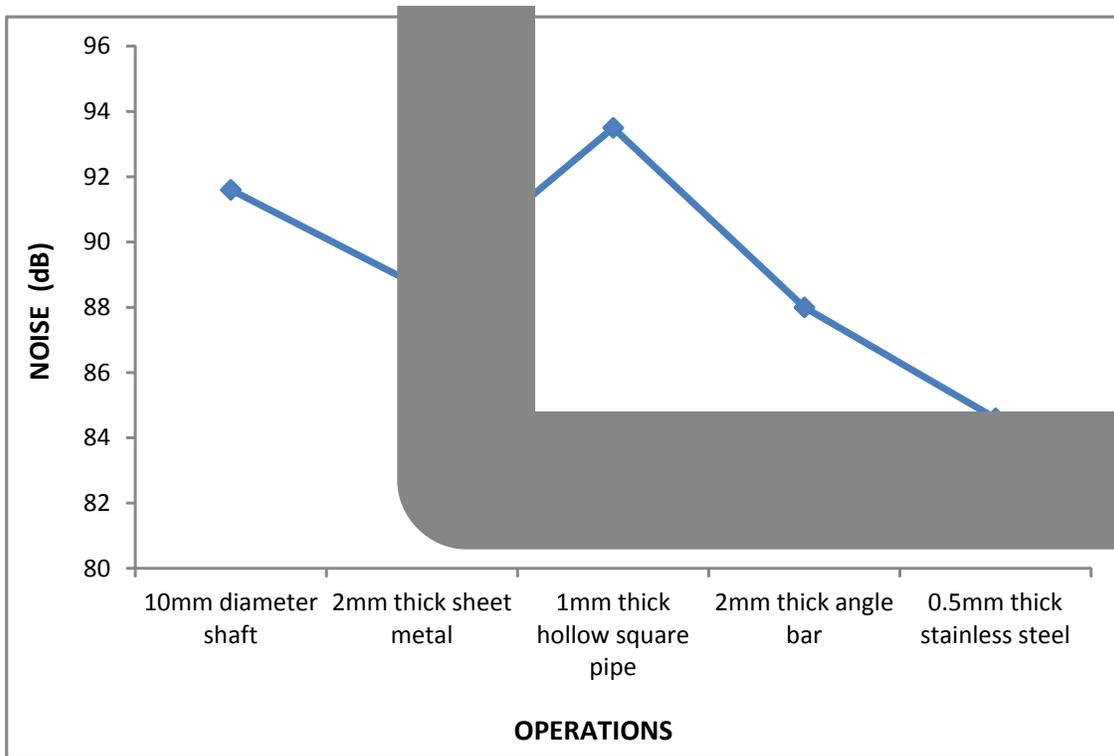


FIGURE 6: Pedestal Grinder Operation Noise Levels

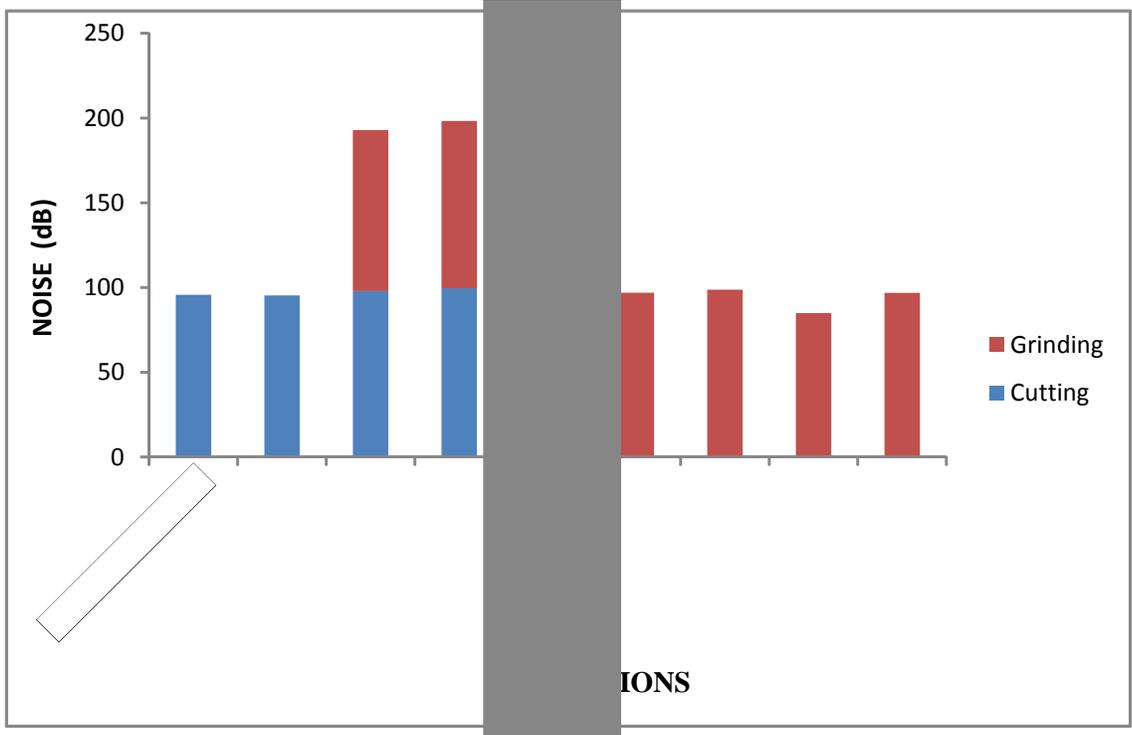


FIGURE 7: Angle Grinder Operation Noise Levels

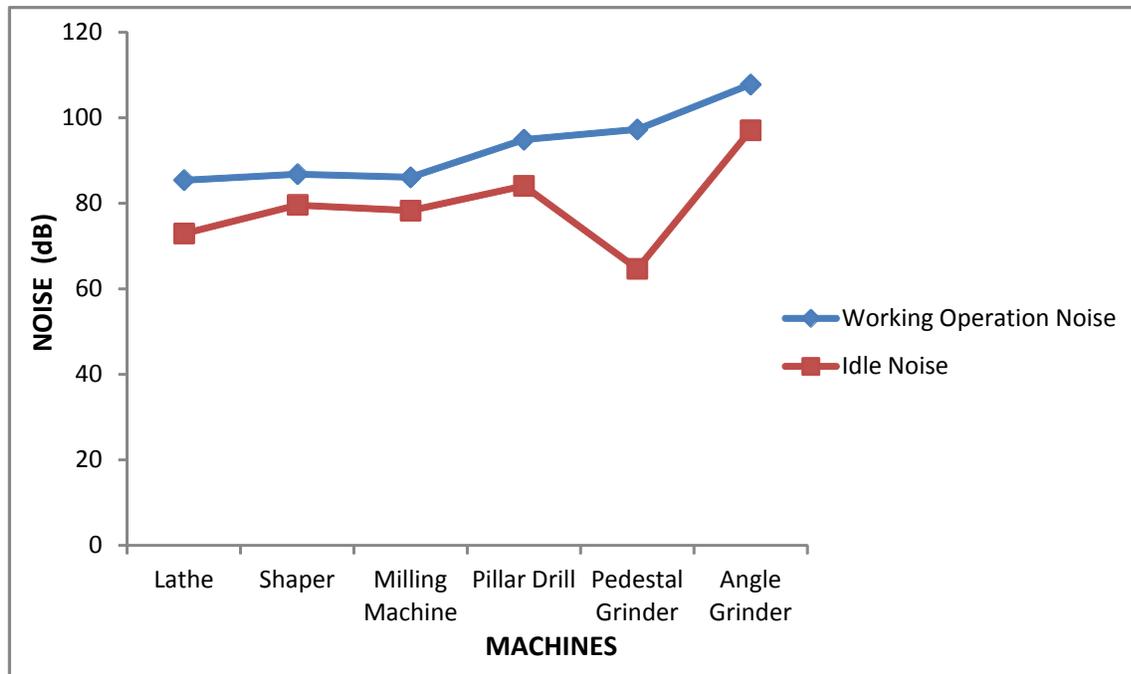


FIGURE 8: Operation and Idle Noise Levels of the Machines

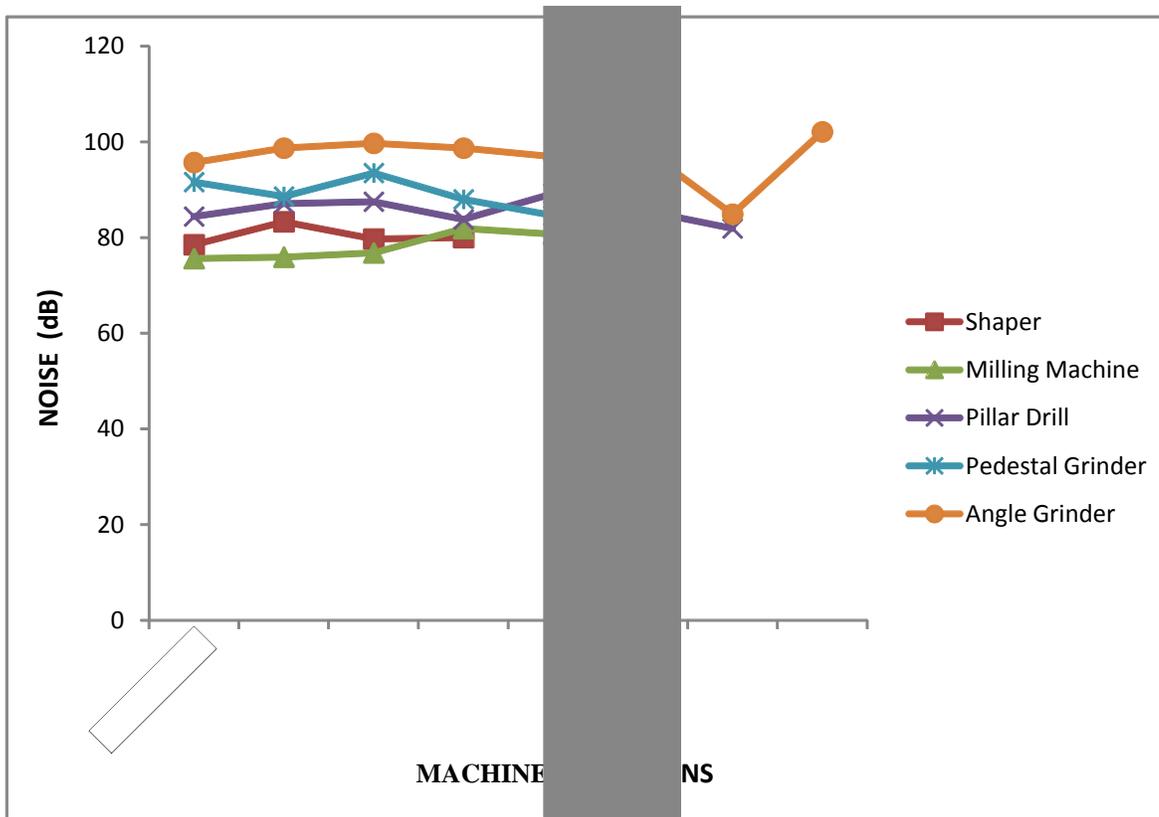


FIGURE 9: Comparison of Different Categories of Machine Noise Levels

IV. CONCLUSION

From the results of the study, the machines in the Federal university of Agriculture Makurdi Engineering workshop are in good and safe working condition. The lathe produces lesser noise of 85.4dB compared to the angle grinder with 107.8dB despite its size which shows that the noise level of a machine does not correlate with its size.

However, there is high possibility of a chronic health hazard problem for workers working in the workshop where noise levels are greater than 85 dB. This is because after the workers are exposed to high noise levels, they come out from the noise source after their duty hours to an environment of lower noise level; in which there occurs both physiological change and psychological stress in their system (Anjorin et al, 2015).

Preventive maintenance should be carried out on the machines at regular intervals to maintain a good working condition, which will in turn greatly affect the noise emission levels during production activities. However, ear muffs should be used when operating the angle grinder.

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Interpretation of the Falling Weight Deflectometer (FWD) testing Data for the Nairobi Eastern By-Pass Road Flexible Pavement

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ABSTRACT

Falling weight Deflectometer (FWD) testing is today the common tool used to assess the structural condition of the pavement. The objective of the study was to analyse the FWD surface deflection test results of flexible pavement for the Nairobi Eastern by-pass to predict the pavement's structural capacity. The study observed that the pavement exhibits varying characteristics from strong pavement to moderate pavement as the deflections values fluctuates along the pavement length with much of the pavement stretch being characterized as reasonably strong. Three locations at around chainages 14.4km, 24.2kms and 25.8kms had signs of a moderate pavement that required a thin overlay despite the pavement structure showing characteristics of stability. It was recommended that surface dressing with 10/14 class 1 chippings and 80/100 penetration grade bitumen binder for pavement surface treatment will be suitable for the entire stretch of the study section.

KEYWORDS: *Falling Weight Deflectometer testing, Pavement, Surface Treatment, Penetration grade bitumen*

1. INTRODUCTION

As part of a research at the University of Nairobi on the evaluation of flexible pavements in Kenya, the pavement structure of Nairobi Eastern By-Pass Road was evaluated, by conducting FWD deflection testing of the pavement

The FWD is attached on testing truck and comprises of a mechanical loading system, a falling load, and a measuring system. The mechanical loading system simulates the vertical loading element through the induction of load pulses of a single wheel moving at a road speed. The falling weight, applies the load on a rubber buffer that is attached to a stiff loading plate leading to the discharge of haversine fashioned load pulses. The load pulses cause pavement surface deflections that are registered by a set of geophones at an increasing fixed distance from the centre of the loading plate as shown in Figure 1. Further, analysis based on deflection basin-shape indicators and back calculation of pavement layer moduli (E) is performed with the pavement surface deflection data (Doré & Zubeck, 2009).

The performance a flexible pavement in service under traffic loading influences the surface deflections of a pavement. The accumulation of the permanent strains leads to permanent deformation and subsequent cracking of the road surfacing. High deflections always indicate structural deficiency. However, low deflections do not necessarily denote a satisfactory structural condition (Roads Department, 1988).

Three modes of pavement deterioration mechanisms include; fracture, distortion and disintegration (Roads Department, 1988). The deterioration rate of a pavement is influenced by; nature of subgrade soils and the landscape, pavement materials used for pavements construction and pavement layer thicknesses, surface and subsurface drainage, construction and maintenance workmanship, environmental factors - rain, frost, solar radiation; volume, axle loads and configuration of traffic, and pavement condition (O’Flaherty, 2002).

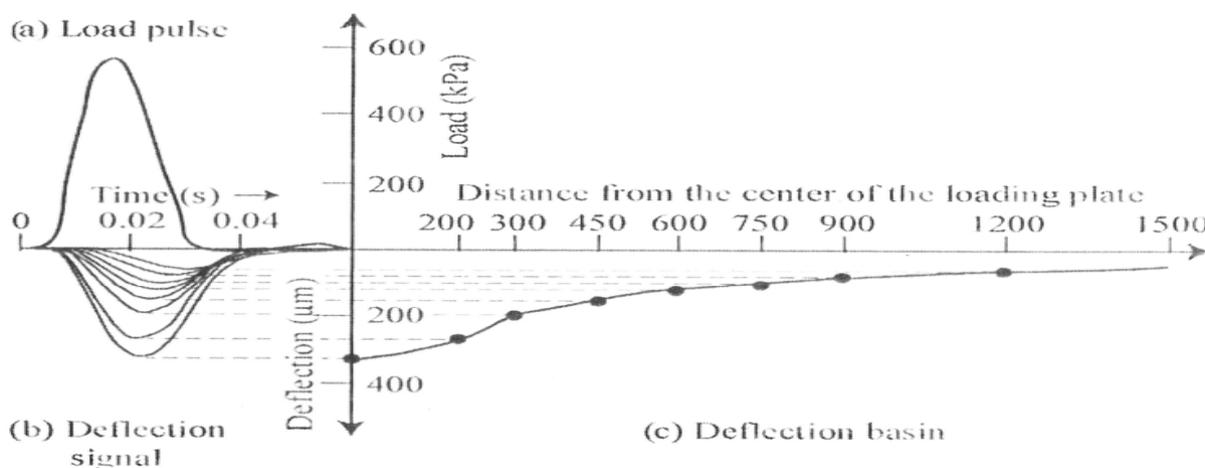


Figure 1: FWD Loading and Pavement Response (Doré & Zubeck, 2009)

2. METHODOLOGY

The test was done in accordance with ASTM D4694 – 09; Standard Test Method for Deflections with a Falling-Weight-Type Impulse Load Device.

2.1 FWD Pavement Deflections’ Measurement and Analysis

The Primax Falling Weight Deflectometer (FWD) testing at the Nairobi Eastern by-pass road flexible pavement was carried out on both directions over the entire length at 100m intervals on 15th June 2017. The FWD equipment being towed is shown in plate 1.



Plate 1: Pavement Surface Deflection Measurement Using FWD Equipment

2.1.1 FWD Sensor Spacing

For this research, the spacing of geophones was: 0 mm, 200 mm, 300 mm, 600mm, 900 mm, 1200 mm, 1500 mm 1800 mm and 2100mm (Roads Department, 1988).

2.1.2 Surface Temperature Measurement

The pavement surface temperature was measured and recorded automatically to the FWD file. The monitoring of the surface temperature during testing was used to help the FWD operator in taking decisions to stop testing in case the pavement became very hot.

2.1.3 Variation Characterization of Homogenous Sections

The Cumulative Sum Method (CUSUM) is used on the FWD central deflection measurements (d_o). The CUSUM method involves plotting the cumulative sum of the differences of the FWD deflection (d_o) from the mean FWD value calculated from all the results based on equation 1. The homogenous sections are identified in the CUSUM plot and the design of the overlays or any form of strengthening is based on the characteristics of each homogenous section.

$$S_i = FWD_i - FWD_{mean} + S_{i-1} \dots\dots\dots \text{Equation 1}$$

Where:

- FWD_{mean} = Mean FWD deflection of the road
- FWD_i = FWD deflection at chainage i
- S_i = Cumulative sum of the deviations from the mean deflection
 (Roads Department, 1988)

2.1.4 Analysis of Pavement FWD Deflection Data

Tables 1 and 2 were used in the interpretation and analysis of FWD deflection values that were obtained from the Nairobi Eastern by-Pass Road.

Table 1: Criteria for FWD Deflection Interpretation for National Roads (TII, 2000)

D1 Criteria	SCI Criteria (D1 – D2)	Comment
<100 μm	<40 μm	Very Strong Pavement
100-200 μm	80-140 μm	Strong Pavement
200-350 μm	140-200 μm	Reasonably Strong May require overlay depending on traffic volume
350-500 μm	200-300 μm	Moderate pavement probably requires overlay depending on traffic volume
500-700 μm	200-300 μm	Moderate to weak pavement requiring overlay (Possibly granular layer required)
>700 μm	>300 μm	Poor Pavement (Granular Layer or Reconstruction required)

Table 2: Use of FWD on National and Regional Roads (TII, 2000)

D ₉ Criteria (2100mm Criteria)	Comment
<10 μm	Very Stiff Subgrade
10-20 μm	Stiff Subgrade
20-30 μm	Stiff to Moderate Subgrade
30-40 μm	Moderate to Weak Subgrade
40-50 μm	Weak Subgrade
>50 μm	Very Weak Subgrade

3. DATA PRESENTATION AND ANALYSIS

3.1 Structural Pavement Conditions of the Nairobi Eastern By-pass Road

3.1.1 Falling Weight Deflectometer (FWD) Data

The pavement deflection data (D_i) measured by the FWD equipment was normalized to standard pressure to obtain the normalized deflections (ND) for all the geophone locations. The analysis and interpretation of the pavement deflection data was based on the normalized deflections (ND). Figure 2 shows that the deflections reduce from the point of load application outwards with ND_1 having higher values of deflections and ND_9 having lower values of deflections.

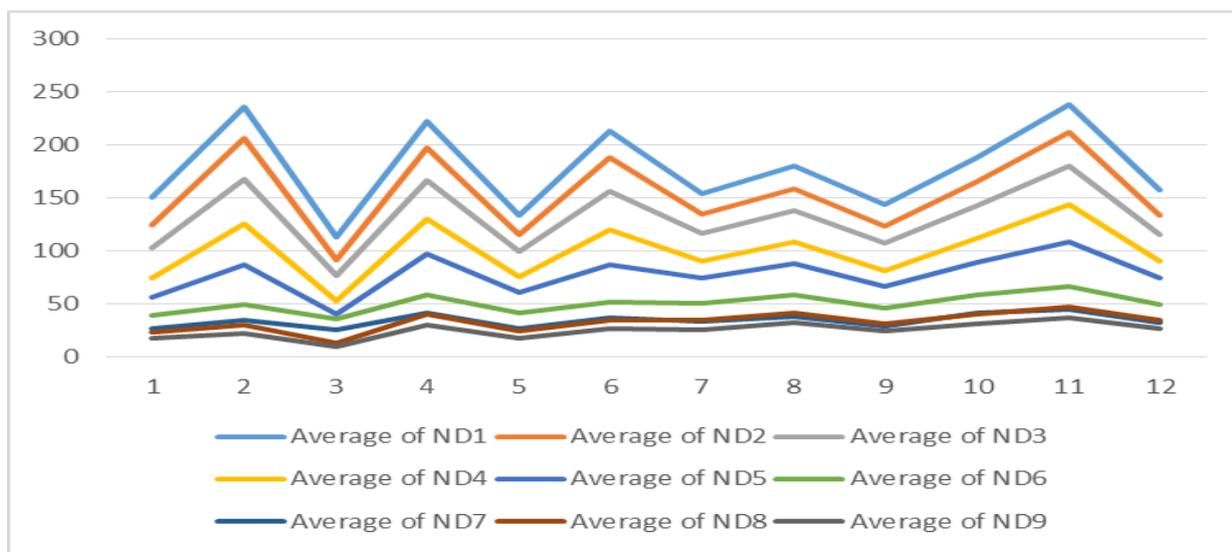


Figure 2: Normalized Pavement Surface Deflection Curves

3.1.2 FWD Central Deflection (ND_1) Plot

A plot for the central normalized deflections is provided in Figure 3. There is variation of the central deflections (ND_1) along the pavement with the values ranging from about 90 - 425 μ m. In reference to table 1, the pavement exhibits varying characteristics from strong pavement to moderate pavement as the deflections values fluctuates along the pavement length. Much of the pavement stretch can therefore be characterized as reasonably strong as the ND_1 are between 200-350 μ m which may require overlay depending on traffic loading.

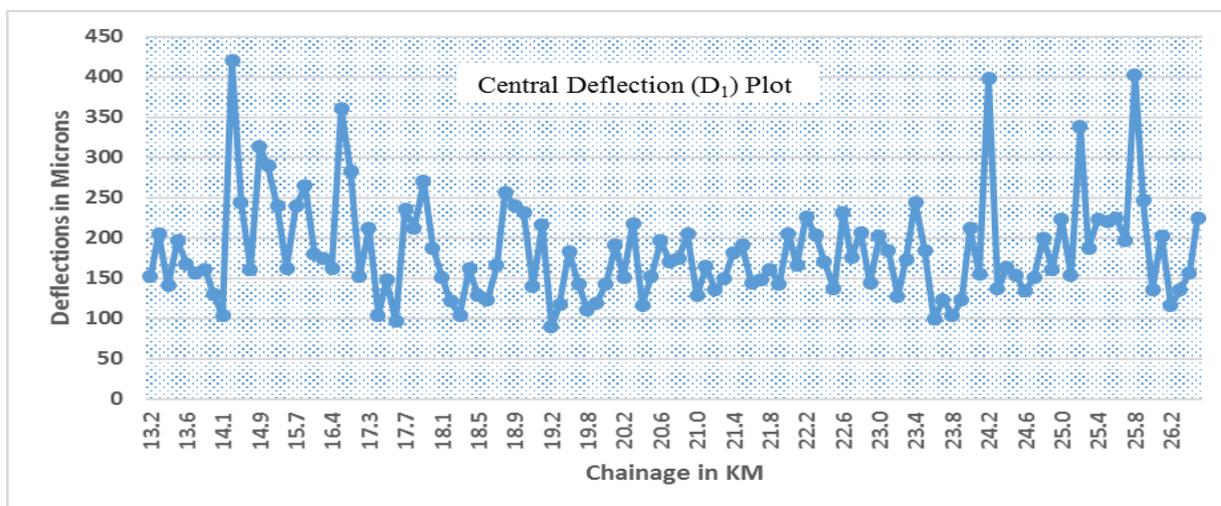


Figure 3: FWD Central Deflection (ND₁) Plot

The results also show that only three locations at around chainage 14.4km, 24.2kms and 25.8kms that have signs of a moderate pavement that may require an overlay depending on the traffic volumes using the road section.

3.1.3 Pavement Surface Curvature Index (SCI)

Surface Curvature Index (SCI) is the difference of deflections measured with geophones in the center of the loading plate (D₁) and 200mm from the center (D₂), and it characterizes the condition of the pavement layers. The pavement surface curvature index curve (D₁ - D₂) range is within 40-80 giving an indication of strong upper layers in the pavement structure in reference to Table 1. Further, it is noted that Figure 4 has the same shape profile like Figure 3 indicating that the upper layers of the pavement have a large influence on the pavement structural condition.

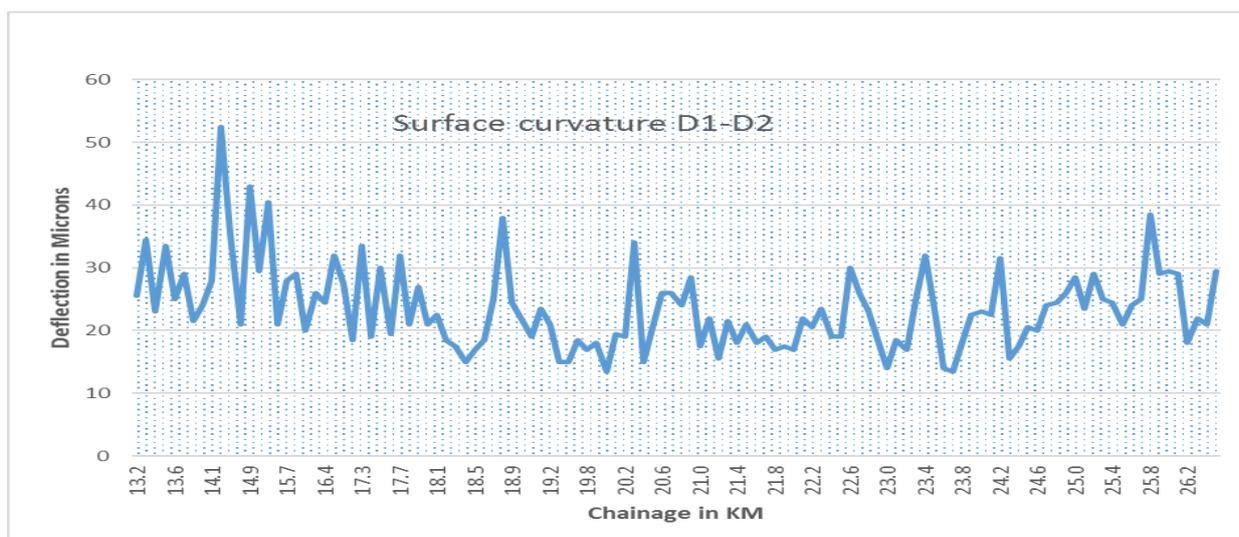


Figure 4: Pavement Surface Curvature Index (SCI)

3.1.4 FWD Outer Deflection (ND₉) Plot

Figure 5 gives a plot for the ND₉ against the chainage along the length of the road. The values of ND₉ are relatively low showing the possibility of a stiff subgrade supporting the pavement structure.

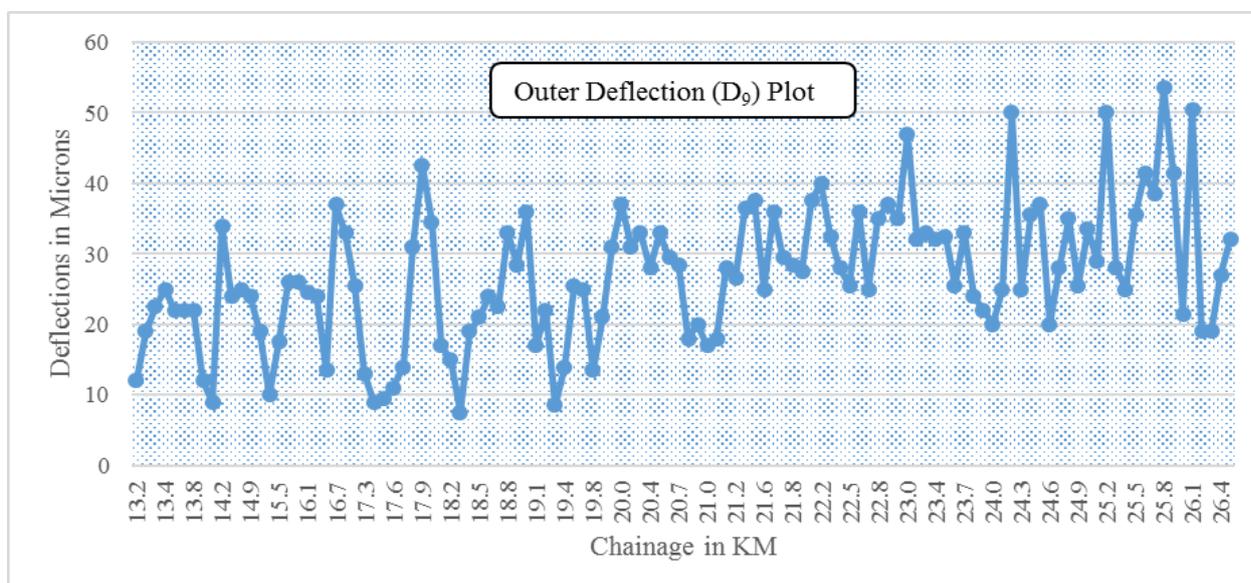


Figure 5: FWD Outer Deflection (ND₉) Plot

4. CONCLUSION

The pavement exhibits varying characteristics from strong pavement to moderate pavement as the deflections values fluctuates along the pavement length. Much of the pavement stretch was characterized as reasonably strong but may require overlay depending on the traffic loading. The pavement surface curvature index gave an indication of strong upper layers in the pavement structure and it was observed that it's the upper layers of the pavement that have a large influence on the pavement structural condition. There is also the possibility of a stiff subgrade supporting the pavement structure.

5. RECOMMENDATION

The results showed that only three locations at around chainage 14.4km, 24.2kms and 25.8kms had signs of a moderate pavement that required a thin overlay despite the pavement structure showing characteristics of stability. Therefore, it is recommended that surface dressing with 10/14 class 1 chippings and 80/100 penetration grade bitumen binder for pavement surface treatment will be suitable for the entire stretch of the study section.

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Energy Conservation Through Changing Human Behavioural Approach; Challenges And Way Ahead For Sri Lanka Navy

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Abstract- Sri Lanka Navy (SLN) spends a considerable amount of capital on monthly electricity bill payments, which, if saved, could be expended for the benefit of the Navy. The present human strength of the Navy is approximately 55,000, and this figure directly influences the electricity consumption in the Navy. Owing to the fact that, the human behaviour can play a vital role in conserving energy, this study is focused on investigating and analysing the challenges influencing energy conservation through a behavioural approach of SLN personnel. The study followed a qualitative approach and necessary data was obtained from the officers and sailors serving at Sri Lanka Navy Ship (SLNS) Rangalla through an open-ended questionnaire and also through structured interviews. The study revealed that, awareness, supervision, restriction, coercion, referent power, attitudes, responsibility, feedback, and motivation are the factors affecting human behavioural approach. The absence or presence of these factors affect the behavioural intention and thereby influences the changing of human behavior. The results could be used in developing a theory that would promote energy conservation by altering the human behavioural approach.

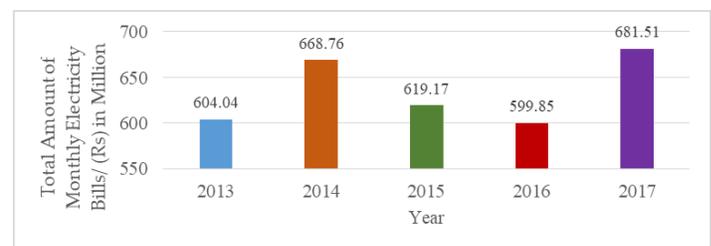
Index Terms- Energy Conservation, Behavioural approach, Challenges

I. INTRODUCTION

Sri Lanka is gradually converting into a globally competitive country with a middle-income economy. The energy crisis has become a major issue throughout the world and it directly affects the national security of a country; this applies to Sri Lanka as well. The country mainly uses biomass, hydro, and fossil fuel to cater to the energy requirement. Hydro plants were considered as a viable solution for the power requirement in Sri Lanka, since the country is rich with many waterways. However, hydro power has been tapped to its maximum by now and thus the country has to depend mainly on imported fossil fuels to balance the energy requirement. According to the information available at the Ministry of Power and Energy, this includes 02 Million Metric Tons (MMT) of crude oil, 04 MMT of refined petroleum products, and 2.25 MMT of coal to the country annually, expending almost USD 5 billion in foreign exchange.

The average total bill of annually imported fossil fuel is around 25% of the country's import expenses, and close to the 50% of total export revenue [1].

SLN daily consumes three main forms of energies; fossil fuels (mainly Diesel and Petrol), electricity, and LP Gas. Fossil fuels are consumed by ships, craft, and vehicles of the SLN. While LP gas is exclusively used for cooking, electricity is consumed for all daily activities. In comparison, the daily consumption of electricity is very high. Therefore, the present study focuses on the electricity usage, which will be denoted by the term 'energy' in the paper. The information obtained from the monthly electricity bills, revealed that the total annual cost of monthly electricity bills is approximately Rs. 600 Million. Graph 1 illustrates the electricity consumption of the Navy from the years 2013 to 2017. SLN pays a substantial amount of capital for the monthly electricity bills, which could be saved for the benefit of the Navy, if energy conservation practices are implemented.



Graph 1: Electricity Consumption in the Navy from 2013 to 2017

Numerous studies have recognised that change of human behaviour is highly effective and is a lasting resolve for energy conservation. Significant number of studies have attempted to ascertain the relationship between the behavioural approach and energy conservation, however, the contribution to recognise the factors influencing the conservation of energy through human behaviour approach is minimal. Furthermore, since the SLN has a considerable work force, this study is more appropriate to comprehend the behavioural change towards energy conservation. Therefore, the current study is focused on recognising the challenges against the conservation of energy through the behavioural approach, with the objective of investigating and analysing the challenges affecting conservation of energy and to make recommendations to mitigate the

challenges to conserve energy. So far, not a single study has attempted to identify the challenges regarding conservation of energy in the military context through a behavioural approach.

II. LITERATURE REVIEW

Energy conservation can be defined as ‘any attempt made to decrease the consumption of energy to conserve energy resources for the future and reduce the effect on the environment’ [2]. Energy conservation is achievable via two methods; ‘technology-fixed’ and ‘behavioural approach.’ The technology-fixed method is purely based on improving, developing, installing energy efficient systems, and devices and machinery to decrease the energy consumption [3]. Though it is highly effective and short-term solution for energy conservation, it is a costly process. A behavioural approach is a successful way towards energy conservation since the outcome is efficient and also it is a long-term solution to conserve energy. The behavioural approach towards energy conservation is a complicated process influenced by various factors and can be considered as the leading pillar of the successful energy conservation [4,5].

Behaviour change is defined as an exploration-oriented review process to address any specific knowledge, attitude, behaviour, and practices those are interconnected to achieve any goal [6]. Similarly, the behavioural approach includes the changes in stimulus conditions that influence the change in human behaviour [7]. There are a couple of factors identified as attributes for behavioural change towards energy conservation, namely; awareness, economy and environment, supervision, feedback, motivation and interventions. The change of consumer behaviour towards energy conservation is the key to saving energy; this is a complicated process influenced by various factors [5]. Behavioural approach could be accomplished by changing human attitudes, whereas attitudes can be influenced by motivating and raising public awareness [3, 6].

Knowledge on energy conservation is identified as a significant obstacle, and the economic and operational factors, and frustration due to non-availability of energy-efficient equipment act as certain impediments for energy conservation in laboratories [5]. Various investigators have recognised the applying of behaviours towards energy conservation at home is highly motivated, primarily by economic factors and secondly by environmental factors. Another study revealed both factors are equally crucial and positively correlated, since attitudes and valuing of the environment with the energy saving habits in the home leads to use energy saving appliances, thereby ultimately benefitting the economy [8, 9].

Supervision has a significant impact on a person’s behaviour and directly affects the change of behaviour. If someone is knowledgeable on the impact of energy conservation, close supervision leads him/her towards energy conservation. However, the abusive supervision directly influences someone’s behaviour negatively [10]. Supervision determines a person’s behavioural intention positively or negatively, and ultimately it changes the human behaviour. Similarly, various feedback methods and interventions influence energy conservation via human behavioural changes. The indirect and direct feedback

methods provide a compelling motivation factor to actively conserve energy and possible to save energy from 3% to 20% [11]. The feedback system on energy consumption, plays a significant role rather than merely implementing measurement programmes. Accordingly, a study has revealed that the users have saved energy from 3.5% to 22% due to real-time feedback [12]. The behaviour on energy consumption in a household primarily depends on habits and routine practices. A constructive correlation was identified between energy saving and changing of behaviours towards energy saving in households. These behaviours and routine procedures can be changed by enhancing knowledge, setting targets, and energy feedback, thereby allowing households to conserve energy significantly [8, 13].

Motivation is another critical factor that changes human behaviour. It is proved that motivation is critical for the performance of behaviour, and therefore for behaviour change [14]. According to various studies, a person can be motivated in different ways to act in a way that is expected. Behavioural change can be achieved through the attitudes and motivation can influence the attitudes [3, 6]. Motivation implements self-regulation which involves superseding existing habits over time until achieving a specified goal [15, 16, 17]. Finally, it is identified that most successful interventions are the interventions that create physical and social opportunities for the employees to conserve energy. Those are the six intervention functions of “Behaviour Change Wheel (BCW)”, education, environmental restructuring, persuasion, modelling, and incentive and enablement. They have been examined in each research approach towards energy saving indirectly or directly, and either alone or in combination with two or more interventions [18]. The BCW is a methodical review of behaviour change interventions, especially for health research, based on popular behaviour theories such as *Theory of planned behaviour*. According to the BCW, motivation, opportunity, and capability are the causes of behaviour. Somebody’s physical and mental capacity to engage in the particular behaviour is considered as the ‘capability’ whereas motivation includes all mental processes that empower a particular behaviour and clear decision-making. Opportunity is the factor that makes the individual’s behaviour possible [18].

As illustrated in Figure 1, functions of nine interventions are located around the central hub, and a study has identified six interventions, i.e., education, incentive, enablement, environmental restructuring, persuasion, and modelling to understand the influence of behavioural interventions towards energy conservation [18]. However, to date, no investigations have been made on the other three functions, i.e., Coercion, Restriction, and Training. These three interventions are highly related to the military setup, because military tasks are accomplished through these functions. Within this context, it is possible to assume that applying these three functions may help to conserve energy in a military context, which will be a catalyst to conserve energy. Coercion is the expectancy of penalty or cost. Applying penalties against employees in a workplace for energy conservation may be impractical, but salary-related penalties may be the most effective penalty type [18]. The restriction includes orders, regulations, and rules targeting a specific behaviour to restrict or reduce the effect of engagement.

Training intervention in the BCW is imparting skills. It is crucial to train on new smart technologies and use them efficiently to save energy. The absence or lack of training directly affects the employees' control of functioning such as lighting, heating...etc. More often, an employee might operate the air conditioning system without any knowledge on how to use the system in the best way, such as keeping the doors and windows sealed when the air conditioning system is functioning [18].

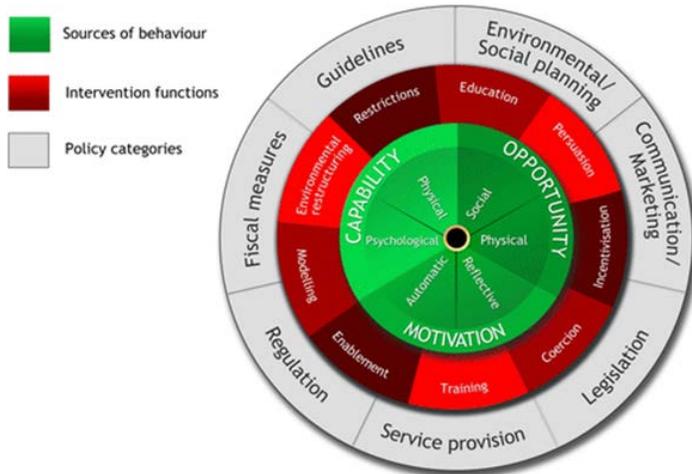


Figure 1: Behaviour Change Wheel [18]

“Theory of planned behaviour” is a development of the “Theory of reasoned action”. According to the theory, there is a complicated psychological process behind each individual’s behaviour, and the behaviour is an outcome of a sequenced psychological process. The theory states that, the actual behaviour is decided and influenced by the behaviour intention, which is affected by three factors, i.e., Perceived behavioural control, Subjective norms, and Behavioural attitude. Behavioural attitude is the leading attitude of a person that assists or not assists in executing a specific behaviour. Subjective norm indicates the pressure and influence of the society that persuades someone to decide when to perform and whether to perform the particular behaviour. Perceived behavioural control includes the ability of an individual to perform a behaviour, and it reflects the actual control conditions of that behaviour. Therefore, perceived behavioural control has a straight influence on the behaviour [19].

The factors identified through the literature review, which influence the behaviour related to the energy conservation, can be explained and applied to the theory of planned behaviour as illustrated in Figure 2. The factors that influence behavioural intention; awareness of energy conservation, training, motivation, feedback, and the impact on the economy and the value of the environment, are grouped under behaviour attitudes. Restriction along with supervision and coercion, the controlled beliefs, are grouped under the perceived behavioural controls. These interventions build the ability to perform the expected behaviour. However, the literature does not reveal a relationship between the identified factors and subjective norms, since they do not force or persuade someone to decide when and whether to perform a particular energy conservation behaviour.

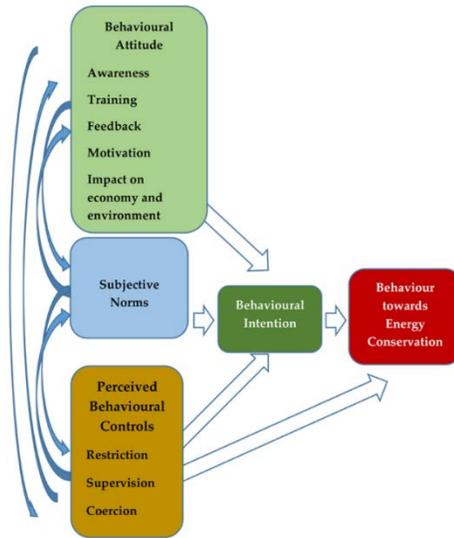


Figure 2: Theory of Planned Behaviour and factors identified

Behavioural approach plays a significant role in the effective energy conservation, since it depends on human behaviour significantly. Therefore, any factor or challenge affecting the behaviour intention can be recognised as a sub-challenge to achieve behavioural change to reach energy conservation. This study focuses on identifying the consequences of all factors discussed in the literature review, to recognise the challenges of electricity conservation through the behavioural approach in the Navy. Most previous studies on similar topics have been conducted overseas, and only a limited number of research is performed regionally. Investigations on energy conservation through changing human behavioural approach in Sri Lanka, or in the SLN was not found. Hence, a wide gap exists in the knowledge between available studies and what remains to be studied in the subject. Therefore, the objective of this study is to identify the factors or challenges affecting human behavioural approach towards energy conservation in the SLN.

III. METHODOLOGY

The study followed an inductive approach since it is designed to derive a theory based on observations from specific to general. An open-ended questionnaire and structured interviews were used to understand the challenges and barriers affecting energy conservation through human behavioural approach. Qualitative method was used since such analysis helps to understand the challenges affecting energy conservation through human behaviour change. The research is outlined in a cross-sectional time zone because the study is limited to a specific time frame. As shown in Figure 3, the independent variable represents the behavioural intent that influences the behavioural change towards energy conservation as identified by the literature. The awareness, impact on economy and environment, feedback, supervision, motivation, coercion, restriction, and training are the main contributing factors to the behaviour intent that influence the behavioural change, according to the literature review.

Therefore, the contributing factors to the independent variable are considered as barriers or challenges, and the behaviour towards energy conservation represents the dependent variable of the study.

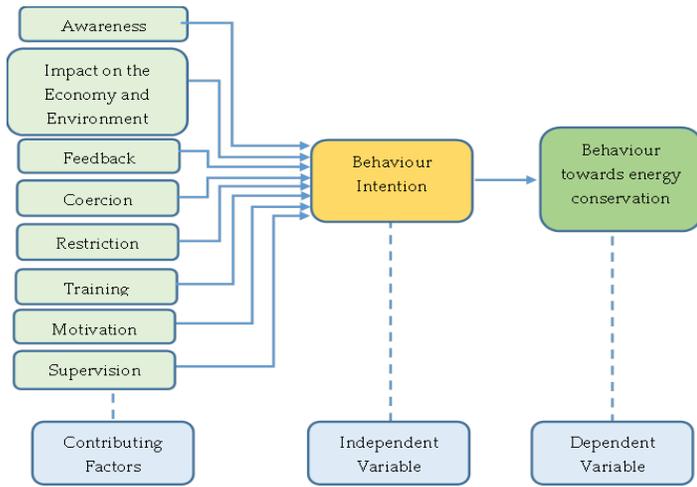


Figure 3: Relationship of factors affecting behaviour intention to change behaviour towards energy conservation

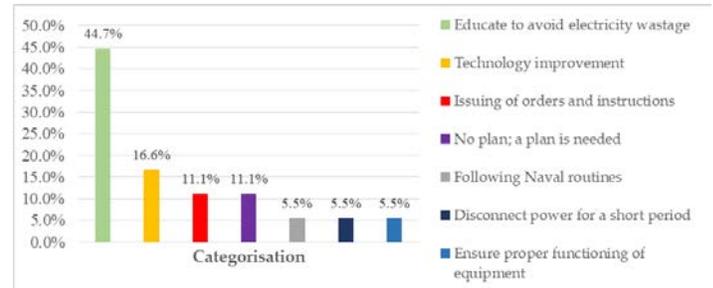
Structured in-depth interviews and an open-ended questionnaire produced the primary source of data. It helped to explore the topic and the factors affecting the behavioural change of participants profoundly, and finally analysed the research questions. Open-sources such as research documents, journal articles, books, and websites provided the secondary data to identify the research problem and construct a conceptual framework. The population was the ship’s crew at SLNS Rangalla with 1395 persons as at 16 Apr 2018, and the samples were selected based on purposive sampling/judgemental sampling. The primary objective of the judgemental sampling method is to focus on specific characteristics of the population that will best assist in answering the research questions [20]. The homogeneous sampling procedure was used to select sample units based on their similar characteristics. Initially, the sample size was not pre-determined because it depends on the data saturation concept [21]. Data were collected from 15 personnel, because data saturation was observed after distributing the questionnaire and conducting 10-12 interviews.

Content analysis, which is a process of categorising verbal and written data to classify, summarise, and tabulate, was used for data analysis [22, 23]. In content analysis, interviews and answers were examined to identify the keywords, paragraphs, or themes [24]. Interviewed data and answers for the open-ended questionnaire were analysed under three stages using a manual method and the MS Excel software; open coding process, categorisation process and recognition of categories [25]. The questionnaire was pilot tested to identify the suitability and reliability to refine the questionnaire, and assure the absence of any doubt when answering the questions during the interview and facilitate data recording. The grounded theory analytical procedure was followed to generate a theory based on the central

theme developed from the data. The data display and analysis procedure were also employed to organise and assemble data into diagrammatic visual displays.

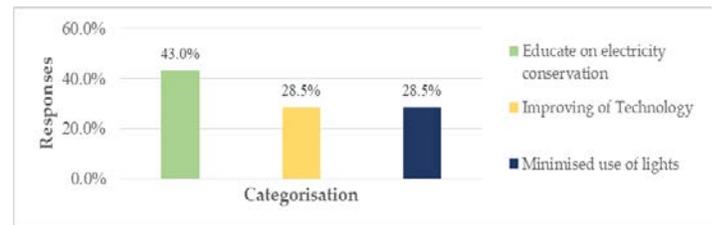
IV. RESULTS

Based on the analysis of data, the following results were derived. Graph 2 to 7 depicts the responses received through the open-ended questionnaire, which were subjected to initial coding for easy interpretation, and Table 1 summarises the final themes identified by the study. The avenues of contribution of SLNS Rangalla towards energy conservation as an individual organization was derived through data and shown in Graph 2.



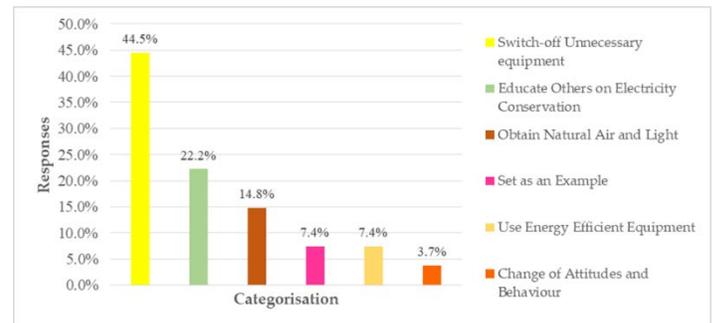
Graph 2: Contribution of SLNS Rangalla for electricity conservation

Existing electricity conservation practices in the SLN, indicated by the respondents, are depicted in Graph 3.



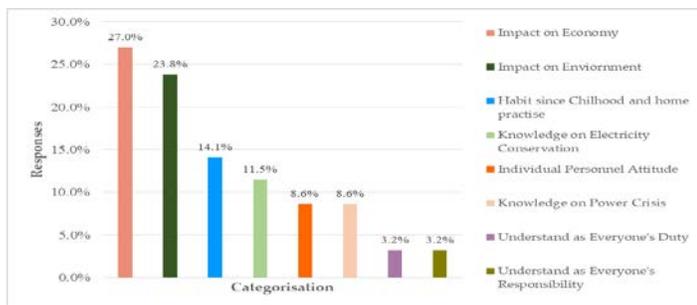
Graph 3: Existing electricity conservation practices in the SLN

The personal contribution towards electricity conservation in SLNS Rangalla is summarized as shown in Graph 4.



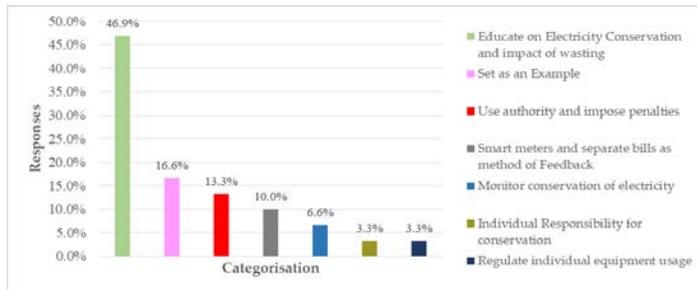
Graph 4: Respondents’ contribution towards electricity conservation

Factors behind such behaviour to initiate energy conservation, those were indicated by the respondents, are shown in Graph 5.



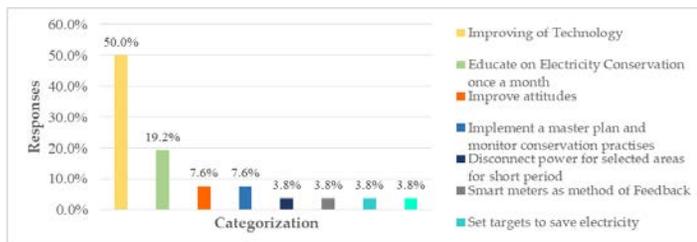
Graph 5: Factors underlying the electricity conservation behavior

The approaches of the respondents, to influence others' behaviour towards energy conservation is summarized in Graph 6, which was used to identify the factors affecting behavioural change of naval personnel towards energy conservation.



Graph 6: The way of influencing other's behaviour towards electricity conservation

In order to derive possible recommendations and solutions to enhance energy conservation in the Navy, the avenues suggested by the respondents to enhance conservation of energy in the SLN are depicted in Graph 7.



Graph 7: Enhancing electricity conservation in the Sri Lanka Navy

After recognising the initial coding, similar coding/categories were identified. These categories were further refined and reduced by grouping similar and overlapped categories together. Finally, a few inductive categories/themes were derived through the data interpretation, as depicted in Table 1.

Table 1: Final themes after reduction and grouping of initial coding

S/No	Grouping of Initial Coding	Inductive Categories /Themes
1	Educate on electricity conservation and the impact of wasting Knowledge on power crisis Impact on economy Impact on environment Obtain the maximum advantage of natural light and air	Awareness

2	Ensure proper functioning of equipment by human Monitor electricity conservation practises	Supervision
3	Disconnect power for a short period Minimise usage of lights Regulate individual equipment usage Issuing of orders and instructions	Restriction
4	Use authority and impose penalties	Coercion
5	Set as an example to others	Referent Power
6	Switch-off unnecessary equipment when not in use Habit since childhood and home practise Individual personnel attitudes	Attitudes
7	Understand as everyone's duty Understand as everyone's responsibility Individual responsibility for conservation Set targets for responsible personnel to save electricity	Responsibility
8	Smart meters and separate bills for individual rooms and offices	Feedback
9	Reward who achieve the set electricity saving targets	Motivation

V. DISCUSSION

As the results of the study shows, awareness of energy conservation influences the behavioural intention, and thereby behaviour of the naval personnel could be directed towards energy conservation. Supervision also has a significant impact on a person's behaviour and directly affect the change of behaviour. If someone is knowledgeable on the impact of energy conservation, close supervision leads him towards energy conservation.

Furthermore, coercion is the expectancy of penalty or cost. Though it is difficult to practice, coercion in a typical working environment, in a military context, this could be easily adopted, since every place and equipment has a responsible person. Authority can supervise whether employees follow the conservation practices, and if not, can impose penalties for those who violate in a military environment. Therefore, coercion may carry a significant impact on human behaviour change. Awareness, supervision, restriction, and coercion were identified as inductive categories/themes. These inductive categories were derived through the existing energy conservation practices of the SLN and have proved that the present conservation practices are directly and indirectly influence the change of human behaviour towards energy conservation. The Theory of Planned Behaviour forms the basis for explaining the relationship between categories and behavioural change.

The factors affecting behavioural change of naval personnel towards energy conservation were also identified. Since enhancing awareness of energy conservation directly influences the behavioural attitude under the theory of planned behaviour, it is a successful approach towards energy conservation. Apart from that, referent power promotes the behavioural attitude of a person and leads him towards the expected behaviour.

The underlying factors of a person's energy conservation practices were identified as a part of this study. Awareness on impact of wasting energy on the economy and environment, energy conservation, and existing power crisis could be categorised under the awareness of energy conservation with significant impact on behavioural attitude. The study further proved that habits and attitudes also lead towards energy conservation. Furthermore, conservation of energy is a prime duty and responsibility of all citizens, and individual responsibility has forced their behaviour positively towards energy conservation. It depicts that, when a person becomes responsible, his/her behaviour change significantly towards the expected direction. The responsibility related to a person's belief that others think he or she should engage in such behaviour, which could be grouped under subjective norms. It is interrelated with factors of behavioural attitude as explained above, awareness of the impact on economy and environment resulting from wasting electricity, power crisis, and electricity conservation practices.

Ways in influencing others behaviour towards energy conservation are, educating others on energy conservation and the impact of wasting and setting an example to others. Furthermore, conservation practices could be monitored and even authority can be used to impose penalties for the personnel who violate. Restriction and supervision are interconnected with coercion and carry a significant impact on human behaviour change. Feedbacks such as, providing smart meters for individuals' rooms, and display bills of previous months, have a direct impact on behavioural attitude.

The study also derived possible recommendations and solutions to enhance energy conservation in the Navy through behavioural change, which includes enhancing the awareness on energy conservation from top to bottom, restricting electricity for selected areas, implementing a master conservation plan with an efficient monitoring mechanism and rewarding system. All inductive themes derived in this study, i.e., awareness, supervision, restriction, coercion, referent power, habit, responsibility, feedback, and motivation, are summarised according to the theory of planned behaviour as depicted in Figure 4.

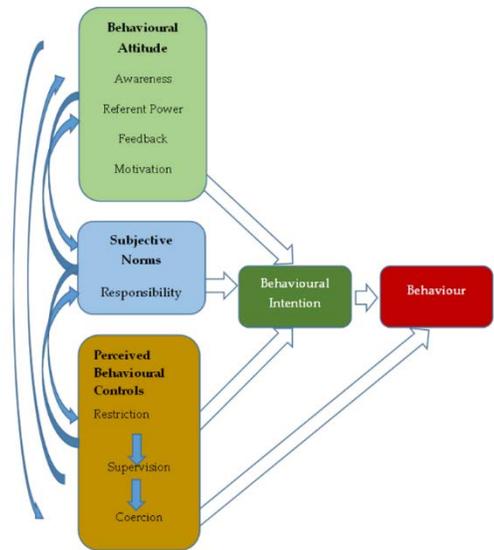


Figure 4: Theory of planned behaviour and all inductive categories derived

VI. CONCLUSION

Behavioural change is a long-term solution for energy conservation, and thus, this study was mainly focused on identifying the factors affecting the behavioural change towards the said purpose. Considering the human strength of the Sri Lanka Navy, the study aimed to recognise the factors influencing human behavioural change. The Theory of Planned Behaviour was utilised to further investigate how the identified factors influence human behaviour. The study revealed that changing human behaviour through these factors is challenging and implementing a suitable and effective mechanism is a need. This study identified the following inductive categories as the contributing factors that stimulate the behaviour intention towards behavioural change; awareness, supervision, restriction, coercion, referent power, habit, responsibility, feedback and motivation.

It was revealed that, the present energy conservation practises in the SLN address the contributing factors, i.e., awareness, supervision, restriction, and coercion to apply electricity conservation practices through the change of human behaviour. Further, the referent power, habit, and responsibility emerged as new knowledge. The absence of a factor directly affects the behaviour intention and subsequently influence the expected behaviour. Therefore, these factors could be contemplated as the challenges to human behavioural change for energy conservation. In conclusion, a central theory could be developed, i.e., 'Energy conservation could be achieved through a human behavioural change in the SLN, and the SLN has to identify a suitable effective mechanism to achieve the expected result through the identified factors.'

Following major recommendations are made to enhance the energy conservation through human behaviour change in the SLN.

- a. Implement an effective awareness programme on energy conservation.
- b. Provide a feedback to limit the consumption, by installing electricity meters in distinct places inside the naval base with the consultation of Ceylon Electricity Board.
- c. Set energy conservation targets for the personnel occupying a particular space and reward the personnel achieving the set targets.
- d. Implement a proper energy conservation action plan with the consultation of energy auditors and specialists in the field. It should be a detailed action plan that includes the following: mission, aim, energy conservation opportunities, daily energy conservation guide, energy audits, recommended lighting settings and energy consumption and cost information.
- e. Establish an energy audit team for monitoring the correct implementation of energy action plan.
- f. Implement necessary orders and instructions to execute the action plan and relevant conservation practices.

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The Impact of the Financial Crisis in the Activation of Corporate Governance

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Abstract- The global financial crisis has led to the collapse of many financial organizations, banks and companies, which negatively affected the economic achievements that it have been achieved by many of global economies. It necessitates investigating the causes of the crisis, and taking all necessary actions and possible measures to deal with these issues and to avoid unpredictable consequences. here appeared the necessary to apply the principles and mechanisms of corporate governance, and activated it and to remedy shortcomings, as one of the tools and the main pillars to solve the financial crisis and avoiding the negative impacts, especially after some studies have proved that the wrong application to principles and mechanisms of corporate governance was the main cause of the crisis.

The aim of this paper is to study the crisis reasons through reviewing previous studies, and the impact of this crisis on activation of corporate governance, despite of all the effects that have been caused by the financial crisis. However, it has had a positive role in showing deficiencies in accounting standards, principles and mechanisms of corporate governance. Besides deficiencies in the methods and application procedures which made many of political actors, bankers, financial organizations and auditors are calling to activating the role of corporate governance through their properly practices, to avoid some of the negative effects which is resulted from the financial crisis worldwide.

Keywords: Global financial crisis, Crisis impact, Banking, Economies, Corporate Governance.

1- Introduction

Since the beginning of the second half of 2007 the world has seen a severe financial crisis has swept many global economies. It resulted in the collapse of many banks, companies and global financial institutions in the United States of America in particular and in worldwide, which made economists and politicians trying to develop detailed explanations about the causes of the current financial crisis, beginning of fraud and financial failure and even the absence of regulations, and not to apply the principles of corporate governance in companies, as pointed out by Rainer Geiger, (YESR) that “the global financial crisis has provided an opportunity for change in corporate governance, perhaps one of the main reasons for this crisis is the lack of transparency and clarity in the financial institutions, it was prevalent before the recent crisis, it has increased criticism of corporate performance, and its executive management of boards of managements of companies, especially the contribution companies that have made many of stakeholders demanding that accounting procedures be tightened, the application of more stringent control laws, they are claiming to apply of requirements of corporate governance”.

It was considered as special cases, there was no significant attention to collapses that occurred to companies, especially whose believed that these collapses will leave its reflection on some of the contributors, but it has exceeded far beyond that in 1998, where it has appeared Bankruptcies to major of companies that have left its impact on economy of entire state, it can be said that it has exceeded the negative impact on the economies of the world countries, until these repercussions turned into a global crisis, It began in the Southeast Asian Nations, then it turned to affect the global economy as a whole. However, despite global attention to this crisis, the global economy has suffered since mid-2007 to financial crisis was more severe, its repercussions are still continuing up to the present. Which has led to the attention of the issues of huge companies again, and extent of the role of imbalances and corruption in the emergence of such crises.

It has led to the current crises of which caused by the administrative and financial corruption, and mismanagement, the gap between the executive and administrative salaries of these companies, to that characterized the process of attracting of sufficient levels of capital is very difficult, many shareholders suffered from financial losses that led them to clearly declare that they are not willing to stand against the consequences of corruption and mismanagement, so that investors are demanding before investing on evidence that companies are run in accordance with business practices right.

Recently they have paid attention to the application of the principles of corporate governance in companies and banks, as a result of rapid developments in the financial markets, the globalization of financial flows and technological progress, which led to an increasingly competitive pressure between banks and companies. With the global financial crisis that has swept most of the global economies, it has started activating a corporate governance which is of importance, to adjust performance of companies, and what the consequent on accuracy of the results and avoiding companies to financial crisis, which leads to failure and financial collapse. The study evolved to explain the reasons beyond this crisis, referring to the weakness management or there is no corporate governance in practice?.

2- The global financial crisis, its concept and its reasons:

The financial crises are considered the most economic issues that it has deliberated due to their nature and its relation to economic business. So we will discuss the concept and types of crisis, we will be discussing examples of financial crises.

What is the financial crisis?

The financial crisis has defined as "The collapse of the financial system as a whole accompanied by the failure of a large number of financial institutions, and non-financial with sharp contraction in macroeconomic activity"¹. The financial crisis is "Sudden collapse in the stock market, or in the currency of a State, or in the real estate market, or a group of financial institutions, to extend to the rest of the economy, it occurs such a sudden collapse in asset prices as a result of price explosion or speculation as sometimes called purchase and sale of huge quantities of one or more financial assets or materiality such as stocks, or properties with price that exceeds their real state value".²

Of the previous definition we conclude that it is profound changes which affect wholly or partly on all financial variables, on size of issuing and stock prices, and total loans and bank deposits, exchange rate, and refers to the collapse of a comprehensive in the financial and monetary system.

The main characteristics of the financial crisis are highlighted in the following points:

- Lack of sufficient information about them.
- Complexity, and tangles, and overlap in their factors and its causes.
- They have occurred violently and suddenly.
- To face the crisis requires a high degree of control in the capabilities and energies.

Types of financial crises

On the difference and diverse of types of financial crises and economic issues, it can be classified to several types:

*** Banking crisis**

Banking crises appear when the bank faces significantly increased and a suddenly in request to withdrawal of deposits. Thus, occurs "liquidity crisis" for the bank, if extended to other banks occur in that case "systematic banking crisis" when deposits are available to bank refuses to grant loans for fear of failure to meet withdrawal requests occurs of a lending crisis. For example Overend & Gurney Bank in UK and Bank of United States in USA.³

**** Currency Crisis**

The crisis occurs when a currency is expose to a country to attack of speculative is very strong leads to a decline of its value significantly reduced, which is imposed on the monetary authorities to reduce its value thus, occurs crisis of collapse of exchange rate.

***** The crisis of financial markets**

The crises occur in the financial markets as a result of what is known as an economic phenomenon "bubble", which occur when rising price of the asset to exceed its value of fair as a result of the severity of speculation.⁴

3- Comparative analysis of the effects of the crisis on Corporate governance

A study of Talal (2009) has indicated that reasons of collapse of some companies was due to the lack of good practice by their governing boards to control and lack of experience and skills, and random drainage imbalance of funding structure and the inability to achieve cash flows sufficient to meet its financial obligations, which has led to financial collapse for companies or financial institutions.

The study also confirmed that financial collapse of companies was due to either the wrong application or not to apply the principles of corporate governance which are based on accounting principles disclosure and presentation of real accounting information on the financial position of the companies.⁵

Amerta (2005) also, has indicated that reasons of collapse of some American companies recently was resulted in meeting the commitment of the principles of corporate governance correctly. According to the study that was conducted on an Enron company, the study has reached to many of results of which; It was not disclosed on activities that have been manipulated by the management of company, it turned out that what was done by Enron of conversion operations was not efficient, but it was intended to hide of losses and achieving gain from it and management of company did not provide any information to shareholders regarding the problems or crises that had emerged to the company, during the financial crisis period, even not expected by the complete collapse.

According to the study of Erkens (2009) the main reasons to crisis areas following:

- ❖ The weakness of the supervisory role of ownership structure of the companies.
- ❖ The independence of the audit committee.
- ❖ The independence of the board of directors, the number of external non-executive members.

The study has found that companies are more powerful in terms of corporate governance to be more able to cope with financial crises, and finding appropriate solutions.⁶

It has explained by a study of Pomerantz & Mohr (2009) that the shortcomings that occurred in risk management owing to the global financial crisis was the issue of weakness in structure of corporate governance due to the lack of effectiveness of internal controls and incentive systems in reducing financial problems, this was confirmed by another study,⁷ Hopkins & Posner (2009) has reported that the process of risk assessment in the companies have become very bad, as a result of the lack of the ability of accountants to provide appropriate information that they can rely on it to face those risks, the study has suggested that an increase of the effectiveness of corporate governance mechanisms should be considered by activating the role of the external auditor, manipulation experts, and anti - manipulation programs, in order to limit of any improper practices which may be associated with financial crises.⁸

As study has indicated (Abadi,2007) that the collapse of many of companies global due to several of reasons: Weak professional practice correct, following the management to practices profit management, besides spread of financial and administrative corruption, which led to increased attention of governments and scientific and professional bodies to corporate governance, to treat causes of bankruptcy collapses and financial crises and ensure that they are not exposed in the future.⁹

Analysis of previous studies the researcher can conclude the following important notes:

- ❖ That the lack of application or the wrong application for the principles of corporate consider of the reasons that helped in emergence of the financial crisis, this what make of many of accounting bodies are requesting for reconsider of the principles of governance, and that taking of actions that commit companies to apply these principles.
- ❖ Several studies have dealt with some of the procedures and the means on which it depends in activating the principles of corporate governance of which; activate role of legal auditor, manipulation experts and programs of anti-manipulation to reduce improper practices that accompany financial crises.
- ❖ Despite all the disadvantages that caused by the current financial crisis, but it was the primary motivation and tool of pressure of effective on all responsible authorities on design development of the principles of corporate governance to ensure the proper application of those standards and principles, so that ensures the reduction of the negative effects of the crisis.

The researcher finds that weak control side and ethical, also the lack of commitment to the basic principles of corporate governance is one of the main reasons behind the prevailing financial crisis, collapse of many banks and international companies.

4- Corporate governance and the effects of its activation on increase confidence and protecting shareholders' rights.

The term corporate governance has associated with the idea of globalization and financial crises, and during the short period has become this the term interesting to many of professional bodies, scientific and the Academy, Interest has increased corporate governance significantly in both developed and developing economies alike in the wake of economic collapses and financial crises which passed it many of global economies during the last

decade of the twentieth century and the first decade of the twenty-first century. Also interest has increased principles, standards and mechanisms for implementing corporate governance in most of the world. Given for the importance of the subject of corporate governance, especially in light of the financial crisis, the researcher will deal with this section in corporate governance in terms of concept, principles and mechanisms of application, and its role in increasing confidence and credibility of accounting information in reports and financial statements, besides its role in protecting shareholders' rights and all of relevant parties to the company.

Concept of corporate governance.

Corporate governance definition indicates that it a set of strategies that adopted by the organization is seeking through it to achieve its basic objectives, in an ethical framework in the light of the systems, internal regulations and the administrative structure, so that ensure its achievement of objectives according to their own potential without detriment on the interests of the rest of the other parties associated with the organization.(Arsanius, 2002).

Ahmad, (2003) defined it" system to control and administration adopted by business organizations with a view to the distribution of responsibilities and rights among all parties involved in the organization, and setting the foundations and procedures for the affairs of the organization, in order to improve performance and keeping of the organization's economic reputation, rationalization of decision-making which serve all relevant categories."¹⁰

Abdul Samad (2010)defined corporate governance "is the practice of a good administration through set of laws, rules and standards that control of relationship between the company's management and its board of directors, shareholders, and other parties have Interests with company, in order to maintain on the shareholders' rights to achieve their wealth equitably, with the support of different levels of the Board of Directors".¹¹

Through previous definitions of the concept of corporate governance, the researcher can that defines the basic pillars which corporate governance is based;

❖ It is a set of foundations, principles and Financial administrative and regulatory practices, it is applied in order to increase benefits of resources and possibilities.

- ❖ corporate governance is a means to achieve goals that achieve through the company's interest and the interest of its shareholders, and providing effective control and using of efficient to resources of the company.
- ❖ Corporate governance system must be an integrated system for control in business organizations, and that is characterized by continuity, so include monitoring all processes and various activities.
- ❖ Corporate governance must that include sub-system for risk management which aims to avoid risks and crises, or reduce its various negative effects, or liquidity risk, or credit risk and the extent of continuity, or any kind of risks that may face the organization.
- ❖ Corporate governance means commitment to proper application of the laws the systems and the regulations different which govern performance is necessary, leads to the satisfaction of shareholders and achieve their interests, in addition to other parties have interests with company.
- ❖ Corporate governance means the disclosure of the activities of the organization, transparency and increase confidence in the necessary accounting information to rationalize management decisions and shareholders.

The importance of corporate governance;

Based on previous definitions of corporate governance, it can be determine with the importance of corporate governance in the following basic points:

- ❖ Ensure commitment with laws and issued regulations with regard to the application of corporate governance.
- ❖ Benefit from accounting and internal control systems significantly, and work to develop it and improve its performance, to achieve the efficiency of the organization's performance, in addition to improvement accounting practices, financial and administrative.
- ❖ Elimination of financial, administrative and accounting corruption and to develop the necessary measures which ensures that it will be avoided again.

The basic principles of corporate governance in business organizations;

The principles of corporate governance can be summarized below.¹²

- **The need for a basis for an effective corporate governance:** The corporate governance framework should include on a set of foundations. which helps to achieve transparency and ensure its efficiency and effectiveness, to ensure the achievement of positive results to economic performance of the organization.
- **Maintain shareholder rights;** Through the implementation of the group of mechanisms that ensure getting all shareholders on the company's information in a timely manner.
- **Fair treatment and equal to all shareholders:** Equality and justice among shareholders within each category, especially small shareholders or foreign shareholders.
- **The role of stakeholders in the exercise of management responsibilities:** It should include a corporate governance framework recognition of the rights of the Company's stakeholders as guaranteed by law, and include what motivates on create a spirit of cooperation between the companies represented in their governing bodies and stakeholders.
- **Disclosure and transparency:** The governance framework must ensure sufficient disclosure, about methods of exercise of authorities, ownership structure, performance evaluation.
- **Responsibilities of the board of directors to company:** It should contain a governance framework on criteria for selection of members of the board of directors, their basic functions and guarantees necessary for effective follow-up for executive management by the board of directors.

Based on the above the researcher finds that make efforts of all responsible parties on the principles of governance and develop them according to developments and economic variables, it became necessary to ensure the effectiveness of those principles and safety of its application, this is confirmed by the global financial crisis, especially in light of the collapse and bankruptcy of many companies, banks and financial institutions, which was supposed to it apply the principles of corporate governance, however it proved in fact after occurrence of the crisis that application of the principles of governance was formality away from reality.¹³

5- The repercussions of the global financial crisis and its role in activating corporate governance.

Although that some of studies pointed out that the global financial crisis started since the beginning of the second half of 2008, however there are other studies confirmed that the real beginning for the financial crisis was in 2002 (Halaika, Al-Wazzani, 2010), where has collapsed at that the time Enron company and company of World-Com, then followed a breakdown and the bankruptcy of many companies, banks and financial institutions, which raised many of the questions about how effectiveness of principles of governance and safety

of mechanisms of its application, and its effect upon quality of financial information and accounting in the financial statements.¹⁴ Despite of the financial scandals which accompanied the financial crisis, however the researcher sees that it of positives these scandals, it has showed lack of substantive rules for corporate governance, and that the principles and governance mechanisms that applied only a formality, and it needs to real reform, helps protect companies of financial collapse, so that ensure this reform achievement of effective control and the credibility of accounting information, veracity of financial statements, also include effectiveness of accounting systems.

So the researcher notes that emergence of the financial crisis, it has imposed on the responsible authorities on the application of principles and mechanisms governance a new challenge, to ensure the proper application of its, lack of complicity of external auditors with some of the parties which have relations and the interests in the company, as members of the board of directors and executives, considering that existence of a good system for corporate governance means more of supervision, intervention and control by shareholders and some of stakeholders.

It has mentioned (Fatah and Ben Aichi, 2011) that the global financial crisis made some of countries are doing several procedures to avoid such crises these include:¹⁵

- ❖ Repair of systems and accounting standards to achieve greater accuracy, credibility and transparency for accounting measurement in companies.
- ❖ Application of effective systems for corporate governance, and that obliges of companies to applying these systems through the issuance of legislation and laws which regulated in different countries, to eliminate negative practices in companies.

The occurrence of the global financial crisis since the beginning of the second half of 2008, and what happened of financial collapses for many international companies was major cause to pay researchers, organizations and scientific bodies responsible for improving and development of corporate governance to make attempts, which ensure activation principles of Corporate Governance and the integrity of the application of its mechanisms.

The researcher can to confirm this through display for some efforts that made by some Governments, scientific and professional bodies to activate the principles and mechanisms of governance, and ensure integrity of its application in companies, banks and financial institutions, the researcher has mentioned previously that

corporate governance mechanisms including internal mechanisms as internal audit and audit committee, and external mechanisms as external audit. It helped the financial crisis focus on weaknesses in those mechanisms which caused an increase in the severity of the crisis, what it has made many of governments, scientific and professional bodies to develop and improve effectiveness of performance those mechanisms, which will be presented by the researcher in the following points of this paper.

6-Some of international efforts to activate the principles and mechanisms of corporate governance.

Some of countries have done and governments Following the repercussions of financial crisis many efforts in order to develop of accounting standards and activation of principles and mechanisms governance, the researcher will deal with it from the beginning of 2002, where the beginning of the collapse of some of companies and large economic institutions, of these efforts, for example the following;

Amendments of the International federation of accountants;

The International federation of accountants has done set of amendments on international auditing standards during 2009, as a result of the global financial crisis and its impact on the global economy, as a means of defense on accusations which it has directed for the profession as one of the causes of the financial crisis, the most important of these amendments are the following;

❖ It was confirmed through the international auditing standard No (260) special of contact with those charged with governance (ISA 260, 2010), on the need to auditor commitment of ethical requirements and special independence requirements to review of the financial statements preparation and connection a report to responsible for governance, refers to that members of audit team and staff of audit office, they have obliged of ethical standards concerning of independence.¹⁶

❖ International Accounting Standard No.(250), and the special to observance of laws and systems when auditing of financial statements (ISA 250, 2010), modifications have been made to this standard in order to increasing the effectiveness of corporate governance and increasing the role of auditors where amendments were confirmed on that the responsibility ensure of run of company operations consistent with the laws and the systems have located on the company's management and under the supervision of the responsible bodies on governance, the standard has pointed out that the process of communication between the external auditor and

responsible on governance has become communication of two directions , it is not in one direction as was before modification, which leads to the reduction of errors and the fundamental distortions in financial statements.¹⁷

❖ International Accounting Standard No.(265), (ISA 250, 2010), special to reporting on shortcomings in internal control for responsible on governance and management, which was issued recently to help auditor in identify deficiencies in the internal control system and connected it to those responsible for governance, at the end of 2008 in the wake of the financial crisis, financial report board has issued special constitution to corporate governance, in order to activate role of the audit committees, on that be written to include a follow-up to the integrity of the financial statements and internal control systems, and how effective of internal audit function and audit process.

In light of the amendments to previous international audit standards, it is clear to the researcher that these amendments aim to emphasize of importance of role that play it by the responsible authorities on corporate governance, it aims also to activate the mechanisms of governance, to treat weaknesses resulting of non the application of governance mechanisms properly. Therefore will help improve and develop corporate governance principles and mechanisms.¹⁸

❖ organization for economic cooperation and development; It has worked with governments of nationalism and some international institutions to develop a set of criteria and instructions for corporate governance. In order to activate the mechanisms more coherent with regard to disclosure standards and transparency, the organization has announced in November 2002, it is being developing and updating principles of governance which it issued in 1999, to suit with crises and economic variables imposed by financial markets at the level of the global economy.

It has been issued of revised corporate governance principles in 2004, but it was not mandatory to apply in companies, thus it did not well implemented by many companies, which threw on governments responsible for develop an effective framework imposes sufficient flexibility allow for markets to work effectively. From the point of view of the researcher that the most important of the main reasons for the financial crisis, and what followed it of financial collapses for many companies, banks and financial institutions, therefore it was necessary on governments to determine how the mandatory application for principles of governance, through the development of laws and legislation that ensure the proper application of those principles, according to cost considerations and the benefits of each company.

❖ Publications of the Basel Committee for Strengthening Governance; it has dealt with one of the studies (Wahiba, 2011) where it was issued Basel committee of report on strengthening governance 1999, after of occurrence the of the Asian crisis in 1997, that it has occurred in 1997, then released a modified version in 2005, in February 2006 it has been updated following the collapse of many of companies and US banks, It included on basic principles for corporate governance in banks.¹⁹

❖ American institute of Certified Public Accountants(AICPA); Audit committees are considered of the basic mechanisms that are used in activating the principles of governance, in 2004 (AICPA) has Issued instructions help Audit Committees in its role towards the external auditor, audit committee is responsible about everything related to the external auditor In terms of employment, determine the fees and isolation, and evaluate the performance of auditor, consequently the audit committee should be knowledgeable all things which have a relationship with external auditor, so that can performance of its responsibilities with a high degree of effectiveness and efficiency.

❖ Financial Reporting Council(FRC); It has issued several of issues including guidelines for audit committee helping in performance of its responsibilities effectively, as one of the most important mechanisms which are reliable in activating the principles of governance, the most important of these publications was that has issued following the financial crisis in 2008, in which the responsibilities of the Audit Committee were determined.²⁰

❖ American Institute of Certified Public Accountants(AICPA); Where the Institute was established center to follow of financial crisis in terms of its consequences and implications, and what it requires from the reactions and procedures to be taken by accountants and auditors, the center has done several of efforts with regard to the most important repercussions of the financial crisis on the profession of accounting and auditing, and a result of what caused the financial crisis of risks, institute has issued alert (AICPA , 2009 , A) including considerations that have to receive attention by accountants and auditors in light of the financial crisis, and taking in them consideration when performing their works, alert has indicated that the most important repercussions of the crisis is the loss of confidence in the published financial statements.²¹

❖ International Auditing and Assurance Standard Board(IAASB); The council issued has issued following the repercussions of the financial crisis several of alerts to try to reduce of the effects, of which;
- alert related to imposition of continuity in light of the financial crisis(IAASB, 2009, A) to assess the company's ability to continue as a basic premise of assumptions of preparation of the financial statements, it was

emphasized in this alert on the need that do of the auditor in each audit process to study the imposition of continuity, and it is disclosed in the auditor's report thereon, it also confirmed on the need to reconsider in the International Standard No. 570 according to the new indicators which was developed in light of the financial crisis.²²

- Alert of special to audit of accounting estimates for fair value In the current economic environment and financial crisis (IAASB, 2009, B) which was released in October 2008, to guided by auditors to it in case of audit of companies that have investments in instruments of the new financial recently.²³

Of the previous presentation it is clear to the researcher that the financial crisis was the main reason behind all these previous efforts, as attempts by the responsible authorities for accounting and auditing profession, to reduce the repercussions of that crisis, and to avoid the negative effects of the resulting. This is what seeks to this paper that the emergence of the financial crisis, it achieved a positive role in the doing scientific and professional bodies to take actions needed to improve and activating the role of corporate governance.

7- conclusion and recommendations

Findings from this study indicated that the major reason to the financial crisis is the wrong application of corporate governance mechanisms, therefore it has to reformulate those principles and mechanisms so that there will not be chance for wrong application because of misunderstanding by those who responsible for this implementation. Global economies need desperately to take the necessary measures to apply the principles and the existing mechanisms to minimise the risk of any financial collapse for companies and banks. Due to the financial crisis, corporate governance has become a concept of ethical and great interest by a number of governments and decision makers.

Therefore, companies should have taken all actions and means that would increase confidence, transparency and credibility in accounting information in financial statements, and finding comprehensive solutions to the current financial crisis, both through the development of current principles commensurate with the economic changes developed, or by proposing new principles and practices. to counter of the current financial crisis, and to avoid financial crises in future should on authorities that take the necessary actions to reform and activate financial control systems, principles and mechanisms of corporate governance, by improving systems of accountability, integrity, transparency and efficiency of companies and global financial organizations.

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Distress and Stress Management Among Distance Learners: A case of Accra College of Education Study Centre

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Abstract- The purpose of the study was to investigate the effects of stress and stress management among distance learners at Accra College of Education Centre of University of Education, Winneba. Five research questions were used in the study. The survey design which involves the quantitative approach was employed for the study. The simple random sampling technique was used to select a sample size of 130 respondents (thus 70 and 60 Post-Diploma and Diploma Distance Learners) for the study. The study sought the views of respondents using questionnaires. Data were analyzed using the software SPSS. Among the present study's findings was that 71% of respondents strongly agreed that effective time management could help deduce academic stress. Another finding was that, most of the respondents believe that stress was very harmful to health and therefore, no among of it was good for students. It's almost impossible to live without some form of stress. However, if stress gets out of control, it may harm one's health, your relationships, and one's enjoyment of life. This study has established that majority of the respondents believe that stress is very harmful to health. Combining work, studies and household chores were the major causes of stress among distance learners. It was also find out that stress has strong negative effects on the respondents and on their students. It was recommended that the private and the public sector employers of labour should make study leave a policy for their workers who are interested in going back to school. Nurseries and Day care Centres should be established inside university campuses to enable working and nursing mothers to take care of their babies with ease. Seminars on stress management and coping strategies should be conducted regularly for distance learners.

Index Terms- Stress, Stressors, Pressure, Frustration, Burnout, coping strategies and Defense Mechanism

I. BACKGROUND TO THE STUDY

In the 21st century, the increased demand for skilled labour has led to an increase in the number of workers seeking opportunities to further their education for promotion or to remain employed. In developing countries, where academic studies is becoming much more strenuous and expensive over the

last 30 years, more and more adult student are schooling and at the same time working to pay their fees and to survive financially while in school. As a result, they are compelled to combine their roles as workers and parents, among others, with schooling at the tertiary education level as a result of numerous challenges; most workers has enroll as distance learners.' Distances learners' at various centers confront significant academic, psychological, emotional and interpersonal stress throughout their schooling period as they struggle to balance demands from work and school. A research by Barners, Egget and Trocel (2000), found out that there was a relationship between the number of the hours of work per week and lower grade point average. Distance learners' are deprived of time they would otherwise have for learning. When the learning environment is not conducive, the distance learners' also comes under a lot of pressure, which is a potential stressor.

It is as well important for distance learners' to know the sources of stress as they attempt to combine work with academic activity among others. These may include among others pressure, fatigue conflict, job/task demand, poor interpersonal relations and unfair management practices. Stress is a fact of life that every human deals with on a daily basis. It could appear frequently, all of a sudden, or over a period of time. In Ghana, admission records at the University of Education Winneba shows an increase in the number of distance learners' at Accra College of Education center within the last three years. Research has attributed the rise in enrolment to the structural adjustment policies, population explosion, increase in the number of workers and regular admissions among others. In spite of these increases, there have not been corresponding increases in the various facilities such as libraries and lecture halls at the various centers.

At the various lecture halls, due to inadequate seating facilities, students are compelled to either struggle for seats or stand for a whole lecture period of two hours or more. By nature, every human being needs a comfortable shelter over his or her head in order to have the peace of mind to study or work. Also, one's academic or work output depends to a large extent on the environment and availability of facilities for enhancement. When these are not adequately provided, life becomes unbearable and stressful. And this seems to be the situation experienced by distances learners' at Accra college of Education center. Even though, all students are subjected to stress through pressure from

academic requirements such as tests, class assignments, examinations and the desire to earn good grades, time factor as well as financial constraints, there is a much higher chance that, a distance learner(student worker) will be more stressed than a regular student(Non-student worker). (Ross Niebling & Heckert, 1999) The reason perhaps being that most jobs have stress of their own, it is clear evidence that students who work are exposed to work stress among others. This includes evaluation by superiors, striving for goals employers' need expectations, and time management. Notwithstanding these, some supervisors may even create difficulties or unfavorable working environment for a subordinate who returns to school for fear that they may take over their position after graduation. All these among others can be potential stressors on the distance learners.'

The situation is more compounded if such a student is married with children. Such students will have triple responsibilities of managing the home, work and school, each of these having a substantial amount of stress. Archer (1980) shares the view that evidence is growing that people are experiencing too much stress in modern societies and if students have to combine school, work and other home responsibilities then such students may likely face multiples of stress, which can be dangerous to the health of students and can affect the academic as well as work output. Snelgar (1990) has suggested in a study on the effects of stress that, stress has been related to physical and mental health, coronary heart disease, absenteeism, and the value of work. Basing the argument on this, one will not hesitate to say that the distance learner is under stress. A critical issue concerning stress among students is its effect on learning. The Yerkes- Dodson Law (1908) postulates that individual under low and high stress learns the least and those under moderate stress learn the most. A field study and laboratory tests supported the notion that excessive stress is harmful to students' performance (Whitman, Young and Fisher, 1985). Distance learners' who stay outside centers have their situation worsened as they face the extra problems of transportation to and from school and home ; they have to go home late after work and school, and not being able to make time for assignments among others. All these can be major sources of stress for the distance learners'. Therefore students going through these with the already mentioned problems on might find themselves under mounting stress with little or no stress management skills at all. Understanding the causes and effects of stress and knowledge on its coping strategies is so important that distance learners' should know the sources of stress, their effects and the management strategies they can employ to overcome it.

II. PURPOSE OF THE STUDY

The purpose of the study was to determine the sources and effect of stress among distance learners', and stress management strategies adopted by students of Accra college of Education study center, to make recommendations for enhancing the stress management skills improved work and distance learners' academic performance. The study also examined how distance programme can be used to provide knowledge and skills in stress management. Finally, the study assesses the effects on

students' performance in the University, especially, the distance learners'.

III. SIGNIFICANCE OF THE STUDY

This work sought to contribute to the existing literature on stress and will also serve as a spring board for further research in this field. It is the wish of the researcher that it will raise the awareness of both the authorities of the University as well as the central government know exactly what distance learners' are going through in order to provide the needed support. Again, it is intended to help both distance learners' and those studying full-time basis to know the sources of stress, its effects and the available coping techniques to enable them manage any stressful situation they may go through. The Ministry of Education will also benefit from the findings of this study because it will help the ministry to formulate meaningful policy guidelines students under stress. Furthermore, policy makers would as a result of this work, appreciate the impact of stress on students' academic work and thereby adopt appropriate measures to take the edge off the side effects.

The findings of this study will enable the Health personnel of the university to be conversant with cause of stress on campus so that they can effectively handle students' health problems. Society at large would also identify the causes of their stress and some strategies they can use when they are stressed through this study. The Department of Social Welfare and other care-givers are also likely to benefit from the findings from this research. Personnel at the department would be exposed to a few more coping strategies they can use in helping students under stress. The research findings are also expected to be of important to adult educators; they will be exposed to a few more causes and effects of stress to help in the education of their clients. Finally, it will aid employees who are trying to upgrade themselves academically by offering them the opportunity to appreciate the effects and consequences of stress and how to manage it.

IV. THE CONCEPT OF STRESS

'Stress is a normal part of life,' People feel "stressed out" in their work place, in their homes and in their communities (Simons 1994). When many think of stress they think only of the negative effects that come with it (Mayer 1988). Though too much stress can have an adverse effect on a person leading to physical and emotional symptoms, which may also be accompanied by changes in the person's behaviour such as drinking and excessive use of tranquilizer notwithstanding these, there are positive effects of stress. Good stresses makes one work hard and do things properly. People of all walks of life need some amount of stress in order to function effectively and that amount needs to be optimal for each individual. Edgewater (1981), quoting Rosch stated that:

'Stress is the spice of life or the kiss of death; the means to Express our talents and energies and the pursuit of happiness or the cause of nervous tension, accidents heart disease or ulcers. Without stress there will be no life'.(Volume 20 Number 1 note 2)

Weiten (1986), shares the view that stress is any circumstances or transactions within the environment that threaten or are perceived to threaten our well-being and tax our adaptive capacities. Westen (1996) added that stress refers to challenges to a person's capacity to adapt to inner and outer demand, which may be psychologically arising and emotionally taxing all call for cognitive and behavioural responses. The point raised in connection with the three definitions is whether stress is the environmental or outer demand itself or peoples' response to that demand that causes stress (inner). To answer this, Rodin and Solver (1989 cited in Westen 1996), provided a comprehensive definition that incorporates both internal and external demand; "stress is the stimuli external to the individual and the individual's appraisal of the environmental demand". Stress therefore is thought of as both environmental demand (stressors) and a person's reactions to them (stress responses).

Atkinson D R, Smith E. E Ben D.S and Hilgard E.R (1990) added that stress is a state that occurs when people are faced with events they perceive as endangering their physical or psychological well-being and deal with these events. A component of stress raised by Weiten (1991) and Atkinson (1990) is that for a situation to be describe as stressful or not depends on how the individual involved appraises the situation. In other words, what will be taken as stress by one person may not be stressful for another under similar circumstances? Lefton (1991) in an attempt to answer the question as to what determines whether or not a particular event is stressful said the answer lies in the extent to which people are familiar with an event, how predictable the event is, and how they can control the event and themselves. Rosch's statement that "stress may be the spice of life or a kiss of death" is valid since people perceive situations and events differently. One person may perceive a situation or event casually while to another, it may be devastating. This is an agreement with Lazarus' position (1981, 1991, and 1993 cited in Westen 1996) which supports the concerns of Rosch by pointing out that a stressful experience is personal. In other words, people do not respond to potential threatening event in the same way. Thus in this view, stress depends on the meaning of an event. Event that can fill one person with excitement can make another feel overwhelmed and anxious. Therefore the extent to which an event is experienced as stressful depends on the person's appraisal of both the situation and her ability to cope with it.

Lazarus (1990) contends that is real life situation, appraisal involves two steps, whether we judge the event or situation as a threat to our ell being (primary appraisal) and whether we believe we believe we have the resources to cope with the threat (secondary appraisal). The level of stress we experience therefore depends on the balance between the two. When we perceive the threat as mild and our ability to cope as weak, stress will be substantial. It can therefore, be deduced that two elements are common. These are: stress seen as either a threat or a challenge.

Principles of Stress

Weiten (1986) stipulates the following as the principles that underline the concept of principles of stress. The following points are the guidelines to understanding stress:

- Stress can be self-imposed. We sometimes put ourselves under pressure when we aim at achieving something, so it not always that stress is imposed on us.
- The individual's response to stress situation differs. What a person may perceive stressful may be benign to the other.
- Stress has both negative and positive impact on the individual.
- Responses to stress are complex and multi-dimensional. Under stressful situation, one's physical, psychological and emotions are affected.
- Stress is a psychological process; it also entails transaction between people and their environment (Westen 1996).

A situation can be described as stressful or not depending upon the way the person concerned appraises such as stressful. The personality of a person constitutes an important factor that influences the perception of stress. According to Goldstein (1959), perception of stress among the personality types can be grouped into repressors and sensitizes. A repressor is a personality type whose definitive characteristics have a tendency to be defensive and avoid facing up to threat. A repressor denies the existence of threat and is oblivious to stress until it becomes overwhelming. A sensitizer however is a personality type whose definitive characteristics have a tendency to be overly sensitive to possible threat. Such a person is highly sensitive to stress and is ready to face it. This explains why personality has a role to play in determining why some people are more prone to stress those others.

According to Robbins, Powers and Burgess (1997) a type A personality "is described as competitive, ambitious, driven, impatient, workaholic, and always rushed" pg 149. Friedman and Rosenman (1974 also cited in Robbins et al 1997) added that the type A personality is always wanting to do more and more in less and less time, speaks rapidly and interrupts frequently during conversation, easily angered, hostile, highly competitive. Siegman & Demrowski (1989), also added that people who are hostile or consistently turn anger inward, it turn out, are the most likely to develop heart diseases. This confirms Friedman and Rosenman's (1974) conclusion that type A personality is more prone to coronary heart diseases (CHD) and also their behaviour patterns put them at risk for a variety of stress related illness. Westen (1996) went on further to say that the opposite of a type A personality is the type B personality. These individuals are more relaxed, easy-going, and less easily angered. People who exhibit the type B behaviour or personality often show signs ofnot being in a rush (Robbins et al 1997 p. 149).Other researchers have come out with a third category of personality type called A/B which is a combination of both types A and B personality traits. According to Friedman and Rosenman (1974 cited in Robbins et al 1997 pg 147) personalities whose score ranges between 65-100 on the personality type test are described as type A while those who score between 20-49 are the type B personalities. Type A/B personalities have been observed as those who score 50-64 on the test.

V. SOURCES OF STRESS

Change

One of the significant sources of stress is change. Virtually any event that requires someone to make a readjustment can be a stressor (Weston 1996). Happy events such as being admitted into the university or other higher institutions of learning or being promoted can cause stress; likewise negative event (Weiten 1986). This is because such change compels are to adapt to a new lifestyle. Some old habits need to be changed. Whether these changes are welcome or not to some extent, may be stressful. Two researchers, Holmes and Rahe (1967) devised a scale to measure the stress level of various life events that require change and adaptation. This scale was known as the Social Readjustment Rating Scale (S.R.R.S) as shown in Appendix I. The scale listed forty-three (43) life events (items) that were determined through extensive testing of the event that, on average, required people to make the most changes in their lives. Each event was given a point value that reflects the amount of adaptation required. Stressful life events are prominent changes in a person's day-to-day circumstances which result in a change

Work Stressors

In our career-driven society, work can be an ever-present source of stress. Work stress is caused by things such as job dissatisfaction, an exhausting workload, insufficient pay, office politics, and conflicts with your boss or co-worker. Swanson (1997) cited in Torkelson and Muhonen (2003) fines occupational stress as 'Working condition that overwhelms the adaptive capabilities and resources of workers, resulting in acute psychological behaviour or physical reaction' pg 117. Mashane and Glinow (2005) also share the view that many people may experience work stress due to the following;

Lack of task control

Low task control occurs where a person's work is paced by a machine or involves monitoring equipment, or where the work schedule is controlled by someone else. To them many people experience work stress because they are controlled at their work place by others. It is important to know that the extent to which low task control is a stressor increases with the person's level of responsibilities. Time-based conflict: This refers to the challenges of balancing the time demanded by work with family and non-work activities. Time-based conflict is more acute of woman than men due to house-work and child care, representing a second shift. Strain-Based Conflict: This occurs when stress from one domain spills over the other e.g. relationship problem, financial difficulties. In support of this Mashane and Glinow (2005) attest that a study found that father who experience stress at work engage in dysfunctional parenting behaviour.

Academic Stressors

D'zurilla and Sheedy (1991 cited in Ross 1999) share the view that though everyone experience stress, university students, especially, freshman are particularly prone to stress. Towbase and Cohen (1996 cited in Ross 1999) added that the experience is due to the transitional nature of university life which they have to adjust to. Often student perceive that faculty exert great power over their lives and feel that they live in a state of substantial powerlessness (Altbach 1970). Also identified the following as

the academic stress; maintenance of high level of academic achievement adjusting to new social environment. Wright (1967) added that these factors if not dealt with effectively, feeling of loneliness and nervousness as well as sleeplessness and excessive worry may result into acute stress.

Pressure

Another source of stress is pressure. According to Weiten (1986), pressure involves expectations and demands that we behave in a certain manner, often a self-imposed form of stress. Two types of pressure have been identified: pressure to conform and pressure to perform. The individual sets standards to achieve. In attempt to attain this goal, the individual finds himself under pressure. For example, a student may put pressure on him/herself to get a better grade in school or a worker to work harder to achieve a specific goal (pressure to perform). Weiten further explains that the pressure to perform is self-imposed. In addition to this pressure to perform, there is also pressure to conform to other expectations, which produce stress. Sometimes, we have to conform to authority or cultural roles, which may be unacceptable or unfair. For example in Africa, Adults are expected to get married at a specific age. Pressure to conform of the overlaps which generate conflict.

Frustration

As people strive to satisfy their unlimited needs, the world becomes unfriendly. Society has put many regulations that may or may be good for him or her. This invariably restricts the satisfaction of the needs of the individual. Frustration is one of the major conditions that interfere with the satisfaction of needs of people. A law that discriminates between races, requirements of admission to higher or tertiary level of education and standards assumed appropriate are some of such examples of situations that can cause frustration. Frustration occurs when one wants something and cannot have it. Weiten (1986) shares the view that frustration is the blocking of some motivation behaviour, a situation resulting from unsuccessful pursuit of some goal. Frustration may be minor or significant. Minor frustration includes waiting in line at a movie theatre or performing poorly in an examination. Major frustration includes losing one's job or flunking out of school. Failure comes about as a result of the individual's inability to attain a set goal or a standard set to achieve. For example, a student is frustrated when he or she is not able to obtain a required grade to enable him/her pursue a course of his or her choice. Losses are deprivation of things we are accustomed to having, when we lose something very important to us, we experience frustration. For example the loss of a dear one through death and the loss of one's physical capabilities through injury are examples of very frustrating losses that usually produce very severe stress. Chauhan (1978) is of the view that frustration is brought about by physical, biological, psychological, cultural and sources from the self.

Physical barriers include: time, space, distance, temperature and confinement. For example, a student is always late for lectures because of geographical distance between the school and place of residence. Biological barriers leading to frustration include physical unattractiveness, intellectual limitation, and lack of strength, energy or skill. For example a student is frustrated when he lacks the intellectual capabilities to

pursue a course or profession of his choice. A cultural barriers such as rules and regulations, restrictions placed upon behaviour by a group is a potential source of frustration, for example, doing things the “right way” and to behave in the proper manner, to obey and to conform. Psychologically, frustration comes in our lives because of a feeling of guilt, which makes it impossible to do the things that we would like to do. Again authority is another source of frustration. The behaviour of people such as parents, police, teachers, may be seen as constant sources of frustration for most of us. Parent’s attitude to their children may create tension and anxieties, people in authority, who are authoritative often turn to frustrate people under them.

Finally, frustration can be self-imposed in that we frequently erect barriers to success ourselves. For instance, if you choose not to study adequately for an examination and then experience frustration when you flunk, you have created your own frustration (Weiten 1986).

Conflict

Every individual has several motives to achieve. Sometimes two motives coincide with each other and the satisfaction of one of the motives leads to the blocking of the other. When a situation of this nature occurs conflict is said to occur. One experiences a conflict when one is torn between two or more potential courses. According to Simons (1994) pg, 491, conflict occurs when we must decide between two or more incompatible stimuli. Weiten (1986) defines conflict as the co-existence of incompatible motives, behavioural impulses, beliefs, or values. Conflict occurs whenever you have to decide between two or more incompatible motivation tendencies or struggle with incompatibility in beliefs or values. Lewin (1935) identified three kinds of conflicts. These are approach- approach, avoidance-avoidance and approach avoidance conflicts.

In approach/approach conflict, you are torn between two desirable courses of action or the individual has two equally attractive goals to achieve in which choosing one automatically means giving up the other. For instance a student who gains admission into universities at the same time may agonize over the decision and feel doubts after making a choice. Whichever is chosen has a happy-ending. Approach/avoidance conflict occurs when the individual is simultaneously drawn to and repelled by the same goal. In this case, the person is confronted with a goal that has both positive and negative consequences. For example making more research and studying very hard for an examination can result in the attainment of satisfactory grade but is very stressful and difficult. Avoidance-avoidance conflict: This is when the individual must choose between two unattractive stimuli or circumstances, for instance choosing between studying a boring textbook for an examination or risk not studying and failing the test, in this situation you must choose one.

Daily hassles

For Kanner Schaefer and Lararus (1981) daily hassles are the irritating, frustrations, distressing demands that to some degree characterize everyday transaction with the environment. Daily hassles ranges from interpersonal conflict to commuting during rush hour. The most common daily hassles can be concerns about weight, health of a family member, rising prices of common goods, too many things to do, misplacing or losing

things to mention a few. Daily hassles can have a substantial impact on health by well-being (Afflect, Tennen, Urrows and Atig 1994), deBenedittis and Lorenzetti (1992).

Lararus (1984) points out that common daily hassles are sources of stress that seen to be unavoidable features of everyday life. In another study by Lararus and Folkman (1985) classified the following as the daily hassles that take toll on one’s adaptive capabilities.

1. Household Hassles: These include making meals, shopping and keeping the home in order.
2. Health Hassles: Physical sickness that regularly or occasionally attack people.
3. Time Pressure Hassles: This is having too many things to do at the same time.
4. Inner Common Hassles: This is a situation of feeling loneliness, fear of disapproval of one’s behaviour and other social demands and expectations like marriage, social status etc.
5. Environmental Hassles: These include air pollution, traffic congestion, noise, crime etc.
6. Financial Responsibility Hassles: This means concern about one’s daily meals.
7. Work Hassles: These are problems related to dissatisfaction, problem with superiors at workplace and so on.
8. Future Security Hassles: This is connected with proper investment, retirement and others.

Effects of stress

Stress has both positive and negative effects that are perceived to threaten our well-being and tax our adaptive capacities. The effects of stress are shown through (behaviourally) inability to verbally address a group of people satisfactorily. Stuttering, inability to speak fluently (cognitive), short-term and long-term memory decrease, (Melgosa 1999). Weiten (1986) argues that stress has positive effects too. To him, life would have been very dull, if it were altogether devoid of challenges. Stress promotes personal growth. Personal growth refers to movement toward greater psychological health. Stress therefore is needed at certain time to force the individual develop new skills, learn new insights and acquire new strengths. Thus, if one goes through a stressful experience, it alerts them individually to face impending stressful experiences.

Burnout

Simons (1994) defines burnout as ‘a hopeless, helpless feeling brought on by relentless work-related stress, burnout leaves its sufferers in a state of physical and emotional exhaustion that includes chronic fatigue and low energy occur because of a gradual accumulation of heavy work-related stress’ pg 149. Edward, Hershberger. Russell and Market (2001), share the view that negative social interaction was the most predictor for physical ailments and burnout. People with burnout often are not concerned about other and have physical as well as social problems.

Physical Problems and illnesses

Stress is said to have negative health effects on its victims Kiecolt-Glaser E.C, Fisher L, Ogrocki L, Speicher C.E, (1987),

shares the view that people under stress are more likely to suffer from infectious diseases. O'leary (1990) added that both acute and chronic stress can affect the efficiency and availability of cells in the immune system and hence the body's capacity to fight disease.

Psychological Problems and disorders

Stress is one of the factors that cause psychological problems and disorder and mental illness. According to a research work conducted by (Barrett, Rose and Klerman 1979), in the domain of common psychological problems, it is clear that stress may contribute to poor academic performance, insomnia, sexual difficulties, drug abuse, excessive anxiety, nervousness, dejection and depression. The psychological disorders that are a result of stress are depressive disorders, schizophrenic disorders and suicide attempts.

Coping Strategies

Coping is the process of managing the internal and external demands that one appraises as taxing or overwhelming (Lazarus and Folkman, 1984). Coping strategies are techniques or methods people use to deal with stress and changing situation. Lazarus and Folkman (1985) and Pearlin and Schooler (1978) have grouped coping strategies into two main forms. Problem-directed coping or attempt to do something constructive about the stressful situation, and emotion-focused coping, or efforts to regulate the emotional consequences of a stressful situation. Weiten (1986) also defines coping as a behavioural efforts to master, reduce or tolerate the demands created by stressful transactions. He identified the following as the five important components of his definition on stress coping. First, coping is constantly changing and being evaluated and is therefore a process or strategy. Second, coping involves managing situations, not necessarily bringing them under complete control. Third, coping is effortful, it does not happen automatically. Fourth, coping aims to manage behavioural as well as cognitive events and lastly, coping is a learned process. Stress management or coping strategies will be discussed under the following sub-headings.

Problem solving

Problem solving can be defined as the process of the process of transforming one's situation into another that meets a goal (Gilhooly, 1989; Greeno 1978 cited in Westen 1996) defines problem solving as the process of transforming an initial operators to attain a goal state. (pg. 267). There are different categories of problem solving namely defence mechanisms, emotional focused coping, and physiological-focused coping. According to Weiten (1986) there are infinite numbers of problems that may arise in the life of an individual and since every problem situation is unique, it is difficult to suggest a solution or advice that will effectively solve these infinite problems.

Weiten (1986) emphasized earlier works by Mahoney (1979) and Miller (1978) and other experts, which involve four steps.

- i. Clarify the problem
- ii. Generate alternative courses of action
- iii. Evaluate your alternatives and select a course of action, and

- iv. Take action while maintaining flexibility.

Clarify the problem

People are constantly confronted with problems to solve in daily life and since stressful situations come in different forms, very often identifying the source of stress is difficult. For example, your next-door neighbor plays his stereo too loud, your grades in the semester's examinations are lower than you would like, or you are having difficulty with a relationship. In all cases, the individual needs to decide what is causing the stress and find a solution, and since problems cannot be tackled hand-on, it is most important to: Clarify the nature of the problem. Arrive at a specific and concrete definition of your problem. Develop a clear specification of your problem in terms of frustration, conflict, pressure and change.

Generate alternative courses of action

Once the sources of stress are identified by the individual or victim, it is more realistic to search for alternatives that might produce some kind of improvement in the situation. Various lines of evidence suggest that it is wiser to engage in brainstorming, which involves generating as many alternatives as possible without initially paying any attention to their apparent practicality.

Evaluate your alternatives and select a course of action

After generating every imaginable alternative you can, you need to start evaluating the possibilities. To evaluate alternatives efficiently, one needs to: ask whether each alternative is a realistic plan. Consider whether any costs or risks are involved in each alternative; Compare the desirability of the possible outcomes of each alternative.

After eliminating the unrealistic possibilities, list the problem consequences (both good and bad) associated with each alternative. Then review and compare the desirability of those potential outcomes. In making this decision, one has to know "what is important to him or her and what outcome he values".

Take action while maintaining flexibility

Once you have chosen your action, you should follow through and try to implement your plan. In so doing there is the need to maintain flexibility. Do not get "locked into" a particular course of action. To be able to evaluate your plan accurately, you must enact it with vigor and confidence and give it time to succeed.

Social Support

An important resource of coping with stress is social support, the presence of others in whom one can confide and from whom one can expect help and concern. Social support is important for maintaining physical and mental health (Pilisuk, M. Montgomery, M. B, Parks. Acredolo, (1993). This kind of support can help mute the effects of stress and reduce the risk of illness. The source of support we get is more important than whom we get it from. Sources of support can include friends, spouses, lovers, children, church members, club members or even a devoted pet. People do not need great numbers in our social support system to feel its benefits. The most important aspect of support is having at least one confidante

to whom one can turn. In some cases having too many people provide advice or support may actually increase stress (Warthman D.C and Loftus E.F 1992). Social support can effectively reduce distress at times of stress, lower the likelihood of illness, speed recovery from illness, and reduce the risk of death from serious disease (Cohen and Wills, 1985; Kulik and Mahler 1987).

Defense Mechanisms

Defense mechanisms are unconscious mental process aimed at protecting the person from experiencing unpleasant emotions. Common defense mechanisms include repression, denial, reaction formation, sublimation, rationalization and passive aggression (Weiten, 1996). Weiten also shares the view that a lot of factors cause stress in individuals. Stressed individuals may react against the sources in different ways. The person may physically attack the source in order to reduce his mental tension and hostility or he may disrupt the object of frustration (Weiten, 1986). To Freud (1960), defence mechanism is habitual method of overcoming blocks, reaching goals, satisfying motives relieving frustration and maintaining equilibrium. Freud (1960) has identified the following ways to maintain equilibrium, repression, denial, projection, and reaction formation.

Repression

Repression has been identified as one of the major defense mechanisms for stress.

According to Weiten (1996), repression is an unconscious mechanism that keeps thoughts or memories that would be too threatening to acknowledge from awareness. The stressed individual tries to forget the causal agent of the stressful situation he or she finds himself or herself; for example, the individual tries to forget what made him fails his examinations or memory of events that are traumatic. With repression the individual is able to cope, for example with death of loved one.

Denial

According to Freud (1960) one way to maintain one's balance of personality is to deny the fact which causes stress. With denial, one refuses to acknowledge external realities rather than thoughts. One intentionally refuses to believe the threatening thoughts at the conscious level and try to avoid thinking about them. It is a very good strategy to deal with frustration related stress.

Projections

Researchers have also identified projection as a major defense mechanism in dealing with stress. In projection, a person attributes his own unacknowledged feelings or impulses to others. People cope with guilt feelings by projecting them onto other things and people. It is to relieve frustration or stress of the individual. For example, a student whose performance is poor is often critical of other student's act or the lecturer or any other thing.

Another known defense mechanism is rationalization. This means explaining ways and actions in seemingly logical way to avoid uncomfortable feelings, especially guilt or shame. For example a student who plagiarizes her term paper may justify her

dishonest actions by saying that passing the course will help her earn her policy degree and serve the community.

Reaction Formation

In extreme situations, people adopt reaction formation in their attempt to deal with a stressful situation. It is an exaggerated effort to behave in a manner that is exactly opposite to one's true feelings. It is often used to cope with feelings of anger and hostility. The stressed person, instead of shifting the hostility to an irrelevant target, converts the resentment into exaggerated displays to an irrelevant target.

Emotion- focused Constructive Coping

Emotion-focused coping involves efforts to control and reduce the emotional reaction aroused by stress. It is aimed at re-establishing a healthy emotional equilibrium.

Benson (1975) has identified relaxation techniques that help in emotion-focused constructive copy. To him, these techniques help individual going through stress shift the body into low arousal and reduce state of abnormal tension associated with stress. Relaxation techniques are considered effective for treating insomnia, hypertension, tension headaches, anxiety disorder and general autonomic arousal. There are many worthwhile approaches to achieving beneficial relaxation. It is left with the individual to select the approach most suitable. Examples are systematic desensitization meditation biofeedback, controlled breathing.

Progressive Relaxation

Progressive relaxation was developed by Jacobson (1938, 1964 cited in Robbins 1997). The individual tenses and then releases different muscles groups in sequence. During this process, the individual learns to relax deeply the muscles of the body. For example, the first step might be to bend the left hand as far back as possible and to notice the pattern of strain in the back of the hand and up the arm. After maintaining the position for about ten seconds, one relaxes the hands completely. Jacobson called this procedure "going negative".

Physiological Focused Constructive Coping

This involves effort to diminish the impact of the physical demand placed on the body as stressful encounter. Its goal is to minimize the susceptibility of one's body to the possible damaging effect of stress (Weiten 1983). Stress responses affect the normal functioning of the body's mechanism and past threat. Therefore to keep in a relatively sound shape which involves the consumption of a nutritionally balanced diet, get adequate sleep and engage in at least a moderate amount of exercise, and learn how to control overeating and use of tobacco, alcohol, and other drugs, these are to strengthen the body's immune system against the corrosive effects of stress else it will render the body vulnerable to stress related physical disorders (Weiten, 1986).

Nutrition

A collection of process (food consumption) through which an organism receives and utilizes the materials (nutrition) required for survival and growth. Food consumption plays an important role in the body's ability to endure stress as the energy needed to do this is derived from the food that we take. Luke

(1984) provides a guideline for sound nutritional habit that promotes good health and endurance. These include;

- Not consistently consume more calories than you expend. The amount of calories that the individual needs within a specific period depends on the type of work he/she goes. Too much calories can lead to gaining weight, which can however result into obesity.
- Consume a balanced variety of food: A balanced diet constraint all the essential nutrition and in their correct proportion. These provide energy to the body, repair worn-out tissue and facilitate digestion.
- Avoid consumption of excessive fat, cholesterol, sugar and salt. They have side effect if consumed in excess. The consumption of food substances in fats should be reduced. For example, pork, ham, hotdog also the intake of eggs, beef, and others, which is high in cholesterol, should be reduced.
- Increase the consumption of complex carbohydrate, poly-unsaturated fats nature sugar and food with fibre.

The term “stress” has become such an engrained part of the contemporary vocabulary that the word sometimes seems almost to have lost its meaning. These days, what we think of as stress can result from something as simple as a child crying, shopping, and packing from one’s old house to a new place to something as catastrophic as losing a family member, failing an examination or facing marital problems (Payen and Hahn, 1995). People of all sexes, race, ethnic heritage, experience stress of varied from and intensity.

Theoretical Framework

The theoretical foundation used for the study is the theories of motivation (Need concept and Persons Environment Model by Lazarus (1966), and McClusky’s theory of Load, Power, and Margin.

Motivation (“needs” concept)

Malcom Knowles’ Andragogical theory is one of many theories which try to explain why adults would want to learn and conditions under which adults learn better. Knowles emphasizes that adult are self-directed and expected to take responsibilities for decisions. Part of the theory says that, adults are motivated to learn as they experience the need. Relating this to stress among working-students, adults who are working are going back to school because they have experienced the need for a kind of learning. Motivation is therefore basic to the education of adults. Motivation, according to Fowler and Fowler (1973 cited in Amedzro 2005), “is what induces a person to act”. Here, motivation is related to conditions that has necessitated tertiary education in adult and is therefore defined in terms of factors that induce people to learn. Rae (1994), also share the view that motivation is an internally generated attitude, learners therefore join in the learning programme with a range of motivational attitudes. For example, when one knows that learning a particular thing will help to achieve a dream, the zeal to learn will be internally generated. A working-student may face psychological, social and physiological challenges that discourage him or her from acquiring the necessary critical skills to enable him or her

become resourceful in taking initiative to find solution to problems that affect him or her. Challenges that discourage one from furthering their education may also be financial, or related to age, work schedule and family responsibilities.

Most adults need further education and training to improve upon their skills, knowledge and living conditions. It is against this background that motivation for continuing education is important to promote effective and efficient quality delivery of service at one’s work place and home. Abraham Maslow share the view that human beings seek to satisfy five basic kinds of needs, physiological needs (food, water, air, sex, shelter), safety needs (security, stability, freedom from fear or threat), social needs (friendship, affection, acceptance by others), esteem needs (self-esteem, respect from others) and self-actualization (realization of potentials). Abraham Maslow went further to say that these needs operate in hierarchy, with the most basic or compelling needs – physiological and safety at the base. One’s ability to satisfy a lower enhances the ability to satisfy a higher order need. For instance, if one is able to satisfy physiological needs, than he or she can move up the hierarchy to satisfy safety needs. To Maslow, learning depicts self-actualization. At this stage one is able to make good use of talent. As adults strive to realize their potential talent and capacity through education, they also need to work in other to provide the basic needs for the family. As such, students often face challenges which need to be address.

Person’s environment model

One other model that is useful in understanding stress among distance learners’ in the Person- Environmental Model of Lazarus (1966). According to one variation of this model, stressful events can be appraised by an individual as “challenge” or “threatening”. When student appraise their education and job as a challenge, stress can bring them a sense of competence and an increased capacity to learn. When this is seen as a threat, however, it can elicit feelings of helplessness and a foreboding sense of loss. A critical issue concerning stress among distance learners’ is its effect on performance (academic, work and family). The Yerkes- Dodson Law (1908) share the view that individuals under low or high stress learn or perform less while those under moderate stress perform or learn better. Distance learners’ may be under high, low or moderate stress depending on the appraisal of the life event as challenging or threatening. If the individual perceive responsibilities as threatening he or she is likely to experience more stress than one who deems responsibilities as challenges which needs to be addressed. The level of stress on the distance learners’ will therefore depend on the appraisal or the interpretation he or she gives to the environmental factors such as combining work and school with other responsibilities.

McClusky Differential

At this juncture, it is important to make mention of McClusky’s concept of differential learning. McClusky, in his theory, used Load- Power- Margin as the three major issues that adult learners need to address as they enter into the learning environment. Load was defined as the self and social demand required by a person to maintain a minimal level of autonomy. This could be linked to stress. Power is the means or resources

available to the individual to deal with the load (coping strategies). Margin is the relationship between power and load. The key factor of adults life are the load the adult carries in life, which may be internal or external (self-concept, goal, personal expectation as well task of life, such as family career, economic status academic and occupational demand respectively). The power available to him or her to carry the load could also be; (family support, resiliency coping skills economic ability, experience).The issue here is the distance learners' ability to manage Load and Power so as to create an effective margin to reduce stress. If the student is able to combine the academic, family and occupational demands (load) to match the coping strategies (power) then the individual will be able to achieve the expected goal with ease. This therefore will reduce stress in the distance learners'.On the other hand, when the student is far less than his or she coping strategies, he or she will adequately be equipped to lay hands on reserved power to better perform far exceeding his or her expectations. If strategies are not well put in place, an attempt to balance between load, power and margin can put the distance learners' a lot of pressure which can result in stressful conditions.

Research Design

The study employed survey research method. This was because the study intended to measure many variables to help determine the sources of stress and stress management techniques available to distance learners'. Survey research measure many variables and test multiple hypotheses (Kerlinger and Neuman, 1973). This design also helps in the generalization of the research findings.

Population

The population used for the study was the distance learners' (working students) of the University of Education Winneba, Accra College of Education Studies Center. The total population was Eight hundred and fifty (850) made up of Diploma and Post- Diploma distance learners' offering Basic Education. The table below showed the break down of the population.

Table 1: Student's population by their levels and courses

PROGRAMMES	LEVEL 100	LEVEL 200	LEVEL 300	LEVEL 400	TOTAL
Post-Diploma	-	-	205	235	450
Diploma	170	230	-	-	400
Total	170	230	205	235	850

Source: Fieldwork, 2012

Sample and Sampling Procedure

A sample of 130 students was taken from the Accra College of Education Studies Centre comprising 70 and 60 distance learners' from Post-Diploma and Diploma programmes respectively. The sample was taken from this group because distance learners' form the bases for the study. During data collection, five of the respondents refused to respond to the questionnaire. This reduced the sample from 130 to 125 and this was the number used for the analysis. The stratified sampling technique was used to select representatives from the various levels. This is sampling procedure in which the population is divided into sub-groups (strata) and sampling carried out independently in each stratum. It is also a procedure used when a heterogeneous population sub-group might respond differently to the independent variable. The population was categorized into Diploma and Post- Diploma offering Bachelor of Education in Basic Education and Diploma in Basic Education respectively. Simple random sampling was then used to select the sample for the study from each stratum. Since a representative sample is a basic requirement in survey research, the researcher was of the view that the method would be more appropriate. The registration list of the distance learners' of the center was used as the sampling frame.

Research Instrument

Self-administered questionnaire was the main instrument for the data collection. A questionnaire, according Babble (1998 cited in Badu-Nyarko 2009) is a series of questions or instruments specifically designed to elicit information that will

be useful for analysis. This instrument was used because the researcher assumed it would permit wide coverage of the population in an easier and effective way. This was in line with the view of Badu-Nyarko (2009) that questionnaire requires less skill to administer. Kerlinger (1964) also shares the view that a great deal of information needed for social research can be obtained from respondents by direct questions.

The questionnaire was made up of both close-ended and open-ended items. The close-ended questions asked respondents to choose from alternatives while the open-ended questions demanded answers that represented the views of the respondents. The questionnaire was placed under the following sections; demographic data, perception of stress, sources of stress, effects of stress and coping strategies.

Method of Data Collection

Collection of data was done at the Accra College of Education Studies Center by the researcher. The questionnaire was distributed to respondents using simple random sampling method. With this method each member of the population has an equal chance of being represented. Questionnaire was divided into two comprising of Post- Diploma and Diploma distance learners'. The answered ones were collected according to the levels.

Validation of Instrument

To ensure construct validity of the instrument used for data collection, extensive use was made of the relevant literature. It was also thoroughly discussed amongst course mates before it was sent to the supervisor for validation. The supervisor gave

comments and made additional suggestions to improve on the construct and face validity of the instrument. These suggestions were used to modify the instrument before typing was done.

Methods of Data Analysis

The software SPSS was used to analyze the data quantitatively. The data collected from the field using questionnaire was first edited, sorted and those found to be unusable were discarded. The questionnaires were then numbered and the responses coded by assigning numbers/codes to them. The coded responses were then captured using SPSS after the questions and all possible answers have been defines in SPSS. The data generated in SPSS formed the basis of the analysis. The results were presented in descriptive statistics and percentages. A cross tabulation was done to identify relationships among some of the variables.

Socio-Demographic Characteristics of Respondent

Table 4.1 shows that a greater percentage of respondents (54.4%) fall within the age range of 30- 49 and their mean age was approximately 39 years. Few of the respondents representing (9.6%) and (4.0%) were within the age range of 20-29 and 50-60 years. The result therefore suggests that on the average, the students were in their late thirties and early forties.

Table 2 Age Distribution of Respondents

Age Range	Frequency	Percentage (%)
20- 29	12	9.6
30- 39	68	54.4
40- 49	40	32.0
50- 59	3	2.4
60+	2	1.6
Total	125	100

Mean age = 39

Source: Survey report, 2012

Table 3 shows the sex distribution of the respondents. The table shows that a greater majority of respondents were female (56.8%) while (43.2%) were males.

Table 4.2 Sex Distribution of Respondents

Sex	Frequency	Percentage (%)
Male	54	43.2
Female	71	56.8
Total	125	100.0

Source: Survey report, 2012

Table 4.3 shows the distribution of respondents by their religious affiliations. From Table 4.3, it was revealed that the respondent were mostly Christians (58.4%) while (32.0%) were Moslems. There were, however few (3.2%) who belong to traditional religion with the remaining (4.0%) belonging to other religions which were not specified in the question. 3 people did not respond to any of the questions.

Table 4 Distribution of respondents by religious affiliation

Religion	Frequency	Percentage (%)
Christian	73	58.4
Moslem	40	32.0
Traditionalist	4	3.2
None of the above	5	4.0
Total	122	97.6

Source: Survey report, 2012

Table 5 below shows the distribution of respondents by their marital status. The result from Table 5 revealed that 80 out of 125 respondent representing 64.0% were married while 45 representing 36.0% were not married. The unmarried consist of 24 (19.2) of the respondents who were single, 3(2.4%) divorced, 16(12.8%) widowed and, 2(1.6%) separated.

Table 4.4 Marital status of respondents

Marital	Frequency	Percentage (%)
Single	24	19.2
Married	80	64.0
Divorced	3	2.4
Widowed	16	12.8
Separated	2	1.6
Total	125	100.0

Source: Survey report, 2012

Table6 shows the occupational distribution of the respondents on the distance learners' programmes. The table revealed that all the respondents are teachers.

Table 6: Occupational distribution of respondents

Occupation	Frequency	Percentage (%)
Teaching	125	100.0
Financial institution	-	-
Technicians	-	-
Administrative/	-	-
Administrative assistant	-	-
Business	-	-
Total	125	100.0

Survey report, 2012

Table 4.6 shows the academic level of education of the respondents. Forty nine (49) of the respondents representing 33.6% were at level 400 while 53 representing 36.6% were at level 300 and 30.6% which constitute 45 of the sample were at level 200 at the Accra college of Education Center.

Table 7: Distribution of respondents by Academic Level of education

Level	Frequency	Percentage (%)
200	45	30.6
300	53	36.6
400	49	33.6
Total	146	100.0

Source: Survey report, 2012

Sources of Stress: Home-related stress

Total	125	100.0
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Survey report, 2012

Table 8: Number of Children of Respondents who are less than 18 years

Number of Children	Frequency	Percentage (%)
None	4	3.2
1-2	48	38.4
3-4	59	47.2
5-6	2	1.6

From Table 8, only 4 respondent representing (3.2%) do not have children less than 18 years old. Again (38.4%) of the respondents have one to two children. Majority 59 representing 47.2% had three to four children under age 18. However a few 2 (1.6%) of the respondents had 5 to 6 children under 18 years. The implication of this information is that majority (96.8%) of the respondents have children who are less than 18 years and need to be taken care of by parents.

Table 9: Age of Children of Respondents

Age	Q8a 1 st Child	Q8b 2 nd Child	Q8c 3 rd Child	Q8d 4 th Child	Q8e 5 th Child	Q8f 6 th Child
Less than 1 Year					6(4.1%)	
1-5 Years	59(40.4%)	11(7.5%)	7(4.8%)	9(6.2%)		
6-10 Years	43(29.5%)	97(66.4%)	28(19.2%)			
11-15 Years	12(8.2%)		6(4.1%)			
16- 20 Years	14(9.6%)		3(2.1%)			
21-25 Years		3(2.1%)	2(1.4%)			
26- 30 Years	5(3.4%)	2(1.4%)				

Survey report, 2012

The study revealed that 59 (40.4%) of the respondents had their first children when they were within the age range of 1-5 years, 43(29.5%) were within the age range of 6-10 years, 12(8.2%) 11-15 years and 14(9.6%) fall within the age range of 16-20 years, 5(3.4%) had their first children within the age range of 26-30 years. No one has a first child within 21 and 25 years. Eleven 11(7.5%) respondents have their second children within 1-5 years range, 97(66.4) within 6-10 years 3(2.1%) within 21-25 years and 2(1.4%) within 26-30 years. However, there were no second children of respondents aged 21-25 and 26-30.

Furthermore, seven (7) of the respondents had children within the ages of 1-4, twenty eight (28) of the respondents had children within the ages of 5-10, six (6) of the respondents had children within the ages of 11-15, three (3) of the respondents had children within the ages of 16-20 while two (2) of the respondents had children within the ages of 21-25. Nine (9) of the respondents were of the view that, their fourth children were within the age range of 1-4. Only six (6) of the respondents have their fifth children less than 1 year.

Table 10: Time Respondents Leaves the House in the Morning

Time	Frequency	Percentage (%)
5am	7	5.6
6am	71	56.8
7am	37	29.6
8am	10	8.0
Total	125	100.0

Source: Survey report, 2012

From Table 4.9, 78 of the respondent representing 62.4% left home by 6:00am. Majority of 37 representing 29.6% left home by 7:00am while 10 of the respondent representing and forming 8.0% left home by 8am.

Table 11: Time respondents go home after school

Time	Frequency	Percentage (%)
7 pm	17	13.6
8:30 pm	25	20.0
9: 00 pm	59	47.2
After 9: 00 pm	24	19.2
Total	125	100.0

Survey report, 2012

From Table 4.10, the majority of the respondents 83 representing (66.4%) go home after 9:00 pm while seven (42) (33.6%) said they go home between 7:00 am and 8:30 pm.

Table 4.11: Caretakers of respondents' children when they are away from home

Caretaker	Frequency	Percentage (%)
My husband	13	10.4
My Mother	25	20.0
House Help	19	15.2
No One	40	32.0
My wife	18	14.4
Total	125	100.0

Source: Survey report, 2012

From Table 12, 32 percent of the respondents said no one took care of their children when they were not at home, while (20%) said their mothers took care of their children when they were not at home, thirteen percent said they had house-helps who were responsible for the children when they were away. Only 10.4% said their husband took care of the children.

Table 13: Frequency at which husbands help in household chores

		Every time	Usually	Occasionally	Total %
Yes	Count	16	7	48	71
	%	22.5%	9.9%	67.6%	100.0%
	within q12				
	%	100.0%	100.0%	100.0%	100.0%
	within q13				

Source: Survey report, 2012

Table 4.12 above is an illustration of the extent to which husbands helped their wives with household chores. Out of the 125 respondents, seventy one (71) indicated their husbands helped them with household chores while 29 said their husbands did not help with household chores. Further probe to find out the frequency at which husbands helped at home revealed that sixteen (16) out of seventy one (71) husbands helped every time, seven (7) usually helped, while forty eight (48) helped occasionally.

Table: 14 Respondents' Position at the work place

Item	Frequency	Percentage (%)
Senior Level	57	45.6
Junior Level	68	54.4
Total	125	100.0

Source: Survey report, 2012

Majority of the respondents were junior level staff in their respective organizations. From the study sixty seven 57 (45.6%) were senior level staffs while 68 (54.4%) were at the junior level. This implies that majority of the men and women interviewed were at the junior level at their various work places, and found it necessary to upgrade themselves academically.

Table 15: Time Respondents Start Work

Items	Frequency	Percentage (%)
6am	6	4.8
7am	24	19.2
7.30am	78	62.4
8am	17	13.6
Total	125	100

Survey report, 2012 (Table 15 continued)

A significant majority of respondents totaling 78, (62.4%) start work at 7:30 am. 30 respondents (23.0%) start work between 6 and 7.00 am while 17 (13.6%) start work at 8 am.

Table 16 Time Respondents Close from Work

Item	Frequency	Percentage (%)
3pm	45	36.0
4pm	49	39.2
5pm	23	18.4
6pm	8	6.4
Total	125	100.0

Source: Survey report, 2012

From Table 16, 84 respondents from the majority and representing 39.2% close from work after 4 pm. Out of this number, 8 respondents forming (6.4%) close at 6 pm. However twenty (45) representing (36.0%) respondents close at 3 pm.

Table 17: Rating of Work Schedule of Respondents

Items	Frequency	Percentage (%)
Very demanding	51	40.8
Demanding	70	56.0
No Answer	4	3.2
Total	125	100.0

Survey report, 2012

Fifty one 51 (40.8%) of the respondents said their work schedules were very demanding, (70) 56.0% said their work was demanding while four (4) forming 3.2% did not answer the question. However none of them said their work was not demanding.

Table 4.17: Study Leave Status of Respondents

Item	Frequency	Percentage (%)
Yes	0	
No	125	100.0
Total	125	100.0

Source: Survey report, 2012

From Table 18, the findings revealed that all the respondents were not on study leave. This implies that these students have to combine their teaching responsibilities with the academic work and this situation can be very stressful.

Table 19: Awareness of respondents' schooling by their boss

Items	Frequency	Percentage (%)
Yes	82	65.6
No	43	34.4
Total	125	100.0

Source: Survey report, 2012

Poor	20	16.0
Very Poor	5	4.0
Total	125	100.0

Table 19, indicates that a total of 82 out of 125 respondents representing (65.6%) have their bosses aware of their schooling, while forty three (43) (34.4%) stated otherwise.

Table 20: Reaction of the Boss of Respondents

Items	Frequency	Percentage (%)
Very cordial	4	3.2
Cordial	26	12.8
Indifferent	60	48.0

To find out from the respondents, the reaction of their bosses' towards their further education indicated from Table 4.19 that 26 of respondents representing (12.8%) expressed that they had cordial relation with their bosses, 20 (16.0%) expressed that they had poor relation with their bosses, 4 (3.2%) expressed that they had very cordial, 5 (4.0%) expressed that the reaction was very poor while 60 (48.0%) stated that the their bosses' reaction was indifferently.

Table 21: Student's opinion level of the following school related stress and their effects

Items	Responses				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Time lectures start put stress on me	64(43.8)	68(46.6)	8(5.5)	3(2.1)	1(.7)
Time lectures end put pressure on me	65(44.5)	65(44.5)	10(6.8)	3(2.1)	2(1.4)
I get disturbed when I am unable to get expected grade	73(50)	58(39.7)	10(6.8)	3(2.1)	1(.7)
Combining work and studies cause depression, anxiety and fatigue	50(34.2)	74(50.7)	9(6.2)	11(7.5)	1(.7)
I am unable to learn in the evening because of tiredness	64(43.8)	58(39.7)	19(13)		4(2.7)
I am unable to manage my time very well between work, household chores and academic work	56(38.1)	53(36.3)	27(18.6)	4(2.7)	5(3.4)
Effective time management will allow me to lower academic stress	47(32.2)	81(55.5)	12(8.2)	3(2.1)	2(1.4)
Academic stress is a necessary challenge for students to learn	58(39.7)	49(33.6)	21(14.4)	3(2.1)	14(9.6)

Source: Survey report, 2012

Table 4.21 illustrates the response of students on their opinions with respect to some issues in the case of schedule of lectures. Sixty-four (64) of the respondents representing 43.8% strongly agree that time lectures start put stress on them. Sixty-five (65) of the respondents representing (44.5%) strongly agree that the time lecture end put stress on them. With regards to the items that focused on finding out whether combining work and studies cause depression, anxiety and fatigue, 50 of the respondents (34.2%) strongly agreed with the statement and 50.7% also agreeing that combining work and studies cause depression, anxiety and fatigue. they are unable to learn in the evening due to tiredness. When asked about whether they are

unable to manage their time very well between work, household chores and academic work, 56 (38.1%) strongly agreed while 27 (18.6%) were neutral.

Respondents' Perception on stress

Table 22: Respondents' Perception on Stress

Items	Frequency	Percentage
A state of confusion feels disturbances	33	26.4
A time when one feels	26	20.8

depressed		
Abnormal feeling	14	11.2
Harmful situation	51	40.8
Total	124	99.2

Source: Survey report, 2012

From Table 4.22, thirty three (33) consider stress as something that makes one confused and disturbed, twenty-six (26) claimed stress is a time when one feel depressed. Furthermore, fourteen (14) respondents saw stress as an abnormal feeling while fifty one (51) also considered stress as a harmful situation. However, one person did not respond to any of the question.

Table 4:23: Number of Times Respondents Experience Stress

Items	Frequency	Percentage
Every time	26	20.8
Usually	57	45.6
Occasionally	34	27.2
Seldom	5	4.0
Never	2	1.6
Total	124	99.2

Source: Survey report, 2012

The Table: 23 revealed that twenty-six (26) respondents forming 20.8% said they experienced stress every time. Fifty-seven (67) representing 45.6% experienced stress usually. Thirty-four (34) making up 27.2% experienced stress occasionally, while five (5) experienced stress seldom. Only a few representing 1.6% had never experienced stress. One person did not respond to any of the question.

Strategies Adopted in Reducing Stress

Table 24: Strategies Adopted by Respondents to reduce stress

Items	Frequency	Percent
Social Support	63	50.4
Reading	13	10.4
Effective Time Management	41	32.8
Exercising/Sleeping	6	4.8
Total	123	98.4

Source: Survey report, 2012

Table 4.24 revealed that sixty three (63) mentioned social support, thirteen (13) stated reading. Forty one (41) mentioned good planning and effective time management. While six (6) were of the view that resting, exercising and sleeping were the best options.

Additionally, when respondents' views were sought on whether effective time management skills could help them lower academic stress; 33% of them strongly agreed that effective time management could help to reduce academic stress; another 48%

also agreed with this view; however, 11% were neutral while four percent each of the respondents disagreed and strongly disagreed respectively. This signifies that majority of the respondents believed that effective time management could help to reduce stress among distance learners. However two (2) persons did not respond to the question.

Table 25: Gender and position at work

Sex/ Level	Senior level		Junior level	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Male	39	72.2	15	27.8
Female	28	30.4	64	69.6
Total			97.4	

Source: Survey report, 2012. ($X^2 = 23.93$, $df = 1$, $p.05$)

From the result in Table 4.25, it can be observed that most men (72.2%) help senior positions, whilst, just 27.8% of them were in junior positions. However, the majority of women (69.6%) held lower positions. This could also buttress the point that most of the mature students are women who are occupying junior positions at their work places and would like to be promoted.

This chi-square test result showed a very high chi-square result of 23.929 which indicate that there is a strong relationship between gender and position at work. The values obtained also indicate that more men are in the senior level than woman.

Table 26: Gender and demand of work

Gender	Very demanding		Demanding	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Senior level	36	53.7	31	46.3%
Junior level	26	34.7	49	65.3%

Source: Survey report, 2012. ($X^2 = 5.23$, $df = 1$, $p<0.05$)

The chi-square value of the cross tabulation of work schedule against position is 5.23 which clearly suggests that there is a relationship between position and demand of work. The test results also shows that distance learners with senior level position had very demanding work schedules whilst those with junior level positions had demanding schedules.

Table 27: Work schedule of respondents and frequency of stress experience

Level of staff	Every time		Usually		Occasionally		Seldom	
	F	%	F	%	F	%	F	%
Senior level	27	40.9	22	33.3	15	22.7	0	0.0
Junior level	4	5.1	40	50.6	29	36.7	6	7.6

Source: Survey report, 2012. ($X^2 = 33.85$, $df = 4$, $p < 0.05$)
 Key: Percentage = %, Frequency = F

It was observed that 40.9% of senior level workers experienced stress at work every time due to their work schedule whilst just 5.1% of junior level workers under went stress every time due to work schedule. As observed from previous tables the findings above fit our previous observation since most workers at senior level experienced stress every time than the junior counterparts. The result of the cross tabulation of work schedule and frequency of experiencing stress showed a chi square value of 23.17 which strongly suggests a relationship between the two variables. The values also show that the higher a person's position the higher the demand of their work schedule and the higher the stress experienced.

Effect of Stress

Respondents were asked to indicate the effects of stress on their activities as distance learners. 43.8% percent of the respondents strongly agreed (as shown in 4.21 above) that they were not able to study because they were already tired from work and school. Thirty-four percent (34.2%) strongly agreed and 50.7% agreed that stress makes them feel, depressed, fatigue and anxiety, which affect their health and studies. Respondents' inability to combine household chores, their jobs and studies exposed them to stress; thirty-eight percent (38%) of the respondents strongly agreed that their inability to combine household chores, work and school exposed them to stress; thirty-six percent (36%) agreed in their answers.

**Summary of Findings, Conclusion and Recommendations
 Respondent's Perception of Stress**

Findings obtained from the study revealed that students understood stress and therefore held different views about what they considered to be stress or constituted a stressful situation. Some saw stress as something that made people unable to do their work as expected while others perceived stress as a negative encounter that could harm people as well as their health was concern. The following were some other perceptions held by students on stress: A time when a person feels depressed, abnormal feeling, harmful situation and a state of confusion and anxiety. These were the various responses drawn from the study on perception of stress from respondent as indicated from the statistic obtained in Table 4.23 of the analysis section. The findings pointed to the fact that respondents perceived stress in

the negative. The result, however, substantiated views expressed by Myers (1989) perception of stress that, when many think of stress they think only of the negative effects that come with it.

The Sources of Stress Among Distance Learners

Stress, as viewed by many authors, is a normal part of life. People feel "stressed out" in their work place, in their homes and in their communities. According to Westen (1996), everyone experience stress of various forms. To Weiten (1986), stress is normal in modern life. From the viewpoints of these authors and others who think in the same direction, no one can boldly say he/she never experienced stressful situation in his/her life time. The findings of this study confirmed these viewpoints. It was also revealed from the study that, almost every student interviewed had experienced stress before or continues to experience stress. Table 4.23 indicated that about 97.9% have experienced stress before. Out of this figure, only 4.1% seldom experience stress. The rest experienced stress either every time, usually or occasionally. The predisposing factors of stress among the distance learners were numerous and diverse. But the fact distance learners combined household chores, academic work and office duties were enough to make them experience stressful situations. The study revealed in Table 4.8 that, about 90% of the students interviewed had children who were below the age of 18 years. Leaving these children at home in the morning and returning after 10.pm (which is the time most students go home) was a serious burden on the parents and this may have caused stressful situation.

The nature of some students' office duties may be very demanding that they may face difficulties coping with academic exercises. The following were some of the findings from the studies on student's sources of stress:

- Lecture times: (the time lectures begin and close)
- Combining work and studies
- Anxiety, depression and fatigue
- Getting bad grades in an examination
- Unable to attend lectures due to the nature of my duties
- Having no one to take care of my children.

A chi-square value of 23.17 strongly suggests a relationship between work schedule and frequency of stress experienced. The values also show that the higher a person's

position the higher the demand of their work schedule hence the higher the stress experienced.

A chi-square value of 5.23 clearly suggested that there is a relationship between position and demand of work. The test result also showed that distance learners with senior level positions had very demanding work schedules, whilst those with junior level positions had a lower demanding work schedules.

Effects of Stress on Distance Learners

Stress has both positive and negative effects that are perceived to threaten our well-being and tax our adaptive capacities. These are shown through our physical and psychological lives. According to Weiten (1986), life would have been very dull, if it were altogether devoid of challenges. To him stress promotes personal growth. This refers to movement towards greater psychological health. Stress, therefore, is needed at certain times to force the individual develop new skills, learn new insights and acquire new strengths. Thus, if one goes through a stressful experience, it alerts him/her to face impending stressful experiences. The study revealed some negative effects of stress on students. These include: Stress put excessive pressure and discomfort on students, stress makes students feel uncomfortable and stress affect negatively on students' academic endeavor. That is, students who are stressful find it extremely difficulty learning especially in the evening. This translates into poor academic performance. Stress can cause both psychological and mental disorders in students. Stress poses negative effects on students' health. This data from the respondents shows that stress has strong negative effects on most of them. Simons (1994), O' Leary (1990), Kiecolt-Glaser, Fisher, Ogrocki and Speicher (1987) outlined the following as the effects of stress regardless of one' status.

Burnout

- Disruption of social relations
- Physical problems and illnesses
- Psychological problems and disorders

The effects of stress are detrimental to the overall education of the respondents and others in similar conditions. Similarly, it was also found that 28% of the respondents strongly agreed that academic stress was a necessary challenge for student' to study, 35% also indicated agreed while 16% were neutral. This means that a good number of the respondents disputed the notion that stress was absolutely bad. Like this group of respondents, Weiten (1986) believes that there are positive effects of stress to him life would have been very dull if it were altogether devoid of challenges. A good stress makes one work harder and does things well. We all need some amount of stress in our lives to function effectively.

Stress Management and Coping Strategies.

Coping is the process of managing the internal and external demands that one appraises as taxing or overwhelming Lazarus and Folkman (1986). Weiten (1986) also defines coping as a behavioral efforts to master, reduce or tolerate the demands created by stressful transactions. Coping strategies are techniques or methods people use to deal with stress and changing situation.

Lazarus and Folkman, (1985) Pearlin and Schooler, (1978) have grouped coping strategies into two main forms.

- Problem-directed coping or attempt to do something constructive about the stressful situation.
- Emotion-focused coping or efforts to regulate the emotional consequences of a stressful situation.

Sdorow (1993) identify exercise as the management and coping strategies adopted by students. The following were some of the strategies mentioned: Social support, reading, effective time management, exercising and sleeping, and problem solving. The coping and management strategies that were mentioned by respondents above are similar to work of Freud (1959) Gilhooly (1989), Greeno (1978) Westen (1996) Anspaugh et al (2003) Wortman et al (1992) which also suggested in their studies, the following coping strategies: Distracting yourself, relaxation, controlling breathing, nutrition, exercise, sleeping and problem solving. Good time management is a good strategy of coping and managing stress. This means that stress is something that could be managed if the means of managing it is known to the one suffering from it.

VI. MAJOR FINDINGS

From the study, the following major findings were made:

Significant proportions (63%) of the respondents were females. About half, 55.5%, of the respondents were married people with children. A good number (34%) of the respondents had gone through stress as they combined work and school, 42.5% of them experienced stress often while 30% experienced it occasionally. Four percent (4.0%) admitted they seldom experienced stress. The majority (36.8%) of the respondents believed that stress was very harmful to health and therefore, no amount of it was good for students. To majority of the respondents, time of lectures start and end as well as combining work and studies with household chores were the major causes of stress. Majority (43.8%) of the respondents strongly agreed that the times lectures start in the Accra College of Education Centre is putting a lot of pressure on them while 33% also agreed with this notion. Half (50%) of the respondents strongly agreed that the time lectures usually ended in the night at campus put a lot of pressure on them as workers and students, 36% also agreed with this assertion while only 10% were neutral.

More than half of the respondents also deeply agreed that combining studies and work made them to be depressed, anxious and fatigue. About 51% of the respondents strongly agreed that they get disturbed when they were unable to get expected grades in their exams, class assignments and class test. All the respondents agreed that stress had strong negative effects on them and on their studies. The majority of the respondents believed that exercise, resting, sleeping, seeking of specialist advice, social support, planning skills, study leave, rescheduling of lecture times, singing, watching movies, dancing, conversing with friends, getting a helper at home to assist in household chores especially when they were away for school and work, were some of the main strategies that if adopted by working students would help to reduce stress. Seventy one per cent of the

respondents strongly agreed that effective time management could help to reduce academic stress.

VII. CONCLUSION

It's almost impossible to live without some form of stress. However, if stress gets out of control, it may harm one's health, your relationships, and one's enjoyment of life. This study has established that majority of the respondents believe that stress is very harmful to health. Combining work, studies and household chores were the major causes of stress among distance learners. It was also found out that stress has strong negative effects on the respondents and on their students. Finally, it was also identified that getting a helper at home to assist in household chores especially when respondents were away from school and work was difficult. Exercise, relation, sleeping, counselling, good planning, study leave, rearrangement of lessons periods, effective time management, social support and different kinds of entrainment are some of the key strategies that could help to reduce stress among non-traditional students.

VIII. RECOMMENDATIONS

The following recommendations were made to help distance learners to manage and cope with stress and for stakeholders to assist in reducing stress among students.

Stakeholders like the University authority should make stress counselors available to students.

The private and the public sector employers of labour should make study leave a policy for their workers who are interested in going back to school.

Nurseries and Day care Centres should be established inside university campuses to enable working and nursing mothers to take care of their babies with ease.

Seminars on stress management and coping strategies should be conducted regularly for distance learners.

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Sexual Harassment of Women in Sri Lankan Public Bus Service.

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Abstract- There are tremendous gender issues prevailing in Sri Lankan Context. Some Issues had been discussed in the international forums as well. As a result of that discourse United Nations Population Fund (UNPF) has exclaimed that 90% of women are being harassed while they are travelling by public transport services in Sri Lanka and it is the main cause to minimize the women's enrollment for jobs. Labour force survey of the 1st quarter in 2017 explicated that female labour force 37.6% while the male labour force is 75.1%. This study sought to find out the frequency of women are being harassed in public service buses and which type of sexual harassment ways that they are experiencing, type of journeys they are being harassed and the time of the day they face harassments and women's suggestions to make the Public bus service as a safer mode of transportation. The results of the study exclaim that 96% of women are being harassed while travelling by public service buses. Remarkably majority of women have experienced sexual harassment at least once per year. Frequently sexual harassments take place in long distance travels (more than 20Km) than in short distance travels. Morning 5-12 and evening 4-7 is the time sexual harassments have been taken more. Improper seating etiquette and unwanted crowding of personal space (ex. Excessive closeness) are the most experiencing harassment methods. For preventing from being harassing majority of women have moved the location within the same bus to get away from the harasser. Women have suggested that the musical show videos and films screening in buses should be prohibited and the requirement of an immediate and strict method of punishment system in order to make public transport buses as a safer mode of transportation.

Index Terms- Gender inequality, Public bus service, Sexual harassment, Women harassments.

I. INTRODUCTION

Sexual harassment has been becoming as a hot issue in Sri Lankan context. Despite the programs are going on in order to empower woman still gender inequality is visible within the Sri Lankan context. Recently, United Nations Population Fund (UNFPA) has revealed an unprecedented argue on women harassment in public transport in Sri Lanka. They explicated sexual harassment in public transport is a major reason to minimize women's enrollment for jobs.

Recently implemented four awareness programs under the project name of Travel with a smile and programs were organized with the help of Ministry of Women, Road Passenger Transport Authority-Western Province, National Committee on Women, Women's Bureau, Sri Lanka Police, Legal Aid Commission, Women in Management, Men Engage Alliance, British Council, and UN Volunteers. The project's ultimate goal was preventing women from sexual harassments in public transport. Four awareness campaign had been conducting from 2017 up to 2018. They called attention from different parities such as passengers, bus-conductors, drivers, bus-stand officers, timekeepers, policy-makers and activists.

Findings of a countrywide study done by the United Nations Population Fund (UNFPA) revealed that 90% of women and girls in Sri Lanka have been subjected to sexual harassment on public buses and trains. UNFPA stated that among the many issues

highlighted, sexual harassment in public transport is among the key deterrents that restrict movement of women for economic opportunities.

People who belong to the workers in government and private institutions and the people who travel for their private matters have practiced to use buses and trains as their major travel medium. There are Sri Lanka transport board service buses and private owned buses. Based on the statistics on the ministry of transport and civil aviation the total number of Sri Lanka transport board's buses which operated per day were 5,274 in 2017 and total number of passengers who travel on SLTB buses 1,005,205,383 including both male and female. Beside that there are 379 passenger trains operated per day in 2016. They carried 359,037 of passengers per day both male and female. This statistic shows solely the passengers who travel by the Sri Lankan transport board services and except them there are people who travel by private owned buses.

The current population of Sri Lanka is 20,936,714 as of Thursday, April 26, 2018, based on the latest United Nations estimates.

Based on the statistics on the Sri Lankan Labour Force Survey of the 1st Quarter in 2017 has done by the Department of Census and Statistics showed that male labour force 75.1% and female labour force 37.6%. The report of the statistics on the Sri Lankan Labour Force Survey of the 1st Quarter in 2017 depicts that out the total female labor force in Sri Lanka only 37.6 % are employed.

Table 01: Total economically active labor force

Year	Total	Male	Female
2017 1Q	54.7	75.1	37.6

Source: statistics on the Sri Lankan Labor Force Survey of the 1st Quarter in 2017

As defined by the United Nations High Commissioner for Refugees Policy on harassment, "Sexual harassment encompasses any unwelcome sexual advance, request for sexual favour, verbal or physical conduct or gesture of a sexual nature, or any other behaviour of a sexual nature that might reasonably be expected or be perceived to cause offence or humiliation to another. Sexual harassment may occur when it interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive environment. It can include a one-off incident or a series of incidents. Sexual harassment may be deliberate, unsolicited and coercive. Both male and female colleagues can either be the victim or offender. Sexual harassment may also occur outside the workplace and/or outside working hours". (2005)

Further Australian Human Right Commission manifests that, "The *Sex Discrimination Act 1984* (Cth) defines the nature and circumstances in which sexual harassment is unlawful. It is also unlawful for a person to be victimized for making, or proposing to make, a complaint of sexual harassment to the Human Rights and Equal Opportunity Commission"

Examples of sexually harassing behavior include: unwelcome touching, staring or leering, suggestive comments or jokes, sexually explicit pictures or posters, unwanted invitations to go out on dates, requests for sex, intrusive questions about a person's private life or body, unnecessary familiarity, such as deliberately brushing up against a person, insults or taunts based on sex, sexually explicit physical contact; and, sexually explicit emails or SMS text messages.

Act now Sri Lanka website stated that sexual harassment may constitutes, Unwelcome physical contact and advances, Words or comments of sexual nature that makes the person hearing if uncomfortable, Dirty jokes and obscene gestures, Showing

pornographic material, Demanding or requesting sexual favours, Circulation of abusive personal and or obscene emails and visuals, Any other unwelcome physical, verbal or non-verbal conduct of sexual nature.

There are number of laws prevailing in Sri Lanka against sexual harassments. Act now Sri Lanka website has been manifesting that,

- . According to Article 12 (2) of the Constitution, discriminating against a person based on his or her sex is a violation of such person's fundamental right to equality.
- . Sexual harassment is criminally punishable under Section 345 of the Penal Code (Amendment) Act, No. 22 of 1995.
- . Sexual harassment constitutes "Harassment of a sexual nature using assault, criminal force, or words or actions which causes annoyance to the person being harassed." This includes: Unwelcome sexual advances by words or action used by a person in authority (eg. Police, armed service personnel, school officials, medical officials etc.) Unwelcome sexual advances in the work place. Sexual harassment in the Penal Code may cover misuse of internet and emails that are obscene or make allegations of a sexual nature in order to harass, intimidate or embarrass.
- . Encouraging or condoning sexual harassment is also a crime under the law.
- . Under the Prohibition of Ragging and other forms of Violence in Educational Institutions Act, No. 20 of 1998, if a person causes sexual harassment while ragging any student or a member of the staff of an educational institution he or she will be given a minimum punishment of ten (10) years and may also be ordered to pay compensation of an amount determined by court. Punishment for the offence is imprisonment with or without hard labour for any period up to 5 years. Or a fine, or imprisonment and a fine imposed together. The perpetrator can be ordered to pay compensation to the person against whom the offence was committed

Hot debates on gender inequality and remarkably deformation, allegation and harassment on women are going on social media among Sri Lankan people. There are many Face book pages which are facilitating women to share their worst experiences on public space. Street Harassment Hurts (SHH) Face book page was created after the incident that happened in Wariyapola area in 2014. That was facilitated to create dialogues and conversation around women harassment. It intended to give voices to women who do not have space on main stream media as well as in order to give awareness about women's right and punishments against harassments. On this virtual space most of the women have shared their daily experiences and their opinions on women harassment. Most of the female have been shared their stories anonymously and with their identities. Anonymously some girls have uploaded photos and have shared their opinions as follows.

"Just because of I move through the public space, doesn't mean my body is public space".

"The moment you use "Aaaaa... Nangi, Baduwa/ Kealla" to address a girl, that's when I loss all respect for you".

Sunday observer news media has reported more news along with women's comments in order to give voice to women who are fighting against sexual harassment in public transport "women, fight against fear and shame". Female scholars and critics have declared their ideas regarding women harassment in public transport and on streets. A journalist, Isuri Kaviratne has been experiencing harassment in public transport often. She says, during one of her journeys in the night on the 138 route, bus number was NA 6485 she was subjected to harassment by the conductor himself.

As per the words of Isuri Kaviratne she was questioning "will I be safe to walk alone the same road if I complain today?" It depicts even though women have been harassing they are unable to raise their voices. Women have to bear their grievances in order to survive in the society even being harassing. This is the situation most of the women are experiencing within Sri Lanka.

As mentioned on Sunday observer news media a Lawyer, Consultant in Gender/ Adolescent health and Executive Director of Shanthi Maargam, Kamani Jinadasa that the reasons for sexual harassment to go unreported are as follows:

"The criminal justice system and the law enforcement authorities do not encourage complaints, Victims' fear of making matters worse, Fear of harm to one's name and one's reputation, Normalization of it as a common occurrence in the workplace, places of

education or public transportation, Fear of being followed if sexual harassment takes place in public places and public transportation, Lack of awareness about legal relief Absence of sexual harassment prevention policies , and The common practice of blaming victim-survivors rather than the aggressor”

A Sociologist and senior lecturer, Department of Sociology and Anthropology, University of Sri Jayawardenepura, **Dr. Praneeth Abeyundara says that** *“sexual harassment in public transport has become a common nuisance for all those who yearn for ‘civilised’ behaviour in a public place. The main reason I see is the breakdown of moral values among the present day generation. The deterioration of morals has been seen in an unprecedented manner”.*

Deputy Director of the Children and Women’s Division of Sri Lanka Police, W. A. S. P. Lanka Rajani Amarasena has mentioned on Sunday Observer newspaper *“The UNFPA report says, of the 90% women sexually harassed, only 4% had complained to the police. This is because the police complaint is a long procedure which delays and kills time, during which process some victims change their minds. Some women just ignore, not aware that it is a crime, some are afraid of the law and do not like to go to the police and the courts, as the whole country would get to know. Women from traditional families are shy to complain.*

LITERATURE REVIEW

The study titled on “Normalizing Sexual Violence: Young Women Account for Harassment and Abuse Heather” carried by Hlavka. R.H at Marquette University, USA in 2014 shows despite high rates of gendered violence among youth, very few young women report these incidents to authority figures. This study moves the discussion from the question of why young women do not report them toward how violence is produced, maintained, and normalized among youth. The girls in this study often did not name what law, researchers, and educators commonly identify as sexual harassment and abuse. How then, do girls name and make sense of victimization? Exploring violence via the lens of compulsory heterosexuality highlights the relational dynamics at play in this naming process. Forensic interviews with youth revealed patterns of heteronormative scripts appropriated to make sense of everyday harassment, violence, coercion, and consent. Findings inform discussions about the links between dominant discourses and sexual subject.

A study on “A Model of Racialized Sexual Harassment of Women in the UK Workplace” indicates that frequency rates of sexual harassment in Black Asian and Minority Ethnic (BAME) women tend to be limited to a single incident or of short duration, i.e. less than a week, further findings show that culture influences not only the nature of the sexual harassment experienced, but also explains the strong prevalence in the sample of same race harassment. Asian women in this study appeared to be much more afraid of reprisals that would injure them or their family than other groups, who feared more about what their family would do to the harasser. The fear expressed by Asian women frequently arose from the community status of harassers, who were often very influential and powerful within their own ethnic communities. This power was not only over those BAME women who had experienced sexual harassment, but was also over their family. It is interesting that BAME women frequently viewed their situation as significantly different from that of White women; women they felt had more ethnic power and who would receive more support in their claims. (Fielden. S.L- 2009)

A research study on “Sexual harassment in Dentistry: prevalence in dental school” has demonstrated that sexual harassment can occur in a dental school setting. There is a need for ongoing sexual harassment education programs for students and university staff. Increased knowledge of sexual harassment during graduation can better prepare dental professionals to respond to sexual harassment during their practice. (GARBIN et al 2009)

A study “sexual Harassment of Uppity women” carried by Berdahl.J.L in 2007 revealed that the women with relatively masculine personalities (e.g., assertive, dominant, and independent) experienced the most sexual harassment further this effect was not because women with relatively masculine personalities were more likely than others to negatively evaluate potentially harassing scenarios and women in male-dominated organizations were harassed more than women in female-dominated organizations, and that women in male-dominated organizations who had relatively masculine personalities were sexually harassed the most.

A study on “Shame-Proneness as a Diathesis for Dissociation in Women with Histories of Childhood Sexual Abuse” examined whether shame-proneness is associated with dissociation among abused women multiple regression analysis indicated that shame-proneness was independently related to dissociation, but childhood sexual abuse was not. As predicted, the combination of shame-proneness and childhood sexual abuse was associated with dissociation. (Jean A. Talbot - 2004)

A research titled “Racialized Sexual Harassment in the Lives of Mrican American Women” by Buchanan N.T and Onnerod in 2002 indicate that African American women cannot easily separate issues of race and gender when considering their personal accounts of victimization, which creates a form of racialized sexual harassment.

A study on Sex and Ethnicity as Moderators in the Sexual Harassment Phenomenon: A Revision and Test of Fitzgerald et al. (1994) has proven that sex is an important moderator of these relationships, but that ethnicity is not. Further, sex and ethnicity were not found to moderate the effect of sexual harassment on its outcomes.

THEORETICAL FRAMEWORK

Freedom is a fundamental right of human being “Liberal feminists share this view, and insist on freedom for women” Liberals have a disagreement on what freedom articulates and it may take different forms more than one.

“Liberal feminism conceives of freedom as personal autonomy (Living a life of one’s own choosing and political autonomy (being co-author of the conditions under which one lives.” (Stanford encyclopedia of philosophy-2007)

Women have the liberty of their lives to live as their own. But it depends on certain conditions no enough conditions to exercise the personal autonomy or the social formation fail to respect the women’s personal autonomy and other elements of women’s flourishing.

METHODOLOGY

Questionnaire was employed in this study. Researcher has spread out 200 questionnaires. Present research study conducted a pilot study by giving questionnaire to 10 people similar to the study population. It provided a chance to clear and simplify most questions pertain to the respondents.

Researcher has used random sampling in order to choose well defined sample. 200 questionnaires were disseminated to women passengers who travel by public bus services in Colombo district and 100 questionnaires have chosen as acceptable respondents. Questionnaire consists with twenty eight questions. First four questions were asked about the usage pattern of public transport. From question number five to eleven were asked about the sexual harassments women are exposing. From question number twelve to twenty two were asked about reactions and effect on the post stage of sexual harassment. From question number twenty three to twenty seven were asked about the awareness level of laws, legal actions and institution against sexual harassment in Sri Lanka. Last question allowed respondents to make suggestions in order to minimize sexual harassment in public transport.

This study was set within the Colombo district the commercial capital city and the second level administration division of Sri Lanka. Based on the calculations of the Department of census and statistics 2017 Mid-year Population estimates shows the population of male within Colombo district is 1,187 and female 1,232 as the highest population all among the district.

RESULT & CONCLUSION

Majority of respondents were of 25 to 34 years and also a considerable amount of respondents were more than 45 years old. The total number of respondents from the passengers use public transport buses for traveling to work place, traveling educational purposes and their personal purpose respectively 28%, 32%, and 60%.

96% of respondents have been stated that they are being harassed when they travel by public transport buses. As per the frequency of being harassed majority of women have been harassed at least once or twice per year. A considerable amount of respondent stated that they are subjected to be harassed 8 to 10 times per year. Harassment takes place more in long distance travels (more than 20 km) more than short distance journeys. The respondents were asked when they face harassment more. Majority of respondents stated that Morning 5-12 and Evening 4-7 is the time the majority of them are facing harassments. Female who travel for education and jobs usually travel within above mentioned time.

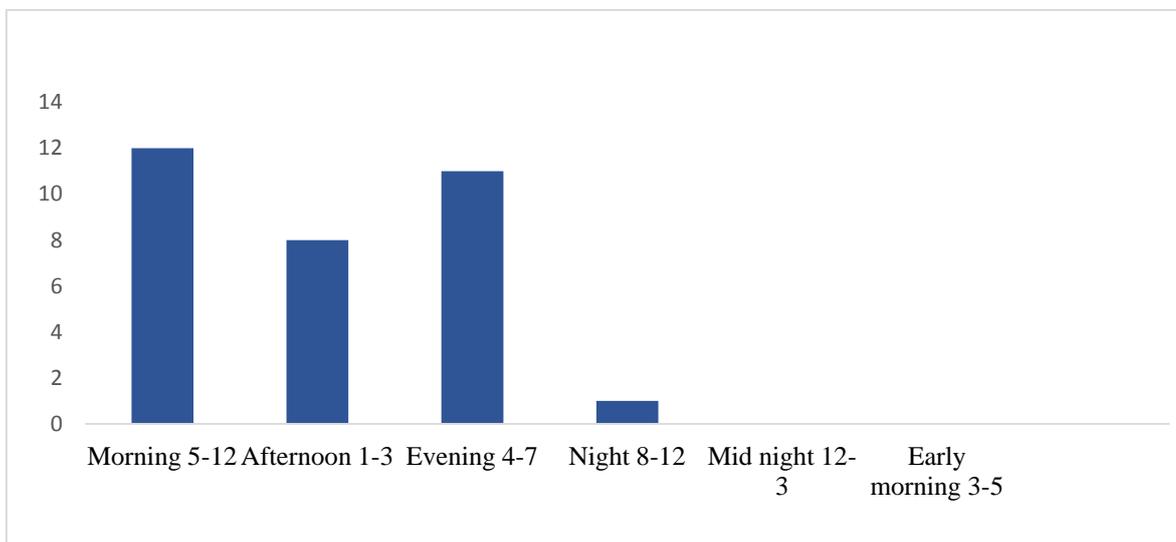


Figure 1: Time duration of the women are being harassed in public Buses.

All the respondents have been stated that perpetrators are men. Improper seating etiquette and unwanted crowding of personal space (ex. excessive closeness) are the most common harassment types which they have been experiencing. Deliberate touching of any part of the body, pause to get contact details, Trampling on foot deliberately, suggestive/ lascivious look also at a considerable level. Majority of respondents (60%) stated while they were experiencing harassments other passenger did not intervene in order to stop the harassment.

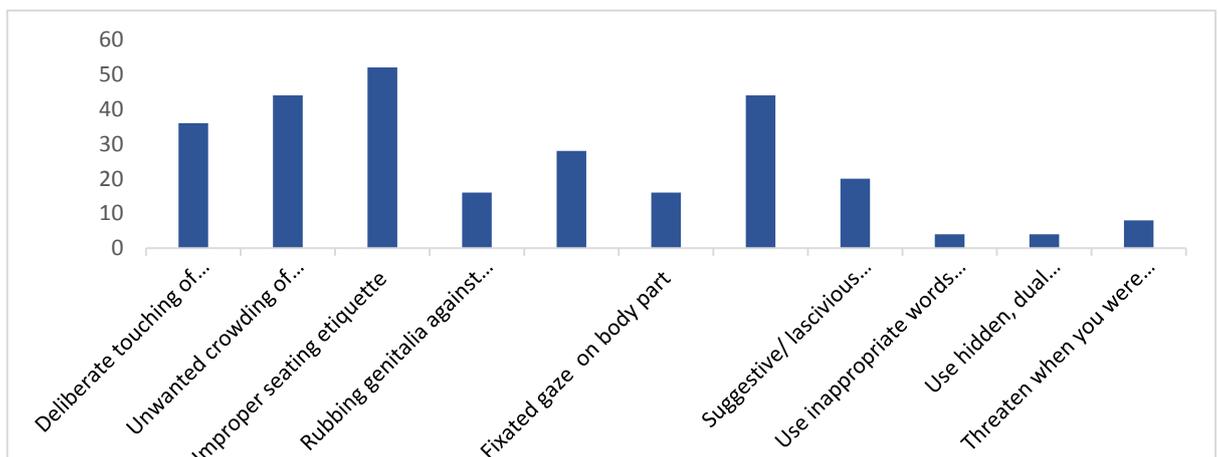


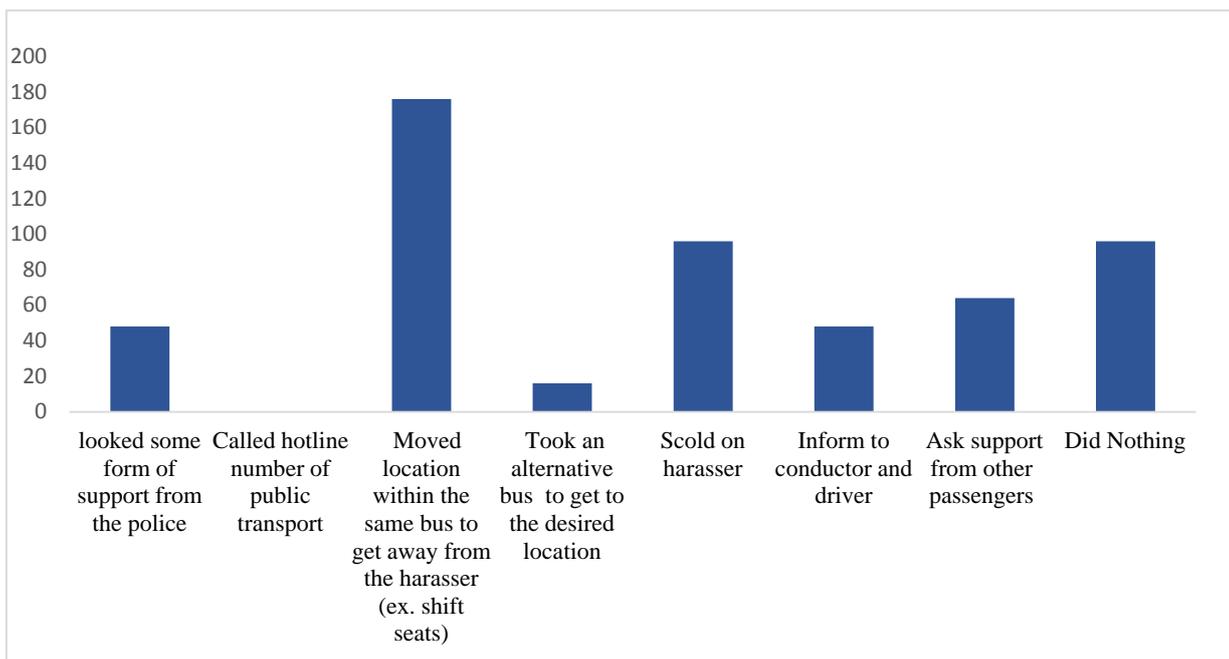
Figure 2: Common harassment types on women.

While women were harassing majority of them had felt angry and scared. A considerable amount of respondents had stated that they felt humiliated and embarrassed. Even more majority of respondents stated that these harassments had been affected both on their personal lives and education as well.

Researcher inquired on women’s interventions on another female person is being harassed in public transport buses. Majority of respondents stated that they have seen other women are harassing in buses and a considerable amount of respondents have intervened in order to stop the harassment. Furthermore, though they had intervened to stop the harassment it happens rarely. They were not able to intervene all the time while they are seen that another woman is being harassed.

Out of the total number of women who had been harassing in public transport buses only 36% of women have taken an action against the harassment. The majority have moved location within the same bus to get away from the harasser (ex: Shift seats) instead of taking an action against the harassment. Furthermore, considerable respondents have stated that they had scolded to harasser and a similar amount of respondents they have done nothing against the harassment.

Figure 2: Types of actions women taken against harassments.



The researcher asked the respondents to give suggestions to make public transport buses as a safer mode of transportation. Majority of them have suggested videos/films on the screen of buses should be prohibited. Descriptively there are musical show videos screening in public buses those videos contain with inappropriate scenes should be prohibited. Furthermore, there should have a strict and immediate method of punishment. A similar number of respondents suggested that the requirement of an active method inform the harassment to relevant parties (mobile app, Signal system in Buses and bus halts) and the need of laws those function independently without political influences.

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Typology of Human-Wildlife Conflicts Encountered by the Local Communities in Kieni-West Sub-County, Kenya

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Abstract:

Human-wildlife conflicts (HWC) have become more frequent and severe over recent decade as a result of human population growth, expansion of agricultural and industrial activities which together have led to increased human encroachment on uninhabited and areas meant for wild animals. This study focused on the typology of human-wildlife conflicts in Kieni West Sub-County, Kenya. This study used a descriptive survey design. The target population of the study was 2340 households drawn from three villages namely: Amboni, Bendeni and Njeng'u. Data was collected using questionnaires, interview schedules for key informants, participant observations and focus group discussions. Collected data was later analyzed using descriptive statistics in form of frequencies, percentages, chi-squared tests and Spearman's rank correlation coefficient. Different types of human-wildlife conflicts and their occurrences were analyzed by frequencies and percentages. Chi-squared test was used to compare different variables while Spearman rank correlation coefficient was used to establish the relationship between variables. Information given by key informants and opinions by local leaders was analyzed thematically. Data was presented by frequency tables, figures, percentages and texts in a descriptive way. The findings of this study showed that the local communities in Kieni County encountered with various types of human-wildlife conflicts including human injuries and threats (3%), crop damage (53%), livestock predation (23%), disease transmission to livestock (16%) and property damage (5%). The observed difference in types of human-wildlife conflicts was significant ($X^2=248.7$, $df=5$, P 0.001).

Index Terms: Human-wildlife conflicts, Kieni West Sub-County, species, typology

I. INTRODUCTION

Human-wildlife conflict has been in existence for as long as humans have existed and wild animals and people have shared the same landscapes and resources [1,2]. According to the 2003 International Union for the Conservation of Nature (IUCN) World Parks Congress, human-wildlife conflict occurs when wildlife requirements encroach on those of human populations, with costs both to residents and wild animals [3]. Studies around the world show that HWC is more intense in the developing countries where livestock holdings and agriculture are an important part of rural livelihoods. In these regions, competition between local communities and wild animals, for the use of natural resources, is particularly intense and direct and resident human populations are very vulnerable [4]. However, human-wildlife conflicts occur everywhere around the world in one form or another. In Alberta, Canada, for example, over a period of 14 years (1982–1996) wolves killed 2,806 domestic animals, mainly cattle but also some dogs, horses, sheep, chickens, bison, goats, geese and turkeys. In Idaho, Montana and Wyoming in the United States, wolves killed 728 animals, mainly sheep and cattle, over a similar time period (1987–2001) [5]. In the state of Gujarat, Asia, near the Gir National Park and Sanctuary, the Asian lion and leopard hunt prey such as buffalo, cattle, pigs and dogs [6]. In the southern state of Karnataka, the overall annual damages caused by large tigers and leopards near the Bhadra Tiger Reserve, are reported to be approximately 12 percent of total family livestock holdings. In addition, elephant damage to crops accounted for an average loss of 14 percent of total annual production [7]. In Africa, human wildlife conflicts are also prevalent in many countries. In Mozambique, many deaths go unreported, simply because of the difficulty

for many people of getting to a government office. A rough estimate would be around 300 people killed by crocodiles per year nationwide [8] while lions killed 70 people in Cabo Delgado province over a period of 18 months between 2001 and 2002. Most of these people were out at night protecting their crops from elephants [8]. In the United Republic of Tanzania from 1999 to 2004, crocodiles killed at least 28 people and injured 57 others in the Jukumu Wildlife Management Area, an area of about 500 km² comprising 22 villages located in the northern buffer zone of the Selous Game Reserve. In one village alone 11 people were killed in a single year [9]. Lion attacks are also widespread where between 1990 and 2004, lions killed at least 563 people and injured more than 308. The problem has increased dramatically over the past 15 years, with the majority of cases occurring in the southern part of the country [10]. A few lions are known to eat humans, such as the notorious Osama which killed at least 34 people along the Rufiji River [11]. In South Africa, between 1996 and 1997, at least 11 (possibly more) illegal immigrants making their way on foot from Mozambique across the Kruger National Park were reportedly killed by lions. This tragic situation may have occurred many times over the years [12].

In Kenya, more than 200 people were killed over the last seven years by elephants alone [13]. At Kibwezi, 478 goats, 48 sheep and 50 cows were killed by crocodile over five years representing an economic value of US \$16 958 [14]. Kenya's unique landscape supports abundant and varied wildlife of scientific intrinsic and economic value and has a considerable extent of wildlife habitat [15,16; 17,18]. With a significant population of wildlife living outside protected areas on a seasonal or permanent basis, the country's wildlife resource has suffered from the effects of human economic activities poaching, human wildlife conflict, demand for wildlife products in the illegal market, and weak legislation, among other factors [19;20]. Kieni County is one of the areas where human-wildlife conflicts occur in Kenya causing human deaths and injuries, livestock deaths, crop destruction among others. Studies have been done in the global, regional and national levels concerning different types of human-wildlife conflicts affecting local communities. However, little has been done at the local level on the human-wildlife conflicts and therefore the study focused on the typology of human-wildlife conflicts in Kieni West Sub-County.

II. Materials And Methods

Research Site

The study was carried out in Kieni West Sub-County which was purposive sampled since it had incidences of human-wildlife conflicts. Three villages Amboni, Bondeni and Njeng'u were also sampled purposively. Administratively, Kieni West Sub-County has Mweiga, Endarasha, Gatarakwa, Labura, Mwiyo and Mugunda locations covering a total area of 1,230 Km². Kieni West Sub-County in Nyeri County covers an area of 623Km² and it's situated between longitude 36° 40' East and 37° 20' East and between the equator and latitude 0° 38' South. In terms of altitude the Sub-County lies between 3076 meters to 5188 meters above sea level. It registers mean monthly temperatures ranging from 12.8⁰ C to 20.8⁰ C and monthly rainfall ranging between 500 mm and 2400mm per annum. The population is mainly comprised of low-income families sparsely dispersed throughout the area. Kieni West Sub-County land has fertile ridges that are on the slopes of Aberdares Mountains. The transport infrastructure in most of Kieni West Sub-County is underdeveloped. The populated areas are mainly connected by dirt roads.

Sample size and sampling procedure

Kieni West Sub-County comprises of 6 locations with an estimated population of 79,312 people [21]. The target population of this study was drawn from three sub-locations namely Amboni, Bondeni, Njeng'u of Mweiga location, Kieni West Sub-County. Target population comprised of a total of 2345 households (Amboni has 1194, Bondeni 365 and Njeng'u 784 households) (Table 1). The respondents included farmers, Kenya Wildlife Service (KWS) officers, Agricultural officers, Veterinary officers and local opinion leaders. The sample size (n) was determined using the following formula given by Colton (1963) cited in Dongol (2007) at 95% confidence level.

Sample size (n) =

$$\frac{N * z^2 * P * (1-P)}{d^2}$$

$$N * d^2 + z^2 * P * (1-P)$$

Where,

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N=total number of households

Z=value of standard variant at 95% confidence level (1.96)

P=estimated population (0.05)

d=error limit of 5% (0.05)

Table 1: Total number of households and sampled households

Villages	Total households (N)	Sampled Households
Amboni	1194	69
Bondeni	367	61
Njeng'u	784	67
Total	2345	197

Source: KNBS (2009)

Data Collection & Analysis

Data was collected using structured questionnaires, FGDs, interviews with key informants and field observations. The researcher randomly administered structured questionnaires to the affected households in the three sampled village. Three FGDs were involved; each from the three villages comprising of 8 members of the local community. Interviews with key informants were conducted with agricultural officers, veterinary officers, Kenya Wildlife Service officer and local leaders. Field observations in the form of visits to the affected fields in order to have an appreciation of the nature of the conflicts between humans and wildlife were conducted on both affected and non-affected fields. Both primary data and secondary data were used. The study yielded both qualitative and quantitative data. Qualitative data was derived from open-ended questions in the questionnaires, Key Informant Interviews (KIIs) and FGDs. Analysis of quantitative data was done where descriptive statistics in form of frequencies, percentages, chi-square and spearman rank correlation coefficient was computed. The data collected was then presented by frequency tables, figures, percentages and texts in a descriptive way.

III. Results and Discussion

A. Encounter with wild animals

The study findings showed that 91% of respondents had encountered wild animals in their farms and homesteads while 9% had not encountered wild animals, a difference that was statistically significant ($X^2=123, df=1, P=0.001$). The survey finding indicates that most of the respondents in the local community have been affected by the wild animals in their farms and homesteads.

Encounter with Wild Animals

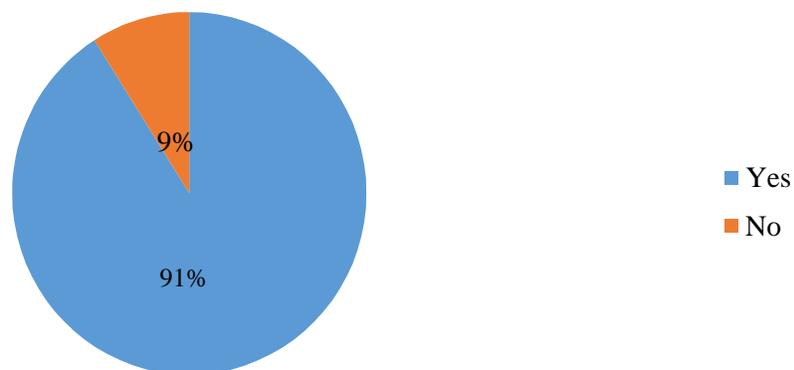


Figure 1: Encounter with Wild Animals

Source: Field Survey (2015)

B. Wild animal species encountered

According to the findings, ten different types of wildlife were reported to visit the local community farms. 92% of the respondents

reported that they encountered monkeys, 81% encountered Baboons, 12% Leopards, 15% encountered Buffaloes, 52% Elephants, 18% Hyenas, 29% wild dogs, 34% porcupines, 18% Antelopes, while 32% encountered Squirrels. The wild animals encountered by farmers varied significantly ($X^2=331.9, df=9, P 0.001$). The findings indicate that the local community had a great challenge when dealing with the wild animals in their farms. The findings also indicate that the farmers encountered with more than one wild animal.

Table 2: Wild animal species encountered by farmers

Wild animal	Frequency	Percentage
Leopard	21	12
Monkey	167	92
Baboon	148	81
Buffalo	28	15
Elephant	94	52
Hyena	36	18
Wild Dog	53	29
Porcupine	61	34
Antelope	33	18
Squirrel	59	32
N=182		

Source: Field Survey (2015)

C. Number of raiding species

On the number of wild animals that reached their farms relative to distance in meters, the survey results were as shown in table 3. From the findings, a strong negative correlation between the number of species that raided each farm and their approximate distance from ANP fence was found (Spearman’s $r_s = -0.942, P < 0.05, n=6$). This indicated that farms that were closer to the ANP fence were raided by more species, and farms farther from the ANP fence raided by relatively fewer species. However, animal species like squirrel, birds and porcupines had no distance limitations.

Table 3: Number of raiding species

Approximate Distance (m)	Average number of raiding species
0-200	6
200-400	5
400-600	3
600-800	4
800-1000	2
1000-1200	1

Source: Field Survey (2015)

D. Time of encounter with wild animals

The respondents indicated the time of the visit of the wild animals (Figure 2). The findings show that 81% of respondents encountered wild animals at night, 11% of the encountered wild animals during the day and 8% of respondents encountered wild animals at any time of the day a difference that was significant ($X^2=184.4, df=2, P 0.001$). Wild animals that were reported to reach the farms during the day include monkeys, baboons, squirrel, elephants, antelopes and wild dogs. Hyena, porcupine and leopard reached the crop lands and homesteads at night. However, elephants were also reported to reach the farms at night.

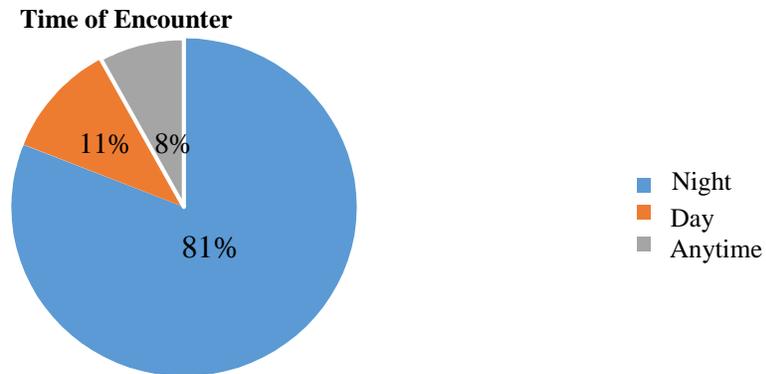


Figure 2: Time of Encounter
 Source: Field Survey (2015)

E. Frequency of encounter

The study further sought to establish the frequency of visit of by wild animals in the community farms and homesteads and the responses were indicated as shown in table 4. The survey results show that 71% of respondents reported that wild animals reached their cropland and/ or houses on daily basis, 3% once in a week, 5% twice a week, 7% monthly and 14% said that wild animals visited their cropland and homesteads at other times. Wild animals significantly visited on daily basis ($X^2=301.3$, $df=4$, $PM0.001$) than other times. The findings indicated that majority of the farmers were on constant conflict with the wild animals and hence had to be on their cropland most of the time to protect their crop land and their homesteads from wild animals attacks. Respondents mentioned that the frequency of visit by wild animals was found high during the maturing and harvesting periods of crops.

Table 4: Frequency of visit by wild animals

Visit by wild animals	Frequency	Percentage
Daily	129	71
Once a week	5	3
Twice a week	9	5
Monthly	13	7
Other times	26	14
Total	182	100

Source: Field Survey (2015)

F. Problems caused by wild animals

The study established that wild animals caused problems to the local communities as shown in table 5. There were a total of 213 recorded incidences of human-wildlife conflicts in the local community over a period of 12 months. From the result findings, 53% of respondents indicated that the major problem caused by wild animals in the local communities was crop damage, 3% human injuries and threat, 23% livestock predation, 16% disease transmission while 5% indicated property damage. There were no incidences of human deaths caused by wild animals in the area. Property damage in the local communities involved damage of fences (traditional and artificial), trees, gates, water pipes, buildings and other structures. However, incidences of property damage were not often reported since the community did not see it to have a direct impact on their lives. The observed differences were significant ($X^2=248.7$, $df=5$, $P<0.001$) with crop damage being the major problem. However, the findings are different from a similar study carried out by [8] noted that in less than a period of 18 months within one province (Cabo Delgado) of Mozambique 70 people were killed by lions, with almost 30 people killed by crocodiles in a 500km² area of north of Selons Game reserve in Tanzania in less than 5 years [9].

Table 5: Major problems caused by wild animals

Type of HWC	Frequency	Percentage
Human injuries/Threat	7	3
Human death	0	0
Crop damage	113	53
Livestock predation	48	23
Disease Transmission	34	26
Property damage	11	5
Totals	213	100

Source: Kenya Wildlife Service (KWS), Aberdare National Park Headquarters (2015)

G. Crops damaged by wild animals

The study further established that there were a total of 113 recorded incidences of crop by the elephants over a period of 13 months (i.e. from February 2014-March 2015). Different crops were damaged in the local communities (Table 6). From the findings, 45% of the crops destroyed by wild animals was maize, 18% bananas, 13% beans, 11% potatoes, 9% vegetables and other crops 4%. The difference between different crops that were damaged by wild animals was significant ($X^2=72.7, df=5, P<0.001$) with maize damaged more than other crops. The finding indicates that most of the farmers were largely affected in terms of yields produced and their nutrition after crop damage by the wild animals.

Table 6: Crops damaged by wild animals

Type of Crop	Frequency	Percentage
Potatoes	12	11
Bananas	20	18
Beans	15	13
Maize	51	45
Vegetables	10	9
Others	5	4
Totals	113	100

Source: Department of Agriculture, Kieni West Sub-County (2015)

H. Wild animals' species responsible for crop damage

In establishing the most responsible animal for crop damage, the study findings revealed that monkeys and baboons were the most responsible animal species for most of the crop damage in the local communities at 88% and 81% respectively. However, the incidences of crop damage by monkeys and baboons were not reported to Kenya Wildlife Service (KWS) Officers since the latter are not included for compensation. Crop damage by elephants was also reported (79%), rodents (squirrels and porcupines) (38%), birds (47%), antelopes (12%) and buffaloes (26%). The animals species reported for crop damage varied significantly ($X^2=183.4, df=6, P<0.001$) with monkeys and baboons being more responsible for crop damage. This indicates that monkeys and baboons accessed the local community farms throughout the year and hence caused much damage to the crops. It also suggests that farmers had a problem in dealing with monkeys and baboons from attacking their crops land. The findings also suggested that crops were damaged by more than one wild animal. Elephants were reported to destroyed crops during migration period where they damaged crops that they came across eating mature crops and trampling on young crops. Buffaloes also were also reported to attack crops any time of the year while birds also damaged crops throughout the year.

Porcupines attacked potatoes at tuber stage and other vine crops as monkeys attacked them when they were most hungry. Monkeys attacked maize mainly at the cobbing stage though they still attacked them at other stages. Porcupines attacked maize at cobbing stage while birds especially yellow-necked spur fowl attacked maize seeds during sowing and during silking stage by cutting off the silk. Squirrels also attacked maize during sowing where they were after the maize seeds. Elephants and buffaloes attacked maize at all stages of growth. Elephants attacked cabbages at mature stage while birds attacked the cabbages at the nursery beds. Birds

also attacked all vegetables at the nursery beds. They also attacked all legumes at all stages. Passion fruits were also attacked during the flowering stage by cutting the flowers. Antelopes damaged beans and sweet potatoes by eating their leaves.

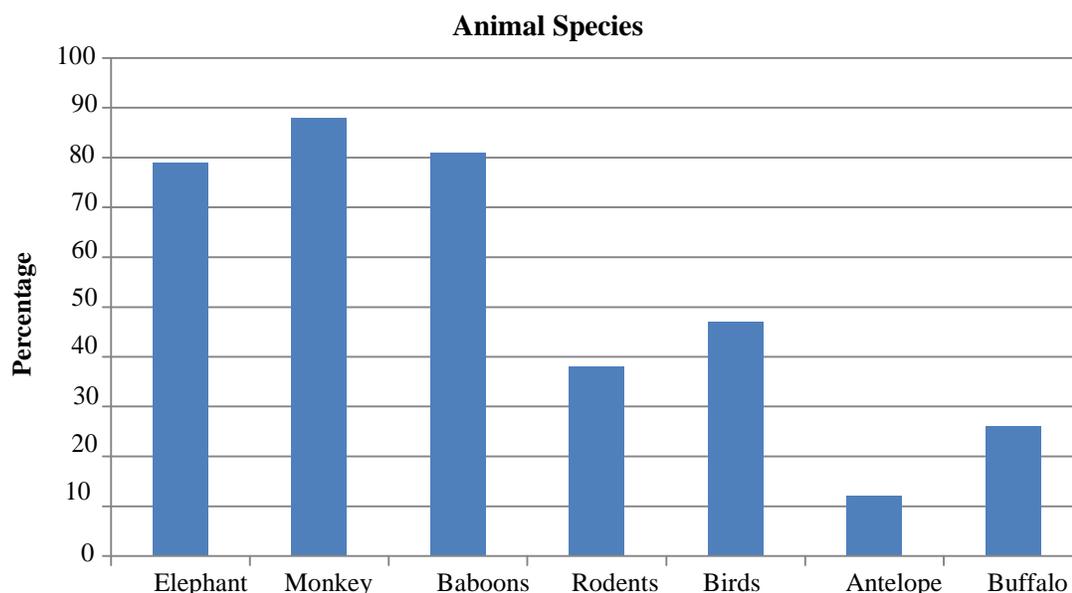


Figure 3: Animal Species
Source: Field Survey (2015)

I. Farm raids by elephants

The study further sought to investigate the crop raids by the elephants reported between February 2014 and March 2015 (Table 7). According to the findings, 51% of the incidences of farm raids by the elephants occurred in the months of February and March 2014, 16% in April 2014, 7% in June 2014, 8% in 2014, 10% in February 2015 and 8% in March 2015. There was significant difference ($X^2=180$, $df=13$, $PM0.001$) on crop damage by elephants in different months. The findings indicate that there was high numbers of elephants migrating of from Mount Kenya to Aberdares National Park destroying a lot of crops on their way in the months of February, March and April. This also indicates fact that there were a lot of crops in their farms. However, in 2015 during the same period the number of farm raids that were reported went down and this indicates that there were little crops in the farms as a result of the dry spell in the area. The findings further indicate that Kenya Wildlife Service (KWS) and farmers had taken precaution to protect their cropland. Lack of incidences of crop raids by elephants in the months of August 2014 to January 2015 indicates that there were no crops in the farms to be raided at that particular time.

Table 7: Farm raid incidences by elephants

Month of Raids	Frequency of farm raids	Percentage
Feb. 2014	27	24
March	31	27
April	18	16
May	0	0
June	8	7
July	9	8
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
Jan. 2015	0	0
February	11	10
March	9	8
Totals	113	100

Source: Department of Agriculture, Kieni West Sub-county (2015)

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J. Livestock predation

The livestock that were most preyed on by the wild animals were also indicated by the respondents (Figure 4). According to the findings, a total of 48 livestock were attacked by the wild animal species. From the results, 54% of the livestock predation was on sheep and goats, 15% of the attacks was on cattle while attacks on poultry and dogs were 21% and 10% respectively. However, most cases of dogs that were attacked went unreported. Different livestock were attacked by wild animals though the difference between the numbers of livestock was not statistically significant ($X^2=8.6, df=4, P=0.075$) small stock being attacked more than other livestock. The finding indicates that sheep and goats were exposed more to the predators and hence more vulnerable to the wild animal attacks.

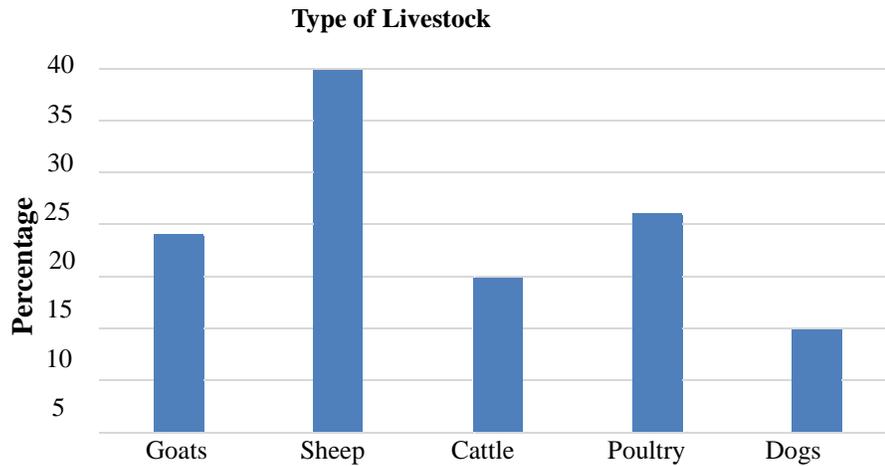


Figure 4: Type of Livestock
 Source: Field Survey (2015)

K. Wild animal species responsible for predation

The study findings revealed that different wild animal species were responsible for the livestock attacks as shown in figure 5. From the survey results, wild dogs were responsible for 31% of the attacks difference that was significant ($X^2=9.9, df=4, P=0.05$) compared to attacks caused by other animal species. Leopards were responsible for 27% of the attacks, hyenas for 23% of the attacks, elephants 8% of the attacks while baboons were responsible for 11% of the attacks. Wild dogs and hyenas attacked sheep and goats while baboon attacked small goats and also dogs inflicting serious wounds to them especially when they are protecting cropland from attacks. However, baboons only attacked dogs when they were in groups. Leopards attacked sheep and goats, calves and the udder of the cattle. Leopards in the area were reported to attack the livestock during the breeding season when they tended to wander around. The findings indicate that carnivores were responsible for most of predation incidences.

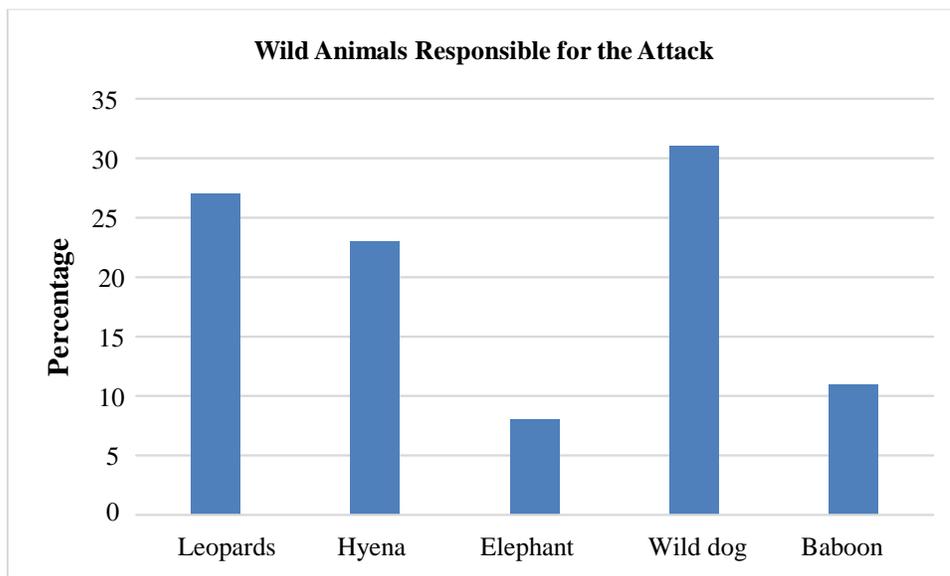


Figure 5: Animals Responsible for Attacks
Source: Field Survey (2015)

L. Time of the day when predation occurs

Findings from the survey results indicates that 51% of the livestock attacks occurred at night as compared to 40% of the attacks that occurred during the day while 9% of the attacks were reported to occur anytime of the day ($X^2=52.6, df=2, P=0.005$) a difference that was significant. Animals that attacked during the night were hyenas, leopards and wild dogs while baboons came during the day. However, hyenas were also reported to attack livestock during the day. The finding suggests that farmers were not able to protect their livestock during the night resulting to more attacks to the livestock.

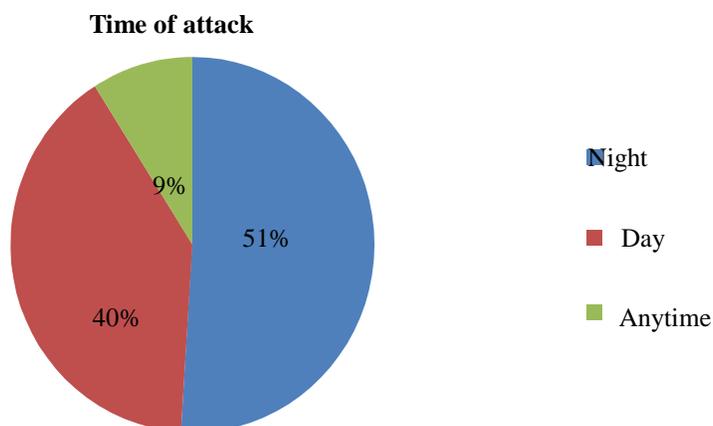


Figure 6: Time of Attack
Source: Field Survey (2015)

M. Disease transmission

There were a total of 34 reported incidences of disease transmission to the livestock over a period of 12 months. From the results, 61% of respondents reported that their cattle were diagnosed with East Coast Fever (ECF) while 39% reported that their livestock were diagnosed with Trypanosomiasis (Table 8). However, there was no significant difference in reported diseases that were transmitted to the livestock ($X^2=1.88, df=1, P=0.200$). East Coast Fever was reported to be transmitted to the cattle by the infected ticks from the buffaloes. This suggests that livestock and the buffaloes were sharing pasture and water when grazing. The findings further suggest that farmers used poor tick control measures exposing their livestock more to tick-borne diseases. However, domestic animals could transmit East Coast Fever (ECF) among themselves. Trypanosomiasis was reported in cattle and was said to be transmitted by tsetse flies from wild animals especially in the months of March and April at the onset of the long rains. However, there were no cases of human beings with sleeping sickness reported.

Table 8: Diseases Transmitted

Disease Transmitted	Frequency	Percentage
East Coast Fever	20	59%
Trypanosomiasis	14	41%
Totals	34	100

Source: Veterinary Department, Kieni West Sub-County (2015)

IV. CONCLUSION

The study results demonstrated that most of the people in the local communities encounter with wild animals causing different human-wildlife conflicts and hence the study concluded that different types of human-wildlife conflicts were significant in the local communities of Kieni West Sub-County. This has led to farmers not being able to realize the full potential benefits from the crops they grow and the livestock they keep. This is as a result of crop damage and livestock predation from wild animals denying farmers the economic benefits that accrue from crop farming and livestock rearing. The crop yields are affected when their crops are damaged by

wild animals and when livestock attacked by predators.

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Quality of Goods Produced By Small and Medium Enterprises as A Determinant of Their Growth in Kenya

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Abstract- Small and Medium Enterprises (SMEs) form the bulk of enterprises in Kenya currently standing at a population of over 7.5 million. They contribute about 80 percent of total employment and generate 92 percent of all new jobs in the country. In Kenya, SMEs contribute about 40 percent of the country's gross domestic product (GDP). Research has shown that in most countries, SMEs generate by far more employment opportunities than big companies or the public sector. Employment is the major source of livelihood globally. No wonder the search for employment is one of the greatest reasons that accounts for the Rural-Urban migration. The resultant consequence is strained resources and auxiliary facilities such as housing, schools, security water, power, sewerage and so on. Undoubtedly, growth of SMEs can check against these odds by creating equal employment opportunities within the rural areas and subsequently attracting development of infrastructure and presence of auxiliary services within those areas. Many studies have been conducted to determine factors that influence growth of SMEs. The mixed results can perhaps be explained by contextual differences (including both micro and macro environment operative) or the mix of variables observed. This study looked at the quality of the goods produced by the SMEs as one of the determinants of growth in four of SME subsectors; manufacturing metal items, wooden furniture, textiles and leather goods in Nairobi City County. This study used a survey research design. The target population was all registered SMEs operating in Nairobi City County, total number, 556. The sampling frame was all the SMEs from the four subsectors who are involved in manufacturing activities and these were 316. The sample size of 177 was picked randomly from the sampling frame. The data collected was mainly quantitative. This data was collected by way of a questionnaire served to owner managers, managers and senior managers of the enterprises. Both descriptive and inferential statistics were used to summarize the results. The study concluded that the quality of produced goods greatly influences growth of SMEs in Kenya with use of electrical power playing a catalytic role.

Index Terms- Growth, market information, small and medium enterprises, rural to urban migration.

I. INTRODUCTION

The definition of small and medium enterprises (SMEs) differs from country to country. In Kenya, enterprises are classified into a number of groups: those with less than 5 employees are referred to as micro enterprises, those with 5 to 49 as small scale enterprises, those with 50 to 99 employees are referred as medium enterprises with those with a 100 or more being referred to as large enterprises (Migiro & Wallis, 2006). Another method of classifying enterprises in Kenya is by their annual turnover. According to World Bank (2010), enterprises are classified according to their annual turnover as follows: those with turnover less than Ksh. 500,000 are referred to as micro enterprises. Those with turnover between Ksh. 500,000 and Ksh. 5 million are referred to as small enterprises while those with turnover between Ksh. 5 million and Ksh. 800 million are referred to as medium enterprises.

Small and Medium Enterprises play a crucial role in the development of most countries in the world. In a lot of cases, SMEs come to be as a result of reduction in job security in big firms and the public sector, increase in education levels and innovation. Small and medium enterprises come up when an economy of a country is not doing well and because of shrinking employment opportunities in the public sector (Masocha, Zindiye & Chiliya, 2012). When the economy of a country is doing well SMEs survive better because factors like credit become easily accessible and governments are able to improve pre requisite infrastructure for growth (IFC, 2011; OECD, 2010). These reports further submit that the SMEs that survive with a strong economy are more than those that fail.

Undoubtedly, growth and successful performance of SMEs is a global desirable in proliferation of entrepreneurship. Their operations is another factor that makes entrepreneurship and by extension SMEs to flourish globally. In Kenya, SMEs generate approximately two thirds of all new jobs annually (OECD, 2004). They account for half of the turnover in Kenya's business sector. According to Sagwe, Gicharu and Mahea (2011) small and medium enterprises contribute a lot as far as job creation in any country is concerned. The trio further argue that SMEs generate many more jobs in any country than the government or the large firms. Small and medium enterprises in Kenya however face numerous challenges (Kinyua, 2014). These include lack of infrastructure, access to credit, competition among themselves as well as from large firms, competition from

outside the country through cheap imports and insecurity (Bowen, Morara & Mureithi, 2009).

Entrepreneurial initiatives in both rural and urban areas play a big role in the development as well as growth of small and medium enterprises in Kenya. Toward this, the importance of developed physical infrastructure cannot be overlooked. To achieve her vision 2030 goals, Kenya is set to ensure improvement of physical infrastructure among other factors of production (Republic of Kenya, 2007). Reading from the same page on Kenya, the World Bank report (2017) acknowledges that the physical infrastructure contributes greatly to the development and growth of SMEs. ILO (2005) cites additional reasons for the lack of growth in SMEs as: lack of resources, limited motivation, focus on local markets, lack of business ideas and lastly, lack of business support initiatives. While the list of factors contributing to SMEs' growth may be endless, governments' commitment towards addressing these encumbrances is key to SMEs' realization of growth. Indeed Kenya's Vision 2030 has its initiative springing from entrepreneurship.

This paper places its focus on the quality of the goods produced by SMEs as a key determinant of SMEs' growth in Kenya. Many market opportunities are lost because of the quality SMEs present to the market. Review of influence of quality of produced goods in relation to SMEs' growth is discussed later in this study.

II. THEORETICAL REVIEW

A number of theories on enterprise growth exist. This study looks at two of the theories on enterprise growth in relation to the quality of goods an enterprise produces. It is perceived that customers prefer goods that are fit their purposes, aesthetically good and long lasting.

III. GREINER'S MODEL

Greiner's theory is about managing change in enterprise growth. As an enterprise grows, it passes through different phases or stages of growth. Greiner (1972) defines two terms that are often used to describe the processes through which enterprises go as they grow from one level to another. These are evolution and revolution. Evolution is a prolonged time of uninterrupted growth in an organization whereas revolution is time of troubles in an organization's life occasioned by growth. During some of these stages, an enterprise grows uninterrupted from either within the organization or from without. At other times, there may arise interruptions mainly from within the organization. If the management of a company fails to understand its developmental problems, it is likely to get stuck in its current state or altogether fail (Mainiero and Tromley, 1994).

According to Greiner (1986), as enterprises grow, they must have strategies for the growth and these are determined by the market opportunities. Once an enterprise gets to know the opportunities that exist in the market, they develop strategies and form structures to take advantage of the opportunities or meet any challenges that there may be in the market. One of the issues they have to deal with is access to market intelligence. This also entails knowing the quality of goods any particular market may want. For these organizations to get market intelligence, they must be connected to information sources and particularly telecommunication networks (Maltz & Kohli, 1996). Through market intelligence, a firm is able to compete with its rivals since it can get information that makes it get certain insights into the market. An enterprise must abandon the traditional methods of the newspaper or print media and get to the Internet (Baumgartner, Gottlob & Herzog, 2009). This broadens their reach for market information.

The Five Phases of Growth.

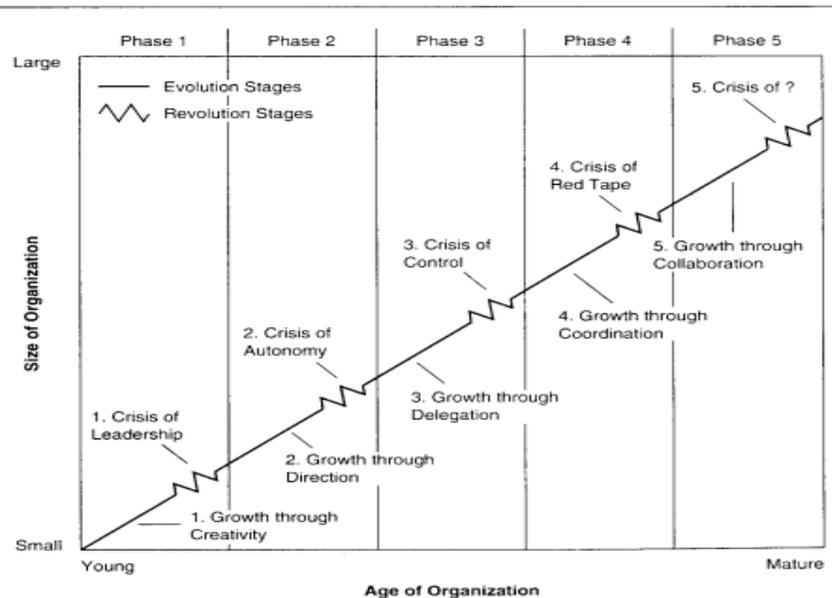


Figure 1: Five Phases of Enterprise

Source: Larry E. Greiner (1986).

Greiner's model shown in Figure 1 illustrates points at which management practices change with time from one phase to the other. This is because of the changes in growth that occur facilitated by new technologies, additional personnel and revenue from more efficient systems.

IV. TYEBJEE, BRUNO, MCINTYRE GROWTH MODEL.

Tyebjee, Bruno and McIntyre (1983) model deals with entrepreneurial marketing and especially for a manufacturing concern. Revenue from sales is a key determinant in the growth of an enterprise. The top management must give the much needed attention to the marketing of the enterprise products. They must market these products beginning with their acquaintances as they also take care of the cash flow of the enterprise (Gunaratne & Weerawardena, 2005). This is entrepreneurial marketing and it relies heavily on networks of

personal relationships. This is an outstanding feature of entrepreneurial marketing. Quality, which is defined as the distinctive attribute of a product plays a big part in attracting buyers of SMEs' products. The market demands that any manufacturer must bring to the market goods that will meet customer demands and hence bring in customer satisfaction (Wanjau, Gakure, Kahiri, & Magutu, 2013).

A modern way used in doing business is the use of electronic Commerce (Gelinias, Sutton & Fedorowicz, 2004). E-commerce on the other hand simplifies the way business is done. Monitoring cash flow in the business with branches in different places is made easy through electronic means. Buyers and sellers are able to meet over the Internet and they are able to transact business without travelling (Gelinias, Sutton & Fedorowicz, 2004). Technology has in great ways changed the way business is conducted world over. Thus through the use of electric power, instead of travelling to mitigate the problems highlighted by Tyebjee, Bruno, McIntyre Growth Model, one can solve them from a home station.

Entrepreneurial marketing is an important activity in SMEs especially in the early stages of an enterprise.

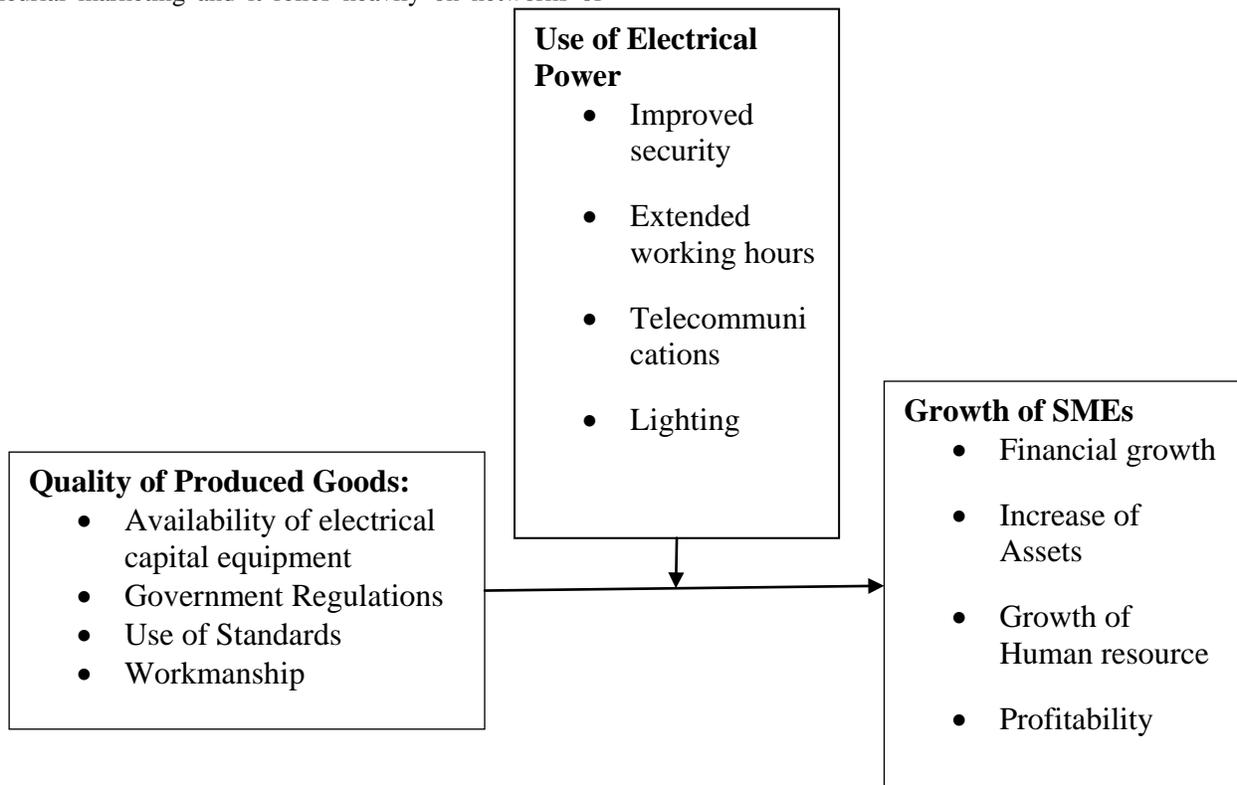


Figure 1: Conceptual Framework

Quality of Produced Goods

Quality to many has different meanings. Quality to some means zero defects or is a measure of excellence, conformance to requirements free from deficiencies and significant variations. This can be achieved through strict adherence to measurable and verifiable standards. This does achieve consistent output that satisfies specific customer or user requirements (Crosby, 1979). Electric power, a very useful part of infrastructure plays a catalytic role in production and marketing of products in SMEs.

Quality is defined as the distinctive attribute of a product plays a big part in attracting buyers of SMEs' products. The pressure from the market demands that any manufacturer must bring to the market goods that will meet customer demands and hence bring in customer satisfaction (Wanjau, Gakure, Kahiri, & Magutu, 2013). To produce goods of good quality, an SME would have to use electricity for measuring equipment which operates mainly on electricity. In recognition for the need of quality products, the Kenya government has developed a national

quality, standards and anti-counterfeit policy. This body ensures that goods imported into Kenya must meet certain quality standards (ROK, 2010).

National grid electric power is a catalyst to SME development and growth as states Bose, Uddin, and Mondal (2013). They further argue that introduction of grid power causes investors to invest in various types of workshops. Joints produced through arc welding are by far stronger than those which would be produced through bracing and again it's cheaper to use electricity than gas. Thus use of electricity produces better quality work than what would be produced using industrial gas.

Capital equipment forms the base of manufacturing infrastructure in Kenya. ROK (2010) argues that beside physical infrastructure, the manufacturing industry contributes very little to the country's economic development because of its high dependence on manufacturing machine imports. For example, in the year 2009, the contribution of the industrial sector to the GDP was only 9.5% (ROK (2010). Machine tools are driven by electric power and they perform a lot of functions in the manufacturing industry. Machine tools and their accessories form a very critical part of the manufacturing sector and contribute greatly to the economic development of any country. With machine tools use, uniformity and quality of the products is ensured (ROK, 2010).

Quality is a feature in industrial products that is of great value to consumers. By use of standards, measurements of how close to the ideal can be ascertained. In a manufacturing concern, components for making different items are placed in bins where they are later picked from during assembling. With many manufacturing SMEs, and particularly in developing countries, the picking of component parts for assembling is done manually (Arham *et al*, 1985). However, with the use of electricity, jigs and fixtures are used and this presents a lot of advantages as items can now be produced that are uniform and made with a high degree of accuracy to meet the standards dictated by the market (NITC, 2012).

Workmanship, which may be defined as the level of skill with which a job is done or a product is made is a very important factor in producing quality goods and services. When jigs and fixtures are employed in the electric manufacturing machines, workmanship is not as important as it is in manual machines because machines' level of accuracy is too high as compared to manual ones (Carrlane, 2015). According to Carrlane (2015), the work is held in position by the jigs and at the same time the jigs guide the work. This makes it possible to mass produce with a lot of uniformity of the parts. Since these machines are driven by electricity, speed can be adjusted to various levels and hence control the volume of units produced. This will however be discussed in detail in the next section.

V. RESEARCH METHODOLOGY

This study used survey research design. This research targeted manufacturing SMEs who manufactured textile items, wooden furniture, metal items and leather goods within Nairobi City County. Data was collected from respondents who were owner managers or senior managers in the enterprises. According to data obtained from Nairobi County Licensing Office (2016), there were 556 licensed SMEs involved in manufacturing, selling

and repair activities of metal items, leather goods, textile items and wooden furniture. Of the 556 licensed SMEs, 316 were SMEs involved in manufacturing activities in the four subsectors. Stratified and random sampling were employed yielding a sample size of 177 by Slovin's formula (Altares *et al*, 2005). A total of 177 questionnaires were administered to owner managers of SMEs in the four sub sectors randomly in a drop and pick later method. The response rate was 141 (80%) which is acceptable (Saldivar, 2012). The reliability and validity of the data collection instrument were tested and yielded results of above 0.6 for reliability (Haele & Twycross, 2015). The study sought to establish whether access to market information has an influence on the growth of small and medium enterprises in Nairobi City County. Analysis was carried out to test the hypothesis that access to market information has no significant influence on the growth of SMEs in Nairobi City County.

VI. RESEARCH FINDINGS AND DISCUSSION

The study was conducted on 177 respondents who were served with a questionnaire. Out of the 177 questionnaires, 141 questionnaires were returned. Thus the response rate was 80%.

VII. RELIABILITY OF DATA COLLECTION INSTRUMENT

Reliability is a measure of consistency of a measuring instrument. If a test is carried out on respondents and the same test is repeated on the same respondents under the same circumstances, the results should be the same (Heale & Twycross, 2015). This would mean the results are showing consistency. According to Heale and Twycross (2015), any value above 0.7 in Cronbach's scale is acceptable although Bajpal (2011) puts minimum value at 0.6. Table 1 shows the Cronbach's reliability coefficient values for the study.

Table 1: Reliability Coefficients of the Study Variable

SME Determinant	Growth	Number of Items	Reliability (Cronbach's coefficient)	Comment
Quality Products	of	13	0.943	Acceptable
Use Electrical Power	of	6	0.613	Acceptable
Growth SMEs	of	4	1.00	Acceptable

VIII. QUALITY ADOPTION INITIATIVES

The response of the respondents contacted about quality initiatives on their products showed that 79.4% were in agreement. It was noted that quality plays a big role in securing a market for their products. Adaptation of quality initiatives in many of the enterprises raised their revenue. Indeed 56 % agreed that their revenue went up and durability of their products too

increased. Most of the respondents ascertained their happiness due to this adoption of quality initiatives by their suppliers.

IX. INFERENCE STATISTICS

The researcher sought to establish the kind of influence quality adoption has on the growth of SMEs in Kenya and how strong the influence is. Inferential statistics were used to test the hypotheses put forward. The null hypothesis would be accepted if above the 5 % level of significance and rejected if below. Growth of SMEs was the dependent variable while quality of produced goods and use of electrical power (moderating variable) were the independent variables. This relationship was established through the use of bivariate or Pearson's correlation coefficients. The results showed that for: quality of produced goods, ($r = 0.691$, $p = 0.000$), and use of electrical power ($r = 0.828$, $p = 0.000$) the moderating variable; all indicate positive correlation and p - values of less than 0.001. It was noted that for any increase in access to market information enhanced SME growth.

Effect of Quality of Produced Goods on SME Growth- Multiple Regression.

Multiple regression is defined as a statistical method dealing with the formulation of a mathematical model to show the relationship between variables in a case where the independent variables are two or more (Kothari, 2004). The case at hand has one predictor variable, one moderating variable and one dependent variable. The effect of access to market information on the growth of SMEs was first tested and then with the moderating variable M. Table 1 has parameters that show the contribution a predictor (X_i) makes toward the output (Y), the growth of a SME.

Hypothesis: Quality of Produced Goods has no significant influence on the growth of SMEs in Kenya. Quality of Produced Goods and SME Growth- Model Summary

From Table 2, the coefficient of determination, R Square accounts for 47.7 % of the firms' growth. It is a measure of the firm's strength of association with all the independent variables while 47.4 % accounts for variance in the dependent variable. The remaining percentage can be explained by other factors that are not in the model. A coefficient of determination, R of 0.691 shows there is a positive correlation between the quality of produced goods and the growth of the enterprise. When quality of goods produced by an enterprise rises, customers start seeing attributes of the goods such as longevity, good performance, easy to use properties and this attracts more customers to buying the products. This likely brings more revenue to the company and therefore growth of the enterprise. The p -value was found to be 0.000. Thus the alternative hypothesis was found to be true. Thus, quality of produced goods has a positive relationship with the growth of SMEs. Further results from regression indicate that for every unit of increase in quality of produced goods change, growth of an enterprise changes by 0.975 while ANOVA results show a value of $F(127.025, 0.000)$ which is quite significant.

Table 2: Quality of Produced Goods and SME Growth Model Summary

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate
1	.691 ^a	.477	.474	.67848

a. Predictors: (Constant), Quality of Produced goods(X2)

X. CONCLUSION

Access to market information was found in this study to play an important role in the growth of SMEs. From the results, it was found to play a pivotal role in the growth of SMEs. Its contribution to SME growth cannot be ignored. In this study, it was also noted that access to market information is greatly improved by the introduction of the use of electric power. Electric power in access to market information plays a catalytic role. With electric power, different communication machines can be energized and therefore be used to get market information. This is an input to a communication system that is indispensable. Market information is so related to business growth that enterprises should ensure that their businesses are well linked to sources of market information as this is how they can know where there are market opportunities for their products. It is therefore concluded that market information is an indispensable ingredient in enhancing growth of SMEs in Kenya.

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Oral Manifestations of Systemic Lupus Erythematosus: A Case Report

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Abstract- Systemic lupus erythematosus (SLE) is a multifactorial autoimmune disease. The hallmark feature of SLE is chronic inflammation that affects the skin, joints, kidneys, lungs, nervous system, serous membranes such as the pleura and pericardium, mucous membranes and other organs of the body. Oral lesions of lupus erythematosus show an array of clinical aspects and most affected sites are lips and buccal mucosa [1, 2]. This case report presents a clinical profile of a patient with SLE along with different oral lesions. This article highlights methods to recognize and manage the oral manifestations of this systemic disease.

Index Terms- Systemic lupus erythematosus, SLE, Autoantibodies

I. INTRODUCTION

Systemic lupus erythematosus (SLE) is the prototype of systemic autoimmune diseases. The etiology is not known as yet and the pathogenesis is complex, involving immunological, genetic, hormonal and environmental factors. Damage to tissues and cells results from pathogenic autoantibodies and immune complexes. Classically, Lupus Erythematosus has been subdivided into a systemic and a cutaneous form where in, Systemic lupus erythematosus (SLE) is a multiorgan disease with variable prognosis and Cutaneous lupus erythematosus (CLE) is a more benign condition limited to skin and/or mucosal surfaces. This case report highlights oral lesions seen in an SLE patient along with clinical presentation and management of oral lesion with general therapeutic approach.

II. CASE REPORT

A 36-year-old female patient with the complaint of burning sensation in the left inner cheek which was intermittent since 1 year came to this dental centre.

On eliciting her medical history it was known that she is a known case of diabetes mellitus, hypertension, hypothyroidism and arthralgia. She had no family history of similar illness. She also complained of photo-sensitivity for the past 1 year. She had diffuse hair loss for past 4 months. She complained of severe pain in both knee joints which was more in the morning and reduced as the day progressed. She had visited a local dentist for routine examination and undergone restorations during her pregnancy.

Extra oral examination revealed butterfly shaped malar rash [Fig: 1A] and multiple erythematous patches in face and

extremities. Dry, scaling and itchy lesions were seen in bilateral ear lobes. Occular examination, chest X-ray and cardiovascular system were found to be normal by respective specialist consultants on referral. During the period of investigation patient complained of episodes of memory loss for which she was referred to neurologist where she was advised to write down whatever she practices or about to practice.

Intra oral examination revealed multiple ulcers on the buccal mucosa. Multiple erythematous lesions were found only in the palate, buccal and vestibular mucosa [Fig: 1B, 1C, 1D & 1E]. Left buccal mucosa showed erythematous lesion with white irregular radiating lines in region of mandibular and maxillary third molar. The white lines were non-scrapable. She also added that these lesions appeared after child birth.

Laboratory investigations showed Haemoglobin level 10mg%, ESR level 45mm fall in 1st hour by Westergren's method, platelet count was 365000 cells per cubic mm, serology for antinuclear antibody (ANA) was positive with a homogenous pattern. Double-stranded deoxyribonucleic acid antibody (Anti-ds DNA) was raised to 37 IU/ml (normal 0-6). C3 complement fraction was lower than normal range of 0.738-1.80 GL. Her C-reactive protein and Rheumatoid Factor were negative. MRI scan showed normal brain study and diffuse disk bulge at C5-6 level with minimal impingement on bilateral exiting nerve roots. Her Mantoux test was 7mm and TSH was 4.00 which were within the normal range.

Based on the typical skin lesion, intra oral findings, systemic examinations, special investigations especially ANA test positivity, raised Anti-ds DNA, depleting C3 complement fraction contributed to the diagnosis of this case as a case of Systemic Lupus Erythematosus. Presently the patient is on, Triamcinolone with Orabase topical steroid along with Prednisolone (5mg) tablet twice daily.

III. DISCUSSION

Patients with Systemic Lupus Erythematosus (SLE), a prototypic autoantibody disease, develop auto antibodies to nuclear molecules in many of their cells, cell components and tissues. Clinical manifestations appear to result from deposition of antigen antibody complex in the tissues. Cytokines are thought to play a key role in SLE; however, the extent to which they affect progression of lupus is not clear.

Another theory might be that SLE autoantibodies are a sequelae of cross reactions to exogenous antigens e.g. RNA

retroviruses. Extrinsic factors such as exposure to sunshine, infections and drugs may trigger SLE reactions in some patients. No matter the etiology, genetic predisposition is a probability, as expressed in associations with specific HLA/MHC antigenic profiles. Dysfunction of B-lymphocytes is one of the main defects in SLE. In addition, suppressor T-lymphocytes are also reduced in number, permitting a considerable increase in autoantibodies [3, 4].

SLE is rare in India. A prevalence study in India (carried out in a rural population near Delhi) found a point prevalence of 3 per 100,000 [6]. This disease commonly affects young women of child bearing age with a female : male ratio of 10:1 (90% of cases are in women), more predominantly in young women due to higher levels of estrogen, while at premenstrual and post-menopausal women, ratio with males decreases to 3:1 [1,2].

Cutaneous manifestations are seen in the form of erythematous patches on the face that coalesce to form a symmetrical pattern over the cheeks across the bridge of the nose in a butterfly pattern of distribution which is known as malar rash [Fig: 1A]. Skin around the neck, arms, shoulders and fingers are also affected. They may also be associated with itching or burning sensation, and areas of hyper pigmentation. Macules or papules occur on the face, or a generalized rash occurring on the body, which may or may not be sun induced.

Diffuse alopecia can generally occur when the disease is active and is usually reversible during remission. Patchy alopecia, on the other hand, may lead to scarring and can become permanent [5, 6]. Cardiovascular and respiratory symptoms are also common and include chest pain on inspiration due to pleurisy or pericarditis. Renal complications (glomerulonephritis and microvascular thrombosis) and neuropsychiatric complications (seizures, psychosis, neuropathies, stroke, and depression) are common as well [7]. Ophthalmic and gastrointestinal manifestations are usually uncommon but can be serious, including kerato-conjunctivitis sicca, pancreatitis, hepatitis, and subacute bowel obstruction. Pain in the joint and arthritis are common manifestations [5]. Present case showed similar cutaneous involvement and joint pains in the form of arthralgia.

In 20-50% of patients' oral lesion of SLE are seen. These manifestations of the oral cavity may be seen either prior to or following the development of skin lesions or even in the absence of skin manifestations [8]. In a decreasing order, locations more frequently affected are buccal mucosa, hard palate and lower lips in the form of ulcers, erythema or hyperkeratosis. Oral lesions appear as erythematous areas, without induration and with white spots. The margins of these lesions are not sharply demarcated but quite often show the formation of narrow zone of keratinization. Hyperemia with edema is a common occurrence and there may be a tendency for bleeding [8]. The main clinical differential diagnoses are lichen planus, leukoplakia, squamous cell carcinoma and even vesico-bullous diseases [9].

Although investigation plan for a case of SLE will depend on the clinical picture, the minimum laboratory workup should include [10]:

- Haemoglobin, WBC, Differential count, ESR
- Urine routine (preferably a fresh sample examined) and microscopy, and 24 hour protein and creatinine estimation if necessary
- Serum chemistry (urea, creatinine, liver function tests, lipid profile)
- Chest x-ray
- ANA, anti-dsDNA, C3, C4

Histological appearance of SLE is not pathognomic but is suggestive of the disease. Histopathological features include, changes at the dermo-epidermal junction that include thickening of the basement membrane (best demonstrated by periodic acid-Schiff staining) and vacuolar degeneration of the basal cells along with perivascular and peri-appendageal inflammatory cell infiltration of a variable degree in the reticular dermis. Hyperkeratosis is more evident and follicular plugging may be seen in more mature lesions [11].

Direct immunofluorescence testing is often used to detect the presence of IgG, IgM and IgA at the basement membrane. The antinuclear antibodies (ANA) test is highly specific with a positive result in >95% of SLE patients. The anti-dsDNA antibody test is positive in 60% of SLE patients and is considered the best marker for disease activity, with a specificity of almost 100%, except in elderly patients who have a lower prevalence of anti-dsDNA. Complement levels (C3 and C4) are negatively correlated with lupus activity and their levels deplete because of consumption [10].

If a patient fulfills more than 4 of 11 criteria made by American College of Rheumatology, then the diagnosis of SLE can be made with about 95% specificity and 85% sensitivity. Diagnosis of SLE is based on clinical judgment. SLE can be suspected whenever 2 or more organ systems listed in Table-1 are involved [10, 12].

There is no known cure for Systemic Lupus Erythematosus, hence treatment is based on relieving symptoms, suppressing inflammation, and preventing future pathology. Symptomatic treatment for the specific involved organ as per the severity of the disease: topical sunscreens, avoidance of UV light and estrogens, NSAID's for arthritis, antimalarials for dermatologic manifestations, topical steroids for rash, use of systemic steroids for prevention of end organ damage, Calcium and Vitamin D supplements to fight osteoporosis and corticosteroids as immunosuppressant drugs for serious organ involvement (e.g. Cerebritis, nephritis). All medications used to treat SLE require monitoring periodically for potential toxicities [13, 14].

Preventive dental hygiene care in Lupus patients is very important. Chlorhexidine mouthwashes helps contain periodontal disease by chemical plaque control. Mucous membrane ulcers can be managed with hydrogen peroxide gargle or steroid impregnated gel. Intralesional injections of corticosteroids are also effective modality. Bacterial, viral and fungal infection should be treated using conventional, proven

therapy specific for the infection. No Dental procedures should be undertaken on patients with active Lupus, and if necessary, antibiotic premedication is always advisable due to high incidence of bacterial endocarditis.

Adverse effects of Lupus therapy in oral cavity [20]

Long term use of medications to control Lupus can induce significant intra-oral pathology such as mentioned below:

- Corticosteroids: leads to root canal calcification, delay of tooth eruptions and root dilacerations.
- Steroids: causes necrotizing ulcerative gingivitis.
- NSAID's: induces gingival bleeding, but due to the inherent property of NSAID's to inhibit alveolar bone resorption, periodontal health in some patients with Lupus has been found to improve.
- Cyclosporine: causes gingival enlargement (hyperplasia).
- Immunosuppressive treatment: fights against intra-oral infections but promotes Candidiasis and Herpes Simplex Virus opportunistic infections.

IV. CONCLUSION

Systemic lupus erythematosus is an autoimmune disorder that can affect several organ systems, including the skin, kidneys, and CNS. Of patients with SLE, 25% have associated oral lesions, which are usually superficial ulcers with surrounding erythema. It is essential that dental practitioners should know these pathologies and diagnose them at an early stage of the disease to help assist in providing more effective treatment to improve survival rates. The intraoral examination should be incorporated as a part of dermatologic examination as the oral manifestations can represent preliminary signs or can coexist with the disease [15].

APPENDICES

Appendix 1: Table 1.

Appendix 2: Fig 1.

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Appendix 1

Table 1: Diagnostic criterion for systemic lupus erythematosus include any 4 of the 11 criteria given below simultaneously or in succession [14]

SLE criterion	Definition or examples
Malar (butterfly) rash	Fixed erythema over the malar eminences
Discoid rash	Erythematous raised patches, may scar
Photosensitivity	Skin rash as a result of unusual reaction to sunlight
Oral ulcers	Often painless sores
Arthritis	Non-erosive: Jaccoud's arthropathy
Serositis	Pleuritis — pleuritic pain, pleural rub, pleural effusion Pericarditis — ECG changes, pericardial rub, pericardial effusion
Renal disorder	Proteinuria (with 3+ or more protein noted in urinalysis specimen or 0.5 g of protein/day) Cellular casts in urine
Neurological disorder	Seizures Psychosis
Hematological disorder	Hemolytic anemia Leukopenia Lymphopenia Thrombocytopenia
Immunological disorder	Anti-DNA antibodies Anti-Sm antibodies Antiphospholipid antibodies
Antinuclear antibody	Antibodies to nuclear constituents

Appendix 2



Figure. 1. Clinical aspects of lupus erythematosus (A) Rash on bridge of nose (Malar Rash), forehead (B) Lesion on buccal mucosa and gingival (C) Erythematous lesion with irregular white lines on buccal mucosa (Left) (D) Erythematopurpuric lesion on hard palate (E) Erythemato-keratotic lesion on buccal mucosa (Right).

The Role of Electronic Accounting Information Systems in the Quality of Accounting System Outcomes

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Abstract- In the business of financial institutions it was always necessary to get up risk management and in time much before the emergence of Information Systems. There was no idea the bank's approval credit to someone without assessing how much risk they face, and whether they will be able to collect receivables. The development of information technology itself in individual periods was accelerated by the need for accurate and timely calculations by reducing risk. Financial institutions (banks, insurance companies, etc.) funded development and the improvement of information systems and some of the first systems are developed just for these needs. In the 21st century we no longer have to talk about the need to implement info technology for these purposes, because they already exist in all areas, but about the need to be correct implemented, as well as the necessity of adequate handling and understanding information's they give to us. Regardless of the existence of highly sophisticated system quality improvement hardware components of information systems, remarkably improved communication channels (primarily in the speed of data transfer) between different systems, software development specialized in risk assessment as part of the ERP company. So far, there was no need for information systems to work more efficient and make information which are obtained on this way they are adequate.

Index Terms- business, financial. information systems. technology. company.

I. INTRODUCTION

Financial institutions have drastically increased the extent of the risk that they have to measure what it is set new tasks for the information systems they use. There is a legal obligation when it comes to reporting. Banks are for example in an obligation to monitor credit risk, as and perform real-time business transaction checks when it comes to this kind risk, but also to provide answers customized reporting for different groups of users. Insurance companies are obliged to take care of the law. However, they have an ongoing assessment of their solvency, which is also regulated is appropriate by law and by-laws. In practice, the performances of VAR (value at risk) calculations obtain a statistical estimate of the maximum probable wrinkle portfolio when the market behaves in normal circumstances.

Based on the growing demands of global organizations as well as new expectations of investors and boards in recent years, a five important trends (Rahman, 2006):

1. Change the role of accounting and expanding the scope of the accounting,
2. Assessment of the quality of operations,
3. Accountability and transparency organization structure,
4. Moving to a accounting on the basis of risk,
5. Upgrading accounting infrastructure in accordance with technological progress.

The traditional functions of accounting were confined to the recording of business transactions in a systematic manner. Nowadays, accounting is no more just a recording job, instead it serves multiple needs of diverse users of accounting information, systems audits, fraud investigations and audits of special project became less important than urgent needs of regulatory compliance and business process optimization. Today, looking properly structured accounting function which affects not only legislation but also operational. The role of an accounting is now changed from mere financial reporting to the control of risk management, priorities, objectives and activities, eliminate complexity and redundancy, ease of doing business, as well as the protection and enhancement of shareholder value.

II. THE DIFFERENCE BETWEEN TRADITIONAL ACCOUNTING & ELECTRONIC ACCOUNTING

Accounting traditionally was processed manually with all transactions recorded in columnar papers and kept in voluminous binders. Once computers became popular and software affordable, accounting tasks moved into this medium, where concepts stayed the same but mechanics changed from papers to programs. The most glaring difference between traditional and computerized accounting is the speed of operations (Shanker, 2018). With an accounting program, data is entered once and it is saved. The program provides management with reports in a speed never dreamed possible in the traditional days. No more waiting days or weeks to know whether your business is making a profit. Using computerized accounting, information can be accessed in a matter of minutes. Once data is available in the system, it can be used in reports, queries and analysis. Computerized systems have drastically increased accuracy of calculations when compared to the traditional, manual system, in which columns had to be added up, numbers moved from one

page to the next, and trial balance and financial statements manually compiled. If errors occurred, many hours had to be spent trying to find and correct them. With accounting software, this problem is eliminated. In the case of accounting spreadsheets, adding simple formulas still may be needed, but it is an easier and more accurate process. Efficiency goes through the roof when a computerized system is used. The traditional manual accounting system with paper and pencil is cheaper than the computerized version, in which a firm needs a computer, software, printer and other expenses associated with a system. The manual system may work for small businesses up to a certain point, but with the affordable costs of computers and software, many firms are opting for the computerized system. They are easy to use, and finding experienced employees to run the system is not a hurdle. When using a manual system, the risk of losing data is real. If important papers are damaged or destroyed, that work may have to be re-created. Copies of the original work can be made, but that could be expensive and time-consuming. Accounting on a computerized system offers the choice of saving work on a CD, portable or external hard drive, flash drive, or even online. Many firms back up data every night as a precaution. If something happens the next day, the data can be restored from the backup. Using a computerized accounting system keeps all of the information organized and in one place: the computer hard drive. Finding and accessing information on an accounting software program is much easier than the traditional method. Specific data can be found using system functions, which usually include a "find" or "search" key. For example, finding information about a vendor on a manual system could take many steps and significant time. The same process in a computerized system most likely would yield the information in a snap, with less confusion and aggravation.

III. ACCOUNTING INFORMATION SYSTEM - AIS

An Accounting Information System (AIS) is the collection, storage and processing of financial and accounting data used by internal users to report information to investors, creditors and tax authorities. An accounting information system is generally a computer-based method for tracking accounting activity in conjunction with information technology resources. An accounting information system combines traditional accounting practices, such as the Generally Accepted Accounting Principles (GAAP), with modern information technology resources. The accounting information systems represent a range of sources, namely persons and equipment, which are designed to collect financial data to reach the information needed for different decision-makers (Bodnar and Hopwood, 2010). The use of accounting information is indispensable in the management activities of a company, given its quantitative information on various activities. Accounting information is primarily intended to be useful in economic decision-making. Accounting information is needed not only by management in the direction of cooperation but also by shareholders, who need periodic financial data in order to assess the performance of the company's management (Nnenna, 2012). Accounting information systems rely on the quality of input data, as the poor quality of data used in the input process leads to poor results (XU, 2003). From the point of view of Wilkin & Tayan (2003), the

relationship between quality and information systems is determined by three basic components: system quality (technical components), information quality in terms of the accuracy and correctness of data entering the system, and service quality, meaning the assessment of the level of excellence in providing information to users. Accounting information systems have three basic functions:

1. The first function of an AIS is the efficient and effective collection and storage of data concerning an organization's financial activities, including getting the transaction data from source documents, recording the transactions in journals, and posting data from journals to ledgers.
2. The second function of AIS is to supply information useful for making decisions, including producing managerial reports and financial statements.
3. The third function of AIS is to make sure controls are in place to accurately record and process data.

An accounting information system typically has six basic parts:

1. *People* who use the system, including accountants, managers, and business analysts.
2. *Procedure* and instructions are the ways that data are collected, stored, retrieved, and processed.
3. *Data* including all the information that goes into an AIS.
4. *Software* consists of computer programs used for processing data.
5. *Information technology infrastructure* includes all the hardware used to operate the AIS.
6. *Internal controls* are the security measures used to protect data.

Because AIS stores and provides such valuable business information, reliability is vitally important. The American Institute of CPAs (AICPA) and Canadian Institute of Chartered Accountants (CICA) have identified five basic principles important to AIS reliability:

1. *Security* - Access to the system and its data is controlled and limited only to those authorized.
2. *Confidentiality* - The protection of sensitive information from unauthorized disclosure.
3. *Privacy* - The collection, use, and disclosure of personal information about customers is done in an appropriate manner.
4. *Processing integrity* - The accurate, complete, and timely processing of data done with proper authorization.
5. *Availability* - The system is available to meet operational and contractual obligations.

IV. CONCLUSION

Information systems are an integral part of modern society and they are not only business factor in the 21st century. Although they have achieved an enviable level of development, they are also developing in the goal achieving as good as possible results. In this paper will be accent on their application in the function of accounting and how much they are really effective in realizing accounting tasks, especially keeping factor

of man as an unavoidable factor that makes sense Technological progress makes it possible to simplify and strengthen the accounting function so that it brings strategic value and reduce its operating costs. The expected benefits are improved data transparency, shared environment, decision-making process and quality of accounting data. So the quality of accounting information systems has next dimensions which were: accuracy, audit ability, reliability, security, timeliness, flexibility, and user satisfaction.

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Climate Change-Induced Displacement: Drivers, Challenges and Mitigation Measures

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Abstract: Large population displacements are now commonly presented as one of the most challenges of climate change. Recent forecasts and projections show areas that would be affected by such population movements are riverine, coastal and delta regions as well as low-lying islands. Climate change induced displacement brings about expanding urbanization that in turn weakens already vulnerable communities and people. This paper aimed to study climate change-induced displacement with emphasis on its drivers, challenges and mitigation measures. As such, data were collected from both secondary and primary sources. Secondary data were collected from relevant literatures while questionnaire and interview were adopted as a means of collecting primary data with the use of purposive sampling technique. The questionnaire were analysed quantitatively using factor analysis in the form of PCA, percentages and Kruskal Wallis whereas the interviews were analysed qualitatively. The study found that the core drivers of climate change-induced displacement are Persistent flooding, rising drought and advancing desertification while interview result confirmed flood and drought as key drivers. A Kruskal Wallis test conducted show no statistically difference from respondents on the challenges of climate change-induced displacement presented while the core mitigation measures are creation of disaster risk-reduction and management policies, reducing the emission of greenhouse gases, investments in clean technologies (e.g. hydropower, wind power) and agro-fuel production. The study concluded that disaster risk-reduction should be created and policies to ensure human rights are not violated should be enacted and maintained.

(Keywords: Climate change, Displacement, Flooding, Nigeria)

I. INTRODUCTION

Throughout history, different reasons have made people to move. These movements maybe due to persecution and conflict, natural hazard events such as flooding or spilling disasters such as famine brought about by drought. Others choose to move temporarily or permanently in search of better economic conditions, or once seasonal conditions, such as rains, make it impossible or hard to earn a living (Shen, 2013; Lilleor and Van den Broeck, 2011; Piguat, 2010; Ibáñez and Vélez, 2008). Moreover, some circumstances have made governments to pursue programmes and policies which encourage movement and relocation of people from areas highly hazard-exposed. These movements either temporarily, permanent, forced or voluntarily is what this paper term displacement. The aim of this paper is to assess climate change-induced displacement with emphases on its core drivers, challenges and mitigation measures. Also, the research compares the responses from respondents across the states studied.

II. CLIMATE CHANGE-INDUCED DISPLACEMENT

Large population displacements are now commonly presented as one of the most dramatic possible consequences of climate change. Recent forecasts and projections show those areas that would be affected by such population movements are coastal and delta regions including Sub-Saharan Africa Nigeria included and low-lying islands. Human activities on environment have complicated already complex picture of climate change. This is so because a changing climate will modify the intensity, frequency, duration, location and timing of sudden and slow onset climate-related hazards (IPCC, 2014a; 2012).

Slow-onset climate-related hazards comprise desertification, drought, ocean acidification, salinization, changing trends in seasons, glacial retreat and sea-level rise. Though not represented in the disaster displacement data, slow-onset hazards play a role in convincing people to move especially when government responses are inadequate to enable them to stay in a place or where there

are few choices left for survival (Adamo, 2003). Therefore, these types of hazards, that often have long warning times, can make people to migrate either permanently or temporarily, when livelihoods can no longer be supported or areas become uninhabitable as a result of drier and warmer seasons or the physical loss of ecosystem resources and land (Bremner and Hunter, 2014). Glantz (1999) posited that Slow-onset climate-related hazards usually have high impacts and last longer i.e. over months and years.

Similarly, Adamo (2009) posited that on a yearly basis, sudden-onset climate-related hazards contribute to large numbers of displaced persons through moving out of harm's way as well as evacuation. This is so because these types of hazards displaced over 24 million people in 2016 and over 10 million people in this current year 2018 (over flooding alone). In general they have displaced 32 times more people than any other geophysical hazards like earthquakes, and three times as many as those fleeing conflict (IDMC, 2017). Sudden-onset hazards comprise flooding, storms (e.g. typhoons), and extreme temperatures. However, the focus for this paper is on flooding partly because it is the most prevalent hazard in Nigeria (especially during the rainy season) and because of all of the ten largest disasters displacement events in recent times; were related to floods and storms. Also, between 2008 and 2017, sudden-onset events were responsible for about 99% of displacement internally: about 21 million people annually (ibid). This year data is yet to be compiled because the hazards are still ongoing.

Moreover, the roles of sudden-onset hazards in displacement have brought about warnings that climate change will cause mass population movements. Stern (2006) maintained that by 2050, 200 million people will be displaced as a result of climate change. Similarly, the non-governmental organisation (NGO) Christian Aid has estimated that a billion people may be displaced by 2050 because of environmental reasons, although not climate change alone (Christian Aid, 2007). Other scholars estimated the number of 'climate migrants' to be between 25 million to 30 million a year (Myers, 1997; El Hinnawi, 1985). In recent time, report by the Environmental Justice Foundation (EJF, 2017) suggested that sea-level rise will lead to the displacement of hundreds of millions of people by 2100.

Climate change impacts are being felt already through increasing heavy rainfall and drought and it contribute to flooding, unusual high temperatures and sea-level rise (Blunden and Arndt, 2017). These changes in climate are impacting the ecosystems which are relied on for economies and livelihoods. Also, cultures and societies depend on it for food, water, waste removal and energy etc. (Cozzetto et al., 2013).

According to Steiner (2017), there is need for a protection agenda for people displaced by the impacts of climate change and disasters. He posited further that their numbers will increase, because since 1970, the risks of disaster displacement have doubled and numerous legal gaps need to be filled. Although a number of international initiatives have talked on these issues of climate change and displacement ; such as the World Humanitarian Summit, the Sustainable Development Goals, the New York Declaration for Refugees and Migrants, the Sendai Framework for Disaster Risk Reduction and in particular, the Nansen Initiative on Disaster-Induced Cross-Border Displacement and its replacement, the Platform on Disaster Displacement; more is required, with regard to both the capability to foresee displacement, and to decide what kind of 'protection' is called for, by whom, and where, thus the need for empirical research because most literature have been on forecast and estimation.

Additionally, most forecasts and estimations assume a deterministic approach based on the number of people living in areas that will be affected by flooding or sea-level rise, and conclude that about 150–200 million people could be displaced by 2050 because of climate change (Byravan and Rajan, 2006; Myers, 2002; Brown, 2008). However, such forecasts have caused widespread disagreement among the scholars, and have been repeatedly criticized for being too environmentally deterministic and not adequately grounded in empirical evidence (Black, 2001; Castles, 2002). Thus one of the gaps the research intends to fill.

The drivers of displacement today are intense and multifaceted, this is so because climate change can both contribute to conflicts that cause displacement, and can worsen existing displacement situations (IDMC, 2016). Thus, the drivers of climate change-

induced displacement include: persistent flooding, rising drought, advancing desertification, rising temperature, increasing deforestation, dehydration, spread of infectious diseases, malnutrition, damage to public health infrastructure, long-term effects of recurrent flooding, development in hazard-exposed locations, a decrease in essential resources (i.e. water; food production), armed conflict and violence among others.

Climate change brings about extreme weather events which in turn contribute to the destruction of people's natural life support base that has been already dwindled by over utilization of natural resources. These extreme weather events consist of higher drought, temperatures, and rising sea levels which contaminate groundwater as well as soil with salt, flood in coastal areas. Climate change induced displacement brings about expanding urbanization that in turn weakens already vulnerable communities and people. Other challenges include: competition over scarce resources, water insufficiency, food and energy insecurity, loss of livelihoods (Naser M. M. and Afro, 2009; UNHCR, 2017). Overall, the risk of climate-related displacement is predominantly high in countries that do not have the resources or capability to prepare for climate change (i.e. low adaptive capability and low resilience) such as developing countries, Nigeria inclusive. Furthermore, the most vulnerable people are the underprivileged, who live in the risk areas and cannot protect themselves. These people contribute the least to global greenhouse gas emissions yet, are the most severely affected by the penalties of climate change (UNHCR, 2017).

From the foregoing, the impacts of climate change-induced displacement are enormous. Hence, the need to have proper and well maintained mitigations measures in place. For this study, the mitigation measures consider are investments in clean technologies (e.g. hydropower, wind power), agro-fuel production, forest conservation projects, the re-establishment of marshlands, disaster risk-reduction and management policies as well as reducing the emission of Greenhouse gases.

III. MATERIALS AND METHODS

This study is limited to four (Kwara, Niger, Benue and Kogi) of the six states in the middle belt of Nigeria majorly hit by flooding year in year out. Similarly, three local governments severely affected from Niger (Mokwa, Lavun, Agaie and Lapai), Benue (Makurdi, Buruku, Tarka and Agatu), Kogi (Kogi/Kotonkarfi, Ofu, Idah and Ibaji) were selected. For Kwara, only two local governments badly affected were selected; there are Moro and Ilorin West. Secondly, these states were selected because they lie along the two major rivers (Niger and Benue) in Nigeria. Release from dams (i.e. Kainji, Jebba, and Shiroro all in Nigeria and Lagdo Dam in neighbouring Cameroun) during the heavy raining season cause the rivers to over flow their banks which in turn flood the communities of these states and hence, result to peoples' displacement.

Both secondary and primary data were used in this study. The secondary data sources used are UNHCR reports, reports and documents published by government and non-governmental organizations as well as individuals. The sampling technique employed is purposive because of the sensitivity of the issues examined and also because respondents' consistency and capability is required. Moreover, Purposive sampling technique can be more accurate than randomization with regards to time, effort and cost needed in finding respondents (Seidler, 1974; Snedecor, 1939); thus, one of the reasons for its selection. Furthermore, according to Benard (2002), purposive sampling is effective when dealing with studies that require the use of both qualitative and quantitative techniques. Hence, information was gotten from informed citizens from the regions such as teachers, civil servants, literate farmers, traditional rulers etc.

The primary data used were the questionnaire and interview to illicit information on the drivers, challenges and mitigation measures for flood-induced displacement. The questionnaire designed was in four parts (section A – D; A deals with knowledge of climate change-induced displacement in general, B deals with its drivers, C deals with challenges while D deals with mitigation measures). A total of 190 questionnaires were received from 300 distributed (42 from Kwara, 50 from Kogi, 48 from Benue and 50 from Niger). A response rate of 63.3% and according to Dillman (2000) and Takim et al. (2004), response rates

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from questionnaire survey can be 20% to 30% at minimum; therefore having 63.3% (190 respondents) response rate for this study is above the expected response rate. Oral interview were also conducted with the aim to illicit informed and detail information from those respondents who could not read or write. These sets of people include heads of household, rural women, farmers, fishermen etc.

IV. RESULTS AND DISCUSSIONS

Prior to analysis, the responses from the questionnaires were subjected to reliability and validity test. According to Forza (2002), these tests are necessary to assess the quality of a research instrument. The results from reliability test using Cronbach’s alpha is 0.848. This shows that the constructs of the questionnaire have internal consistencies because according to Swafford et al., (2006a) a Cronbach’s alpha of 0.70 or higher is usually used to establish reliability of a construct. Validity of the research is enhanced because most of the items for the questionnaire were obtained from the background of the study and also, completed questionnaires were inspected for completeness and uniformity before data analysis. As a result, the instrument can be said to be of good construct validity (O’Leary-Kelly and Vokurka, 1998).

To determine the core drivers of climate-induced displacement, a factor analysis in the form of principal components analysis (PCA) was computed with the help of SPSS 20 version. However, prior to computing PCA, the appropriateness of data for factor analysis was evaluated using Kaiser-Meyer-Olkin and Bartlett’s Test of Sphericity. In addition, the correlation matrix which was examined revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Olkin value was .796, exceeding the recommended value of .60 (Kaiser 1970, 1974) while Bartlett’s Test of Sphericity was statistically significant i.e. $p = .000$ (significant value should be .05 or smaller) (Bartlett, 1954); hence supporting the factorability of the correlation matrix.

Table 1: PCA of Drivers of Climate-induced displacement

Component/Drivers	Initial Eigenvalues			Extraction Sums of Squared Loadings			Total
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
Persistent flooding	3.398	33.977	33.977	3.398	33.977	33.977	2.619
Rising drought	1.234	12.344	46.320	1.234	12.344	46.320	1.964
Advancing desertification	1.139	11.389	57.709	1.139	11.389	57.709	2.212
Rising temperature	.841	8.406	66.115				
Increasing deforestation	.812	8.122	74.237				
Increasing dehydration	.605	6.054	80.291				
Long-term effects of recurrent flooding	.571	5.715	86.006				
A decrease in essential resources	.529	5.287	91.293				
Development in hazard-exposed locations	.459	4.590	95.883				
Increase malnutrition	.412	4.117	100.000				

Source: Authors’ field survey, 2018.

Of the ten drivers assessed, only three drivers with eigenvalues exceeding 1 (Table 1), explaining 33.977%, 12.344% and 11.389% of the variance respectively were retained as core drivers for climate-induced displacement. Thus, from Table 1, the core drivers are Persistent flooding, rising drought and advancing desertification. This result is in agreement with literature because

flooding is the most hazards ravaging the country from north to south. Similarly, Director General (DG) of National Emergency Management Agency (NEMA) in 2018 posited that:

‘Floods and drought had become basis of major worry for government all over the world. He stated further that in 2012 flooding across the country, 7 million people were affected. 2.3 million were displaced; 597,476 houses were destroyed and over 363 people lost their lives. He gave the total estimated loss and damage as 2.6 trillion naira. For this year, the NEMA DG warned that the flood might grow higher than what was experienced in 2012 due to the fact that in 2012, the flood level rose to 12.84 metres on 29th September, and as at September 21, 2018 the level of flood had reached 11.21metres’ (Vangrdng, 2018).

Estimates for affected people and loss of livelihoods are yet to be out; reason been that rain is still falling. In an interview in Kwara, a respondent posited when asked the main driver of displacement that:

‘Flood has been seriously ravaging this community since my birth and the effect have increase in recent years. The flood have affected out farmlands, businesses, infrastructures and general livelihood. The worst part is that government efforts are yielding little or no results’. (Interview transcript)

In another interview with community leader in Kogi state; when asked the major driver of climate change-induced displacement he stated that:

‘During raining season and between July and September, our communities been an area located along river Niger and Benue (confluence state) is flooded with water year in year out partly due to rainfall and partly due to release from dams (Kainji and shiroro and Jebba) in Nigeria and Lagdo in Cameroun’. These make the two major rivers to over flow their banks into the communities. Hence, the main driver is persistence flooding (Interview transcript)

Furthermore, in Benue state, when asked the major effect of climate change a respondent posit that

Flooding is major effect of climate change that causes people to move. He stated further that the flooding is majorly due to over flow river Benue bank due to release from Ladgo dam in neighbouring Cameroun. Similarly, due to drought and desertification in far north of the country, herdsmen move in their numbers towards the middle birth especially our state for pasture. This cause clashes among the herders and farmers as well as other members of the community (Interview transcript).

In Niger state, the respondents maintained that flooding is the major effects of climate change as one respondent posit:

As a result of the three major dams (Kainji, Shiroro and Jebba) in Nigeria been located in this state, the state is worst hit anytime there are releases of water from the dams. This is couple with heavy rainfall witness between July and September. People and livestock dies, goods perish and inhabitants are made to cope with their losses because of little or no relief fund (Interview transcript).

On the challenges, Table 2 presents the result. 50.5% of the respondents across the states studied strongly agree to the challenges presented, 42.0% agree, 5.7% were undecided, 1.1% disagree while 0.7% strongly disagree. This shows that the challenges posed by climate change-induced displacement are the same across the states considered.

Table 2: Challenges of Climate-induced Displacement

Challenges	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Food and Energy Insecurity	1	3	14	88	84

Loss of Livelihoods	3	2	8	68	109
Competition over Scarce Resources	1	2	9	85	93
Water Insufficiency	1	2	14	80	93
Increase Violent	1	2	6	78	103
Destruction of the environment	0	1	12	76	101
Increasing urbanization	1	3	10	75	101
Spread of infectious diseases	2	1	14	89	84
Total	10	16	87	639	768
Percentages	0.7	1.1	5.7	42.0	50.5

Source: Authors' field survey, 2018.

However, to confirm this assertion, a Kruskal Wallis test was conducted to check if the responses across the studied areas were statistically different, Table 3. The result revealed no statistically different in the challenges faced by respondents across the four states studied. This is so because according to Pallant (2010), if the significant level is less than .05 (e.g. .04, .01, .001 etc.); one can conclude that there is a statistically significant difference among the groups examined. In Table 3, however, significant level are well above .05, hence, it can be concluded that the challenges faced as a result of climate change-induced displacement are the same across the studied states.

Table 3: Kruskal Wallis Test on Challenges posed by Climate change-induced Displacement

	Food and Energy	Loss of Livelihoods	Competition over Scarce Resources	Water Insufficiency	Increase Violent	Destruction of the environment	Increasing urbanization	Spread of infectious diseases
Chi-Square	7.743	1.544	2.195	.850	2.641	7.981	4.122	6.998
df	4	4	4	4	4	4	4	4
Asymp. Sig.	.101	.819	.700	.932	.620	.092	.390	.136

Source: Authors' field survey, 2018.

Furthermore, and in line with the above result, Dr Hansen of the NASA Goddard Institute for Space Studies said:

‘If the causes of climate change is not controlled,... there will be devastating effects, including increased frequency of floods and droughts, increasingly rapid sea level rise, and increased pressure on plants and wildlife because of changes in the environment (Earth Climate Approaches Dangerous Tipping Point, 2007)’

Similarly, in an interview with a respondent in Niger:

‘The effect of climate change especially flood when it occur takes away everything. Our houses, properties, ancestral land are washed away and when we move, it is not easy on us or the people we meet there’.

To determine the core mitigation measures of climate-induced displacement, a factor analysis in the form of principal components analysis (PCA) was also computed with the help of SPSS 20 version. The data met the requirement for PCA because the correlation matrix which was examined revealed the presence of many coefficients of .3 and above and the Kaiser-Meyer-Olkin value was .702, exceeding the recommended value of .60 (Kaiser 1970, 1974) while Bartlett’s Test of Sphericity was statistically

significant i.e. $p = .000$ (significant value should be .05 or smaller) (Bartlett, 1954); hence supporting the factorability of the correlation matrix.

Table 4: PCA of Mitigation Measures for Climate-induced displacement

Component/Mitigation measures	Initial Eigenvalues			Extraction Sums of Squared Loadings			Total
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
Creation of Disaster Risk-Reduction and Management Policies	1.475	21.071	21.071	1.475	21.071	21.071	1.285
Reducing the Emission of Greenhouse Gases	1.068	15.255	36.326	1.068	15.255	36.326	1.173
Investments in Clean Technologies (e.g. Hydropower, Wind Power)	1.039	14.837	51.163	1.039	14.837	51.163	1.134
Agro-Fuel Production	1.000	14.291	65.454	1.000	14.291	65.454	1.096
Establishment of Forest Conservation Projects	.908	12.975	78.429				
Re-Establishment of Marshlands	.833	11.894	90.323				
Building setbacks	.677	9.677	100.000				

Source: Authors' field survey, 2018.

Of the seven mitigation measures assessed, only four with eigenvalues exceeding 1 (Table 4), explaining 21.071%, 15.255%, 14.837% and 14.291% of the variance respectively were retained as core mitigations for climate change-induced displacement. Therefore, from Table 4, the core mitigation measures are creation of disaster risk-reduction and management policies, reducing the emission of greenhouse gases, investments in clean technologies (e.g. hydropower, wind power) and agro-fuel production.

Mitigations against the effect of climate change are necessary As Kyung-wha Kang (2008), one time UN Deputy High Commissioner for Human Rights stated:

...ultimately climate change affect the very right to life of various individuals...[countries] have an obligation to prevent and address some of the direst consequences that climate change may reap on human rights.

Similarly, a respondent in one of the interviews in Niger state maintained that:

Government and well-meaning Nigerians needs to come to our aid. According to him, the impact of climate change-induced displacement is enormous and sometimes people affected never regain from their losses in a whole lifetime.

V. CONCLUSION

The subject of climate change today is an essential part of the present global discus. Climate change have been affecting the environment for a very long time now and in recent time, the impact cannot be over looked especially as regards to displacement. Although, the causes of displacement prompted by climate change, such as flooding, drought, rising temperature desertification identified as the core drivers of displacement in this paper are not new; their extent and occurrence are likely to increase. The worrisome scenario of this climate change-induced displacement as revealed in the areas studied is that the underprivileged who cannot protect themselves are the most severely affected. These people lose their homes, sources of livelihood to the effects of this climate change. Eventhough, they contribute the least to global greenhouse gas emissions (UNHCR, 2017). To reduce the

impact, the study revealed that disaster risk-reduction should be created and policies in line with international standards should be formulated so as to help affected people and regions.

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Traditional Building – Construction Problems: Need for Espousal of Sustainable Construction in Nigeria

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Abstract- Sustainable building or construction has become one of the major global practices of the 21st century. It has been observed that some of the developing countries in the west Africa such as Nigeria are yet to practice sustainable building. As the developed countries battles with measures of maintaining and improving the quality of life for its citizens and harmonize within the local climate, tradition, culture, also the environment in the region, this study examines the level of awareness of sustainable construction among the key stakeholders in the Nigerian construction industry. A descriptive survey design using data collection instrument such as questionnaire was adopted. One hundred and forty-three (143) respondents were selected based on years of experience in practice in Lagos state. Structured questionnaires were used in eliciting information from the key stakeholders on their knowledge of sustainable building, and how it can be achieved in Nigeria. The frequency counts and item analysis method were used to analyse the data collected. The result of the findings shows that about 32.2% of the respondents responded with full knowledge about sustainable building, while the remaining 67.9% of the respondents were not fully equipped with the knowledge of sustainable building and what it entails. Of the 100% that heard about sustainable building/construction, 67.9% do not fully know what sustainable building is all about and its benefits. Based on the research findings, recommendations were made in order to overcome most of the construction problems facing the industry and as well improve the livelihood of the citizenry.

Index Terms- Awareness, Construction Problems, Nigeria, Sustainable Construction, Traditional Building.

I. INTRODUCTION

The construction industry in Nigeria and other parts of the world faces problems and challenges. In the developing countries such as Nigeria, these problems and challenges are obviously present together with economic depression and corruption. The industry ineffective in managing crucial issues affecting the production of building projects is also a factor. Presently in Nigeria, there is an evidence that the problems have become a reoccurring incident even greater in degree and severity, such problems include construction delay due to inadequate production information and fund, building failures and collapse, etc. Choosing suitable method of project delivery system is an important issue concern to major stakeholders in the construction industry. And for construction procurement to meet the need of delivering necessary structure for economic development and inherent issues within the national environment, have to be handled by relevant stakeholders (Ogunsanya et al., 2016). The decision on the choice of project delivery method affects the project execution, completion time, cost, quality and safety which are the key objectives of any construction project.

The traditional system of project delivery is still being widely used in Nigeria. This method of project delivery is being referred to as “traditional” because it has been in existence for a very long time and has been the only alternative available for most clients in the construction industry for past years. This system involves the appointment of an architect by the client, who then recommends, sets up and leads the design team. Other members of the design team are the structural, mechanical and electrical engineers. These team will come up with design solution based on the client’s brief and objectives and it is this design solution that will be used to prepare the contract documents. After this stage, building contractors are invited to tender for the construction aspect. Their tenders are examined, compared and the successful contractor will be awarded the contract to execute the construction phase. This means that the client is under two different contractual arrangements, that is the design team and the building contractor.

The Sustainable Development Goals identified critical areas of need that demands urgent attention if millions of people are to live above the poverty line and have enhanced quality of life and most of these areas identified are directly related to infrastructure delivery (Ogunsanya et al., 2016). In Nigeria, the adoption and practice of sustainable construction has not been given attention in the construction industry. Buildings are still been constructed as usual without sustainability consideration and because of the disintegration of design and construction phase in traditional system of building project delivery, construction problems and issues are still in the increase. There is need for the country to actually improve its environs by introducing and practicing sustainable building. A city like Lagos in Nigeria is fast developing in the area of infrastructure without a thought of sustainable building thereby making the city hot for its dwellers to live in. Hence, sustainable building stands a better chance to enhance the quality of life of people.

This study examines the level of awareness of sustainable construction among the key stakeholders in the Nigerian construction industry. The study also aimed at highlighting some of the issues associated with traditional building and raising awareness to engage and practice sustainable construction among the key stakeholders in the industry so as to promote and strengthen the livelihood of the citizenry.

II. RESEARCH ELABORATIONS

2.1 Issues with Traditional Building

The traditional method of project delivery imposes a contractual and organisational separation between design and construction whereas in the integrated method, the design and construction are under the same contractual and organisational umbrella thus contractual arrangement and organisational deployment of project participants for the realisation of the building project are important processes (Dada, 2012). According to Bima et al. (2015) projects are affected by the procurement method adopted for project delivery and that performance of projects could be improved using alternative or hybrid procurement methods. The traditional system does not create a unified team in which experience, feedback, and new ideas are shared, resulting to client's needs not fully achieved, caused by the separation of design and construction (Kong and Gray, 2006). The alternatives of project delivery methods that are available today resulted from the need to improve construction project delivery (Babatunde et al., 2010).

Traditional method of project delivery has been widely criticized as an ineffective procurement method yet is the most often used by the stakeholders (Bima et al., 2015). The major criticism of the traditional contract was that, construction activities were getting more complex and hence there was need to integrate design and construction for a better solution. And this separation of design and construction phase of building projects created more rooms for ineffective management of building projects, which often result in conflict between the design team and the building contractors. The traditional system generally, has also been continuously identified as the slowest method of procuring building projects. According to Kong and Gray (2006) the major criticisms of the traditional system identified in the literature include, time consuming aspects of the development processes, the effect of cost uncertainty, the effect on buildability, and fragmentation of organisational interfaces.

2.2 Sustainable Building

Sustainable building has been defined on the web as an outcome of a design philosophy which focuses on increasing the efficiency in the use of resources such as energy, water, and materials while reducing building impacts on human health and the environment during the building's lifecycle, through better siting, design, construction, operation, maintenance and its removal. Sustainable building or sustainable construction brings sustainable development as well enhances the economic development of a nation. Ogunsanya and Aigbavboa (2016) opined that in developing a sustainable procurement model, stakeholders' perspective is important. According to the World Commission on Environment and Development, sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own needs. Ayman (2013) state that in order to support developing countries to achieve their sustainable development objectives and overcome the challenges that hinders the project development, that the challenges have to be identified first. Overcash (2005) outlined the modern construction problems as follows; complex construction, diffused design, time limitations and "fast track" construction, budget limitations, designer compensation, owner input, the need for flexibility, distrust of the adversary system and a new look at disputes.

According to Akadiri et al. (2012) sustainability involves enhancing the quality of life, allowing people to live in a healthy environment with improved social, economic and environmental conditions and these can be achieved by the implementation of sustainability objectives at the design stage of a building project. As stated by Kurt (2001) early implementation of sustainable planning can improve the overall economic efficiency of buildings such as costs of construction, operation, use, environment, health as well as non-monetary values. Sustainable building project works best when the sustainability ideas and efforts are considered very early in the planning process (Anuar et al., 2014). According to Growbold (2017) the common misconception that sustainable building practices are high-priced is often an obstacle to implementation. Arijit et al. (2013) to achieve sustainability, the objectives such as minimize consumption of matter and energy; reusability and recyclability of the material; human satisfaction; and minimum environmental impacts and embodied energy must be met.

According to Kurt (2001) sustainable building strives to minimize the consumption of energy and resources for all phases of the life-cycle of buildings - from their planning and construction through their use, renovation and to their eventual demolition. "The building industry is a vital element of any economy but has a significant impact on the environment; by virtue of its size, construction is one of the largest users of energy, material resources, and water, and it is a formidable polluter" (Akadiri et al., 2012). Sustainable building also aims to minimize any possible damage to the natural environment and this can be achieved by applying the following principles during the entire building process: lowering the energy demand and the consumption of operating materials; utilisation of re-useable or recyclable building products and materials; extension of the lifetime of products and buildings; risk-free return of materials to the natural cycle; comprehensive protection of natural areas and use of all possibilities for space-saving construction (Kurt, 2001).

According to Jong-Jin (1998) the ultimate goal of sustainable design is to find architectural solutions that guarantee the well-being and coexistence of inorganic elements, living organisms, and humans; and is increasingly becoming a key consideration of building practitioners with the goal of increasing economic efficiency (Arijit et al., 2013).

III. MATERIALS AND METHODS

The research adopted field survey methodology to discover the level of awareness on sustainable construction among the key stakeholders in the Nigerian construction industry. Survey through the use of questionnaires was adopted to elicit information from the key stakeholders in the Nigerian construction industry on their level of awareness of sustainable building. The research was carried out in Lagos state, which is economically an important city in Nigeria. Lagos state has the highest number of building construction activities as well as a large concentration of building and engineering professionals and contractors of various categories and sizes. The population of this study includes clients, architects, builders, engineers, quantity surveyor and contractors. Samples were selected based on the number of years of experience in practice in the country. Hence, stakeholders in construction industry that are in practice at least five (5) years are qualified as respondents for the survey. Out of the 185 copies of research questionnaire distributed to the various key stakeholders in construction industry, 143 were adequately completed and returned representing an 77.3% response rate. The frequency counts and item analysis method were used to analyse the data collected. The number and percentage of respondent's response was computed after which the respondent's response were tallied and a comparison was made of individual items of high and low response. Tables were used in data presentation.

IV. RESULTS AND DISCUSSION

4.1 Result Presentation

The result of the findings shows that all the key stakeholders in construction industry such as architects, builders, engineers, quantity surveyors, clients and contractors have heard about sustainable building or construction which represents 100% (Table II).

Table I: Professional Background.

S/No	Respondent Response	Frequency	Percentage
1	Architect	18	12.6
2	Builder	42	29.4
3	Engineer	28	19.6
4	Quantity Surveyor	12	8.4
5	Client	19	13.3
6	Contractor	24	16.8
	Total	143	100

Table II: Have you ever heard about Sustainable Building/Construction?

S/No	Respondent Response	Frequency	Percentage
1	Yes	143	100
2	No	0	0
	Total	143	100

Table III: What do you know about sustainable Building?

S/No	Respondent Response	Frequency	Percentage
1	A building that can maintain or improve the quality of life and harmonize within the local climate, tradition, culture, also maintain/improve the environment in the region	26	18.2
2	A building that can conserve energy, resources and recycling materials	36	25.2
3	A building that can reduce the amount hazardous substances to which human and other organisms are (or may be) exposed	15	10.5
4	A building that can maintain or improve the local and global ecosystem throughout the entire building life-cycle	20	14.0
5	Not sure	0	0
6	Serial Number 1,2,3 and 4	46	32.2
	Total	143	100

When asked what they know about sustainable building, about 32.2% of the respondents responded with full knowledge about sustainable building by responding that sustainable building is one that can maintain or improve the quality of life and harmonize

within the local climate, tradition, culture, also maintain/improve the environment in the region, conserve energy, resources and recycling materials, reduce the amount hazardous substances to which human and other organisms are (or may be) exposed, and can maintain or improve the local and global ecosystem throughout the entire building life-cycle; while the remaining 67.9% of the respondents were not fully equipped with the knowledge of sustainable building and what it entails based on their responses (Table III). Of the 100% that heard about sustainable building or construction, 67.9% do not fully know what sustainable building is all about and its benefits.

Table IV: Do you believed that most of the construction problems can be solved with Sustainable Construction?

S/No	Respondent Response	Frequency	Percentage
1	Yes	106	74.1
2	No	37	25.9
	Total	143	100

Some respondents, because of the gap in the knowledge of sustainable building do not fully know most of the advantages in practicing sustainable construction. Hence, when asked whether they believed that most of the construction problems can be solved with sustainable construction, 74.1% responded in affirmation, while the remaining 25.9% responded negative (Table IV).

Table V: How can Sustainable Building be achieved in Nigeria?

S/No	Respondent Response	Frequency	Percentage
1	By improving the economy	8	5.6
2	By intensive research	27	18.9
3	By effective multi-stakeholder partnerships that bring together all major players in the development process, including governments, bilateral and multilateral development agencies, national and international development finance institutions, the private sector, civil society, and even academia	108	75.5
4	Not sure	0	0
	Total	143	100

Some of the respondents could not help their ignorant concerning sustainable building and the way to go about it. This was clearly demonstrated/confirmed by their response to the question that seek to know how sustainable building can be achieved in Nigeria. They gave different shades of opinion. 5.6% of the respondent believed that sustainable building can only be achieved if the economy is improved, 18.9% of the respondents believed that it can only be achieved by intensive research, whereas 75.5% of the respondents responded that sustainable building can be achieved by effective multi-stakeholder partnerships that bring together all major players in the development process, including governments, bilateral and multilateral development agencies, national and international development finance institutions, the private sector, civil society, and even academia (Table V). When asked if they believed that sustainable building will promote and strengthen livelihood of the citizenry, about 90.2% of the respondents responded in affirmation, while the remaining 9.8% of the respondents responded negative (Table VI).

Table VI: Do you believed that Sustainable Building will promote and strengthen livelihood of the citizenry?

S/No	Respondent Response	Frequency	Percentage
1	Yes	129	90.2
2	No	14	9.8
	Total	143	100

4.2 Discussion of Findings

Sustainable building/construction awareness is a synthesis of the stakeholders in the building industry conception, interpretation and perceptions of sustainable building related issues that promote and strengthen livelihood of the citizenry, and the quality of responses and reactions to the issues. The result of the findings shows a low level of awareness and knowledge about sustainable building among the key stakeholders in Nigerian construction industry. The low level of knowledge and awareness about the concept of sustainable building and its benefits has a lot to lose in maintaining/retaining friendly environment in the study area. Sustainable construction awareness is a necessary ingredient for a successful espousal and practice of sustainable construction in the state and nation as a whole.

The gap in the knowledge of sustainable building among the stakeholder in building construction industry in Nigeria shows that sustainable building is not being taken seriously. According to Growbold (2017) the common misconception that sustainable building practices are high-priced is often an obstacle to implementation. Improving building construction, raising awareness of sustainable building and sharing/discussing useful information on sustainable construction and evidence of its value to the citizenry are essential

to nation building. Effective multi-stakeholder partnerships that bring together all major players in the development process, including governments, bilateral and multilateral development agencies, national and international development finance institutions, the private sector, civil society, and even academia has to be involved. The most important is to educate the clients on the numerous benefits on sustainable building and the importance of adapting to it.

V. CONCLUSION AND RECOMMENDATION

The findings of this study clearly show that there is a low level of sustainable building/construction awareness among the key stakeholders in the Nigerian construction industry in the study area. It is therefore important we take the sustainable building/construction awareness campaign to all and sundry by encouraging the setting up of sustainable building/construction awareness organization. Such organization can be challenged to identify means of practicing sustainable building/construction to overcome most of the construction problems facing the industry and as well improve the livelihood of the citizenry and harmonize within the local climate, tradition, culture, also maintain/improve the environment in the region.

This study recommends the need to establish sustainable construction awareness organization in the state of Lagos and the nation at large so as to identify means of practicing sustainable building to overcome most of the construction problems facing the industry and as well improve the livelihood of the citizenry and harmonize within the local climate, tradition, culture, also maintain/improve the environment in the region. Secondly, the federal governments are encouraged to kick start the process by creating an effective multi-stakeholder partnership that bring together all major players in the development process, including governments, bilateral and multilateral development agencies, national and international development finance institutions, the private sector, civil society, and even academia.

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Reliability of Radiographic Union Scale for Tibial Fractures (RUST) when used in determining Bone Healing in Femoral Fractures treated with Interlocked Intramedullary SIGN Nailing

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Abstract: Non-union is still one of the most common complications in orthopaedic practice. One major problem with the diagnostic management of fracture non-union is the definition or the criteria of non-union. The objective of this study is to determine the reliability of the Radiographic Union Scale for Tibial Fractures (RUST) score when used to assess bone healing in patients with femoral fractures treated with intramedullary SIGN nailing. Six observers were employed randomly, namely, three fellow orthopaedic consultants from a pool of six consultants and three orthopaedic residents in a tertiary government hospital, to assess the femur radiographs treated with intramedullary SIGN nailing using the RUST. Two sets of radiographs in the Anteroposterior (AP) and Lateral Views for each follow-up period, One hundred five (105) sets in total, were randomly selected and assigned a specific number from the pool of one hundred and forty-four (144) available radiographs. These radiographs were initially assessed within the 3rd week of June 2018 in a specific order and another assessment was done on the 3rd week of July 2018. Assessments of one hundred five (105) radiographs totaled into an ICC of 0.94 (0.92-0.94) which can be interpreted as “excellent” according to Fleiss’ (1986) standards and as “acceptable as clinical measure” according to Portney et. al (2009). Results of this study showed that the use of RUST can also be used clinically as a scoring tool for assessment of bone healing in femoral shaft fractures treated with intramedullary nailing with high reliability and reproducibility

Index Terms- RUST Score, Interobserver reliability, Intraobserver reliability, femoral fractures, intramedullary nailing, SIGN nails, Reliability

I. INTRODUCTION

Non-union is still one of the most common complications in orthopaedic practice. Its treatment curtails various options or strategies that are still largely controversial. However, one major problem with the diagnostic management of fracture non-union is the definition or the criteria of non-union. Various researches have been proposed for the radiographic union scoring for several bones, namely the hip or proximal femur and the tibia with the Radiographic Union Score for Hip Fractures (RUSH) and the Radiographic Union score for Tibial Fractures (RUST),

respectively. Despite the availability of these radiographic union scoring systems, majority of the other bones still do not have an existing radiographic union scoring system for them to be utilized and thus standardize the language of union and non-union for each bone.

Two types of fracture union assessment has been formulated from the University of Toronto and McMaster University namely the RUST and RUSH (Radiographic Union Score for Tibial Fractures and Radiographic Union Score for Tibial Fractures) and was generated to increase the reliability of fracture assessment between observers but still currently needs further verification since there is no gold standard scoring system established for these types of fractures [1]. The RUST has been used mostly in assessment of tibial shaft fractures and sparsely used in determining fracture healing in femoral shaft fractures even though they are similarly long bones of the lower extremities.

With advances in trauma patient management, determination of whether fracture has united or not remains subjective. Precise assessment is needed to make a universal language for determination union or nonunion. In actual practice, fracture-healing is usually assessed by factors such as pain on bearing weight, or palpation of the fracture area in association with radiographic images [2]

II. REVIEW OF LITERATURE

A. Intramedullary Nailing of the femur

The gold standard for the treatment for femoral shaft fractures is Closed Antegrade Interlocked Intramedullary Nailing. Antegrade femoral nailing can be one of the most predictable procedures in orthopedic traumatology. It is the most common treatment for femoral shaft fractures in adults, and virtually all orthopedic surgeons have had some exposure and experience with the techniques necessary to successfully perform a femoral nailing [3]. The most commonly used implants for femoral shaft fracture fixation today are interlocking intramedullary nails—through which transverse or oblique transfixing screws can be inserted to control the major proximal

and distal fragments [1]. Currently, statically locked femoral nailing with limited reaming is the standard of care [4].

B. Fracture Healing

When motion occurs within certain limits at a fracture site, fracture callus progressively stabilizes the bone fragments, and remodeling of the fracture callus eventually produces lamellar bone. When the fracture surfaces are rigidly held in contact, fracture healing can occur without grossly visible callus in either cancellous or cortical bone. Some surgeons refer to this type of fracture healing as primary bone healing, indicating that it occurs without the formation and replacement of visible fracture callus. In most fractures that are rigidly stabilized with the bone ends directly apposed, the bone ends are in contact in some regions of the fracture line and other areas where there are small gaps. There are three stages in bone healing. Namely, they are, 1) Inflammation, 2) Repair or Callus Formation and 3) Remodeling [5].

C. Nonunion

Nonunion occurs when a fracture has failed to heal in the expected time and is not likely to heal without new intervention. Delayed union occurs when a fracture has not completely healed in the time expected, but still has the potential to heal without further intervention. Establishment of a nonunion can also be defined based on a lack of complete bone healing in a specified time frame, commonly 6 to 8 months, but this is arbitrary [3]. Nonunion, while often obvious in retrospect, is often difficult to define and diagnose in real time. For example, in the tibia the time for a metaphyseal fracture to be considered nonunited will be different than for a fracture in the diaphysis. Both clinical and radiographic findings are necessary for the diagnosis of nonunion. However, such signs may be elusive as primary and secondary healing may be occurring simultaneously. On a cellular level, nonunion occurs when there is cessation of a reparative process antecedent to bony union.

D. Radiographic Union Score for Tibial Fractures (RUST)

In a study by Whelan et.al. (2010) they assessed the Radiographic Union Score for Tibial fractures (RUST). They reviewed 45 sets of tibial shaft fractures treated with intramedullary fixation. Seven orthopedic reviewers independently scored bony union using RUST. Intraclass correlation coefficients (ICC) with 95% confidence intervals (CI) measured agreement. Overall agreement was substantial (ICC, 0.86; 95% CI, 0.79-0.91). There was improved reliability among traumatologists and overall intraobserver reliability was also substantial (ICC, 0.88; 95% CI, 0.80-0.96). However, since there is currently no gold standard to compare the RUST to, they concluded that further research is required to fully validate this scoring system as a clinical tool. The RUST is based on callus formation and visibility of fracture line at 4 cortices observed on AP and lateral radiographs. Minimum score of 4 indicates no healing and maximum of 12 indicates a healed fracture [6].

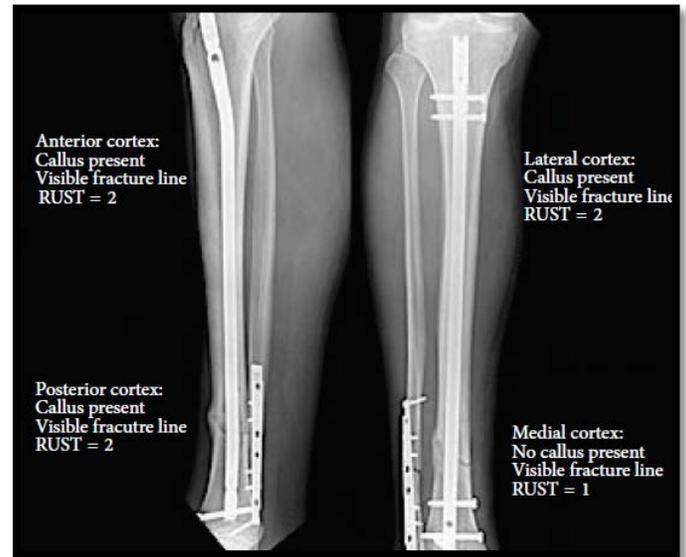


Figure 1: Assignment of the RUST in a patient with distal tibial shaft fracture at 3 months postoperatively. Overall RUST = 7. Copied from Whelan et. al. (2010)

III. MATERIALS AND METHODS

This study was designed to determine the reliability of Radiographic Union Score for Tibia Fractures (RUST) when used in randomly selected patients who have undergone intramedullary SIGN Nailing of the femur from January 2011 to December 2017 at Western Visayas Medical Center. This is a descriptive cross-sectional study done at Western Visayas Medical Center at Iloilo City, Philippines and was conducted from May to July 2018.

A. Study Population

All patients admitted at Western Visayas Medical Center with fracture of the femoral shaft and have undergone intramedullary SIGN Nailing of the femur. In total, 108 patients were found to have undergone intramedullary SIGN nailing of the femur with adequately documented follow up-radiographs. Forty-four (44) radiographs were taken on the 3rd to 6th weeks, twenty (20) radiographs were taken on the 6th to 8th weeks, eighteen (18) radiographs were taken on the 8th to 10th weeks, nine (9) radiographs were taken on the 10th to 12th weeks, thirty-three (33) radiographs were taken on the 12th to 52nd weeks and twenty (20) radiographs were taken on more than 52 weeks. One hundred forty-four radiographs were available for viewing overall.

B. Inclusion Criteria

Radiographs were also included if any of the following criteria are met: 1) Radiographic pictures are retrievable from the

online SIGN surgical database, 2) Patient was admitted in our institution (Western Visayas Medical Center) from January 2011 to December 2017.

C. Exclusion Criteria

Radiographs were excluded if any of the following criteria are met: 1) fractures not located on the femoral shaft (from five centimeters below the lesser trochanter and more proximally, and fractures six centimeter from the knee joint and distally), 2) patients having follow-up radiographs of fractures taken less than three weeks, 3) presence of a cast or brace on the thigh as seen on radiographs

D. Sample Size

A total of 144 radiographs of 108 patients will be employed in this study based on the computed sample size for frequency in a population using the OpenEpi Version 3, Open source calculator—SS Propor. To avoid errors, type I and type II, a 95% confidence level was set for the sampling size. An exacting degree of significance level was employed (set at 0.05) since the result of this study has important significance.

E. Description of the Study Procedure

Six observers were employed randomly using a simple randomization platform from an internet website “randomization.org”, namely, three fellow orthopaedic consultants from a pool of six (6) consultants and three (3) orthopaedic residents of Western Visayas Medical Center from a pool of eleven (11) residents (one resident each from the 1st year, 2nd year and 3rd year), to assess the femur radiographs treated with intramedullary SIGN nailing using the Radiographic Union Scale for Tibial Fractures (RUST). Two sets of radiographs in the anteroposterior (AP) and lateral views for each follow-up period, one hundred five (105) sets in total, were randomly selected and assigned a specific number from the pool of one hundred and forty-four (144) available radiographs using a simple randomization tool from an internet website “randomizer.org”. These one hundred five (105) sets of radiographs were initially assessed by the observers within the 3rd week of June 2018 in a specific order. Another assessment was done on the 3rd week of July 2018 by the same observers but with rearranged order and numbering of the previously selected and assessed radiographs. All the radiographs were evaluated in an office setting with minimal noise and ample lighting i.e. at the Orthopaedics office of Western Visayas Medical Center using one laptop with maximum brightness. Inter-observer and intra-observer agreement will be assessed by the statistical tool as follows.

F. Statistical Tool

Data were analyzed using SPSS Version 25. The RUST scores were analyzed with intra-class correlation coefficient to obtain the intra-observer and inter-observer reliability. 95%

confidence interval was used. Portney LG & Watkins MP (2000) proposed a level of acceptability as clinical measure as shown on the table below (Table 1) with 0.90 to 0.99 as measure acceptable for clinical measures, good ICC at 0.75 to 0.89 and poor to moderate with 0.50 to 0.74 ICC.

ICC	Fleiss (1986)	P&W (2009)
0.99		
0.96		
0.90	Excellent	
0.89		
0.80		Good
0.75		
0.50-74	Good	Poor to moderate

G. Ethical Considerations

A letter of approval was given by the Institutional Review Board for the commencement of the study. The identity of all patients were kept strictly confidential and no information disclosing the identity of any individual was included in the final report.

IV. RESULTS

From the total number of 144 femur radiographs available, only 105 were included to be utilized for evaluation of consistency of RUST when used as a scoring tool for union in femoral shaft fractures treated with intramedullary SIGN nailing.

Table 2 summarizes all Intraclass Correlation Coefficients (ICC) with a 95% CI computed using SPSS Version 25. As shown in table 2 below, all twelve (12) assessments of one hundred five (105) radiographs totalled into an ICC of 0.94 (0.92-0.94) which can be interpreted as “excellent” according to Fleiss’ (1986) standards and as “acceptable as clinical measure” according to Portney et. al (2009). This shows a significant correlation and agreement among the assessment of all observers. Total ICC of the orthopaedic consultants was slightly higher than the orthopaedic residents, 0.91 and 0.87 respectively. ICC of the second assessment as compared to the first assessment was noted to minimally improve to slightly improve respectively among the orthopaedic consultants and the orthopaedic residents, from 0.81 to 0.82 and from 0.71-0.78. Excellent intra-observer ICC were noted from two observers, namely Consultant 1 and Resident 3. Orthopaedic residents were noted to have marginally higher mean intraobserver ICC than the orthopaedic consultants at 0.84 and 0.82 respectively.

V. DISCUSSION

One of the common complications of long bone fractures is non-union. However, the criteria for its diagnosis has always been controversial and ambiguous. Criteria for union can be theoretically subdivided into two components, namely functional and radiologic. For the radiologic criteria, according to Court-Brown et, al (2015), in two orthogonal views of a fractured bone, three cortices out of four evidenced to have bridging callus

Table 2. Summary of all Intraclass Correlation Coefficients (95% Confidence Interval) for the entire study

Observer	Intra-Observer ICC 95% CI	First Assessment ICC 95% CI	Second Assessment ICC 95% CI	Total ICC 95% CI
Consultant 1	0.91 (0.87-0.91)			
Consultant 2	0.71 (0.57-0.80)	0.82 (mean)	0.81 (0.74-0.87)	0.82 (0.75-0.87)
Consultant 3	0.84 (0.76-0.89)			
Resident 1	0.80 (0.70-0.87)			0.91 (0.88-0.93)
Resident 2	0.81 (0.71-0.87)	0.84 (mean)	0.71 (0.49-0.82)	0.78 (0.67-0.86)
Resident 3	0.91 (0.87-0.91)			0.87 (0.81-0.91)

can be considered to have radiologic union [3]. This rule of thumb has been generally accepted among Orthopaedic surgeons though its use for research and clinical management has generally been vague and subdued. Several radiographic scoring tools were proposed, namely the Radiographic Union Scoring for Tibial Fractures. According to Whelan, overall agreement was substantial (ICC, 0.86; 95% CI, 0.79-0.91) for RUST when it was applied on Tibial Fractures and was noted to increase in relation to the raters' clinical experience.

In our institution, open reamed interlocked Intramedullary Nailing using SIGN implants have been made available since March 2011 with the sustenance of valuable implants especially the interlocking Nails for the long bones of the upper and lower extremities by the SIGN Fracture Care International Program. In this program, financially deprived patients are enrolled to have access to free and speedy treatment of their long bone fractures with the condition of having to come back for regularly scheduled follow ups for proper documentation and management postoperatively. All patients under this program are logged into an online SIGN Surgical database including their follow ups, squat and smile images and further relevant comments. With the help of an available online and properly documented surgical database, we are able to review previous radiographs of trauma patients.

Currently there are no existing radiographic union scoring tools for femoral shaft fractures. In this study, we employed the RUST as a tool to evaluate bone healing in femoral shaft fractures treated with interlocked intramedullary SIGN nailing. With the availability of the SIGN surgical database, we were able to rate one hundred five follow up radiographs of patients who underwent Interlocked Intramedullary SIGN Nailing. After all assessments were done, an excellent absolute agreement between all observers was noted at 0.94 (95% CI; 0.92-0.94). According to Portney et. al. (2009), having an ICC of 0.90 to 0.99 can be acceptable for use as a clinical measure. This means that the usage of RUST scoring in femoral fractures

treated with an intramedullary nail can be highly reliable and reproducible. Fleiss (1986) interpretation of total ICC in this study is excellent (0.75-0.99) [7]. Higher ICC was noted by Whelan et al (2010) among traumatologists versus residents which is also evident in this study however only up to a minimal extent [6].

Another notable result of this study is an increase in ICC upon second assessment which suggests that frequent use of this scoring tool improves inter-rater reliability and intra-rater reliability.

VI. CONCLUSION

Results of this study showed that the use of Radiographic Union Scale for Tibial Fractures is reliable when used clinically as a scoring tool for assessment of bone healing in femoral shaft fractures treated with intramedullary SIGN nailing.

VII. ACKNOWLEDGMENT

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Barriers Physically Challenged Students faced during Practical Physical Education Inclusive Lessons and how Assistive Approach helps to eliminate these barriers

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Abstract- The purpose of this study was to find out the reasons that militate against the participation of physically challenged students in physical education in an inclusive school setting. Though physically challenged students are to enjoy equal right as others, yet negative attitudes were meted to them by teachers, parents, students and the society.

The study used 48 respondents. The target population consisted of all male and female students who were physically challenged from the public senior high schools. As part of the respondents, all the 13 Physical Education (P.E) teachers were sampled from the targeted schools. The study was delimited to only nine public senior high schools in Ho Municipality and South Dayi District in the Volta Region of Ghana.

The result of the study showed that there is the general acceptance of persons with deformities in public schools based on the good hospitality nature of Ghanaians. Significantly, people do not know about the Disability Act 175 let alone observe it. In order to strengthen the practice of advocacy on disability issues, there is the need to empower organizations of disabled people to lead the way by using legal procedures to force government to extend services to all areas of the country. The lack of effective organizations of persons with disabilities coupled with inadequate provision of information and policies impede the effective practice of inclusive education in many parts of the country. In order to achieve an effective implementation of disability policy must be geared towards the social model of disability.

Index Terms- Challenged, disabilities, inclusive school setting, deformities

I. INTRODUCTION

Inclusive education has undergone a number of metamorphoses in terms of acceptance by the larger society and the formal educational setup. It would be recalled that decades back, inclusion was called mainstreaming. Today it is not only seen as a mere inclusion but also a strong tool of education worthy of providing opportunities for the acceptance of human diversities in many forms.

The inclusion and participation of physically challenged in education is really a matter of concern for all. Many people all over the world have been challenged physically due to one cause or the other. The number of people affected cannot be over-emphasized.

‘Approximately half of the entire planet’s population which is an estimated 3 billion people is in some way affected by disability (half the Planet, 2001, p.2366, [as cited in Cavanaugh, 2003]). The paper further stated that statistics concerning the special needs population of 750 million people worldwide were challenged by disabilities but fewer than 15% of people with disabilities were born with them’. On the basis of this large and increasing number of special need learners, it is perceived and observed that people who are physically challenged share in the millions of people with disabilities.

It is important to point to the fact that students who are physically challenged need a psychological motivation and an assistive educational technology to fit into the regular educational setup. This will enable them to match their non-physically challenged peers.

According to the United Nations Children’s Fund (UNICEF), (2007) estimates that of the 75 million children of primary school age who are out of school, one-third are children with disabilities and that over 90 percent of children with disabilities in developing countries do not attend school. Several factors contribute to this exclusion. These are; a lack of proper understanding of the concept of inclusion, social attitudes, poverty, insufficient government leadership, non-availability and quality of human and material resources, fragmented approaches, lack of appropriate role models in the process, such as Disabled People’s Organisations (DPOs), and lack of adequate confidence building programmes for children with disabilities.

Furthermore, persons with disabilities may have a lower standard of living than persons without disabilities with the same income, owing to their special need for services such as transportation, eating, or medical services and adaptive devices. While standard of living rises with income, households with greater needs because of the disability of one of its members tend to have a lower standard of living than that of other households with similar income.

Physical deformity of the limb is widely prevalent in Ghana. Depending on the degree of impairment, overall ability to

interact with others as the demands of everyday life may be seriously affected.

According to the outcome of the twenty-third (23rd) special session of the General Assembly (2000), it came out that physical disability results in low self-esteem and psychological trauma, especially to the females in society. Physically challenged persons often develop complexity syndrome in society. The interpretation of disability in Ghanaian society is rather discriminatory and as a result those who experience them become self-conscious of their condition. In Ghana where education has become the norm, physical disability is an impediment to the future of the physically challenged. It is upon this that mainstreaming was institutionalized to address the need of the physically challenged.

In the United States for example, mainstreaming came to replace segregation of individuals with disabilities including the physically challenged students or pupils into the regular classroom through Public Law (PL) 94 142. Mainstreaming focused on the right to equal education for both physically challenged and the non-physically challenged learners in a regular classroom setting. Not long, inclusive education came to replace mainstreaming to enforce Individual with Disabilities Education Act (IDEA) Amendments of 1997. The inclusive education has come to provide education for all children in the public education setting.

Inclusive education is a global agenda (Pijl, Meijer, & Hegarty, 1997 'as cited in Agbenyega, 2007]), however, it is context specific in terms of meaning and practice since it has not got any definite definition. Generally, inclusion in education means, "full inclusion of children with diverse abilities in all aspects of schooling that other children are able to access and enjoy" (Loreman, Deppeler & Harvey, 2005, p.2). All children can learn when teaching is effective and meets individual strengths and learning needs (Ainscow, 1999; Corbett, 2001; Gale, 2001; Lindsay, 2003).

The policy guiding the principle and practice of inclusion was first adopted at the World Conference held in Salamanca, Spain in June 1994, now regarded as the Salamanca Statement by United Nations Educational Scientific Organisation (UNESCO, 1994). The statement has drawn global attention to access and quality in delivery of special needs education. Considering the importance this could have, it was later emphasized at the World Educational Forum at Dakar, Senegal in 2000 and supported by the UN Standard Rules on the Equalization of Opportunities for Persons with Disabilities proclaiming participation and equality for all. The Salamanca Conference recommended the following to governments of various countries in the world as a matter of urgency to;

- i) Give the highest policy and budgetary priority to improve education service so that the children could be included, regardless of difficulties.
- ii) Adopt as a matter of law or policy the principle of inclusive education and to enroll all children in ordinary schools unless there are compelling reasons for doing otherwise.
- iii) Ensure that organizations of people with disabilities along with parents and community bodies are involved in planning and decision-making.

- iv) Put greater effort into pre-school strategies, as well as vocational aspects of inclusive education. Most important, paragraph 2 of the Salamanca statement, spelt out 5 major clauses as key issues in inclusion.
 - a. Every child has a fundamental right to education, and must be given the opportunity to achieve and maintain an acceptable level of learning.
 - b. Every child has unique characteristics, interests and learning needs.
 - c. Education system should be designed and educational programs implemented to take into account the wide diversity of these characteristics and needs.
 - d. Those with special educational needs must have access to regular schools which should accommodate them within a child-centered pedagogy capable of meeting these needs.
 - e. Regular schools with this inclusive orientations are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all. Moreover, they provide an effective education to the majority of children and improve the efficiency and ultimately the cost-effectiveness of the entire education system. By this, all children including those with special educational needs were to be educated in the regular school where equal opportunities and access were to be guaranteed.

Ghana's concept of inclusive education, however, is aligned with her Free Compulsory Universal Basic Education (FCUBE) policy increasing access, retention and participation of all students of school going age in education and not the movement and provision of education to children with disabilities in regular schools. The emphasis is on changing school culture and organization to providing resources and to building capacity on special and regular schools to offer new opportunities to pupils who may have previously or continue to experience learning difficulties (Ghana Education Service (GES), 2004; Hayford, Agbeko, Gadagbui, Avoke, Boison, 2002).

The government of Ghana since independence regards education as a fundamental human right for all citizens and it has enshrined this right in the Legal Framework of Education. The 1961 Education Act is the principal legislation concerning the right to education for all children in Ghana, it states that; Every child who has attained the school going age as determined by the Minister shall attend a course of instruction as laid down by the Minister in a school recognized for the purpose by the Minister (GES, 2004, p.2).

In the Ghanaian educational sector, one wonders whether there are laws backing inclusive education. Ghana's disability bill was passed on 23rd June, 2006 after many years of agitation. It has 12 main objectives. The following are excerpt from the bill:

- i. Create an enabling environment for the full participation of People with Disabilities (PWDs) in national development.
- ii. Facilitate the employment of PWDs in all sectors of the economy.

- iii. Promote disability friendly roads, transport, and housing facilities.
- iv. Ensure access of PWDs to effective health care and adequate medical rehabilitation services.
- v. Ensure that women with disability enjoy the same rights and privileges as their male counterparts.
- vi. Ensure that law enforcement personnel in cases of arrest, detention, trial, and confinement of PWDs take into account the nature of their disabilities.
- vii. Ensure access of PWDs to the same opportunities in recreational activities and sports as other citizens.

After its passage, its implementation has been a big issue. This hinders the inclusive education in so many ways. The knowledge of so many Ghanaian educationists on the inclusive education seems to be very low. Based on this, the approach to teaching physical education and the wrong perception about the subject conflicting with the coaching of sports has relegated the participation of physically challenged students in the general physical education. It is obvious to state that most teachers, even some physical educationist do not see the teaching of physical education as a process that uses carefully planned and selected movement activities to attain an optimal physical, emotional, social health and mental fitness skills in an individual or the learner.

II. STATEMENT OF THE PROBLEM

Physical education, an aspect of education which aims at helping students to enjoy an optimal health in order to obtain educational success cannot see the physically challenged denied their right of inclusive education.

According to DePauw and Gavron, (1991), "there is a paucity of empirical research on coaches of athletes with physical disabilities; in fact, literature pertaining to their expertise is almost nonexistent". They added that, "the need for empirically based research on these coaches is undisputed especially with the recent increase in sporting events and opportunities for athletes with physical disability (DePauw & Gavron, 2005; Reid & Pupas, 1998). This therefore exposes the challenges this category of students face while on the academic ladder. Efforts like governmental policies ensure that these people enjoy equal right yet negative attitudes by teachers, parents, students and the society towards inclusion jeopardize government effort.

III. PURPOSE OF THE STUDY

The purpose of the study was to find out the reasons that militate against the participation of physically challenged students in physical education in an inclusive school setting. The study also aimed at finding out how the level of task difficulty assigned to a physically challenged student affects his/her participation in an inclusive class.

Research Questions

1. How do teachers accept physically challenged students in physical education class?

2. How do physically challenged students benefit from inclusive education?
3. What are the barriers for physically challenged students in the inclusive setting?
4. What changes would assistive approach bring to the inclusive education?

IV. METHODOLOGY

This study adopts an exploratory survey design. Blurtit (2012) defines exploratory study as a study that is undertaken when little is known about a subject or no information is available on how a similar problem or similar research issues have been solved in the past. Generally it is the heavy preliminary work in investigating practically anything. It is there to acquire primary research and actually compile any and all pre-existing knowledge, albeit limited in most cases. It then seeks to establish and portray this in a coherent manner for interpretation. Cherry (2009) defines survey as a data collection tool used to gather information about individuals. Surveys are commonly used in psychology research to collect self-report data from study participants. A survey may focus on factual information about individuals, or it may aim to collect the opinions of the survey takers' (Cherry, 2009).

The population for this study was 48 from the ten senior high schools sampled from south Dayi District and Ho Municipal in the Volta Region. The target population consisted of all male and female students who are physically challenged from the public senior high schools. As part of the respondents, all the 13 Physical Education (P.E) teachers were sampled from the targeted schools.

Based on the problem understudy, the researcher used the purposive sampling which is a non-probability sampling technique to select the nine public senior high schools. The same technique was used to select the respondents from the public schools for the study. The researcher used this technique because it enabled him to arrive at the very respondents the researcher used for the study.

The instrument for data collection was questionnaire. The researcher administered the instrument personally. The respondents were educated and assured privacy and security after their consent. The respondents were adequately informed on the significance of the exercise. Within the five days, respondents chosen were invited to respond to the sixteen-item questionnaire. All persons with physical deformity (challenged) were made to respond to the questionnaire independently.

Frequencies and percentages of the responses were determined, presented and discussed. These statistical methods were chosen because the research aimed at finding reasons that militate against the participation of physically challenged students in physical education in an inclusive school setting.

V. RESULTS/DISCUSSIONS

The study also aimed at finding out how the level of task difficulty assigned to a physically challenged student affects his/her participation in an inclusive class.

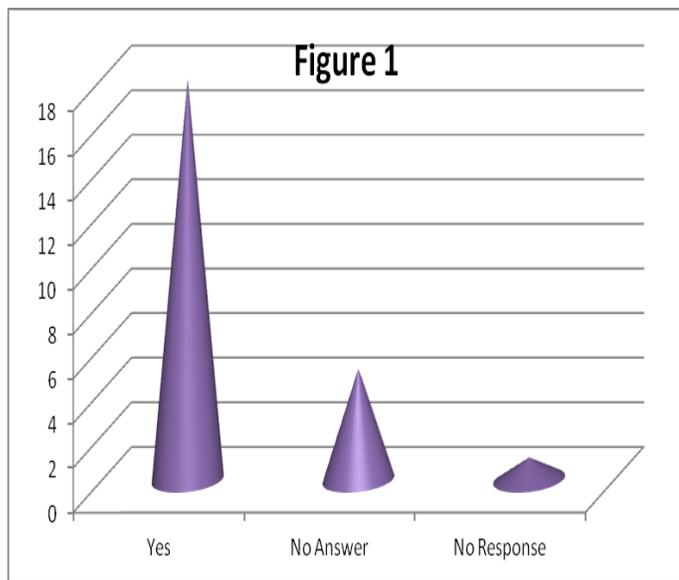
Table 1: Response to Teacher’ Engagement of Students with Disability in Practical P.E. Lessons

Response	Frequency	Percentage (%)
Yes	23	96
No	1	4
No answer	-	-
Total	24	100

According to table one, an absolute number of 21 representing (96%) of the respondents indicated that they were engaged in practical P.E. lessons in the inclusive setting. An absolute number 1 representing 4% indicated students with deformity on the limbs were not engaged in practical P.E. lesson.

Table 2: Response to Teachers’ Encouragement of Students with Disability to take part in P.E.

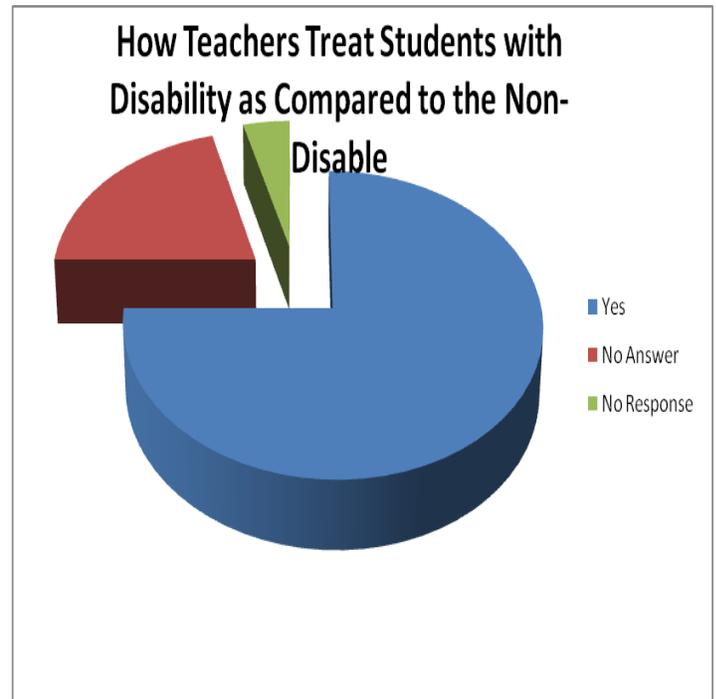
Response	Frequency	Percentage (%)
Yes	24	100
No	-	-
No answer	-	-
Total	24	100



From figure one and its corresponding graph above, all the respondents showed that teachers encourage them to take part in P.E.

Table 3: Response to how teachers treat students with disability as compared with non-disable students

Response	Frequency	Percentage (%)
Yes	15	63
No	8	33
No answer	1	4
Total	24	100



From figure two and its graph above, sixty three percent (63%) of the respondents showed that teachers gave equal treat to students with disability as in relation t the non-disable students. Contrary to the above, thirty three percent (33%) of respondent showed that students with physical deformity were not given good attention that was demanded or were not taking care off very well. Four percent (4%) of respondents indicated that they had no idea to share when it comes to teacher-learner relationship with respect to physically challenged students.

Table 4: Response to Students’ Involvement in P.E. Practical Lessons

Response	Frequency	Percentage (%)
Yes	22	92
No	1	4
No answer	1	4
Total	24	100

From table four, ninety-two percent (92%) showed that all students were involved in practical P.E. lesson. Students with physical deformities were all engaged or involved in practical P.E. lesson.

On the other hand, four percent (4%) said that students with physical deformities were not involved during practical P.E. lessons. The first four percent who have no answer to whether students with physical deformities were involved in practical P.E. lessons.

Table 5: Teachers’ Response to whether P.E. Contributes to Students’ Health and well being

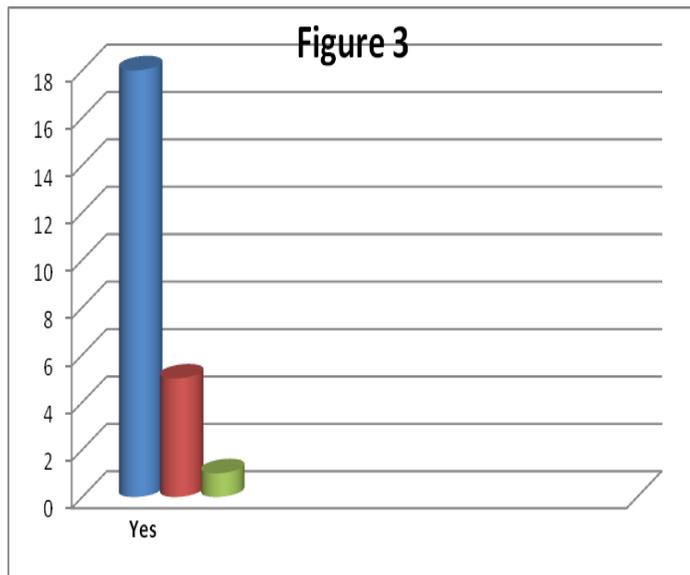
Response	Frequency	Percentage (%)
Yes	23	96
No	1	4
No answer	-	-
Total	24	100

Table five indicated that ninety six percent (96%) of the respondents believed that students’ engagement with physical education affects positively their health and well being. The engagement with the subjects physical education improves or enhances the health and well being of the students irrespective of his physical stature (nature). Four percent (4%) of the respondents were of the view that physical education does not influence the health and wellbeing of students.

There was no absolute number who did not have any idea whether P.E. contributes to the health and well being of the student.

Table 6: Physical Education as a Tool for Development of Knowledge on the Rules and Laws of various Games, Attitudes, and Motor Skills/Fitness

Response	Frequency			Percentage (%)		
	Laws	Attitude	Skills	Laws	Attitude	Skills
Yes	23	23	23	96	96	96
No	1	1	1	4	4	4
No response	-	-	-	-	-	-
Total	24	24	24	100	100	100

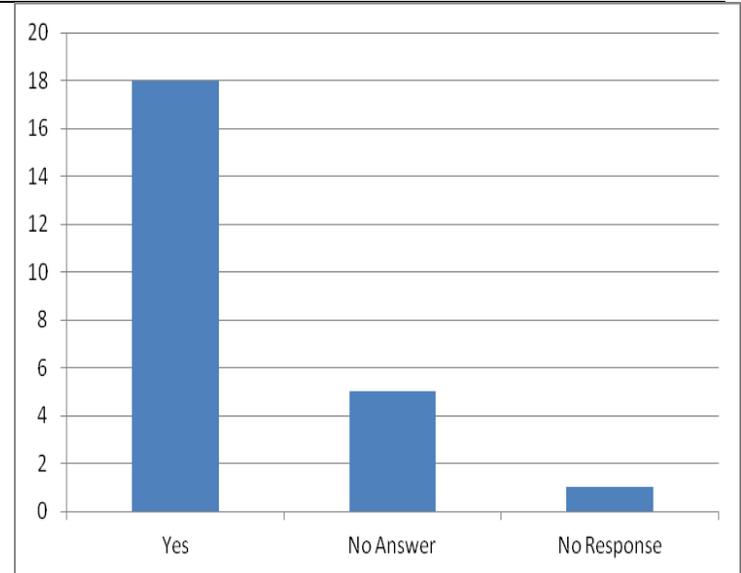


From figure three and its corresponding table, an absolute number of twenty three (23) out of twenty four (24) represents the view that physical education is a tool for developing students’ knowledge on rules and laws of the games, attitudes and motor skills or fitness.

Contrary, out of an absolute number of twenty four (24), one (1) was of the view that physical education was not a tool for developing knowledge on the rules, and laws of the games, attitudes and motor skill/fitness.

Table 7: Teacher’s response on how P.E. helps students with deformities to interact with peers and the society at large

Response	Frequency
Yes	18
No	5
No answer	1
Total	24



From table 7, eighteen (18) out of twenty four (24) respondents were of the view that physical education help students with deformities to interact with their peers and the society at large. It created a conducive ground for them to interact with their peers and others better. Five (5) out of the twenty four (24) responses indicated that physical education does not help students with deformity compared to their ‘able’ peers. One (1) responses out of the twenty (24) had no response.

Table 8: Teacher’s Responses to the Awareness of the Disability Act of Ghana

Response	Frequency	Percentage (%)
Yes	2	8
No	22	92
No answer	-	-
Total	24	100

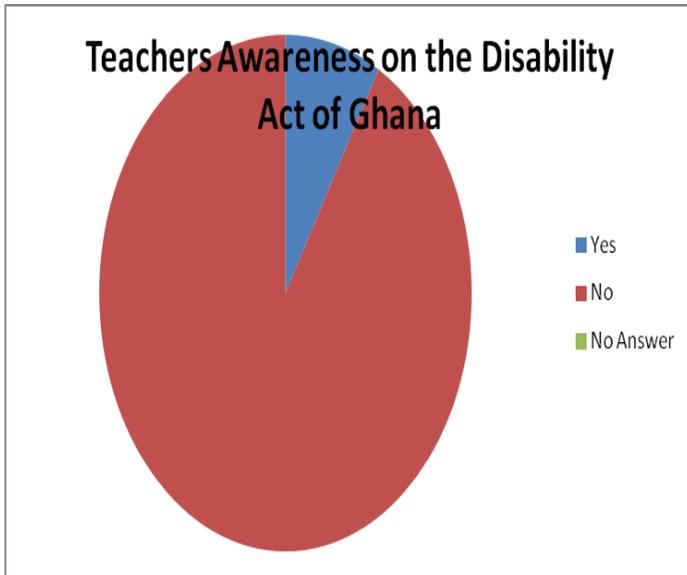


Figure five above indicated that, eight percent (8%) of the respondents said that they were aware of the disability act of Ghana while ninety two percent (92%) were of the view that they were not aware of the disability act of Ghana. At least each respondent knows that he or she is either aware or not aware of the disability act of Ghana.

Table 9: Teacher’s response to whether students with deformities need any assistive material to enhance their participation in the inclusive setting

Response	Frequency	Percentage (%)
Yes	16	67
No	7	29
No response	1	4
Total	24	100

Table 9 indicated that, sixty-seven percent (67%) of the teachers who responded to the questionnaire demanded that assistive materials are to be provided to students with physical deformities so that this participation would be enhanced.

Twenty-nine percent 29% said that students with deformities could survive and fit in the inclusive setting even without the assistive materials. Four percent (4%) of the respondents could not tell whether the physically challenge need any assistive material to enhance their participation in the inclusive setting.

Table 10: Teacher’s response on whether students with deformities are being called all kinds of names based on their disability

Response	Frequency	Percentage (%)
Yes	11	46
No	11	46
No answer	2	8
Total	24	100

From table 10 above, forty-six percent of respondents express the view that students with deformities were called all sort of names based on their deformities. The same percentages of respondents oppose the view that students who were physically challenged were not called names of all kind.

Eight percent of the respondents decline by not expressing their views on this issue.

Table 11: Teacher’s responses on whether students’ with disability likes the nicknames giving to them by their colleagues in the inclusive setting

Response	Frequency	Percentage (%)
Yes	9	15.2
No	2	81.8
No answer	-	-
Total	11	100

From table 11 above, based on the statistics in table 10, eighteen point two percent (18.2%) of the respondents welcomed the names given to them by their peers but eighty one point eight percent (81.8%) frown on the names given to them by their colleagues.

Pupils Responses

Table 12: Pupil’s response to whether teachers teach practical lessons

Response	Frequency	Percentage (%)
Yes	14	100
No	-	-
Total	14	100

Table 12 above indicated that, all the fourteen respondents who were physically challenged with one kind of physical deformity on their body agree to the fact that their physical education teachers teach practical lessons. It is therefore obvious that hundred percent (100%) of the teachers) teach practical P.E.

Table 13: Involvement of students with deformities in practical physical education lesson

Response	Frequency	Percentage (%)
Yes	12	86
No	2	14
Total	14	100

Table 13 above showed that, eighty six percent (86%) of the respondents said, they were involved in practical P.E. lessons but fourteen percent said that they were not involved in practical P.E. lesson.

Table 14: Whether teachers assign task to students with disability based on their disability and ability level

Response	Frequency	Percentage (%)
Yes	12	86
No	2	14

Total	14	100
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From table 14, eighty six percent (86%) said that, task given to them to perform was based on their ability and disability level while fourteen percent (14%) said, task assign to them to do in P.E. class was not considered on the fact that they were physically challenged.

Table 15: Whether teachers encourages students with disability who dislike practical P.E. lessons

Response	Frequency	Percentage (%)
Yes	12	86
No	2	14
Total	14	100

Table twelve, above showed that, two (2) respondents out of fourteen (14) believed that teachers do not encourage them to engage in practical P.E. They do not whip up their interest. However twelve (12) of the respondent representing eighty six percent (86%) said they were encouraged to create likeness for the practical P.E.

Table 16: Responses to whether students with disability wish to be in a segregated school

Response	Frequency	Percentage (%)
Yes	2	14
No	12	86
Total	14	100

From table 16, fourteen percent (14%) of the respondents who were actually physically challenged wish to school in the segregated settings but eight six percent (86%) of the respondents wanted to continue in the inclusive setting.

Table 17: Response to whether teachers use assistive approach to help teach in the inclusive setting

Response	Frequency	Percentage (%)
Yes	9	65
No	3	21
No answer	2	14
Total	14	100

Table 17 indicated that, sixty-five percent (65%) of the respondents used assistive approach and materials to help teach physical education to suit their conditions. Twenty one percent (21%) do not see teachers use assistive approach in handing P.E. for the physically challenged students. Fourteen percent (14%) of the respondents do not see whether or not teachers use assistive approach to teaching the physically challenged students.

Table 18: Response to whether teachers recommend inclusive setting

Response	Frequency	Percentage (%)
Yes	9	65

No	2	14
No response	3	21
Total	14	100

Table 18 above indicated that, sixty five percent (65%) of the respondents said that P.E. teachers recommended the inclusive education while fourteen percent were convinced that the teachers did not recommend it.

VI. FINDINGS AND DISCUSSIONS

Teachers' Response

Table one revealed that teachers do engage students with physical deformity in practical P.E. lesson. Every child has a legal right to P.E. class. Federal Law of Disability Act, 2006 Act 715 – Ghana states that, all children regardless of their handicap and condition are entitled to free and compulsory education.

A student may only used minimal assistance with physical activities and access or may require a role in his Education Program (IEP) comes into play. This is therefore supported by McGregor and Vogelbert (1998) that general teacher education programmes should be designed to include content related to inclusion concepts, including assistive technology. It is therefore observed that not all teachers engaged students with disability in practical physical education lessons based one reason or the other. It is significance to introduce Adapted P.E. in the colleges of education so that teachers will be equipped to handle all level of abilities. www.hlst.itrn.a.c.uk/resources/link304.html supported the issue that in many cases, regular P.E. teachers are not equipped with the knowledge and skills to effectively include children with disability into their classes (North Carolina Physical Education 4 me 2007).

Table two illustrates teachers' encouragement of students in taking part in physical education lessons. It was observed that all teachers encouraged students to take part in physical education lessons. This is supported with the declaration of independence of July 4th 1776. 'We hold these taught to be self evident all men are created equal, that they are endowed by their creator with certain unalienable rights, that among these one life, liberty and the pursuit of happiness'. The philosophy is founded on the tenets of disability right advocacy which have historically promoted the involvement of people with disabilities in all facets of society.

It is obvious to say that all physical education teachers understood the importance of engaging a child in P.E. lessons that is how come there was a hundred percent assertion that all students are encouraged to take part in practical physical education lesson irrespective of the individual challenge.

Table three provided evidence on how teachers treat students with disability as compared to other students. The chart clearly indicated that sixty three percent (63%) of the P.E. teachers who responded to the questionnaire proved that majority handled disability with care. Even though at most thirty-seven percent (37%) of the teachers showed that they do not treat physically challenged students well, most did better if not best. Statistics revealed that a few teachers do not see the need to observe the law that promotes the right of the physically challenged.

Table four showed detailed teacher's involving students in practical physical education lessons. It was evident that only four percent of physical education teachers whose response did not consider involving physically challenged students in practical physical education lessons. Apart from that four percent of respondents kept their reservations on whether they involved students in practical P.E. lessons or not. Ninety-two percent (92%) really involved students in lessons.

Forestenzer and Kent (2001) supported that school professionals and educational researchers work to foster a rich social environment that provides strong social support network. This requires a keen awareness of the social activity and relations that exist within the school, and an effort on the part of all staff to foster a positive and nurturing environment while they are working the school setting. Exposing the youth to these types of positive social support may encourage them seek out similar support networks when they leave area of work for professional as social support is known to be the strongest influence towards a positive adjustment.

Basically, the ninety-two percent (92%) who involved every student irrespective of the challenges displayed high sense of professionalism while the other eight percent showed how unprofessional they were challenged. Ninety-six percent (96%) of the respondents believed that P.E. positively affects the health and well being of student. It is only four percent of the respondents who felt physical education has no significances change in the health and well being of the student.

According to the study of Emory University and the University of Georgia, 1998, in support of the issue above, participation in sports improve in strength, coordination, flexibility, endurance. In addition parents and teachers reported that children are less likely to be depressed and often shows improvement in behaviour, academic and interaction. The study also indicated that many parents noted a decrease in secondary health complication as when their children became less sedentary.

Table seven revealed that seventy-five percent (75%) of students were of the opinion that physical education is an interactive subject area that helps students to interact better with peers and the society at large. Even though at least twenty-one percent (21%) opposes to this assertion, majority was with the conviction that physical education creates the conducive ground for a perfect inclusive education

Schiller (2006) agreed that inclusion is important as P.E. serves as an interactive device for both the physically challenged and the non-challenged. Schools often keep handicapped children and able bodied apart setting aside a special time for every child, disable or not is going to be on the starting football team but to the content that you don't make a greater opportunity to be seen like they are unusual. TipRoao.com. added, students gain confidence and the needed exposure when they learn together. It also helps them to understand each others challenged. Giangreco, (1994) continued to support that inclusive education provides opportunities for teachers to model acceptance of human diversity in its many forms (e.g. culture, race, gender and disability) if we want to encourage the next generation to accept and value diversity, what better opportunity than welcoming students with disabilities into the classroom as full, participating members? The expanding diversity of the students population

reflects the corresponding expansion of diversity in our communities, which highlights the need for students to learn how to live, work, and play harmoniously with people who have widening range of personal characteristics.

Inclusion is a philosophy in which 'all individuals can participate in physical activities that enable them to be motorically, cognitively, and affectively successful within a community that embraces diversity.

Table eight displayed the level of awareness of the disability Act of Ghana. Teacher's response showed that only eight percent understand the right of the disabled in Ghana. Ninety-two percent proved that they were not aware of the disability Act of Ghana for that matter the right of the physically challenged in the inclusive school setting. After the 1992 constitution of Ghana, the disability Bill was passed in 2006 after so many years of agitation. Besides, estimates of international agencies, UNESCO, the lead agency for the Flagship, more than 90 percent of children with disabilities in developing countries do not attend schools. This is a good testimony as Ghana is a typical developing country, hence, majority of the inhabitants have little or no idea about the Disability Act 715 of Ghana.

Table nine showed how teachers see the need for the use of assistive materials to enhance the full participation of the physically challenged. Sixty seven percent (67%) agreed that they use assistive materials and twenty nine percent (29%) feel they do not use any material to assist them to adapt and fully participation in Physical Education lesson. Four teachers do not know whether they need the assistive materials or not. Technology tools can make a significant different for students with disabilities. According to the MDG report, (Serbia, 2005) policy for persons with disabilities is made to provide Personal Assistants to Persons with Disabilities programme to support persons with disabilities to become active and to work. This is to ensure assistive to enforce full participation of the physically challenged.

VII. STUDENTS' RESPONSE

Table ten showed how students who are physically challenged were involved in practical physical education. Eighty-six percent of the students who responded to the questionnaire showed that they were involved in full participation in practical P.E. lessons. Though, fourteen percent (14%) said they were not involved in practical P.E. lessons. It was obvious that a good number of the physically challenged involved themselves in practical P.E. lessons. It is clear to say that the fourteen percent were denied or are denying themselves the health and skill benefits of engaging in P.E. lessons. Besides, their social life may also be affected as a result of not taking part in practical physical education.

Table 13, 14 and 15 explained involvement of students with deformities in practical P.E. lesson, teachers assigning task to students with disability based on their disability and ability level and whether teachers encourages students with disability who dislike practical P.E. lessons. Interestingly, the three tables exhibit the same level of percentage as to how the physically challenged were involved, assigned task and encouraged in the mist of dislike and fear associated with the course. An absolute number of twelve (12) out of fourteen (14) representing eighty

six percent said that teachers involved them, gave them task to perform and motivated them to increasingly love the practice of physical education. Two percent respectively disagreed to their involvement, task engagement and motivation. It was observed that majority of the physically challenged are in one way or the other benefiting from physical education while a few seem to be left out. This may be attributed to the fact that the state of the disability scares the teacher to engage the student or even motivate him or her to engage in practical P.E.

Lytle, Lavay, Robinson & Huettig (2003) said teachers should promote physical education classes and activities via a Web page. Assign students to gain information via the web rather than using more traditional learning strategies. For example, they can gain information regarding the history of sports (Negro Baseball Leagues <http://www.blackbaseball.com>), rules, equipment, sports organizations, and techniques.

In table 16, fourteen percent (14%) of the respondents who were actually physically challenged wish to school in the segregated settings but eighty six percent (86%) of the respondents wanted to continue in the inclusive setting. It was deduced that 86 percent of the respondents experienced a high sense of security from both teachers and the non disabled students. Fourteen percent who wanted the segregated school system could be viewed as students who did not enjoy good company of their peers and sometimes the teachers.

Table seventeen showed how sixty-five percent (65%) of the respondents used assistive approach and materials to help teach physical education to suit their conditions. Twenty one percent (21%) of the respondents said teachers do not use assistive approach in teaching P.E. for the physically challenged students to fully benefits. Fourteen percent (14%) of the respondents could not tell whether or not teachers use assistive approach to teach the physically challenged students. Disabilities rights leaders have said that the application of assistive approach will be the equalizer of the 21st century (Flippo, Inge & Barcus, 1995). Through the use of assistive technology devices, many students decrease their isolation from a special class and become an important part of a regular classroom, which is considered the least restrictive environment. Technology access solutions do exist for students who need assistance with content material. Caption built into multimedia programmes can overcome barriers for students who have disabilities (RESNA, 2001). Assistive technology then may be a basic tool in the educational process for any individual who experiences a disability.

VIII. CONCLUSIONS

In the current study many of the discussion focused on reasons that militate against the participation of the physically challenged students in an inclusive setting. Within the delimitations and limitations of this study, based on the data analysis, the following conclusions were made;

Special Education Services in Ghana are largely provided in urban areas and district capitals whereas the greater number of persons who need these services are found in the rural areas. Service providers are mainly professionals who teach in the special segregated schools with only a few in mainstream regular classrooms. There is the need for public education in order to foster general acceptance of persons with disabilities in public

schools with requisite specialized support. In order to strengthen the practice of advocacy on disability issues, there is the need to empower organizations of disabled people to lead the way by using legal procedures to force government to extend services to all areas of the country. The lack of effective organizations of persons with disabilities coupled with inadequate provision of information and policies impede the effective practice of inclusive education in many parts of the country. In order to expand the scope for an effective implementation of disability policy ideas must be tailored towards the social model of disability.

IX. RECOMMENDATIONS

Based on the results of present study, the following recommendations were made:

- i. Forging stronger cooperation between Special Education and Regular education.
- ii. Providing funding for logistics and support services for the physically challenged.
- iii. Training of teachers on principles and methodology for the physically challenged.
- iv. Appropriateness of school curriculum/flexible school curriculum to facilitate adaptation in School and Colleges' Curriculum. When students are well informed, they can know the measures to adopt to accommodate persons with disabilities.
- v. Involving agencies such as those in the fields of health, social services, psychology and counseling. Each of these should be assigned specific roles in meeting the needs of children with disabilities.
- vi. Having a programme to bring improvement in social attitudes. This could be achieved through the active involvement of parents who have children with disabilities.
- vii. Improving physical architecture to facilitate access.

From the fore-going, it can be concluded that the practice of inclusive education is not simple. It demands lots of preparation including a strong political will and community participation. Inclusion draws so much on sharing of experiences for it is developmental in scope.

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Utilization of Social Emotional Learning by Teachers on Children with Disabilities in Borno: Implication for Inclusive Education

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Abstract- This study examined the utilization of Social Emotional Learning by Teachers in schools in Borno State. The study's focus was on inclusive education. Social Emotional Learning is the acquisition of core competencies including one's ability to recognise ones' own emotions, set and achieve goals, recognise the emotions and perspectives of others, constructively, manage interpersonal situations including problem -solving and conflict resolution and maintain positive relationship with others. Inclusive education happens when children with and without disabilities are mainstreamed and taught together. The study focused on the Social Model of Disability. Many students receive special education and related services in a general education classroom where peers without disabilities also spend their days. This is called inclusion. Some services that a student might receive in a mainstream setting include and not limited to direct instruction, a helping teacher, team teaching, co-teaching, an interpreter, education aides, modifications or accommodations in lessons or instruction, or more teachers per student. Participants for this study included 718 teachers randomly sampled out of the 7,165 teachers who received training in Education Crisis Response (ECR) in Maiduguri on Social Emotional Learning. Of the 718 teachers, 481 (67%) were females while 237 (33%) were males. The instrument for data collection was a 48-itemed self-developed questionnaire known as SEL Utilization Questionnaire (SEL-UQ). The overall alpha was $r = 0.927$ Cronbach alpha. Data revealed that teachers showed willingness to infuse SEL in their day to day class teaching. Although statistical difference was observed between male and female teachers in the extent to which they are comfortable to use SEL. Teachers reported that participatory teaching and feedback are important topics that need priority attention in schools. Most of the students with disabilities were those with visual impairment and physical/motor disability.

Index Terms- Social Emotional Learning, Disabilities and Inclusive Education

I. INTRODUCTION

This study examined the utilization of Social Emotional Learning by Teachers on Children with Disabilities in Borno

state with a view to assessing the implications for Inclusive Education. In this paper, Social Emotional Learning (SEL) is defined as the process through which children and adults acquire and effectively apply the knowledge, attitude and skills necessary to understand and manage emotions, set achievable goals, feel and show empathy for others, establish and maintain positive relationships and make responsible decisions (CASEL, 2018). For practical purposes and intent, SEL deals with five goals aimed at achieving the purpose of social and emotional learning. A great deal of students, and pupils have suffered setbacks in schools due to varying degrees of disabilities. As a result, learning becomes difficult to them with attendant consequences of avoiding school, and indulging in various kinds of social vices that are preventable.

Cigman (2010) in addressing social model of disability draws a distinction between medical versus social model of disability by asking a pertinent question, where is disability located? Is it within individuals or society? However, the Disability Discriminate Act 2005 as amended, defines disability as physical or mental impairment, which has a substantial and long-term adverse effect on a person's ability to perform normal day-day activities. The act further provides for the protection of children against discrimination in two ways viz; they are entitled not to be treated less favourably than a non-disabled student for a reason relating to their disability unless the school can show that this is justified. And also they are entitled to have reasonable adjustments made with respect to admission arrangements ad in the provision of education and associated services, to prevent them being placed at a substantial disadvantage, unless the refusal to make those adjustments is justified (www.bedford.gov.uk).

Inclusive education happens when children with and without disabilities are mainstreamed and taught together (Melnick Cook-Harvey, & Darling-Hammond, 2017). The advantage of doing this is to mitigate the consequences of disabilities in terms of social and emotional leading to learning disabilities. The benefits are numerous, Al Hout (2017) affirms that meaningful friendships, respect, better appreciation and understanding of individual differences, and prepared for adult life in a diverse society is created by inclusive classrooms.

It is well known fact that the purpose of education is to make sure that students of all abilities gain access to information,

knowledge and skills which will prepare them to live their lives fruitfully by contributing both to their communities and also to their work places. Thus the main purpose of education becomes increasingly challenging as more and more schools begin to accommodate students with different abilities and backgrounds in the same teaching-learning setup. But as one strives to meet the challenge of inclusive education through the "Education for All" the many concepts that are related to the area of inclusive education required to be studied, analyzed and understood to come to a clearer understanding of the concept of inclusive Education itself (Jimenez & Graf, 2008).

Anecdotal studies have shown that over the last few decades the field of education has witnessed use of many concepts and terms which have often caused much confusion and even controversy. Some of these terms continue to be used in the context of emerging educational philosophy especially in the context of Education for All philosophy. The terms and concepts such as Segregated Education, Regular Education, Special Education, Special Needs Education, Education of the Disabled, Mainstream Education, Integrated Education and Inclusive education have become more important due to their direct bearing on Education Policies for the new millennium. In order to properly understand the concept of Inclusive Education.

II. SOCIAL EMOTIONAL LEARNING

Researchers are unanimous about social and emotional learning (SEL) and they have argued that it has positive impact on students in schools (Durlak et al, 2011; Jones, Greenberg, & Crowley, 2015; Jones et al, 2017). They suggested five (5) key competencies of SEL namely; self-awareness, self-management, social awareness, relationship skills and responsible decision making. Working on a Scan project of Reach the Students, Teach the Teachers, Kimberly, Kitil, Hanson-Peterson (2017) reported that as a new area of education, teachers lack appropriate skills on how to impact SEL skills to their students. As such proffered a numbers of recommendations for the inclusion of SEL education in teacher preparatory curriculum. There is growing evidence of positive relationship among SEL, academic performance, and prosocial behaviours. For instance, Durlak, Weissberg, Dymminick, Taylor & Schellinger (2011) reported a study from Meta-analysis, 270, 034 kindergartens through high school students. It showed that SEL participants demonstrated significant improvement in social and emotional skills, attitudes, behaviours and academic performance. The teachers were found to be knowledgeable in the use of SEL programmes in these schools.

The five domains of SEL are explained by Weissberg & Domitrovich (2015) as follows:

1. Competencies in the self-awareness domain involves understanding one's emotions, personal goals and values. In this regard, one's strength and limitations are measured.
2. Self-management domain requires skills and attitudes that facilitate the ability to regulate emotions and behaviours. This includes the ability to delay gratification, manage stress, control impulses, persevere through challenges in order to achieve personal and educational goals.

3. Social awareness domain involves the ability to take the perspective of those with different backgrounds or cultures and to empathize and feel compassion. It also involves understanding social norms for behaviour and recognizing family, school and community resources and supports
4. Relationship skills provide children with the tools they need to establish and maintain healthy and rewarding relationships, and to act in accordance with social norms. Competencies in this domain involves communicating clearly listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking help when it is needed.
5. Responsible decision making domain requires the knowledge, skills and attitudes need to make constructive choices about personal behaviour and social interactions across diverse settings. Competencies in this domain requires the ability to consider ethical standards, safety concerns, accurate behavioural norms for risky behaviours, to make realistic evaluation of consequences of various actions, and to take the health and well-being of self and others into consideration.

III. TEACHER EXPERIENCES

Accordingly, CASEL has suggested that over 83% of teachers in the US are in need of training in SEL (Schomen-Reichl & Zakrzewski, 2014). It is evident that SEL has not gained grounds in most developing countries and the need for its inclusion. There are many factors that might prevent teachers from caring out SEL programmes in schools. Researches have shown significant impact of teachers experiences in the use of SEL programmes in schools. In one of such studies, 935 teachers were surveyed. Confirmatory factor analysis was done that yielded positive, three reliable scales pertaining to teachers' comfort, commitment and school culture support for the use of SEL in schools (Brackett, Rivers, Elbertson & Peter, 2012). In a similar study, Ee and Quek (2013) found that teachers' perception for infusing SEL in the school curriculum is needful. To this end there seem to be readiness to implement SEL in schools in most countries in order to maximise quality Wanless & Domitrovich (2015) noted. One of the problems that teachers are likely to face in the implementation of the SEL in schools has to do with policy, and school curricula. However, research supports the importance of policies and intervention to infuse SEL in school curricula (Badiyyah, Garner & Owen (2013). This shows that the teachers pedagogy curricula should be all encompassing, besides the subject content of the curricula there is need to infuse the teaching of SEL to children and students in schools. For example, Youngblood (2015) reported four major findings showing that teachers perceived they had contextual support for implementation of SEL, although they encountered challenges in implementing the SEL, but importantly, they reported positive changes in their roles as teachers and above all there was increase awareness of the value of building student-teacher relationship. Tom (2012) reported a study involving 302 teachers in which teacher-student relationships, emotional

regulation, social awareness and interpersonal relationships were found to have positive correlation.

Research has shown that teachers' attitude towards implementing SEL, is dependent on their reaction to the idea of change which could determine if the programme was successful, and if it added to the education of the child as a whole (Holmes, 2017). This is possible because the teachers spend too much time in school with the students and ensure that students' needs are met. It is important, Reynolds (2016) has argued that knowledge and attitude of teachers towards SEL standards can influence the quality of social and emotional learning of students.

IV. SOCIAL MODEL OF DISABILITIES

Social model of disability is a way of viewing the world, developed by disabled persons and society (Cigman, 2010). This concept emerged as a result of the views held by people living with disabilities against the medical model of disability. Kretser (2018) argues; social model posits that rather than disability being located as something wrong inside an individual's body, people are actually disabled by the society. For instance, Disability Equality in Education (2005) observes that, we believe that, the problem is not in the child and their impairment, but in the social and attitudinal barriers in the education system. For instance, the education system makes it difficult for some children to function as they are capable of functioning. Where the built environment is not suitable for many students with disabilities especially those with wheelchairs in schools (Jackson, 2018). This is contrary to medical model of disability, which emphasizes what is 'wrong' with a person not what the person needs (<https://www.scope.org.uk> are provided with Social model defines impairment as the loss or limitation of physical, mental or sensory function on a long-term or permanent basis. Essentially, studies have revealed benefits of inclusive education among which are; families' vision of a typical life for their children can come true, they develop a positive understanding of themselves and others and development of friendships. Above all, the children learn important academic skills, and all children learn by being together (www.pbs.org/parents/education).

V. INCLUSIVE EDUCATION

Inclusive education according to UNESCO (2015) is a process of strengthening the capacity of education system to reach out to all learners and can thus be understood as a key strategy to achieving Education for All. ESSPIN (2016) observed that inclusive education originally focused on education for children with disabilities. Contrary to this, it appears inclusive education strategies addresses wider exclusive issues such as gender, marginalized groups, etc. In Nigeria, it has remained a herculean task since according to NPE (2015) there was no functional legislation on Special Needs Education. It further explained that the laws that existed were mainly grants-in aid and policies which must be backed up by legislation. In Borno for instance, Children with disability are still battling with blatant educational exclusion. Report from UNESCO (2015) has argued

that children with disabilities account for one third of all out-school children, it provided an unending list including and not limited to, abused children, child labourers, refugees and displaced children, poverty stricken children, child domestic workers, HIV/AIDS orphans, children with disabilities etc. It is lamentable that Nigeria has the highest number of out of school children in the World (10 million) (UNESCO, 2012).

Research reports on inclusive education have indicated that inclusion provides children with disabilities with more challenging learning settings and the chance to watch, learn and interact with more competent peers (Ferguson, 2014). However, there are number of challenges the schools have to contain with. According to Omega (2016) inclusive education is confronted with challenges such as funding, misinformation, lack of qualified personnel, accessibility, educational modification and cooperation. While these remain the obstacles of inclusive education in Nigeria, the issue of legislation is cardinal and must be addressed immediately in order to join the world in ensuring the philosophy of EFA.

VI. METHODOLOGY

The purpose of this study was to investigate teachers' readiness to infuse the Social Emotional Learning skills in the classes. A quantitative approach was adapted to examine the preparedness of teachers to meet the social emotional needs of their pupils in schools as well as incorporating the inclusive education philosophy of the National Policy of Education.

VII. PARTICIPANTS

The participants in this study consisted of a sample of 718 trained teachers from various primary schools in Maiduguri, Borno State, Nigeria. The teachers were drawn from the 7,165 teachers that received Education Crisis Respond (ECR) training. The age range of the teachers was 22-56 years with 237 (33%) as male respondents and 481 (67%) as female respondents. To ensure anonymity, participants were questionnaire did not carry identification in form of name of participant. They were asked their level of educational attainment, level of classes they handle and number of years they have been teaching.

VIII. INSTRUMENT

The instrument for data collection was a 44- item self-designed questionnaire. The instrument comprised of six sections; demographic information, familiarity with the SEL skills, inclusive education and preparedness. The instrument has five responses; Strongly agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). The overall alpha was $r = 0.921$ Cronbach's alpha. The reliability for the sub-scales (Social Awareness = $r. 49$; self-management= $r. 78$; social awareness= $.42$; relationship management = $.76$ and responsible decision making = $.94$).

IX. FINDINGS AND RESULTS

Table 1: Demographic information of respondents

Table 1 is demographic information of respondents. It shows the ages of teachers who participated in the SEL training and the level at which they teach using the SEL.

Variable	Male		Female	
	N	%	N	%
22-30 years	80	34	70	15
31-40 years	130	56	289	60
41-56 years	27	11	122	25
Primary 4	7	3	0	0
Primary 5	25	11	3	.6
Primary 6	84	35	51	11
JSS1-3	93	39	248	52
SSS1-3	28	17	179	32

Question 1. How effective do you feel your SEL curriculum or SEL learning experience has been?

Table 2 is a summary of chi-square analysis on how effective SEL training has been

Variable:	VE	SE	NE	χ^2	df	P <.05	Decision
Male	176 (75%)	61 (25%)	0 (0%)	3.176	1	0.075	*
Female	326 (68%)	155 (32%)	0 (0%)				

* Significant. χ^2 Chi-square value significant at 0.05 degree of freedom.
 VE= Very effective, SE= Somehow Effective, NE= Not effective

Table 2 is a summary of chi-square analysis requesting teachers to indicate how effective the SEL experience was. Statistical significant difference was observed between male and female teachers. The χ^2 of 3.176; df 1= P < 0.075 is statistically low. Therefore, the difference between male and female in their opinion of SEL effectiveness could be due to chance in the variability of sample size.

Question 2: How comfortable are you infusing SEL competence during your lessons?

Table 2: Summary of t-test on application of SEL in Teachers' Classrooms

Group Statistics		N	Mean	Std. Deviation	Std. Error Mean	t-value	Df	P < 0.05
Self-management	MALE	237	19.3755	1.50645	.09785	-11.148	716	.000
	FEMALE	481	20.6798	1.45823	.06649			
Self-management	MALE	237	36.5907	3.15644	.20503	-14.134	716	.000

	FEMALE	481	40.3243	3.40997	.15548			
Social awareness	MALE	237	23.2700	1.97304	.12816			
						-10.750	716	.000
Responsible decision	FEMALE	481	24.9002	1.87928	.08569			
	MALE	237	31.5148	3.09811	.20124			
						-17.679	716	.000
Making Relationship management	FEMALE	481	36.2744	3.52839	.16088			
	MALE	237	42.8354	4.42957	.28773			
						1.983	716	.000
SEL	FEMALE	481	42.0956	4.82865	.22017			
	MALE	237	153.5865	10.68015	.69375			
						-12.399	716	.000
	FEMALE	481	164.2744	11.02722	.50280			

Table 2 shows that teachers in Borno State have different ways of applying the SEL competence in their classrooms when teaching. There is negative statistical significant difference which indicates reversal in the directionality of the effect.

Question 3 Which of the following did you think should have been included in your training?

Table 3: Distribution of topics that should have been included in SEL training

Variables	Male		Female		Total			
	n	%	n	%	n	%		
Goal setting	8		3.4		139	28.9		
Leadership training	12		5.1		84	17.5		
Feedback	35		14.8		127	26.4		
Student's wellbeing	61		25.7		101	21.0		
Participatory teaching	59		24.9		29	6.0		
Religious activities	45		19.0		1	0.2		
Print rich class	17		7.2		0	0		
							147	20.5
							96	13.4
							162	22.6
							162	22.6
							88	12.3
							46	6.4
							17	2.4

Table 3: is a summary of chi-square analysis on topics teachers thought should have been included in SEL training. Table shows that teachers that goal setting, students wellbeing and participatory teaching are topics teachers felt should be included in their training programme.

Question 4: To what extent do you feel convenient to include students/pupils with disabilities in your class?

Table 5. distribution of types of disability by level of classes

0.Variable/class	Primary 3	Primary 4	Primary 5	Primary 6	JSS1-3	SSS1-3
Reading disability	0	0	1	0	1	1
Writing disability	0	3	7	2	4	8
Physical/motor disability	0	9	7	12	5	19
Visual impairment	0	3	27	13	6	4
Hearing impairment	1	6	4	2	3	3
Others	5	8	0	0	15	1
Total	6	29	46	29	34	36 = 180

Table 4. distribution of pupil/students that got remediation support for various special needs

Table 4 is a frequency of number of students with disabilities attending schools in schools investigated. There were 208 pupils/students with physical disabilities in schools. Teachers were satisfied mainstreaming the pupils along with other students/pupils with no physical disabilities.

X. DISCUSSION OF FINDINGS

The study was designed to examine the utilization of social emotional learning by teachers in primary and secondary schools

in Borno state with particular emphasis to inclusive education. The study examined 718 teachers who were among those trained in SEL. The researchers inquired from teachers how effective the SEL learning experience was. Statistical significant difference was observed between both sexes in which they agreed that the

SEL experience was worthwhile. Meaning that teachers gained experiences from the training received. This finding was similar to what Youngblood (2015) reported, that teachers perceived contextual support for implementation of SEL, although many challenges were encountered in its implementing at some instances. Relevance of SEL in schools was addressed previously by researchers (Jones, Greenberg, & Crowley, 2015; Jones et al, 2017). They consistently favoured the use of SEL in schools because SEL competencies help students get along with others, and make them enjoy learning outcomes.

Teachers reported how comfortable they are infusing SEL competence during their lessons. There has been copious literature supporting the infusion of SEL in schools' curriculum (www.greatergood.edu, & CASEL, 2018). However, societies that are yet to domesticate the Social Emotional learning in their educational system and curriculum have issues infusing it. For instance, the Nigerian National Policy on Education (2015) showed poor implementation of inclusive education which typically in all circumstances is responsible for the none implementation of SEL in schools despite the training received by teachers. Laudable education programmes find ways into our school system without concerted policy directions from the Education bodies (Ministries of Education). Badiyyah, Garner & Owen (2013) supports the importance of policies and interventions to infuse social emotional curricula in schools

Using the Social Model of Disability, boys and girls are almost similar in disability in the schools investigated. However, Visual impairments was high among the students followed by physical/motor disabilities. Most conditions that were categorized as Others were those that were neither visual, physical or motor, nor speech impairments but included such conditions as tardy, untidiness, Attention Deficit/Hyperactive Disorder, Autism, it is interesting to note that no cases of students or pupils with mental disorders was reported by the teachers in this study. Whether such case is available in the study area is a matter that requires investigation. But what that means in this study is that children with such conditions are not allowed to attend schools, let alone being mainstreamed with normal students. This is an issue that requires legislation (Degener, 2016). As Kretser (2018) noted social model of disability posits that rather than disability being located as something wrong inside an individual's body, people are actually disabled by the society. Charmaine (2012) in a research involving disabled persons, concluded that there was a positive attitude towards inclusive education, and suggests that inclusive education heightens the awareness of school community. What is not certain is the legal framework to support inclusive education in Nigeria especially with the abysmal handling of people with disabilities in schools. Important position in inclusive education is supported by Degener (2016) in the sense that the human rights model of disability improves the social model of disability.

XI. CONCLUSION/RECOMMENDATIONS

Teachers in this study demonstrated interest in infusing Social Emotional Learning Competences in class teaching. They showed high level commitment in implementing SEL skills acquired in their training. They suggested some topics which could have been included in their training to make it all

encompassing. Such skills like feedback, participatory teaching and goal setting. It was recommended among other things that Borno state government should make efforts to legislate the infusion of Social Emotional Learning in the school curriculum, since education is on the concurrent list of the constitution.

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Security Challenges Faced Due to Increasing Data

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Abstract- At the moment Data is one of the most important assets for companies in every sector. The constant demand/growth in the importance and volume of data has resulted in a new problem: it cannot be solved by traditional analysis techniques. This problem was, therefore, handled through the invention of a new paradigm: Big Data. However, Big Data itself came up with new issues related not only to the volume or the variety of the data, but also to data security and privacy of each individual. Therefore, this paper will provide a survey on different privacy and security issues the big data is currently facing. The issues include privacy issues, management issues, integrity security, availability and confidentiality of data.

Index Terms- Security challenges, Infrastructure security, Data privacy, Data Privacy, Integrity and Reactive security.

I. INTRODUCTION

Majority of the social media users share a massive amount of their private information in their respective social network portals. This information include their geographical information, contact details, travel information, images, videos, etc. Many users publish their data publicly without security concerns in their mind. Therefore, social networks have become a large sector of personal data that could be used for any illegal activities. Adding to this, most of the social media users usually have a high level of trust towards the other users on same platform. They accept anonymous friend requests with no security measures taken, and trust any relevant /irrelevant information their friends send them.

Over the last decade, data privacy has gained importance all over the globe. After the initial whooping use of social networks with little or no attention paid to the lack of control surrounding access to and the disclosure of information, users are now continuously demanding that their data be secured. Due to social networks large count of users and information available there, and its simple algorithms, social networks have become new platform that urge cyber criminals. This has put all users under great risk. The next part of the paper will talk about variety of privacy and security issues in big data. The issues include privacy issues, identity theft issues, management issues, integrity security, availability and confidentiality of data.

II. LITERATURE REVIEW

The tendency towards increasing the volume and detail of the data that is collected by companies in any sector will not change in the near future , as the rise of social networks, multimedia, and the Internet of Things (IoT) is producing an massive amount of data. We are living in the era of Big Data. Furthermore, this data is mostly unstructured, which signifies that traditional analyzing techniques are not capable of analyzing it. Companies are working to extract more beneficial information from this high volume and variety of data. A new analysis paradigm with which to analyze and better understand this data was needed, hence, emerged Big Data. It was introduced in order to obtain not only private, but also public benefits. But in the process of extracting more and more beneficial data, Big Data have also originated security challenges.

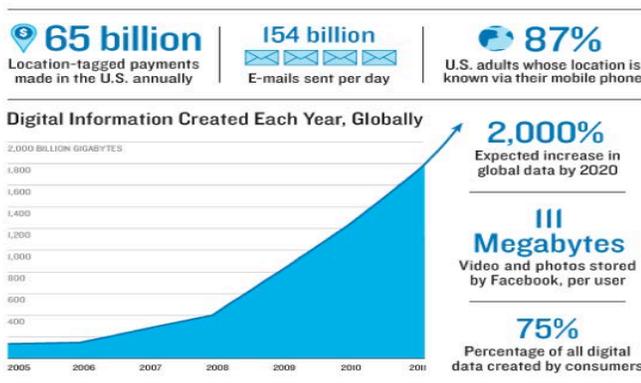


Figure 1: Digital Information Created Each Year

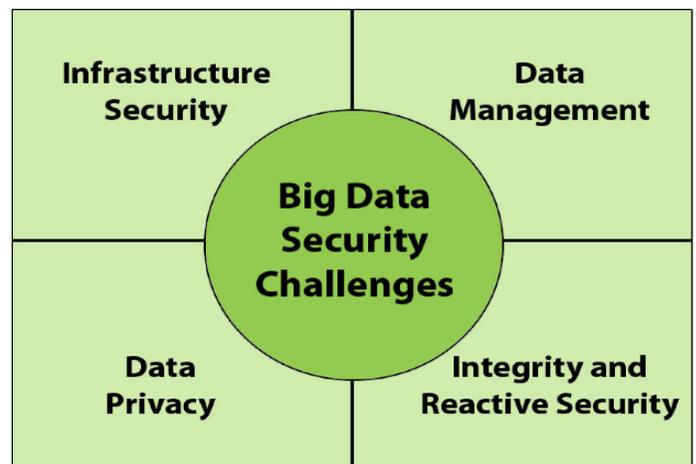


Figure 2: Big Data Security Challenges

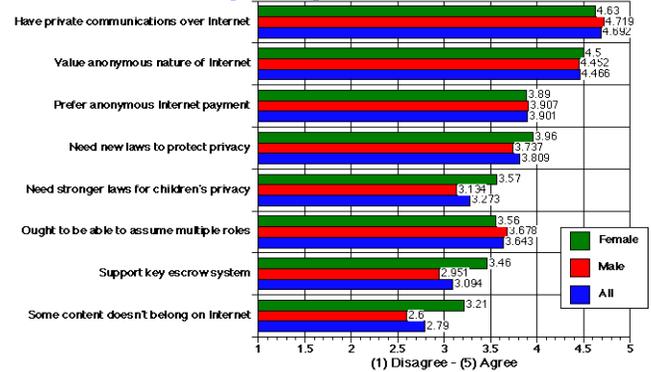
1. INFRASTRUCTURE SECURITY

Infrastructure is the cornerstone of Big Data architecture. Owning the right tools for storing, processing and analyzing your data is essential in any Big Data project. Physical infrastructure enables everything and security infrastructure secures all the elements in your big data environment.

2.

As many have previously stated that their Big Data projects handled by them include structured data sources, it is understood that many are using databases containing sensitive/personal information (such as financial data, marital data, academic data etc.) which are still available on-site. They are server hugging. They do not want to loose control due to security issues, fear of implications if data was lost, deleted or accessed. Keeping the infrastructure on-premise gives a sense of security.

Opinions on Internet Privacy split by Gender



Source: GVUS: Seventh WWW User Survey™ (Conducted April 1997)
<URL: http://www.gvru.gatech.edu/user_surveys/>
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Contact: wwwsurvey@cc.gatech.edu

Figure 4: Internet Privacy



Figure.3: Evolving Threats to Data Infrastructure

2. DATA PRIVACY

Data privacy is probably the issue about which the social networking users are most concerned, but it should also be one of the biggest concerns for the organizations that use Big Data techniques. A Big Data system usually contains a massive amount of sensitive information that organizations use in order to make the data benefactor for them. However, we are unaware of where the limit regarding the use of that information is. Organizations should not be given total freedom to use that information without our knowledge/permission, although they also need to gain some benefit from that data. Several techniques and mechanisms with which to secure the privacy of the information and also allow organizations to still be benefited from it have therefore been developed, and attempt to solve this problem in various different ways.

The current will be discussing two privacy issues:

- 1) Users' Anonymity
- 2) User's Profile and Personal Information

2.1 USERS' ANONYM

In almost all the social networking websites, users tend to use their original name to create their accounts. So, their identity is exposed publicly to peer users and any illegal users, as well as all the anonymous users in the online world. Moreover, all the social network user's account is being indexed by many search engines such as Google, Bing etc., and automatically flashes in the top positions for results of the search. This goes in favor of the attackers, if he/she possess the knowledge of names of the victims, they can happily search for victim's profile and obtain the data he/she requires, or they can search through social networking sites to target new preys. Keeping aside the use of original name as account name, there are also other methods that are utilized to invade social network user's anonymity. The two methods are de-anonymize attack and neighborhood attack. De-Anonymization Attack was published by Gilbert Wondracek and his team proved that by possessing and utilizing information of the members in a group and the technique of stealing the history, villain can easily decrypt anonymity of their prey [5]. In this method, attackers should have knowledge regarding which group on social network (number of people/users that possess similar interests or number of people that come from same background e.g. attended the same college or have same hobbies) preys belong to. A group on social networking site is being targeted as the total groups on social media is less than the number of individual users, which makes it easier to focus on the group, and then that group would help the attackers focus an individual user. Attackers will make use of history-stealing method to gain the information regarding URLs (websites) that preys visited in the past in order to cluster out victim's group. Before explaining about how this technique works, let us discuss about social network link and history stealing. There exist 2 kinds of links in social networks. A static link – It displays the home section of the users, which is pretty similar for all users. Dynamic link – It clearly specifies the uniqueness of every individual or a particular group. Coming to history stealing methods, attackers/hackers drag users to their respective web pages very effectively, and then try to get hold of user's browsing history by simply sending out a particular number of URLs to the

users(probably the one's which the user would use). The group directory which is provided by the social networking sites enables the attackers to get the URLs information. Then, attackers will try and check the user's history in order to know if he/she has visited the URL on the list or not. Later, the browsing history information will be sent back to attackers. "This process of getting the browsing history can be done by making use of conditional logic in CSS (Cascading Style Sheet) i.e. a: visited and display: attribute" or JavaScript (client-side script). Therefore, with the use of history stealing technique, attackers obtain prey's browsing history, and use the browsing history in order to filter out the URLs visited by him/her, here the importance will be given to dynamic links as they possess the unique information about the users. In general, social networks have the information of mailing list of the group members. So, attackers can utilize the acquired emails to get hold of identity (profile) of their preys.

2.2 NEIGHBORHOOD ATTACK

Social graph can be used to represent the social networks. In social graph, a social network user is indicated by a node, and relationship between two social network users is indicated by an edge. The process of Neighborhood attack is that if an attacker has the details of the victims' nearest neighbors' node and the relationship between them, they can track their preys' node. Let's take an example; the data of neighbors of the prey is available to the attacker. Data is of five friends of prey A.A friends are B, C, D, E, F. Among them B and C are friends with each other whereas, D, E, and F are not. Figure 5 can be used to represent neighborhood attack on A. This graph can be used by attackers in order to track A since every social networking node has a unique neighboring attack graph.

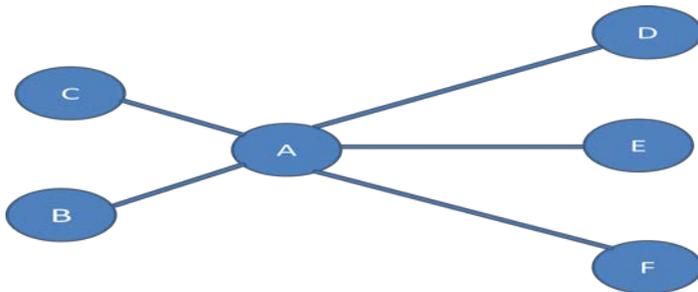


Figure 5: Neighborhood Attack in Social Networks

2.3 USER'S PROFILE AND PERSONAL INFORMATION

Almost all the profiles of users on social networking sites have the original information given by the users. Sensitive information include their geographical information, contact details, travel information, images, videos, date of birth, professional life details and academic details urges attackers to target them. Hence, the major issue of user's account is the misuse of profile and personal details.

What are sources of leakage of users' profile?

Due to lenient privacy policies: Not many users are bothered

about the privacy policies of their account. The audience is set as public so anyone can access their data without any prior permission. Also, many social networking land site no remittal concealment exercise set is still not safe such as in Face book, a ally of a ally who the substance abuser does not know can still see his information. However, even the safest secrecy circumstance; there are still flaws that allow attackers to access user's information

Selling out information to 3rd party members: An API (Application Program Interface) is given out to the third party developers by the social networking websites such as Face book in order give them access to develop their applications on the website. Social networking users are very well aware of these third party developers as well. Once the third party applications get the access to the data of the users', they can anytime use the data. It is also capable of publishing any unwanted information on user's page or user's friend's page without user's knowledge. Leakage of information to 3rd party domain: A lot of social networking sites these days are giving away the access to user's information or their activities to the 3rd party domains for the sake of their commercial benefit.

Identity Theft: The usage of one's identity or information as their identity in order to perform any malicious activities is known as identity theft. Attackers usually get attracted to the social networking sites as they tend to have continuous increase in the amount of information shared on them. Profile cloning is one of the types of identity theft. In this technique, people who are not careful are easily trapped and the trust of friends is also taken as an advantage, when they accept friend requests. Social phishing is another method that can be used to steal social network user's identity.

III. DATA MANAGEMENT

Data management is the organization, administration and governance of immense volumes of both structured and unstructured data.

The goal of immensely colossal data management is to ascertain a high caliber of data quality and accessibility for business astuteness and sizably voluminous data analytics applications. Corporations, regime agencies and other organizations employ sizably voluminous data management strategies to avail them contend with expeditious-growing pools of data, typically involving many TiB or even petabytes of information preserved in a variety of file formats. Efficacious sizably voluminous data management avails companies locate valuable information in immensely colossal sets of unstructured data and semi-structured data from a variety of sources, including call detail records, system logs and gregarious media sites.



Figure 6: Data Management

3.1 PROFILE CLONING

One technique of stealing social network user’s identity is called profile cloning. The main targets of profile cloning are users who set their profiles to be public. Public profile sanctions assailers to obtain profile information facilely, and ergo can duplicate or copy their profile information to engender an erroneous identity. There are two types of profile cloning. Subsisting Profile Cloning In subsisting profile cloning, assailers engender a profile of already-subsisting users by utilizing their denomination, personal information, as well as picture to increment reliance, and then sending friend requests to friends of that utilizer. This action is prosperous since most users accept friend requests from the person that they already ken without looking through it conscientiously. Additionally, it is possible that a person might have multiple accounts. If victims accept the friend requests, then assailers will be able to access their information. Cross-Site Profile Cloning In cross-site profile cloning, assailants purloin user’s profile from one gregarious networking site that users register an account, and then engender an incipient user’s profile on another gregarious networking site that utilizer has not registered on afore. After that, assailants use users contact list from the registered convivial networking site to send a friend requests to all those contacts in another convivial networking site. In this case, it is more convincing than the first case since there is only one account for that particular utilizer. Then, if the contacts accept friend request, assailants can access their profile.

3.2 SOCIAL PHISHING

In phishing attack, attackers provide a fake website that looks authentic to lure victims into providing their sensitive information such as password, financial information, or identification number to the website. Phishing attack together with personal information from social networks make the attack becomes more successful. Attackers can use the social engineering method by gathering data from social network users and then perform automated extraction of data to obtain context-information that is useful to trick users to the phishing site. For example, attackers can send a phishing website to victims by using the victim’s friend’s names.

IV. INTEGRITY AND REACTIVE SECURITY

In the end all that a user needs from any social networking site is that the site has to assure the three main aspects to be secure. They are Confidentiality, Integrity and Availability. These three are called as CIA triad, which is designed for information security within an organization.

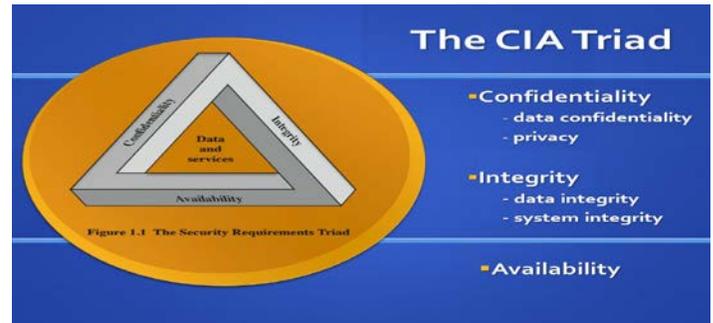


Figure 7: CIA Triad

4.1 CONFIDENTIALITY

Although privacy is traditionally treated as a part of confidentiality, we decided to change the order owing to the tremendous impact that privacy has on the general public’s perception of Big Data technology. The authors that approach this problem often propose new techniques such as computing on masked data (CMD), which improves data confidentiality and integrity by allowing direct computations to be made on masked data, or new schemes, such as Trusted Scheme for Hadoop Cluster (TSHC) which creates a new architecture framework for Hadoop in order to improve the confidentiality and security of the data.

4.2 INTEGRITY

Data integrity is the maintenance of the accuracy and assurance of data over its entire life cycle.

Any unintended changes to data as the result of a storage, retrieval or processing operation, including maleficent intent, unexpected hardware failure, and human error, is failure of data integrity. If the transmutations are the result of unauthorized access, it may withal be a failure of data security. Depending on the data involved this could manifest itself as benign as a single pixel in an image appearing a different color than was pristinely recorded.

4.3 AVAILABILITY

Data availability is the process of ascertaining that data is available to culminate users and applications, when and where they require it. It defines the degree or extent to which data is yarely utilizable along with the indispensable IT and management procedures, implements and technologies required to enable, manage and perpetuate to make data available.

Availability is best ascertained by rigorously maintaining all hardware, performing hardware repairs immediately when needed and maintaining a correctly functioning operating system environment that is free of software conflicts. It's additionally consequential to keep current with all indispensable system upgrades. Providing adequate communication bandwidth and averting the occurrence of bottlenecks are equipollent consequential Redundancy, failover, RAID even high-availability clusters can mitigate earnest consequences when hardware issues do occur. Expeditionary and adaptive disaster instauration is essential for the worst case scenarios; that capacity is reliant on the ease of a comprehensive disaster recovery plan (DRP). Safeguards against data loss or interruptions in connections must include capricious events such as natural disasters and fire. To obviate data loss from such occurrences, a backup copy may be stored in a geographically-isolated location, perhaps even in a fireproof, waterproof safe. Extra security equipment or software such as firewalls and proxy servers can sentinel against downtime and unreachable data due to maleficent actions such as denial-of-accommodation (DoS) attacks and network intrusions.

V. CONCLUSION

This paper provides an explanation of the research carried out in order to discover the main problems and challenges related to security in Big Data, and how researchers are dealing with these problems. The objective was achieved by following the systematic mapping study methodology, which sanctioned us to find the papers cognate to our main goal. Having done so, we discovered that the principal quandaries are cognate to the innate characteristics of an Astronomically immense Data system, and additionally to the fact that security issues were not contemplated when Astronomically Immense Data was initially conceived. Many authors, ergo, focus their research on engendering betokens to forefend data, categorically with deference to privacy, but privacy it is not the only security quandary that can be found in an Immensely colossal Data system; the traditional architecture itself and how to bulwark a Hadoop system is withal an astronomically immense concern for the researchers. We have, however, additionally detected a lack of investigations in the field of data management, especially with veneration to regime. We are of the considered opinion that this is not acceptable, since having a regime security framework will sanction the rapid spread of Sizably Voluminous Data technology. In conclusion, the immensely colossal Data technology seems to be reaching a mature stage, and that is the reason why there have been a number of studies engendered the last year. However, that does not betoken that it is no longer compulsory to study this paradigm; in fact, the studies engendered from now should fixate on more categorical quandaries. Furthermore, Astronomically Immense Data can be

subsidiary as a base for the development of the future technologies that will transmute the world as we optically discern it, like the Internet of Things (IoT), or on demand accommodations, and that is the reason why Astronomically immense Data is, after all, the future.

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The Increase in Prostate Specific Antigen Levels And It's Effect On Patient's Complete Blood Count In Okigwe Imo State, Nigeria

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Abstract- The increase of Prostate Specific Antigens levels and It's effect on patient's complete blood count was carried out in Okigwe Imo State. A total of 200 patients were examined Blood specimen was collected aseptically using standards microbiological laboratory techniques. The patients were examined for, prostate specific Antigen (PSA) (quantitative) and complete blood count (CBC) tests. Out of 200 patients tested for PSA level in study area, 119 (59.5%) patients were positive with PSA level of 4.0ng and above and 81(40.5) patients were negative with PSA level below 4.0 ng/ml. 71-80 years of age had the highest number of positive PSA of 45(21.0) while 21-30 years of age were all negative to PSA testing. In leucocytes, Erythrocyte and hemoglobin levels were shown that the most affected age groups was 80 years above. Mean Corpuscular Volume and Neutrophils of the patient's results were normal. Higher in age did not show much difference in Monocytes and Eosinophil but shown decreased in the younger age especially the age of 31 – 40 years group. The impact of PSA on hemoglobin level in the study population was showed that patients from the age of 60 years below had a little increase in PSA while patients from 70 years and above had decrease in hemoglobin and the PSA levels was increasing with age. It was shown that the higher the PSA level the lower the hemoglobin due to the high presence of heamaturia. Early detection of Prostate Specific Antigens can help the patient and the urologist in the treatment and as well prevent the patient from other complications.

Index Terms- Prostatitis, PSA, diagnosis, CBC, age and heamaturia

I. INTRODUCTION

Prostatitis is the microscopic inflammation of the tissue of the prostate gland and it is a diagnosis that spans a broad range of clinical conditions (Paul, 2017). The human prostate is a part of the male reproductive system. It is located anterior to the rectum, distal to the urinary bladder and wraps around the urethra. Due to its anatomical position, infectious agents can reach the prostate mainly through the urine or as ascending sexually transmitted infections. Serum PSA of quantitative method is the main diagnostic laboratory techniques that shows

(Ogwuegbu *et al.*, 2018) sign of a possible malignant process in the prostate gland (Polascik *et al.*, 2005),

A complete blood count (CBC) is a series of tests used to evaluate the composition and concentration of the cellular components of blood. The complete blood count (CBC) is the most commonly ordered blood test in a healthcare set up. (CBC) provide information about the patient general health, check for infection, check for bleeding which may lead to anemia and to provide a baseline to compare with future CBC's check during and after treatment. It is commonly performed on an automated hematology analyzer using well mixed whole blood that is added to a chemical called EDTA to prevent clotting (Briggs, 2001) and concentration of the cellular components of blood. A CBC is a group of tests used to quantify the number of RBCs, determine the percentage and absolute number of the five white blood cell types, and identify early and abnormal blood cells. The cells which are responsible for homeostasis and tissue repair are called the mean platelet volume (MPV) (Briggs, 2009).

MPV is associated with a lot of inflammatory processes like subclinical inflammation (in coronary ischemia, prostatitis, preeclampsia and stroke) or overt inflammation (in rheumatoid arthritis and inflammatory bowel disease) (Chio *et al.*, 2011).

II. AIM

This research is aimed at assessing the increase of prostate specific antigen levels and it's effect on patient's complete blood count in Okigwe Imo State, Nigeria

III. OBJECTIVES

To achieve the above aim the following objectives were targeted.

These include:

To determine the prevalence of Prostatitis among patients reporting for urological deficiencies.

To assess the hematological characteristics of blood specimens of the prostatitis patients using Complete Blood Count (CBC) test.

IV. MATERIALS METHODS

ETHICAL CLEARANCE: The clearance to obtain specimens and work with the people in the hospital was given by the Head Medical Director in charge of the location after submitting the clearance letter from the Abia State University Uturu ethical clearance committee to the hospital.

V. STUDY POPULATION

A total of 200 people were sampled in the location: the 200 patients were screened from Okigwe. (God Heals Hospital Okigwe). Their ages ranges from 21- 80 and above with 7 class intervals and they were placed in age bracket of 10 intervals (eg, 21-30, 31-40 etc).

VI. SPECIMEN COLLECTION FOR PROSTATE SPECIFIC ANTIGEN (PSA) TEST

1. About 3ml of Venous Blood of the target individual was withdrawn and put into a clean serum gel test tube (plan) and allowed to stand for 10-15 minutes to clot.
2. The blood specimen was capped and labeled.
3. This serum was collected with pipette and stored at 20°C until required for use according to the manufacturer's of the equipment instruction (cheesbrough, 2006).

VII. MATERIALS AND REAGENT FOR PSA TEST USING MICROPLATE READER

1. Antibody –coated microtiter plate with 96 wells
2. Zero buffer, 12 ml
3. Reference standard containing 0, 2, 4, 15, 50, and 100 ng/ml PSA, Liquid standard.
4. Enzyme Conjugate Reagent. 12 ml
5. TMB Substrate, 12 ml
6. Stop Solution, 12ml
7. Wash Buffer Concentrate ,15 ml
8. Control Set.
9. Precision pipette, 0.04 - 0.2 and 1.0 ml
10. Distilled water.
11. Absorbent paper.
12. A microtiter plate reader with a bandwidth of 10nm and optical density range at 450nm (Cheng-Ching *et al.*, 2015).

VIII. EXAMINATION OF PSA USING MICROTITER PLATE READER

All reagents were brought to room temperature and mixed by gently inverting the containers severally before use. The washing buffer was prepared by mixing 1 volume of wash buffer Concentrate into 60 ml of distilled water. The desired number of coated wells for the test were secured in the holder 50ul of standards, specimen and control was dispensed into the appropriate wells. 100ul of Zero Buffer was dispensed into each well. They were thoroughly mixed for 30 seconds. The mixed

samples were incubated at room (18-25°C) for 60 minutes in an incubator. The incubated mixture was removed by emptying the plate contents into a suitable waste container for disposal. The emptied microtiter wells were rinsed 5 times with distilled water. The wells were strike sharply onto absorbent paper to removed all the residual water droplets used. 100ul of Enzyme Conjugate Reagent was dispensed into each well and gently mixed for 10 seconds. The wells were incubated at room temperature (18-25°C) for 60 minutes. The incubated mixture was emptied into a suitable waste container. The well was rinsed and emptied 5 times with distilled water with washing buffer. The wells was stroked sharply onto absorbent paper to removed residual water droplets used. 100ul of TMB Reagent was dispensed into the wells and gently mixed for 10 seconds. It was incubated at room temperature for 20 minutes. The reaction of the mixture was stopped by adding 100ul of Stop Solution in each well and gently mixed for 30 seconds to make sure that the blue color changes to yellow color completely. It was read using microtiter plate reader at 450 density within 15 minutes (Cheng-Ching *et al.*, 2015).

IX. EXAMINATION FOR COMPLETE BLOOD COUNT (CBC)

- 3ml of Venous Blood of the patient was withdrawn and put into in a clean ethylenediamine tetre-acetic acid (EDTA) anticoagulant test tube bottle.
- The whole blood was well mixed in the sample tube by gently rotating the tube for 3 – 5 minutes.
- Sample “mode” button was selected.
- The sample tube was put under the aspiration pipette and the aspiration key was pressed for the aspiration of the blood sample.
- The instrument began analyzing the sample by displaying “testing” on the screen status bar.
- Complete blood count CBC) was analyzed using an automated hematology analyzer at 20°C within 5 minutes.
- The sample test window click print button was pressed to print the test report. (Chhabra, 2017)

X. RESULTS

The Prostate Specific Antigen quantitative results in study area were presented in Table. Table 1 : In Okigwe, out of 200 patients tested for PSA using quantitative method 119(59.5) patients are positive with PSA level of 4.0ng and above and 81(40.5) patients were negative with PSA level below 4.0ng. 71-80 years of age had the highest number of positive PSA of 45(21.0) while 21-30 years of age were all negative to PSA testing.

The age distribution of the patients in relation to the Leukocyte, Erythrocyte and hemoglobin levels in Okigwe were shown in (Fig 1) which they were not affected in the younger age. The most affected ages were the age of 80 years above which they were affected in Leucocytes, Erythrocytes and hemoglobin estimation. (Fig 2): Shows the MCV and Neutophils of the patients in Okigwe, it was observed that the result were all negative. (Fig 3) The MCHC and Lymphocyte in the studied

populations in Okigwe, it was observed that patient of 80 years and above had decrease in MCHC and a little decrease in lymphocyte. (Fig 4): The age distribution of RDW and MPV of the patient in Okigwe. It was also shown that patient from the age of 80 years and above had a little decrease in MPV and increase in RDW. The Monocyte, Eosinophil and Basophil of the patient in Okigwe shows in Fig 5 and it explained the patient's results on Monocyte, Eosinophil and Basophil, it was observed that higher in age did not show any much difference in Monocyte and eosinophil but shown a decrease in the younger age especially the

age of 31-40 years. Then Basophil was not seen all ages. (Fig 6): the levels of PCV and MCH of the patient in Okigwe, their result shown normal in the age of 60 years below while 70 years and above had decrease in both PCV and MCH. (Fig 7): the Impact of PSA on Hemoglobin level in Okigwe shows that Patient from the age of 60 years below had a normal level of Hb with little increase in PSA while patient from 70 years and above had decrease in Hemoglobin and the PSA levels was increasing with age.

Table 1: Age distribution of PSA levels in target population in Okigwe, Imo State.

Age	No. Patient Examine d	Normal 0-4ng/dl	4.1-10	10.1-20	20.1-30	30.1-40	40.1-50	50.1-60	70.1-100	Above 100ng/dl	PSA Positive patient
21-30	5(2.5)	5(6.1)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
31-40	12(6.0)	11(13.6)	1(5.9)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(0.8)
41-50	18(9.0)	10(12.3)	1(5.9)	1(6.2)	2(16.7)	1(5.3)	1(5.0)	2(12.5)	0(0.0)	0(0.0)	8(6.7)
51-60	35(17.5)	15(18.5)	4(23.5)	5(31.2)	2(16.7)	2(10.5)	4(20.0)	3(18.7)	0(0.0)	0(0.0)	20(16.8)
61-70	50(25.0)	22(27.1)	8(47.0)	5(31.2)	2(16.7)	7(36.8)	3(15.0)	2(12.50)	1(11.1)	0(0.0)	28(32.5)
71-80	60(30.0)	15(18.5)	3(17.6)	5(31.2)	5(41.7)	7(36.8)	10(50.0)	5(31.20)	5(55.5)	5(50.0)	45(21.0)
Above 80	20(10.0)	3(3.7)	0(0.0)	0(0.0)	1(8.3)	2(10.5)	2(10.0)	4(23.50)	3(33.3)	5(50.0)	17(14.3)
Total	200(100)	81(40.5)	17(8.5)	16(8.0)	12(6.0)	19(9.5)	20(10.0)	16(8.0)	9(4.5)	10(5.0)	119(59.5)

- Positive PSA level refers to those with PSA value of 4.0ng/l and above
- Those in brackets are the percentage values.

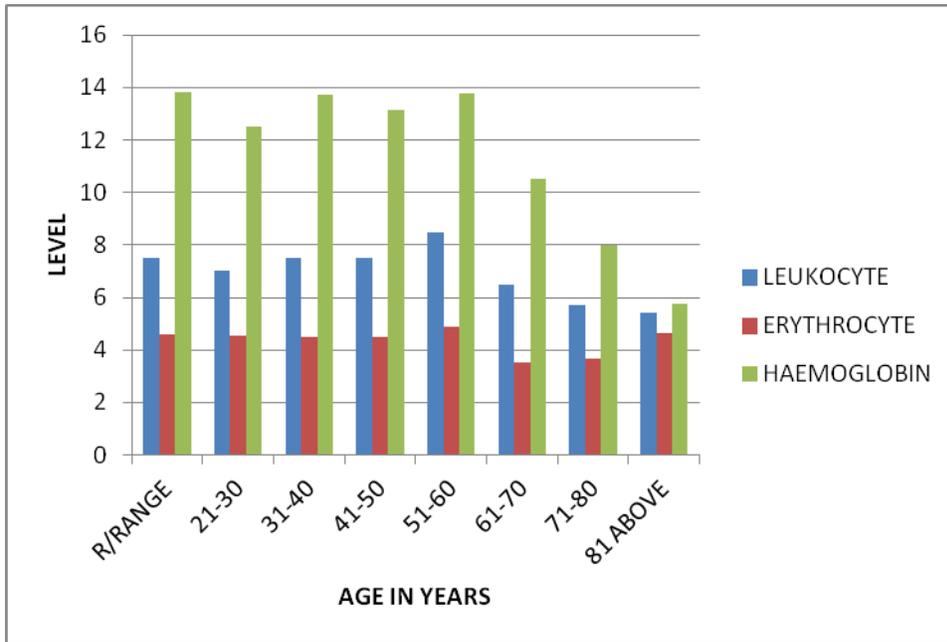


Fig. 1: The age distribution of the patients in relation to the Leukocyte, Erythrocyte and hemoglobin levels in Okigwe

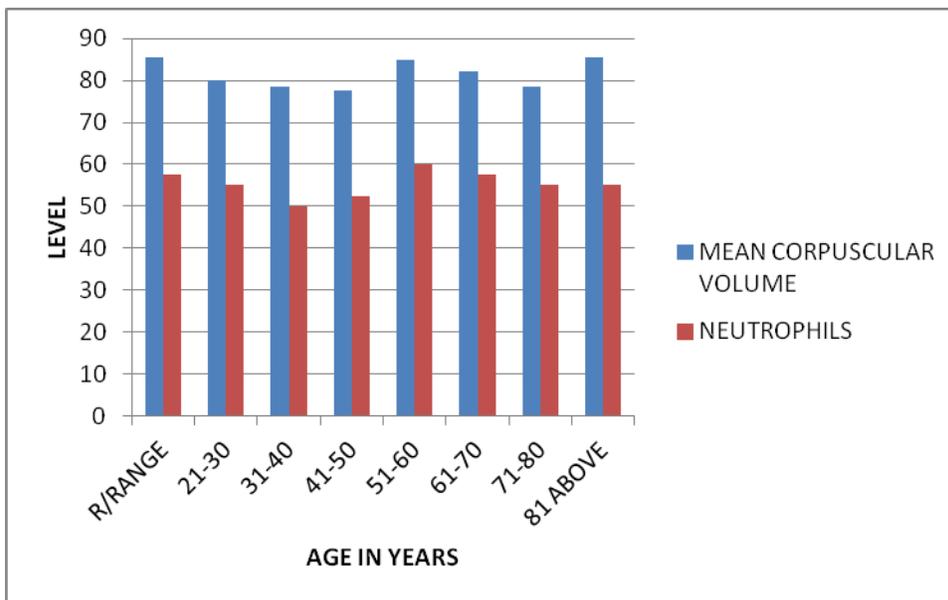


Fig.2 : Shows the MCV and Neutophils of the patients in Okigwe

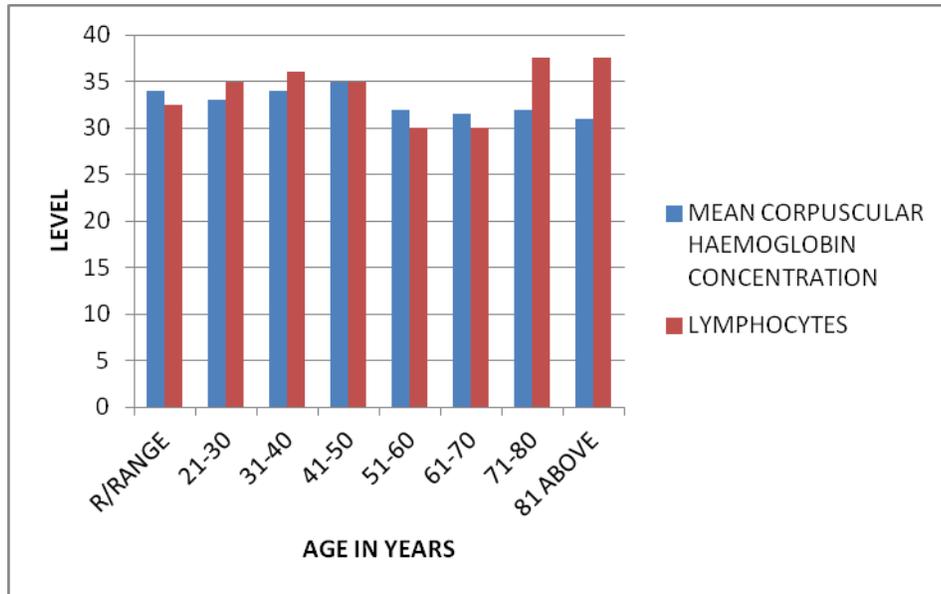


Fig. 3: The MCHC and Lymphocyte in the studied populations in Okigwe

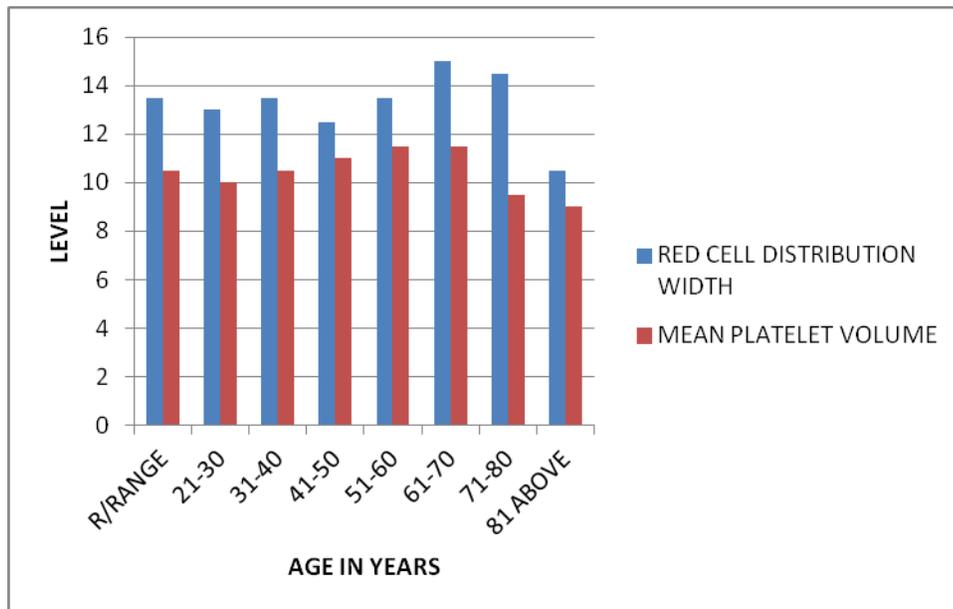


Fig. 4: The RDW and MPV of the patient in Okigwe

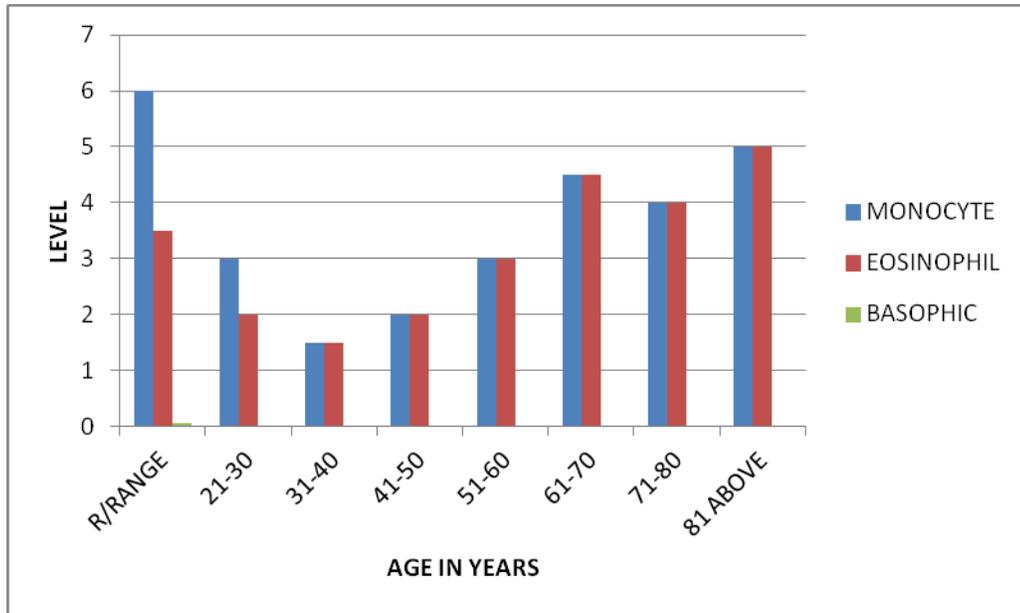


Fig. 5: The Monocyte, Eosinophil and Basophil of the patient in Okigwe

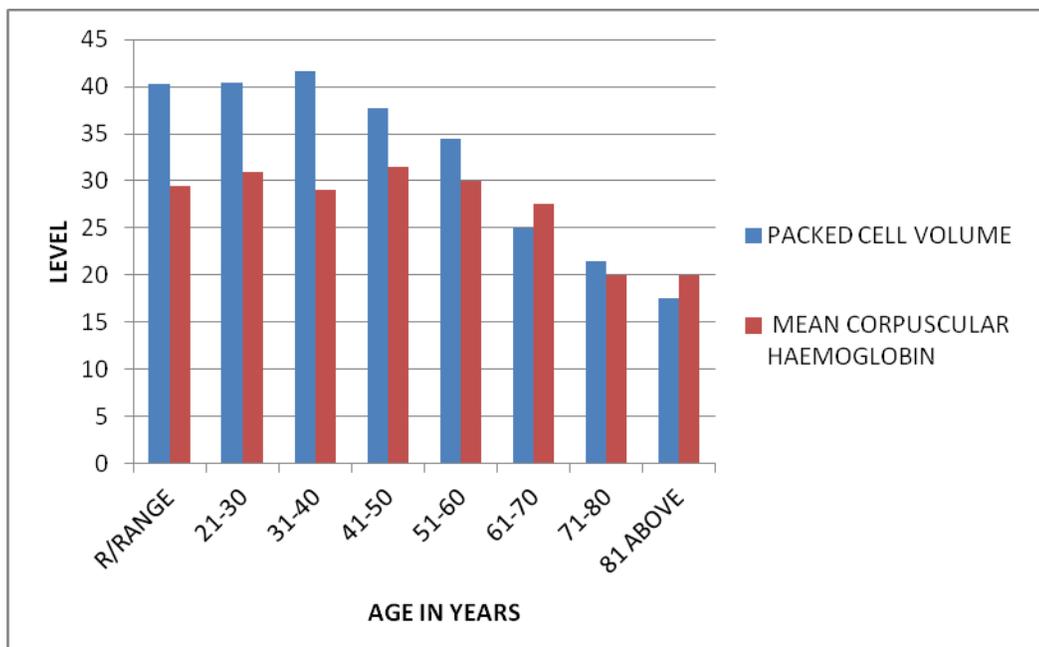


Fig. 6: The levels of PCV and MCH of the patient in Okigwe.

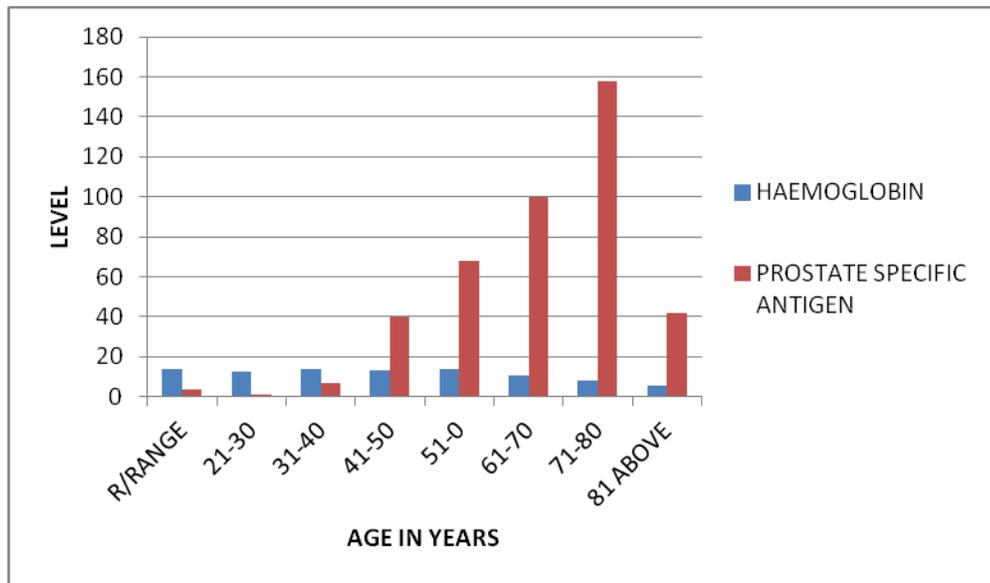


Fig. 7: Impact of PSA on Hemoglobin level in Okigwe.

XI. DISCUSSION

In this study, prostate specific Antigen (PSA) screening test was carried out in Okigwe and Umuahia for a period of 6 calendar months. In Okigwe, the prevalence of PSA was 119(59.5%) patients are positive with PSA level of 4.0ng and above and 81(40.5) patients were negative with PSA level below 4.0ng. From 71-80 years of age had the highest number of positive PSA of 45(21.0) while 21-30 years of age were all negative to PSA testing. The results found in this work showed that age affects the levels but present result showed that the oldest group had prostatitis often; this is in accordance with those of Sharp *et al.*, (2010). Whereas Nickel *et al.*, (2001) found a slightly higher prevalence of prostatitis in the age group below 50 years than among man over 51 years of age. Anyway, older men also have a longer time to develop the disease than their younger counterparts (Ogwuegbu *et al.*, 2018).

In this research, it was observed that the their CBC especially the Hemoglobin were affected in their ages and the levels of their PSA results which showed that patients from 70 years and above had decrease in hemoglobin estimation and patients from 60 below had a normal level of hemoglobin estimation with decrease in PSA levels. Basophiles were not seen in all ages. Age and prostatitis showed a great effect on the patient's CBC which is in line with Felrker *et al.*, (2007).

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Analysis of Students' Thinking Process in Solving Comparison Story Questions

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Abstract- Solving mathematical problems is the focus of mathematics learning which develops students' reasoning skill. This qualitative research aims at identifying the thinking process of students in solving comparison story questions. The subject of this research includes 6 students of Mathematics Education from Universitas Wisnuwardhana, Malang, East Java. The techniques of data collection are essay test and semi-structured interview. Resource triangulation technique is used as the analysis technique. According to the students' work, the result shows that in solving comparison story questions for scale on map, there are 2 students used conceptual thinking process, 1 student used semi-conceptual thinking process, 1 student used intuitive thinking process, and 2 students used semi-conceptual and conceptual thinking process.

Index Terms- Thinking process, computational thinking, procedural thinking, semi-conceptual thinking, comparison.

I. INTRODUCTION

Thinking is a process which produces new mental representation through transformation of information involving complex interaction between mental attributes. These mental attributes are abstraction, logic, imagination, and problem solving [1]. Problem solving has a prominent place within scientific reasoning because of its impact on changes and increasing emotional, cognitive, and psychomotor development. The relation between thinking and problem solving considers problem solving consisting of basic processes, strategies, and knowledge resources [2]. Problem solving is the heart of mathematics and problem solving in mathematics lies in that it is the goal and final outcome of the learning and teaching process, as problem solving is perceived as the right way toward practicing thinking in general. In other words, there is no math without thinking and there is no thinking without problem. Problem solving skills are important in order to develop the abilities of solving problem in mathematics and finding the solution of problems in daily life. Students can apply their knowledge and problem solving skills to be useful in daily life and a variety of unfamiliar situations. On the other hand,

problem solving is also a skill that helps individuals in developing logical thinking and improving their decision making skills by the use of logical processes such as induction and deduction, as well as using algorithms when needed to work out daily situations [3,6].

Problem solving is a process which begins with the initial contact with the problem and ends when the answer is received in the light of the given information. Problem solving is a complex process to learn and multiple set of step process where the problem solver must find the relationship between past experience and the problem at hand then act upon a solution [4]. Component in problem solving consists of cognitive, behavioral, and attitudinal. Problem solving ability according to Polya (1973) is identified as the ability to 1) understanding the problem; 2) devising plan; 3) carrying out the plan; and 4) looking back [4,5,7]. Analog, Herald suggest that one may solve daily problems using a method I.D.E.A.L, where each letter of the acronym represents a step in the problem solving process, presented i.e. 1) identify the problem; 2) describe the possibilities; 3) evaluate the ideas; 4) act out a plan; 5) learn for the future [6].

Every stage of problem solving, according to Polya, lies the thinking process which takes place inside it. Thinking process is a sequence of mental events happening naturally or planned and systematic in a context of time, space, and media used which produce an object change influencing them. Process of thinking includes manipulating and transforming information into memory which are often done in order to form reasoned concept, critical thinking, decision making, creative thinking, and problem solving [8,9]. Thinking process is categorized into 3 kinds namely 1) conceptual thinking process, 2) semi-conceptual thinking process, and 3) computational thinking process. Conceptual thinking process is a way of thinking which always solve problems using owned concept based on the result of assessment. Semi-conceptual thinking process is a way of thinking which, in solving problem, tends to use concept but with less understanding of that concept so that the completion is mixed with intuitive way of completion. Computational thinking

process is a way of thinking that generally, in solving problem, tends to use intuition. The indicator to identify the thinking process includes the ability to express what is known from the question with student's own sentences, the ability to answer which has the tendency to use the concept that has been learned before, and the ability to mention the elements of concept [10]. Therefore, the goal of this research is to analyze students' process of thinking in solving comparison story questions.

II. METHOD

Participant

This research is descriptive qualitative research with 6 students of Mathematics Education from Universitas Wisnuwardhana, Malang, East Java, as the subjects of the research.

Instruments and Data Collection Technique.

The technique of data collection in this research is giving tests and semi-structured interview. The instruments of this research are essay test and interview guidelines. The essay test consists of 5 scale and map comparison questions. In this material, there are three variables such as 1) actual distance, 2) scale, and 3) distance on map. The relationship can be formulated in the following.

$$\text{scale} = \frac{\text{size on image}}{\text{actual size}}$$

Scale 1: n means that 1 cm size on the image represent n cm to the actual size. There are 2 factors as in the following.

1. Diminution factor: Scale = 1: n where the actual size is minimized.
2. Magnification factor: Scale = n : 1 where the actual size is enlarged.

The 5 questions include 1) actual size determination question if the scale and size on the image are known; 2) scale determination question if the size on the image and actual size are known; 3) size on the image determination question if the scale and actual size are known; 4) actual size determination question if the model of image is minimized and 5) size determination question if the image is enlarged. Below is the example of the questions.

Question 1

Two cities has a distance of 15 km and will be drawn on the map with the scale of 1:250.000. Determine the distance of both cities on the map!

Question 2

The distance of two ports is 240 km. If the distance of both ports on the map is 8 cm, determine the scale!

Question 3

A map is made with the scale of 1:350.000. If the distance between two cities is 4.2 cm, determine the actual distance!

Question 4

A map has a scale of 1:1.500.000. The map is 80% copied. If the distance between two cities is the result of map's copy which is 4,8 cm then determine the actual distance of both cities!

Question 5

A map has a scale of 1:350.000. The map is 120% photocopied. If the actual distance is 17.5 km, then determine the distance between both cities on the map that is the result of photocopy!

Data Analysis Technique

The data analysis technique of this research is the resource triangulation technique.

III. RESULT

The students' thinking process in solving comparison story questions is in the following.

Question 1

In answering question 1, there are several subjects who answered systematically correspond with Polya's stages. Some subjects directly answered. Below is the subject's answer for Question 1.

Handwritten student answer for Question 1. It includes a diagram with two points labeled 'kota 1' and 'kota 2' connected by a line labeled '15 km'. Below the diagram, the student writes: 'skala 1: 250.000', '15 km = 1500.000 cm', and 'Jarak Pd Peta = 1500.000 x 1/250.000 = 6 cm'.

Figure 1. Answer of Subject 1 to Question 1

Handwritten student answer for Question 1. It shows a calculation: 'Jarak sebenarnya = 15 km', 'Skala 1: 250.000', 'Skala = JPP : JS', 'JPP = 15 km', '1 : 250.000', and a final calculation '30/5 = 6 cm'.

Figure 2. Answer of Subject 4 to Question 1

First stage, Subject 1 represented the understanding of the question given in the form of image. On the other hand, Subject 4 represented the answer with sentences. Second stage, Subject 1 made a stair of unit length then continue to analyze the relationship between the scale on the map and the actual distance while Subject 2 formulated a formula that is:

$$\text{Scale} = \text{DM (distance on the map)} : \text{AD (actual distance)}$$

Third stage, Subject 1 and Subject 4 did a calculation resulting of the distance on the map as 6 cm. For the fourth stage, Subject 1 and Subject 4 did a recheck. Subject 1 and Subject 4 used the conceptual thinking process because they have understood the scale concept on the map and applied it in order to solve the given question.

The answer of Subject 2 can be seen in the next Figure 3.

Jarak = 15 km = 1500
 Skala = 1 : 250.000
 Jarak ko 2 kota = 250.000
 Jarak 2 kota $\frac{1}{250.000} \times 1500.000 = 6 \text{ m}$

Figure 3. Answer of Subject 2 to Question 1

First stage was done by Subject 2 in understanding the problem given by writing the acquired information which are a distance of 15 km = 1500; scale of 1:250.000 and distance of both cities= 250.000. Based on the result of Subject 2's work, it can be seen that this subject did not understand the conversion of unit length from kilometer to meter. Besides, Subject 2 did not understand the meaning of 1:250.000 scale. Therefore, Subject 2 interpreted 1:250.000 as the distance of both cities such as 250.000 km. Second stage, Subject 2 thought about the relationship of scale, actual distance, and distance on the map. This subject could understand the relationship of the three so that Subject 2 wrote 6 as the result of stage 3. However, unit length used in the calculation was still incorrect. In the final stage, Subject 2 did not recheck the answer given. According to the answer of Subject 2, the thinking process used is the semi-conceptual thinking process. It is shown that Subject 2 actually understood the concept of scale on the map but the subject was not careful in calculating the answer so that the subject only interpreted some parts of the information there.

The answer of subject 3 can be seen in the following Figure 4.

di ketahui Jarak 2 kota 15 km, skala 1 : 250.000
 $15 \times \frac{1}{250.000} = 16,6 \text{ cm}$
 1000

Figure 4. Answer of Subject 3 to Question 1.

The first step done by Subject 3 was writing the known information from the question then Subject 3 did not do a reflection on the relationship of scale, actual distance, and the distance on the map. Subject 3 directly did the algebra operation resulting 16,6 cm as the answer. Finally, Subject 3 did not reevaluate. The thinking process done by Subject 3 is intuitive thinking process because Subject 3 did not understand the concept and used the intuition to understand the relationship between scale on the map and the actual distance in order to determine the distance on the map.

The answer of Subject 5 can be seen in Figure 5.

$15 \text{ km} = 15 \text{ km} \cdot \frac{10^5 \text{ cm}}{1 \text{ km}}$
 $= 15 \cdot 10^5 \text{ cm}$
 Jarak pada peta = $\frac{15 \cdot 10^5 \text{ cm}}{250.000} = 6 \text{ cm}$

Figure 5. Answer of Subject 5 to Question 1

Subject 5 has understood the question and the concept on Question 1. The first step done in order to solve this question was

by converting the unit length from 15 km to $15 \cdot 10^5$ cm. Then, Subject 5 enter the formula in order to determine the distance on the map resulting 6 cm as the answer. The thinking process used is conceptual thinking process.

The answer of Subject 6 can be seen in the next Figure 6.

$\frac{1500.000}{250.000} = 6 \text{ cm}$

Figure 6. Answer of Subject 6 to Question 1.

Subject 6 did not do Polya's stages in sequence. The subject remembered what the teacher taught that the relationship of the actual distance (AD) is the multiplication of distance on the map (DM) with the scale on the map (SM) pictured in the image below.

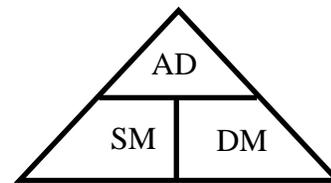


Figure 7. Relationship of actual distance, distance on the map, and scale on the map.

According the interview, Subject 6 directly answered with formula taught and the subject understood about map scale question that needed to be equalized first. The result was 6 cm. The thinking process used is semi-conceptual thinking process.

Question 2

In answering Question 2, there are several subjects answered systematically with Polya's stages. There are some subjects directly answered and even did not answer the question. The subjects' answers to Question 2 are as follow.

240 km
 P. 1 P. 2 P. 3 P. 4 P. 5 P. 6 P. 7 P. 8
 $240 \text{ km} = 24000000 \text{ cm}$
 Jarak peta
 Skala $\Rightarrow 8 : 24000000$
 Skala 1 : 3000000

Figure 8. Answer of Subject 1 to Question 2

Jarak sebenarnya = 240 km = 24.000.000 cm
 Jarak peta = 8 cm
 Skala = $\frac{8}{24.000.000} = \frac{1}{3.000.000}$

Figure 9. Answer of Subject 4 to Question 2

Analog of the completion of Question 1 in the first stage is that Subject 1 represented the understanding of the question given in the form of image while Subject 4 represented the answer with sentences. Second stage, Subject 1 conversed the unit length made in Question 1 the the subject made a comparison of

distance on the map with the actual distance in order to acquire the map scale such as:

$$8 : 24.000.000 \Leftrightarrow 1 : 3.000.000$$

On the other hand, Subject 4 made a stair of unit length first before making the comparison of distance on the map with the actual distance. The thinking process used is Conceptual thinking process.

The answer of Subject 2 can be seen in the Figure 10.

Figure 10. Answer of Subject 2 to Question 2.

Subject 2 directly answered and determined the scale of the map by comparing the distance on the map and the actual distance. According to the interview, Subject 2 explained the formula to determine the scale of the map. Subject 2 was incorrect in giving the period sign so that the scale acquired was 1:300.0000 not 1:3.000.000. Therefore, the thinking process of this subject is semi-conceptual thinking process.

The answer of Subject 3 can be seen in the Figure 11.

Figure 11. Answer of Subject 3 to Question 2.

Subject 3 did not answer the Question 2 because the subject was confused and could not formulate the solution to the problem.

The answer of Subject 5 can be seen in the next Figure 12.

Figure 12. Answer of Subject 5 to Question 2.

Analog to Question 1, Subject 5 has understood the concept of Question 2 where the first step taken by the subject in order to solve the problem was converting the unit length of 240 km to 240 · 10⁵cm. Then, the subject entered it to the formula to determine the scale resulting 1:30(10⁵) = 1:3000000. The thinking process used is conceptual thinking process.

The answer of Subject 6 can be seen in the following Figure 13.

Figure 13. Answer of Subject 6 to Question 2.

Based on the answer of Subject 6 on Figure 13, it can be seen that Subject 6 in determining the scale of the map used the division of distance on the map with the actual distance by converting the unit length first. The process of thinking used is semi-conceptual.

Question 3

Based on the results of all 6 subjects, all of them did not write what was known but they understood the meaning of question number 3. All of the subjects directly used the formulated formula. The error happened was that the students were incorrect in calculating or including the unit length. The answers of the students for question 3 are as follow.

The answer of Subject 4, 5, 6, and 2 can be seen in the following Figure 14, 15, 16, and 17.

Figure 14. Answer of Subject 4 to Question 3

Figure 15. Answer of Subject 5 to Question 3.

Figure 16. Answer of Subject 6 to Question 3.

Figure 17. Answer of Subject 2 to Question 3.

Based on the results of the answers and the interview on Subject 4,5,6 above, basically they already understood the meaning of question number 3 and they understood in determining the actual distance acquired from multiplying the distance on the map with the scale. However, the difference was that the step on each of the calculation. Meanwhile, Subject 2 wrote the information known from the question first then determined the actual distance by multiplying the scale and the distance on the map divided with the actual distance. In formulating the formula or determining the equal comparison, Subject 2 made some error. The process of thinking used by the three subjects is conceptual thinking process while Subject 2 used the semi-conceptual thinking process.

The answer of Subject 1 can be seen in the next Figure 18.



Figure 18. Answer of Subject 1 to Question 3.

Analog on questions 1 and 2, in order to understand the question given, Subject 1 used image representation. To determine the actual distance, Subject 1 used the equal comparison but the result obtained was incorrect because the subject made error in multiplying 4.2 with 350.000. The process of thinking used is conceptual thinking process.

The answer of Subject 3 can be seen in Figure 19.

$$1: 350.000 \times 4,2 = 350.000 \text{ cm} = 350 \text{ km.}$$

Figure 19. Answer of Subject 3 to Question 3.

Based on the result of the interview, Subject 3 was still confused to determine the actual distance and the result was also incorrect. The process of thinking used is intuition.

Question 4 and Question 5 were the question about the scale of the map that have been minimized and enlarged. Based on the students' answers, some students could solve the questions and some students could not. For questions number 4 and 5, the students who could solve them were only 3 students which were Subjects 1, 5, and 6. The results of question number 4 can be seen on Figures 1, 5, and 6. Also, the results of question number 4 can be seen on Figure 20, 21, and 22. For question number 5, it can be seen on Figure 23, 24, and 25.

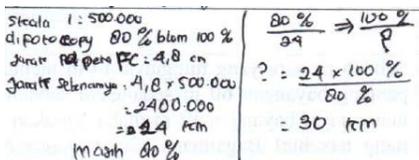


Figure 20. Answer of Subject 1 to Question 4.

$$\begin{aligned} \text{Jarak peta asli} &= \frac{4,8 \text{ cm}}{80\%} = 6 \text{ cm} \\ \text{Jarak sesungguhnya} &= \frac{6 \text{ cm}}{1/500000} = 3000000 \text{ cm} = 30 \text{ km} \end{aligned}$$

Figure 21. Answer of Subject 5 to Question 4.

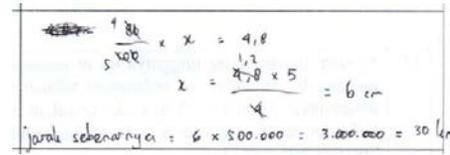


Figure 22. Answer of Subject 6 to Question 4.

Based on Figures 20 and 21 above, Subject 1 wrote the information known, then the subject determine the actual distance by multiplying the distance on the map that had been 80% minimized with 100% scale of the map then the result was the distance on the map that has been minimized. Meanwhile, Subject 5 did not wrote the information known in the question but directly determined the distance on the actual map and resulting the distance on the map which was 6 cm. Next, the subject determined the actual distance with the distance on the map formula divided with the scale (in fraction). For the answer of Subject 6 (Figure 22), in the beginning the subject determined variable x that symbolized the distance on the actual map. The subject determined x then determined the actual distance. The result of the actual distance was 30 km. The process of thinking used by the three subjects is conceptual thinking process.

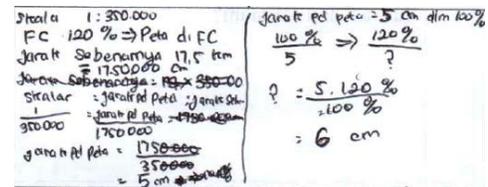


Figure 23. Answer of Subject 1 to Question 5

$$\begin{aligned} \text{Jarak peta asli} &= 17,5 \text{ km} \cdot \frac{1}{350000} = 5 \text{ cm} \\ \text{Jarak peta fotocopy} &= 120\% \cdot 5 \text{ cm} = 6 \text{ cm} \end{aligned}$$

Figure 24. Answer of Subject 5 to Question 5.

$$\begin{aligned} \frac{120}{100} \times 3,5 &= x \\ x &= 4,2 \text{ km} \\ \text{jarak peta fotocopy} &= \frac{2100000}{350000} = 6 \text{ cm} \end{aligned}$$

Figure 25. Answer of Subject 6 to Question 5.

Based on Figure 23, Subject 1 wrote the known information, then determined the distance on the map which has not been enlarged. Next, the result on the map was made to a comparison that had the same value as the distance when the map was enlarged 120%. Analog on the answer of Subject 1, Subject 5 didn't wrote information of the problem and he only solve the answer. In the beginning, the subject determined the distance on the actual map then multiplied it with 120% to get the distance on the map that had been enlarged 120%. For the answer of Subject 6 (Figure 25), the subject first determined the x as the actual distance for the map photocopied 120% and got the result of 21 km. Then the value of x was converted into meter and divided by the scale. The result of the distance on the map

obtained was 6 cm. Even though the final result was the same, the thinking logic of Subject 6 was still based on the formula on Figure 7 without seeing the content which was that the actual distance would still be the same even though the map was enlarged. If the map was enlarged or minimized, the ones undergone changes was the distance on the map and the scale remained the same. The process of thinking used by both subjects was the conceptual thinking process.

The answer of Subject 2 to Question 4 can be seen in Figure 26.

Scale 1: 500.000
 $\frac{1}{500.000} \times \frac{4,8}{x} = \frac{80}{100}$
 $x = 24$

Figure 26. Answer of Subject 2 to Question 4.

In the beginning, Subject 2 wrote the scale of 1:500.000 and formed it as a fraction. Next, the subject multiplied the scale with 4,8 divided by x. The value of x in this context was the actual distance. It should not be multiplied, but the subject should form the comparison equal to the following.

$$\frac{1}{500.000} = \frac{4,8}{x} \Leftrightarrow x = 4,8 \times 500.000$$

$$\Leftrightarrow x = 2.400.000 \text{ cm} = 24 \text{ km}$$

The value showed the actual distance on the map that had been minimized 80% and to determine the actual distance on the actual map there should be a formulation of a comparison as follows.

$$\frac{80}{100} = \frac{24}{x} \Leftrightarrow x = \frac{2400}{80} = 30 \text{ km}$$

It shows that Subject 2 understood the concept but was not entirely correct so that the thinking process used is semi-conceptual.

The answer of Subject 4 on Question 4 can be seen in Figure 27.

1 : 500.000
 JPP : JS
 $\frac{4,8}{1} = \frac{JS}{500.000}$
 $JS = 4,8 \times 500.000$
 $JS = 2400.000$
 $JS = 24 \text{ km}$

Figure 27. Answer of Subject 2 to Question 4.

Based on the answer of subject 4 above, it shown that Subject 4 formed a comparison equal to determining the actual distance which was 24 km. Though the subject did not understand that it was for 80% minimized map while the actual distance to the actual map had not been determined yet by the subject. The thinking process used is semi-conceptual thinking process.

The answer of Subject 3 on Question 4 can be seen in the following Figure 28.

$\rightarrow \frac{1:500.000}{?} = \frac{80\%}{4,8}$

Figure 28. Answer of Subject 3 to Question 4.

Subject 3 actually could determine the comparison equal to question number 4 though not entirely correct. The subject solved the problem to have the actual distance. According to the interview result, Subject 3 was in doubt with the comparison equal to the one the subject made so that the subject did not continue the calculation. The thinking process used is intuitive thinking process because the subject could not relate to the concept.

The answer of Subject 2 on Question 5 can be seen in Figure 29 below.

Scale = 1: 350.000
 Peta Fc = 120%
 Jarak shornya = 17,5 km
 $\frac{1}{350.000} \times \frac{x}{17,5}$
 $x = 61,05$

Figure 29. Answer of Subject 2 to Question 5.

Based on Subject2's answer above 2 (Figure 29), it should not be a multiplication operation but rather a comparison equals to the following.

$$\frac{1}{350.000} = \frac{x}{17,5 \text{ km}} \Leftrightarrow \frac{1}{350.000} = \frac{x}{1750000}$$

$$\Leftrightarrow x = \frac{1750000}{350000} = 5 \text{ cm}$$

After this the distance on the map that had been enlarged 120% should be determined. After being interviewed, Subject 2 actually understood about the question but the subject was confused in making the equal comparison. The process of thinking used was semi-conceptual thinking process.

The answer of Subject 3 on Question 5 can be seen in Figure 30.

$\frac{1:350.000}{?} = \frac{120\%}{17,5}$

Figure 30. The answer of Subject 3 to Question 5.

Analog on the answer of Question 4, the subject actually could determine the equal comparison from the question number 5 though not entirely correct. The subject could not solve the problem to get the distance on the map. Based on the interview result, Subject 3 was in doubt with the equal comparison made so that the subject did not continue it. The thinking process used is intuitive thinking process because the subject could not relate it with the concept.

The answer of Subject 4 on Question 5 can be seen in the following Figure 31.

JPP : JS
 $\frac{1}{350.000} = \frac{JPP}{17,5 \text{ km}}$
 $\frac{1}{350.000} = \frac{JPP}{1750.000}$
 $JPP = 5 \text{ cm}$

Figure 31. Answer of Subject 4 to Question 5.

Analog to question number 4, according to Subject 4’s answer, the subject formulated the equal comparison in order to determine the distance on the map resulting 5 cm. However, the subject did not understand that it was for 120% enlarged map. The thinking process used is semi-conceptual thinking process.

IV. DISCUSSION

Based on the students’ work results, their process of thinking in solving the comparison question for the scale on the map can be seen on the following Table 1.

Table 1. The Student’ Process of Thinking

	Question 1	Question 2	Question 3	Question 4	Question 5
Subject 1	C	C	C	C	C
Subject 2	SC	SC	SC	SC	SC
Subject 3	I	-	I	I	I
Subject 4	C	C	C	SC	SC
Subject 5	C	C	C	C	C
Subject 6	SC	SC	C	C	C

Information: C = Conceptual; SC = Semi Conceptual and I = Intuition

Based on Table 1, it can be seen that in solving the map scale comparison story question, there are 2 subjects who used the conceptual thinking process, 1 subject who used semi-conceptual thinking process and 1 subject who used intuitive thinking process when solving a variety of questions; there was 1 subject that used the conceptual process of thinking when solving basic questions (principal) and used the semi-conceptual when solving developing questions; and also there was 1 subject that used semi-conceptual thinking process when solving basic questions and used the conceptual process of thinking when solving developing questions. Basicly, student’s thinking process until conceptual level but not all student until this level. Lecture must design the learning that can improve thinking process level.

V. CONCLUSION

The result of the research shows that in solving the map scale

comparison story questions, there were 2 students that used the conceptual thinking process, 1 student that used the semi-conceptual thinking process, 1 student that used the intuitive thinking process, and also 2 students that used semi-conceptual and conceptual thinking process.

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An Assessment on the Implementation of Local Government Financial Decentralization in Tanzania: A Discrepancy between Theory and Practice

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Abstract

Tanzania saw the significance of moving to local government financial decentralization from 1990s. Such commitment is evidenced on the policy paper on local government reform of October, 1998 which aimed towards the shared vision for local government in Tanzania, and the main strategy of achieving it was through decentralization by devolution. Tanzania has been implementing a particular vision from 2000s of which its part includes financial decentralization. The study assesses the implementation of Local Government financial decentralization in Tanzania engrossing on the discrepancy between theory and practice. It is the view of the study that, the implementation of Local Government financial decentralization in Tanzania still is passing into a difficult situation. Also, the study opines that, local government stakeholders need to rethink about the progress and commitments towards fully local government financial decentralization.

Key words: Discrepancy, Financial Decentralization, Local Government Authorities

1. Introduction

Local government in Tanzania is a non-union matter. The study centers itself in local government authority in Tanzania mainland. It is however, established under the Constitution of the United Republic of Tanzania of 1977, Article 145 (establishment) and Article 146 provides the purpose for establishing Local government authorities.

Article 145 provides that;

- (1) *“There shall be established local government authorities in each region, district, urban area and village in the United Republic, which shall be of the type and designation prescribed by law to be enacted by Parliament or by the House of Representatives”.*
- (2) *“Parliament or the House of Representatives, as the case may be, shall enact a law providing for the establishment of local government authorities, their structure and composition, sources of revenue and procedure for the conduct of their business”.*

Basing on Article 145 (2) of the constitution of the United Republic of Tanzania, the establishment of local government authorities is empowered by two significant legislations. This is for the reason that, local authorities are divided into urban authorities and rural (District authorities). On the side of rural (Authorities), local government is established under local government (District Authorities) Act. No. 7, 1982, and on the other side of urban authorities, they are established under the local government (Urban authorities) Act. No. 8 of 1982.

The purpose of local government authorities in Tanzania is to transfer authority to the people and power to participate and to involve people in the planning and implementation of development programmes within their respective areas, as Article 146 (1) of the constitution of the United Republic of Tanzania of 1977 provides. The Article provide that,

“The purpose of having local government authorities is to transfer authority to the people. Local government authorities shall have the right and power to participate, and to involve the people, in the planning and implementation of development programmes within their respective areas and generally throughout the country”.

Local government in Tanzania are holistic (multi-sectoral, government units with a legal status (body corporates)), operating on the basis of specific and discretionary powers under the legal framework provided by the national legislation. Local government in Tanzania have the functions of social development and public service delivery, facilitation of maintenance of law and order and promotion of local government under participatory process. They are administered through local councils which is responsible for overseeing local government activities. Councils are the highest decision making body within their localities (REPOA, 2008).

However, Local Government in Tanzania has outstanding history. It has passed through important epochs trending even before colonialism. Other epochs includes independence period (1961-1971), decentralization period (1972-1980s) and reform period (1980s to present). For the sake of this study, the focus is the reform era (Warioba, 1999, Mmari, 2005).

From 1990s, the government of Tanzania decided to embark on reform agenda which aimed at strengthening and improving governance in the country. The Local Government Reform Programme (LGRP) was among the important reforms initiated by the government in this period. The Local government reform programme intended to improve local governance and service delivery with the aim of achieving Tanzania poverty reduction target (Tidemand & Msami, 2010).

The local government reform programme is articulated in the policy paper on local government reform. The reform is based on the CCM election manifesto of 1995, recommendations of national conference on a shared vision of local government in Tanzania, the local government reform agenda, discussion and recommendations with Association of Local Government Authorities of Tanzania (ALAT), representatives from local authorities, sector ministries and other central government organs (Policy paper on LG reform, 1998).

The local government reform stresses at the shared vision of the future local government system which its objective is improving the public service delivery and its main strategy being decentralization. Four important policy areas were stressed including; Political decentralization, Administrative decentralization, Financial decentralization and Changed central local relations. The programme was initiated from 1998 (Policy paper on LG reform, 1998).

In financial decentralization, the main focus was that, local councils to have financial discretionary powers and powers to levy tax. The central government had to be left with obligation to supply to local government's unconditional grants and other forms of grants. Also, financial decentralization empowered local councils to pass budget reflecting their own priorities and mandatory expenditure required by legislation reflecting the national standards (REPOA, 2008).

Du reste, in order to implement the reform, the policy advised the changes of relevant laws to be made to establish legal bases to guide the process. The government began to implement the local government reform programme from 2000 and it has been in the process of implementation (Tidemand & Msami, 2010).

The study focuses on assessing the implementation of local government reform programme on financial decentralization. Several efforts have been made by the government in order to achieve financial decentralization, including amending laws, supervision and capacity building as entailed in the following part.

2. Methodology

The study used the document review method in accomplishing it. It involved reviewing different documents including policies, legal provisions, development reports, books and publications on local government in Tanzania. It has passed through the local government reform programme within the limits of financial decentralization basing on the local government sources of revenue, local government budget process and its effectiveness.

The study provides in details the concept of local government financial decentralization in Tanzania, the sources funds and its budget system. It also provides the discussion of the findings on the discrepancy between theory and practice of financial decentralization, the conclusion and recommendations towards full local government financial decentralization.

3. Financial decentralization in Tanzania

Financial decentralization in Tanzania is among of the four key policy areas that came as a result of policy paper on Local Government reform programme in 1998. The policy paper included ideas from several stakeholders in local government and documents that, in one way or another were in a position of affecting the functions of local government authorities. The policy paper was based on the CCM election manifesto of 1995, the recommendations from a National Conference about a shared vision for local government in Tanzania which was held in May, 1996. The local government reform agenda of 1996 which aimed at decentralizing the local government authorities functions and responsibilities; it also included several discussions and recommendations with the Association of Local Government Authorities (ALAT), representative from local government authorities (including administrators, councilors and citizens representatives), central government organs and recommendations from other stakeholders about local government reform (Policy paper on LG reform, 1998).

This policy can be debated to be democratic since it collected ideas, discussions and recommendations from important stakeholders in in the management of local government authorities. It was *de facto* politically legitimate as stakeholders as whole were involved in planning for decentralization process. With decentralization, it was anticipated that, there was a lot to achieve in the process in improving social, economic, and political efficiency of the country. It was expected that, it would have been the era of autonomy of the local government authorities from what they suffered in the 1970s, when the autonomy was taken away through decentralization by deconcentration under decentralization policy of 1972 (REPOA, 2008).

The policy paper, aimed towards a shared vision of local government authorities whereby its overall objective was to improve the service delivery to the public and improve democratization process at the local level. The main strategy of the vision was decentralization on key areas of local authorities and provides autonomy to exercise the powers vested (REPOA, 2008).

Financial decentralization was among the important policy areas that were recommended for implementation. The *raison deture* of financial decentralization was to provide financial autonomy and improve the capacity of economic performance of the local government authorities.

In financial decentralization, it was meant that, local government councils to have financial discretionary powers and powers to levy local taxes. This aimed at expanding the collection of local revenues and vesting power to the local council empowering it as the highest decision making body at the local government level and the council to have a say over the local government finances including policing how they are being utilized. The financial discretionary powers also included the power to re-allocate funds as the council would see fit for the interest of the public (Mollel & Mbogela, 2014).

Again, in financial decentralization, it was expected that, the central government in turn had the obligation to provide local governments authorities with unconditional grants (intergovernmental transfers) and other forms of grants. This area, aimed at removing conditional recurrent expenditures that were previously provided to the local authorities by the central government. It was aimed further that, funds without conditions could have provided power to the local council to use them depending on the need of the authority (ies) at that time and removing the gap in the service areas administered by the local government.

The policy aimed also, to allow local councils to pass its own budgets. The reason for providing budget autonomy was for local councils to plan budgets basing on their own priorities and mandatory expenditures provided by legislation setting national standards. That is to say, recommendations from local government stakeholders observed the fact that, each local government council had its own priorities depending on what they wanted to achieve in time. Therefore, granting budget autonomy would have provided the chance for local authorities to be flexible in implementing their plans and targets. It was expected that, this autonomy would have improved the service delivery at the local level.

Regarding the local government revenues, the reform aimed at substantial increase in own revenue and sources and enhancing the tax payers compliance to revised legislation for revenue performance. For that matter, it was anticipated to increase and improve local government councils cost effectiveness in revenue collection through dismissing minor local government taxes which was believed that, the cost of collecting them was greater than the outcome. Making the local government tax structure simple, modernizing administration, making the local government tax system more transparent, securing a fair and equal treatment of all tax payers, introducing a less costly system of levying property tax in all urban councils and removing all ambiguities and perhaps, overlaps between central and local governments.

It was however, recommended by the policy that, in order to have smooth implementation of financial decentralization and other areas of decentralization (political, administrative and central local relations), substantial changes in the existing legislation were needed so as to reflect the vision and objectives of the country local government reform. It was stressed that, the changes of local government laws must reflect the vision of the local government reform agenda. For that matter, on the side of financial decentralization, laws had to create a system of local government where powers, functions and revenue are decentralized from central government, establishing sources of revenue and providing financial accountability (Policy paper on LG reform, 1998).

The implementation of the local government reform programme was scheduled to be in different phases, each phase comprising of one third of all district and urban councils. It was expected so, due to insufficiency budget that was required to implement the policy. Local government authorities, central government, ministry responsible and other stakeholders were required to take a lead in implementing the policy reform (Chaligha et al, 2005). However, the question has been how far the country has succeeded to implement financial decentralization.

Financial decentralization had to focus on the local government sources of funds and the budget system. The following part provides what is being implemented as far as such parameters are concerned.

(a) Local government sources of funds (revenue)

Local government authorities in Tanzania mainland have different sources of funds (revenues). They include; the local government own sources of revenue, central government transfers (mostly known as “intergovernmental transfers”), loans from financial institutions and development aid (REPOA, 2008). Here below are the sources of local government revenues.

Local own sources of revenue

Local government authorities have their own sources of revenue, they are four by types. These sources are mentioned and empowered by the Local government finance Act, No.9 of 1982 and the Urban Authorities (Rating) Act. No. 2 of 1983. These legislations identify the following owns sources of revenue for local government authorities.

I. Local Rates

A. Local rates on immovable property and land

- i. Local property rates
- ii. Land rent

B. Local rates on income, business, or activity.

- i. Service Levy
- ii. Produce Cess
- iii. Guest House Levy
- iv. Other rates on income, business, or activity (including Forest Produce Cess and the Fish Landing or Auction Levy)

II. Local Licenses and Permits

- (a) Licenses on business activities;
- (b) Permits on construction activities;
- (c) Licenses on extraction of forest products and natural resources;
- (d) Licenses and permits on vehicles and transportation

III. Local Fees and Charges

- (a) Market fees and charges;
- (b) Sanitation fees and charges;
- (c) Specific service fees and charges

IV. Other Local Revenue Sources

- (a) Fines and penalties
- (b) Income from (sale or rent of) property, goods, or services

However, the financial laws (Miscellaneous amendments) Act of 2008, amended the local government finances Act Cap 290 of 1982 by adding immediately section 31 (A). That section empowers the Tanzania Revenue Authority (TRA) (an authority entitled to collect central government revenue) in consultation with relevant local government authority to collect the property rate.

The section that empowers TRA to collect rates is 31A (1), it provide that;

“Without prejudice to the provisions of section 31, the Tanzania Revenue Authority in consultation with a respective local government authority shall evaluate, assess, collect and account for property rate imposed by Authorities”

31A (3) provide that “In the performance of its functions under this Act, the Tanzania Revenue Authority shall be indemnified by the local government authorities in relation to any cost incurred, loss suffered or action brought by reason of performance of such functions”

Also 31A (5) provides that,

“In the enforcement or recovery of property rate the Tanzania Revenue Authority shall apply mutatis mutandis the powers of recovery stipulated under the provisions of the Income Tax Act and the Urban Authorities (Rating) Act.”

Cited from Financial laws (miscellaneous amendment) Act, 2008; Part II: Amendment of the Local Government Finances Act of 1982, section 5 (addition of section 31A (1-6).

Again, the financial laws (Miscellaneous amendment) Act. 2008, amended the urban authorities (Rating) Act of 1983 in section four by adding subsection one, which empower the Tanzania Revenue Authority (TRA) in consultation with relevant local government authority to appoint a valuation surveyor to prepare a roll or supplementary roll for all rating authorities, as the section below provides;

“(1A) Without prejudice to subsection (1), the Tanzania Revenue Authority in consultation with a respective local government authority shall appoint a Valuation Surveyor for preparing a roll or supplementary roll for all rating authorities to which it has been appointed as agent.”

The amended law provides the power to Tanzania revenue authority (TRA) to collect, evaluate, assess and account property rate which is an important source of local government revenue. Despite the fact that, consultation is required for TRA to be able to collect property rates, the process tries to centralize the particular revenue collection as TRA is an authority entitled to collect central government revenue.

In this aspect, albeit local government authorities have been entitled to collect such revenue from their own sources, but, they contribute a little to the whole local government budget about 6.0% to 15.0%. For example, in the financial year 2010/2011 local own sources of revenue contributed 6.6% of the total budget of local government and in the financial year 2011/2012 the contribution was 8.0% (MOF, 2013). However, in the financial year 2013/2014 local government contributed nearly 7% (PWC, 2016). Arguably, the progress has been almost the same also in recent years. This entails that, local government own sources is still not sufficient and adequate to fund the entire local government budget.

However, for the sake of national revenue contributions, local government authorities collect roughly 2-5% of all public sector revenues and they spend roughly 20% of public sector spending (MOF, 2013).

Intergovernmental transfers

Due to insufficiency of local government own sources of revenue, the largest percent of the local government budget is funded by central government transfers mostly known as “intergovernmental transfers”. The intergovernmental transfers account for about and over 80% to 85% of the whole local government budget. For example, in the financial year 2010/2011 the intergovernmental transfers constituted 86.7% of the whole local government budget and financial year 2011/2012 it was about 92.0% and the progress has been not that much different in recent financial years (MOF, 2013). The trend has not changed in the recent years where by the intergovernmental transfer amount from 80% to 90%. Such as in the financial year 2013/2014 it contributed almost 92% (PWC, 2016).

Intergovernmental transfers are grants provided by the central government to the local government authorities to fund their budget and improve the service delivery at the local level. Types of intergovernmental transfers includes; recurrent block grants, sector specific funds and programmes such as health basket funds, sector specific development funds such as TASAF, other transfers (ministerial subventions and development grants and funds).

(i) Recurrent block grants

Recurrent grants are grants that recur continuously. Each council is allocated such funds from central government to deal with recurrent costs including; remuneration of local government personnel and other for operating system. Such grants includes five sector services provided by the central government but devolving at the local government level including education, rural water, agriculture, road and health. Again, the part of block grants is used to cover the administrative costs at the local government level. The funds are disbursed in the local government councils through the specified prescription linked to the size of the population and services provided by relevant council. It is estimated that, they account for about 60% of the whole intergovernmental transfers (APSP, 2011).

(ii) The sector basket funds and ministerial subventions

They are funds that are added to respective sectors and ministries. For example, they include the health sector basket fund (HBF), the agriculture sector development programme (ASDP) and Road Fund (RF). Also, it includes the road fund that is distributed to each council for maintenance of local government roads (currently the government have decided to establish an agency known as Tanzania Rural and Urban Roads Agency "TARURA" (we argue that, it is a good move) dealing with maintenance and construction of local government roads in order to improve effectiveness of the road funds). The total of such funds contribute roughly an average of 8.0% of each local government authority annual budget (Haki Elimu & policy forum, 2008).

The health basket fund (HBF) is financed by the development partners through the holding account at the Central Bank of Tanzania (BOT) and transferred to the Ministry of Health Community Development Gender Elderly and Children (MoHCDGEC), PO-RALG and respective local government authorities on a quarterly basis through the exchequer account. Local government authorities receive their share depending on the capacity of funding by development partners (CAG, 2017).

The agriculture sector development programme (ASDP) basket fund is financed by contributions and loans from development partners through the embassy of Ireland, International fund for agricultural development (IFAD), and Japan International Cooperation Agency (JICA). Such funds are received through the holding account maintained by Treasury, then after, funds are transferred to Local government authorities for implementation (Ibid. 2016)

The Road Fund (RF) derives its revenue from collection on fuel levy, transit charges, overloading fees, interest income, other income and external support specifically from DFID. The collected amount are distributed among implementing partners including local government authorities basing on the percentage set by the parliament from time to time (Ibid. 2016)

(iii) The development grants

These are intergovernmental transfers that are provided to local government authorities by the central government to cover development costs. They are sometimes known as non- recurrent grants (expenditure) because it does not necessarily recur continuously. They may be given for new infrastructure or rehabilitation. In spending these funds, the respective council may decide where to allocate it depending on the priorities of the council at the time. They may be used for building and renovation of school classrooms, construction of new roads, new or recovering health facilities, water and irrigation projects, disposals and other development aspects, as the council may see fit for the time provided.

Also, the government may provide to local government authorities the development grants that can be limited to specific regions or districts depending on the central government priorities. They may include; Participatory Agriculture Development Empowerment Projects (PADEP), Urban Development Environmental Management (UDEM), District Agriculture Sector

Investment Project (DASIP) and Participatory Forest Management (PFM). Such grants, in general provide about 5.0% of the annual budget of the local government authorities (APSP, 2011).

(iv) Local government borrowing and development aid

This is another source of funds for local government authorities in Tanzania. In this source, local government borrows some funds from financial institutions in order to implement pre-determined development projects and improve service delivery. The local government borrowing does not play a significant role in the budget system as it contribute roughly about 0.1 to 1.% of the whole local budget. For that matter, local government borrowing is not a common source or preferred financing mechanism for local government authorities in Tanzania. For example, in the financial year 2011/2012 according to the MOF (2013) report the local government borrowing had dropped to almost zero percent.

At some points, local government authorities receive funds from other development partners in form of aid. Such aid is channeled to different development projects initiated to help local authorities improve the service delivery such as water projects, roads and schools. Again, this source is not effective, as it depends to the economic situation of funders and how the given funds were utilized. Also, it varies from council to council. Therefore, some of councils may receive more aid than others and therefore creating the development difference between areas where such councils exists. Under this circumstance, it is adamant to trust aid as a permanent source of revenue for local government authorities and do not contribute that much to the local budget.

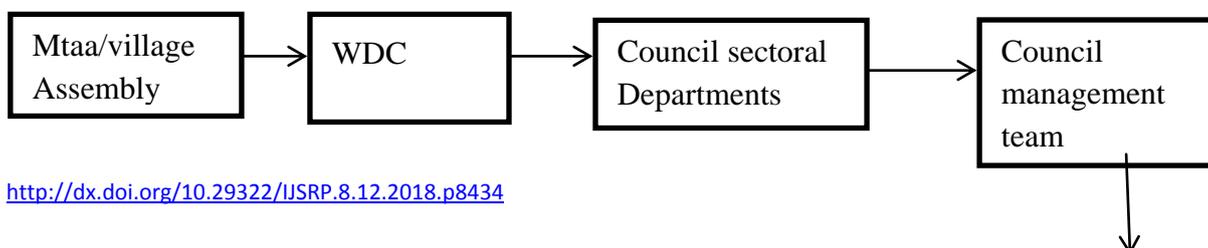
(b) The local government budget system (preparation and implementation)

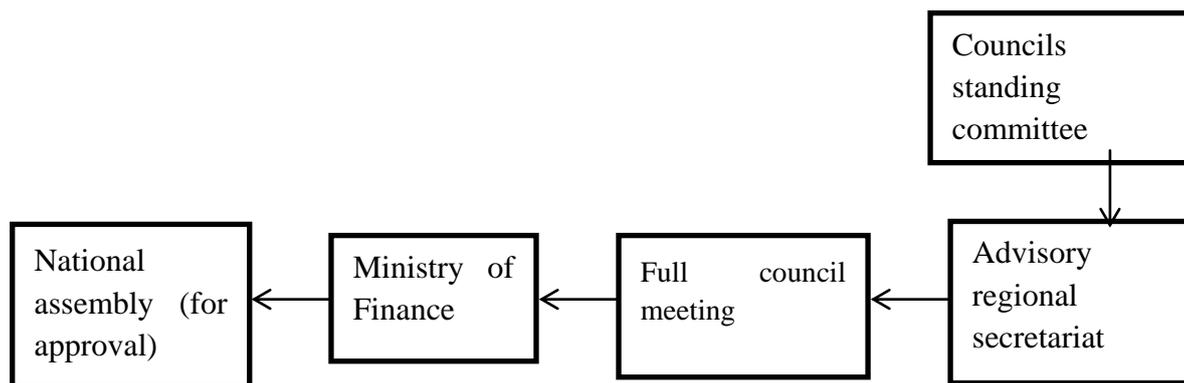
Local government authorities are entitled power to prepare the annual estimates of income and expenditure at their area as provided in Local Government Finances Act No. 9 of 1982. The annual budget plan need to show two important aspects; number one, it must show the estimated income for the next financial year including the amount of revenue expected to be collected from own sources and the amount of sources expected to be received as grants, and number two, the annual budget estimates need to show estimated recurrent and development expenditure for the next financial year (MOF, 2013).

The preparation of the local government budget is provided within the framework of the national budget. Budget estimation is formulated in line with macro-economic forecasts on the future growth, inflation and the external sector trends. For that matter, the preparations of local government budget is linked with the national budget. However, within the budget cycle, local government budget estimates is prepared hierarchically from the lowest level passing through such various level before national approval. Again, such estimates are prepared in consultation with the ministry responsible for local government “Presidents office Regional Administration and Local Government” (PO- RAGL). Also, the Ministry of Finance (MOF), can be consulted for guidelines and clarifications

The local government budget estimation follows the bottom up approach. The channel for local government budget starts with the mtaa (for urban authorities)/village for rural authorities, then to the ward development committee, council sectoral departments, council standing committee, advisory regional secretariat, full council meeting, ministry of finance then to the national assembly for approval as the chart below provides.

Formal local government budgetary channel





Source: (APSP, 2011)

Also, the formulation, approval process and estimation timings linked with the national budget are given below in the following table starting from August to July as provided by MOF report (2013).

No.	Activity	Expected Number of days	Office/official responsible
1.	Prepare and issue national budget guidelines	50	Ministry of Finance
2.	Transmission of guidelines to LGA	5	DLG/PO-RALG
3.	Issue (within LGA) of budget guideline for preparation	5	Council director
4.	Ward Development Committee’s budget proposals	10	WEO
5.	Preparation of non-ward based LGA budget proposals	10	Treasurer
6.	Compilation of total LGA budget	10	Treasurer
7.	Discussion and finalizing draft budget by council management team (CMT)	5	Council director
8.	Submission of budget draft to finance committee	5	Council director
9.	Discussion and approval of council budget by full council	5	Council director
10.	Submission of draft budget to PO-RALG for review	5	Council director
11.	Review and comments on LGA budgets	15	DLG/PO-RALG
12.	Feedback to council- to incorporate any directives	5	DLG/PO-RALG
13.	Revised LGA budget to PO-RALG	10	Council director
14.	Review and approval by PO-RALG for submission to MOF	10	DLG/PO-RALG
15.	Submission of LGA budget to MOF for review	2	DLG/PO-RALG
16.	Budget review at MOF	5	Commissioner for budget
17.	Feedback to PO-RALG with changes if any	5	Commissioner for budget
18.	PO-RALG communicates MOF changes (if any) to LGA	5	DLG/PO-RALG
19.	Submission of MOF-proposed changes to council for adoption	5	Council director
20.	Individual LGA council adoption of changes (if any) made by MOF	5	Full council
21.	Councils ‘ (collectively) budget submission to parliament for debate	5	Minister responsible for LGA
22.	Passing of budget by parliament	80	Minister responsible for LGA
23.	Feedback to LGA of approved budget	5	DLG/PO-RALG
24.	Preparation of revised budget to incorporate parliamentary changes	5	Council director
25.	Submission of revised, Parliament approved budget to council for endorsement	5	Council director
26.	Adoption by council of Parliament approved budget	5	Full council

Source: MOF report, (2013).

(c) Implementation of Local government budget

The approved budget by the parliament is adopted by the full council for implementation. The implementation of the local government budget goes hand to hand with the implementation of the national budget. Due to the fact that, local government budget depends much on the intergovernmental transfers, then, they have to wait until such transfers are made by the central government. Such transfers together with local own sources, are channeled to services, goods and development goals as pre-determined in the budget. Local government authorities while implementing budgets need to keep records of the expenditure being made.

4. Discussion and Results (discrepancy between theory and practice)

The study argues observed a discrepancy between the main agenda of the policy for the reform of the local government authorities on the aspect of financial decentralization and what is really implemented today. The policy for the local government reform on financial decentralization provides that, local government councils to have financial discretions including power to levy local taxes, to pass budgets reflecting their own priorities, as well as mandatory expenditure required for the attainment of national standards.

Also it provides that, central government should provide unconditional grants and other forms of grants to local government authorities. The government has been implementing the policy on the local government reform since 2000s. The study debates that the implementation of financial decentralization has taken a snail move. This is because of the existing divergence between what is articulated in the policy and what have been implemented.

The discussion stick on the following parameters; (i) the weakness of the local government own sources of revenue to fund local government budget, (ii) the fusion of local government budget with national budget (iii) extreme dependence of local government budget on intergovernmental transfers and (iv) weaknesses in the implementation of local government budget.

(i) Weaknesses of local government own sources of revenue

Local government authorities are empowered to levy taxes according to Local Government Finance act. No.9 of 1982 and Urban Authorities (Rating) Act of 1883. These provisions stipulate that, local government authorities may collect revenue from different sources, including; local rates, licenses and permits, local fees and charges and other local revenues sources, including the non-tax revenue. Despite the fact that, local government authorities are mandated to collect revenue from their own sources, but the collection has proved to be accompanied with some weaknesses. They have proven to be weak due to the reason that, they still contribute little to the local government budgets.

Local government own sources of revenue contributes about 6% to 15% of the total local government budget. The MOF report (2013) shows that, in the financial year 2010/2011 and 2011/2012, local own sources contributed about 6.6% and 8.0% of the total local government budget respectively. It is contended that, the progress has been almost the same even in recent financial years (PWC, 2016). The result implies that, local governments own sources are not enough to fund the whole budget, and contribute less to the local government budget. For that matter, they are not effective and adequate. The poor contribution can be caused by poor administration of revenue collection and shortage of manpower resulting into outsourcing (National Audit Office, 2018). This proves the hardness in complying with requirements of financial decentralization. Therefore, strengthening the internal controls over own source revenue collection is significant for proper collection of local government revenue.

Also, the poor performance of local government own sources, can be attributed by aspiring revenue targets or poor forecasting (PWC, 2016). For that matter, local government authorities are failing to reach the estimated collection targets. For instance, in

the financial year 2016/2017 there was under collection of own sources equivalent to 22% of the total budgeted amount. This implies that management of local government lacks effective strategy for increasing revenue from own sources (National Audit Office, 2018).

Again, the issue of empowering the Tanzania Revenue Authority (TRA), to collect property rates which is an important source for local government own sources of revenue, undermine the capacity, innovation and creativity for local government to collect revenue. The Financial Laws (Miscellaneous amendment) Act of 2008, which amended the Local government Finance Act. No. 9 of 1982 and Urban Authorities (Rating) Act. No. 2 of 1983 empowers the Tanzania Revenue Authority (TRA) in consultation with respective local government authority, to evaluate, assess, collect and account for property rate. Despite the fact that, the Tanzania Revenue Authority (TRA) has to consult the relevant local government council for evaluation, assess, collect and account property rates, and it can be true that, the government aimed at improving state revenue collection capacity, but the action, undermines the power and capacity for local government authorities to collect revenue today and in the future. Arguably, the study provides that, the government must rethink of this law and whenever possible return the chance for local government authorities to collect such type of revenue and build capacity for them to be able to perform well in revenue collection. This will go hand in hand with the policy for local government reform of providing and improving the capacity for local government to levy taxes and achieve the financial decentralization as the reform provides.

The study concur with the central government through the Tanzania Revenue Authority (TRA) efforts to encourage the use of Electronic Fiscal Devices (EFD) machines for the aim of ensuring that revenue paid reaches the respective authority and overcome tax avoidance. However, it debate that, this program must also be encouraged even at the local government level. It will help local government authorities to collect their own sources of revenue with confidence. Moreover, it will end the tendency of unfaithful tax payers deviating from paying revenue and local government officials who are conspiring to misuse the collected revenue.

(ii) Fusion of Local Government budget on the National budget

The policy on the local government reform, stipulates that, local government councils should have their own budget reflecting their own priorities. However, the framework for the preparation and implementation of local government budget reflect how the local government budget is fused within the national budget as the framework adopted from MOF (2013) provides.

Before implementation, local government budgets need to be cross checked by the ministry responsible for local government (PO-RALG) and the Ministry of Finance (MOF), and then it is submitted to the parliament for discussion. The aspect of the parliament to discuss the local government budget through the respective ministry, undermine the independence of councils to formulate their own budgets reflecting their own priorities. For that matter, when local government budget is discussed by the parliament there is a possibility of being subject to change and therefore, reflecting the parliament priorities. In this scenario, the paper provides that, the issue of discussing local government budgets by the parliament through respective ministry for local government bound the independence of local government budgets and capacity for local government councils to formulate their own budgets.

Again, the local government budgets are approved by the national assembly. For that matter, they have to wait until the national budget is approved. The aspect of waiting for the parliament to approve the budget reduces the focus of local government councils for their budgets. The study discusses that; the council should be the only organ responsible for approving the local government budget. The central government and respective ministries should play the policy role of advising on how to formulate and

implement the local government budget. This will expand the implementation financial decentralization for local government authorities.

Moreover, the study argues that, if councilors and other administrative officials are trained vividly, councils will be in a good position of implementing their budget reflecting their own priorities. Also, the central government will be in a good position of monitoring and overseeing the activities within local government.

(iii) Local government dependence on intergovernmental transfers

Local government authorities budgets, depends much on the intergovernmental transfers. The transfer's funds local government budget for more than 80%. Intergovernmental transfers are dispersed in form of grants and are channeled through development programs, line ministries or sectors. They are also distributed through the services funded by the central government but devolving at the local government (education both primary and secondary, health, rural water, agriculture and local roads. Albeit, policy for local government reform provides that, the central government should supply unconditional grants and other forms of grants, it has been far from reaching that purpose.

Local government still receives conditional grants from the central government. Those grants are already planned what they are going to cover by the central government at the time they reaches local government. They are channeled to local government by the central government to cover several development programs and services. The study provides that, the fact that, intergovernmental transfers at the local government are conditioned by the central government; undermine the financial independence of the local government authorities. For the aim of proper implementation of financial decentralization to the local government, intergovernmental transfers need to be unconditional and provide the chance for local government councils to be able to plan on how they must utilize such funds.

It is for the facts that, each local council have its own priorities that, they would wish to implement in a particular time and there is divergence of such priorities from one council to another. This must be taken with consideration by the central government that providing conditional grant in one way or another undermines the priorities of local councils and therefore, failure to implement their pre-determined plans.

Again, grants received by the local government which take the lion share of the local government annual budget are mostly sourced from development partners in forms of aid or loan as it is on Health Basket Fund (HBF) and Agricultural Sector Development Programme (ASDP), and from central government revenue collection. Grant depends on the capacity on the one side, the central government revenue collection and on the other, development partner's provision of funds on time. In this view, if development partners do not provide funds on time or failure to provide the expected, services and development projects initiated at the local government will stuck. In this look, local government services and development projects become vulnerable to such delays resulting into financial failures at the local the local government.

Du reste, conditional intergovernmental transfers, creates vigorous financial dependence of local government to the central government. Intergovernmental transfers are significant for the survival of local government authorities, but the fact of transferring them with conditions catalyzes dependence to the central governments. Local governments need to be empowered in revenue generation so that, they may be in a position of receiving little of the intergovernmental transfers. When this is achieved, the central government can be in a position of funding other projects for development and services entitled to provide. Also, local government finance sector will be strong enough to fund important services and development projects. The study opines that, the fifth government efforts to protect national resources and end dependence on donors are a good move towards the local government financial decentralization.

(iv) Weaknesses on the implementation of Local Government budget

The implementation of local government budget in Tanzania depends on two important aspects, one, is the capability of the central government to provide grants and two, depends on the capacity of the local government authorities to collect revenue from own sources.

Focusing on the capacity of central government to provide grants to local government authorities, it is still a challenge. As it has been outlined earlier, the provision of intergovernmental transfers depends on the capacity of development partners to fund and central government capability to collect revenue. For example, in the year ended in June 30, 2016 the controller and auditor general report (2016) provided that, there were 6,769 outstanding audit recommendations from all development projects during the financial year ended 30th June 2016. Out of which, 1,489 equivalents to 22 percent were implemented; 1,527 equivalents to 23 percent were under implementation; 2,688 equivalents to 40 percent were not implemented, and 1,065 equivalents to 16 percent were overtaken by events (CAG, 2016). This was attributed by the fact that, some projects received fewer funds from donors. Part of such projects was being implemented at the local government level. This imply that, there is much dependence of national budget with the implementation of local government budget, if the national budget is not implemented effectively, affects even the implementation of the local government budgets.

On the side local of local government own sources of revenue, also the story is not interesting. Local governments authorities collect from 6% to 15% of own sources of revenue to fund the local government budget. The percentage is subject to variation from one financial year to another depending on the capacity of local government to levy taxes. This performance is not interesting and affects the implementation of local government budget. Local government authorities are responsible for administration of local domains according to the United Republic of Tanzania constitution of 1977, Articles 145 and 146. They are responsible for the wellbeing of citizens devolving around such areas including service delivery, and they need to be capable of levying tax to fund services and other development programs. The fact that, they collect less and depend much on intergovernmental transfer to fund their budget put their responsibilities into question. Local government budget have been failing to reach their targets because of poor mechanism of levying tax at the local level (National Audit Office, 2018). The study argues that, local government authorities need to re-evaluate and come with good suggestion that will improve the situation and become capable of funding their own budgets.

5. Conclusion

Local government financial decentralization still is passing in the hard time of its implementation. Local government authorities continue to depend much on the conditional intergovernmental transfers and its own sources not being self sufficient to fund the whole budget. The essence of financial decentralization still has not been realized. In this aspect the line between policy on decentralization and its practice continue to be maintained. Effort and willingness are required towards ending this discrepancy for better achievement of financial performances in the local government authorities.

6. Further Recommendations

(i) The fifth government regime efforts to end donors dependence is of great and require supports from the country development stakeholders including the local government. it is a good move towards self-dependence and achieve of the local government financial decentralization aims.

(ii) Local government authorities need to rethink of their role in their annual budget. They are responsible for their own budgets; they need to develop the proper and effective mechanism of improving revenue collection at the local level. This will help local government authorities to generate revenue and reduce their dependence on intergovernmental transfers.

(iii) In order for local government authorities to plan and implement their budget reflecting their own priorities, central government have to provide grants that are unconditional to local authorities. Central government grants need to be vested to local authorities so that they can plan on how to use such funds depending on their priorities in a particular time.

(iv) In order to achieve financial decentralization, central government as a capacity builder of local government, have to emphasize much on providing training to local government officials responsible for levying tax, financial discipline and the proper use of revenue for service provision and implementation of initiated development projects.

(vi) Property rates is an important source of local government own revenue, empowering the Tanzania Revenue Authority (TRA) to collect such revenue even though in consultation with relevant local council, for our opinion, not only that it reduce the generation of local government revenue but also undermine the capacity for local government to levy tax. The paper debate that, the financial laws (Miscellaneous amendment) Act of 2008 which empower TRA to levy property rates need a second eye for better empowerment of local government in revenue collection.

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Study on indoor RF Propagation Model with Doppler Effect

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Abstract- Radio wave propagation models are recently important for wireless network designer while designing the specific network design in definite regions, building and infrastructure. There may be some problems when using and designing indoor wireless network. It causes signal attenuation because of complex structure and infrastructure of building and other unwanted effect of carrier frequencies. To overcome these problems, nowadays the estimation of path losses becomes the main challenge. Moreover, while moving mobile objects move around the building and campus, the estimation of path loss values become more complex and hard to define. This paper presents the studies of indoor radio wave propagation models with Doppler frequency shift effect. The common Free Space and Log Distance propagation models are used to analyze these problems in indoor environment. As the various speed of moving object can affect the path loss level at the receiver side, the estimation of carrier frequency at the receiver becomes main issue in correct form. The purpose of this paper is to estimate the path loss values of moving object with constant speed by considering Doppler Shift Effect. The necessary experiments are conducted on different days and in different time to get more stable received signal strength values (RSSI). The estimations of path loss values with Free Space model, with Log Distance model and RSSI values according to those propagation models with Doppler Effect are presented with different points of view. Although Doppler shift effect can mainly cause in outdoor environment, but according to the analytical result, this effect can also cause in indoor wireless communication system.

Index Terms- Radio Wave Propagation, Doppler Effect, indoor propagation models, path loss

I. INTRODUCTION

The demand of wireless communication consistently increases in high-speed mobile environment due to the development of moving object. It is important to provide better link quality which is caused by moving objects' speed up and data rate increase [1]. Indoor coverage is gaining its importance as time is going on because most of the users use cell phone indoor as compared to outdoor users according to a rough estimates more or less 80% of the people use cell phone indoor. Path loss models describe the signal attenuation between a transmitter and receiver antenna as a function of propagation distance and other parameters which is caused by the dissipation of the power radiated by the transmitter as well as effects of the propagation channel. Shadowing is caused by obstruction between the transmitter and the receiver that attenuate the signal power through absorption, reflection, scattering, and diffraction. There are many models of analyzing the path loss model nevertheless any path loss model can not apply to comprehensive. There have been studies on path loss between transmitter and receivers at urban and suburban environment, and also in indoor environment [1]. In this research work, to provide the better communication link, not only the correct estimation of path loss, but also the Doppler Effect for moving object will be analyzed.

II. INDOOR RADIO WAVE PROPAGATION MODELS

Radio waves (electromagnetic radiation) propagate from the transmitting antenna to the receiving antenna utilizing the propagation medium between them [5]. RF signals generally propagate between the transmitting antenna and the receiving antenna in one of the following most common methods: line-of-sight (LOS), refraction, or reflection. Dominant propagation characteristics vary with the frequency (or wavelength) of the transmitted signal involved. There are different models to calculate the path loss especially for indoor environments. Some of them have been modified to be used for monitoring indoor propagation also. But none of them have been accepted as standard; it depends on the types of scenario where we are calculating and also depends upon the reading that we get from the calculation. Many of the papers have adopted the hit and trial rule to figure out the best model that meets their requirements. The performance of indoor high frequency capacity wireless communication is restricted by propagation and wireless channel characteristics due to the fact that transmitter and the receiver either with direct line-of-sight or non-line-of-sight (NLOS) are surrounded by different kinds of objects which have adverse effect on the propagation characteristics of radio medium. Indoor channels are dependent on the physical attribute of buildings, construction materials and other structures [[7]. The main characteristics of wireless communication channel are Path loss, Fading and shadowing, Interference, Doppler shift and so on.

In this study, the path loss and Doppler shift effect are studied and analyzed. Path loss is an electromagnetic wave that propagates through the space between the transmitting antenna and the receiving antenna in communication system. This brings about undesirable dwindling of radio signals due to effects of wireless channel characteristics. These effects are influenced by the condition of the environment, frequency of operation, distance between the transmitter and receiver [[7].

(A) Free Space Path Loss Propagation Model

Path loss can be expressed as the ratio of power of transmitted signal to the power of the same signal received by the receiver on a given path. It is a function of the propagation distance. Estimation of path loss is very important for designing and deploying wireless communication networks. Path loss between transmitter and receiver plays a vital role when we are doing link budget calculation [6]. The free space propagation model is the simplest path loss model in which there is a direct-path signal between the transmitter and the receiver with no atmosphere attenuation or multipath components. Assuming that the total transmits power at the source is P_t , whose gain in a particular direction is G_t , the radiated power density ρ at given distance d will be given by

$$\rho = \frac{P_t G_t}{4\pi d^2} \cdot \frac{\text{Watt}}{m^2} \tag{1}$$

If the receive antenna is located at a distance d and gain is G_r and the effective area is A

$$A = G_r \frac{\lambda^2}{4\pi} \tag{2}$$

The received power P_r at the terminal of the receive antenna is given as

$$P_r = \rho \cdot A = P_t G_t G_r \left(\frac{\lambda}{4\pi d} \right)^2 \tag{3}$$

Therefore Free Space path loss L_p is given by the ratio of the received power to transmit power

$$L_p = \frac{P_t}{P_r} \tag{4}$$

By combining equation 3 and 4, it becomes

$$L_p = \left(\frac{\lambda}{4\pi d} \right)^2$$

In decibel, L_p becomes

$$L_{p(dB)} = 32.45 + 20 \log(d) - 20 \log(f) \tag{5}$$

Where frequency (f) is measured in MHz and distance (d) is measured in km [[7].

(B) Log-Distance Path Loss Propagation Model

In both outdoor and indoor environments, the average large scale path loss for a random transmitter to receiver separation is expressed as a function of distance by the use of path loss exponent n . The value of n depends on the accurate propagation environment. However, reducing the value of n lowers the signal loss, ranging from 1.2 to 8 [[7]. The average path loss $PL(d)$ for transmitter and receiver separated at distance d is given as

$$PL(d) \propto \left(\frac{d}{d_0} \right)^n \tag{6}$$

$$PL(dB) = PL(d_0) + 10n \log \left(\frac{d}{d_0} \right) \tag{7}$$

Path loss exponent n indicates the rate at which path loss increases with distance d while the close reference distance d_0 is determined from taking measurement which close to the transmitter. $PL(d_0)$ is calculated by using the free space path loss equation mentioned above. In this work, the path loss exponent n value of 4 is used to implement.

(c) Doppler Shift Effect

Doppler shift occurs when the transmitter of a signal is moving in relation to the receiver. The relative movement shifts the frequency of the signal, making it different at the receiver than at the transmitter. The waves travel at a speed v and are emitted at a frequency f (cycles/seconds). In this case, the emitter has moved a distance of d towards the receiver between the emissions of two succeeding cycles. The cycles thus arrive at the observer with a frequency higher than the emission frequency. The opposite applies when the transmitter is moving away; the distance between each peak (or cycles) increases, and since the wave is moving at the same v speed, the perception of the observer is that the frequency has diminished. The analysis is different because electromagnetic waves do not

propagate in a substrate and their speed does not depend on a frame of reference. However, the base concept is the same: a frequency shift is caused by the speed of the transmitter in relation to the receiver. A lot of research is going on in the field of algorithms to enable the prediction and correction of waveforms. To do the correct prediction of wireless coverage area, the basic radio wave propagation models can be used in effective ways. In this paper the error between the estimation of path losses and Tx-Rx with and without Doppler Effect is analyzed with various speeds of moving object. The following equations show the mathematical expression of Doppler Shift Effect.

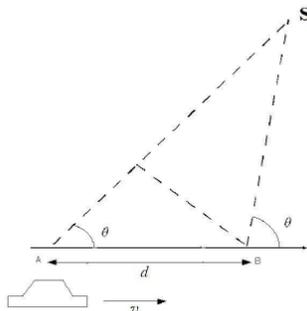


Figure 1. Illustration of Doppler Effect

$$f = \left[\frac{v \pm v_r}{v \pm v_s} \right] f_0 \tag{8}$$

where f is the observed frequency, f_0 is the emitted frequency; v is the velocity of waves in the medium, v_s is the velocity of the source relative to the medium and v_r is the velocity of the receiver relative to the medium. Consider a mobile moving at a constant velocity v , along a path segment length d between points A and B, while it receives signals from a remote base station to source S shown in figure 1. The difference in path lengths traveled by the wave from source S to the mobile at points A and B is $\Delta l = d \cos \theta = v \Delta t \cos \theta$, where Δt is the time required for the mobile to travel from A to B, and θ is assumed to be the same at points A and B since the source is assumed to be very far away [3]. The phase change in the received signal due to the difference in path lengths is therefore

$$\Delta \varphi = \frac{2\pi \Delta l}{\lambda} = \frac{2\pi v \Delta t}{\lambda} \cos \theta \tag{9}$$

and hence the apparent change in frequency, or Doppler shift (f_d) is

$$f_d = \frac{1}{2\pi} \cdot \frac{\Delta \varphi}{\Delta t} = \frac{v}{\lambda} \cos \theta \tag{10}$$

III. EXPERIMENTAL PROCEDURES

The first part of our experiment determines the maximum distance between transmitter and receiver. To conduct all necessary experiments, the TL-WR941ND router is used as a transmitter and Laptop with widows 10 operation and 3 dBi antenna gain with installed inSSIDer software is used as a receiver. According to technical specifications, the TL-WR941ND router has a transmission power of 10 dBm and the omni-directional antennas have a 5 dBi gain. The experiments are carried out at the convocation hall of the University of Computer Studies, Loikaw, Kayah State, the Republic of the Union of Myanmar. To get the stable experimental data, the experiments are carried out in different time and on different days. Figure 2 provides the experimental region and placements of transmitter and receiver. In this experiment, the building is multistoried and with brick wall type of 36.57m x 24.38m. Figure 2 shows experimental environment for estimation model considering Doppler Shift in indoor environment. In this research work, the distance between transmitter and receiver is 15m and the measuring point between two consecutive points is 2m each. The Tx positions were chosen to obtain a line-of-sight condition for all measuring points. The transmitter is placed at the centre of X to Y path and the middle of measuring point and the straight line of transmitter placement is 15m. The carrier frequency for this experiment is 2400MHz. the heights of transmitter and receiver are 0.8m each.

In this research work, the moving mobile object with constant velocity should be actually used to analyze with the experiment. It is difficult to conduct the experiment with moving object in indoor environment. That is why, the estimation of path loss values with free space model and Log distance models are used to analyze.

The path losses value is defined as the difference between the transmitted power level and the receiver sensitivity (in dBm) needed for error free reception according to the following equation (11).

$$PL(dB) = P_t(dBm) - P_r(dBm) \tag{11}$$

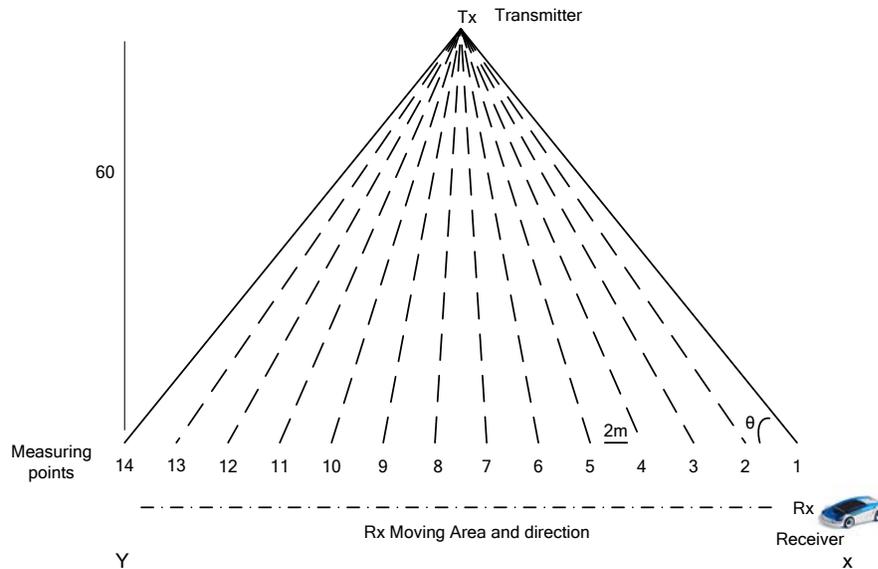


Figure 2. Measuring Points and Direction of Moving Object

While conducting the experiment, there are 14 measuring points for receiving points. In each point, the laptop is placed to get the received signal strength values until the resulting values are stable. The received signal strength (RSSI) is measured at each measuring point with zero velocity in indoor environment. After that, the estimation of path loss using free space propagation model, that of path loss using Log Distance propagation model with Doppler Effect are analyzed. The comparison results of these data are simplified with the help of Matlab programming language.



Figure 3. The Placements of Transmitter and Receiver

IV. ANALYTICAL AND EXPERIMENTAL RESULTS

Figure 4 and 5 provide the theoretical, experimental and analytical results of the path loss values over different distances between the transmitter and receiver. In this study, the various velocities ranges from 5 to 20 ms^{-1} are used to evaluate. It is clear that the mentioned experiments are carried out in indoor environment; the analytical ranges of velocities should be used in those ranges. The path loss values depend on the velocity of moving object. While analyzing the path loss values with free space propagation model as shown in figure 4, it is clear that the less the speed of moving object, the less the error between the estimation with and without Doppler effect. Some fluctuations are found in some measuring points due to the condition of unwanted indoor wireless characteristics.

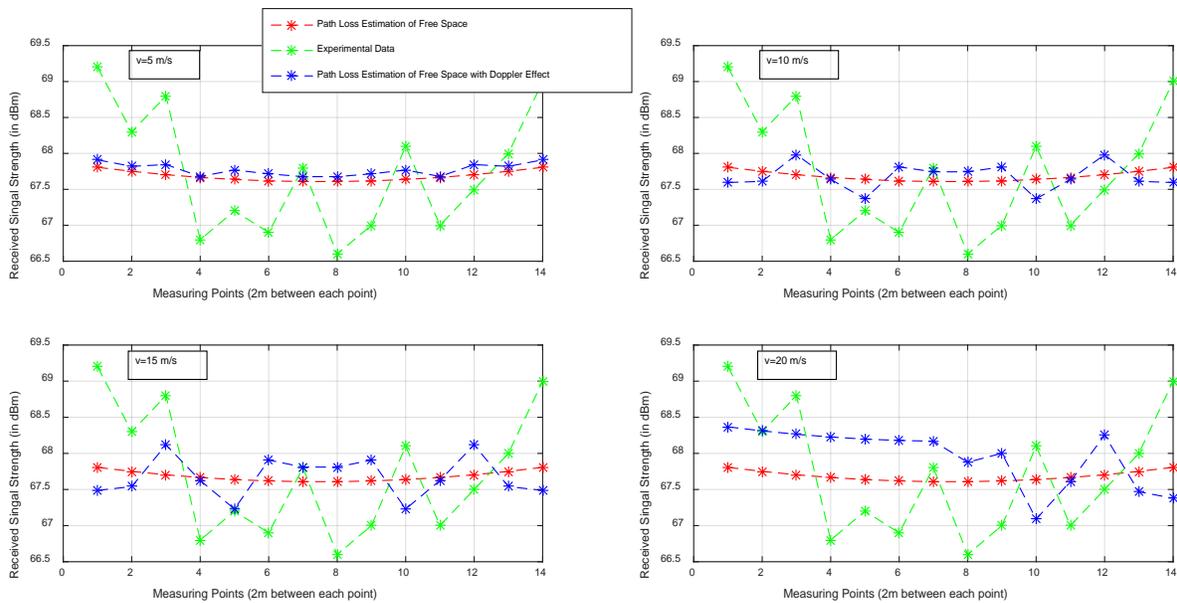


Figure 4. Analysis of Free Space Propagation Model with Doppler Effect (various mobile speed $v=5, 10, 15, 20$ m/s)

The following figure 5 illustrates the path loss estimation of experimental region using mentioned equipments. In this case, the path loss values of log distance show a little more attenuation in such condition. This is because, the path loss exponent value of 4 is used to analyze the proposed system. While analyzing the velocity value of 20 m/s, The fluctuation of path loss values increases obviously because of depending on the path loss exponential value and indoor wireless communication characteristics. In the analytical study of velocity value of 5 m/s, the estimations of path loss value with not only free space propagation model but also log distance propagation model, show that Doppler shift effect can cause a little effect on moving object that can be handled when the network designers implement the network infrastructure.

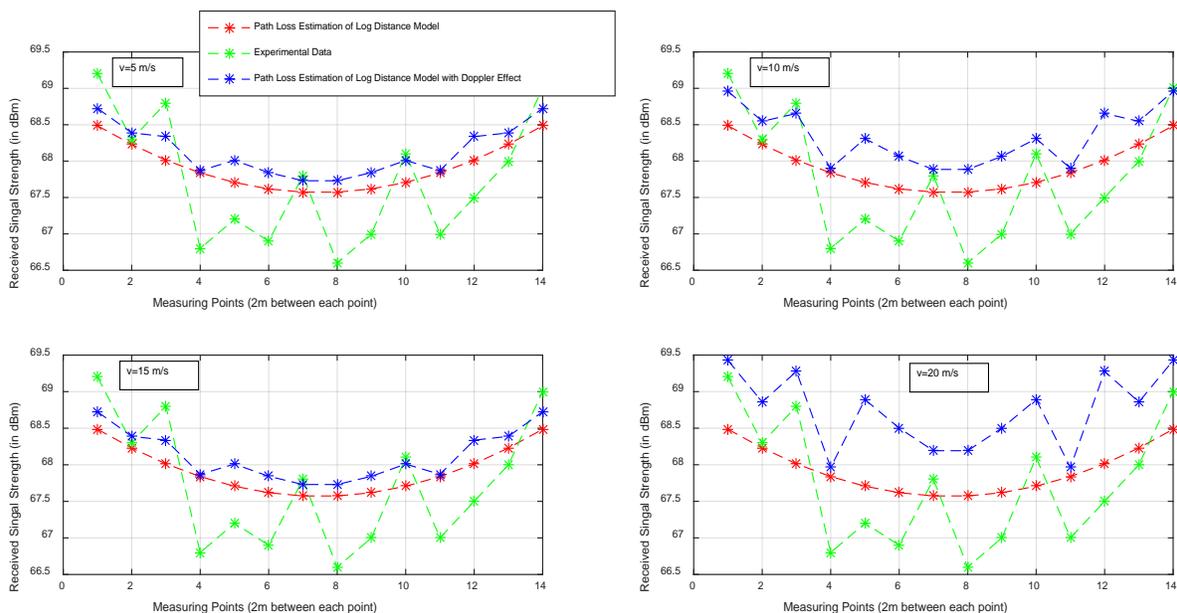


Figure 5. Analysis of Log Distance Propagation Model with Doppler Effect (various mobile speed $v=5, 10, 15, 20$ m/s)

V. DISCUSSION AND CONCLUSION

The basic theoretical background of Doppler Shift Effect on moving object is presented. In this paper, estimation of path loss values for mobile object using free space and log distance models taking into consideration of Doppler Effect with respect to the constant speed is analyzed. The indoor propagation models considering Doppler Effect by using measured data of moving object around the

convocation room was investigated. The path loss values which are fading with Doppler Effect and with various motion velocities are also simulated. The experiment presented here provides nice additions to the standard study of the Doppler Effect in a straight-line movement. To avoid signal attenuation with Doppler spread, path loss value should be predicted correctly with the help of empirical data. The main idea is to estimate the Doppler spread by free space and log distance path loss models with respect to the experimental data in indoor environment in which the motion of receiver is along the straight line such as LOS condition.

As the further work, these results should be compared with outdoor propagation model with and without Doppler Effect. The different types of transmitter and receiver should be used. Theoretical and empirical experiments should be conducted with different high speed velocity and with different frequency ranges.

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Anatomy and Histology of the Liver of *Eetroplus maculatus* (Bloch)

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Abstract- The liver is the key organ notable for its sensitivity to a great variety of environmental factors. It is a reddish brown organ and are trilobed and the right lobe bear the gall bladder. It is composed of a parenchyma covered by a thin capsule of connective tissue. It is divided into irregular lobules by the exocrine pancreas or hepatopancreas, associated to connective tissue. The distinctive histological feature of the liver is the exocrine pancreatic tissue surrounding the portal vein. In addition to these structural components, hematopoietic tissue and melanomacrophage centers (MMCs) occur in hepatic parenchyma. The hepatocytes are polygonal with centrally placed nuclei. The hepatocytes are radially arranged in cords around a central sinusoids. The portal triads are absent. Bile ducts are found in association with the exocrine pancreatic tissue surrounding the portal veins. The hepatocytes are radially arranged in cords around a central sinusoid. The liver anatomy and histology of *Eetroplus maculatus* is similar to that of many other teleosts including fresh water and brackish water. The aim of the present work was carried out the normal anatomy and histological analysis of the liver of *E.maculatus*, one of the most common food fishes of Kerala by light microscopy.

Index Terms- liver, anatomy, histology, cichlids

I. INTRODUCTION

The liver is the “master gland” in vertebrates that controls and coordinates the majority of metabolic activities. The fish liver is a multifunctional organ that has an important role in detoxification, production of vitellogenin as well as the deposition and metabolism of carbohydrates and fat [1,2,3,4,5]. The basic structural and functional unit of the liver is the acinus, which consists of hepatic lobules and portal triad (also called Glisson’s sheath [2,6]). The hepatic lobules are the functional units of the liver [2,5,6]. The sinusoids are capillary networks which are localized in the spaces between hepatic plates [2,5,6]. The liver synthesizes bile which eventually empty into the gall bladder [2,5]. In most teleost fish, the liver is divided into lobes located cranially and ventrally in the body cavity with a reddish-brown colour [7]. The liver is surrounded by a thin capsule of connective tissue, the Glisson capsule, dividing the parenchyma into lobules and lobuli. The liver receives blood through both portal vein and hepatic artery. Most of its blood comes from the portal vein that conveys blood containing nutrients absorbed in the intestine.

In most teleost fish, the liver is divided into lobes located cranially and ventrally in the body cavity with a reddish-brown colour [3,7]. Its size, shape and volume are adapted to the space available between other visceral organs [8]. The head kidney, liver and spleen in some teleosts may present aggregates of macrophages called melanomacrophage centres (MMC). The MMCs are histologically distinguishable within the tissue for presenting macrophages with distinct pigments such as melanin, hemosiderin and lipofucins [9,10,11]. The analysis and quantification of granules can be a great indicator of the main metabolic activities by macrophages from MMCs [9,10,11]. Moreover, presence, number and area of MMCs have been used as biological parameters in toxicology and environmental impact studies [9,11,12,13]. The liver has two types of irrigation: one constituted by the hepatic artery, which provides arterial blood to the gland and the other derived from the portal vein, carrying blood from the oesophageic and gastro intestinal tracts, from spleen and pancreas [14].

The species of *E. maculatus* belongs to the family cichlidae, and the genus *Eetroplus* is the most common and diverse. Due to the wild distribution, this species become economically important. It is used as a food and also an aquarium fish. Thus, this work aims to understand the anatomical structure and the normal histology of *E.maculatus* by the description of hepatocytes, sinusoids, melanomacrophages, blood vessels and exocrine pancreatic tissues.

II. MATERIALS AND METHODS

Specimens of *Etroplus maculatus* were collected from different parts of Kuttanad, Alleppy District; Kerala State. Fifteen specimens of *E. maculatus* were collected alive by using a net. Their length ranged from 40 to 80mm. The fishes were carried immediately to the laboratory, where they were stunned by a sharp blow on the head and the liver tissues were removed. For the histological study the liver tissues were fixed in Bouin's fixative during 24 hours. The organ was dehydrated with a series of alcohol and embedded in paraffin, cut in 5µm thick sections. The sections were stained primarily with hematoxylin and alcoholic eosin (H & E). Stained sections were studied under a compound research microscope and photographs were made using photomicrography system.

III. RESULTS

In *Etroplus maculatus*, the liver is a dense reddish brown organ located ventrally in the cranial region of the body cavity. It is trilobed and united anteriorly. The right and left lobes are wing-shaped and equal in size and the middle lobe is conical and elongated (Fig.1). The right lobe bears the gall bladder which is tubular and bright green in colour with bile fluid.

The liver is encased in a fibrous connective tissue capsule. The hepatic parenchyma is made up of bicellular plates surrounded by sinusoids (Fig.2, A). Each plate shows polarized hepatocytes with a sinusoidal face for absorption and a biliary face for excretion. The parenchyma is very homogeneous and the hepatocytes are polygonal cells with spherical, centrally placed nuclei. Hepatocytes exhibit histological variability depending on the amount of stored fat and glycogen reserves in them. The hepatocytes appear condensed with eccentrically positioned nuclei (towards the nearest sinusoidal space), when they contain large quantities of fat and many glycogen granules. Between two adjacent sinusoids, the hepatocytes are arranged as cords usually two cells thick, but branching and anastomosing of cords can result in four or more layers. The parenchyma is not divided into distinct hexagonal lobules and hence there is no distinct interlobular connective tissue stroma. The true triads constituted by the ramification of the portal vein, the hepatic artery and biliary duct are absent.

The distinctive histological feature of the liver is the exocrine pancreatic tissue surrounding the portal veins (Fig.2, B). The periportal pancreatic tissue forms a compound tubuloacinar gland that lie within a well vascularised, thin, fibrous connective tissue stroma. The pancreatic tissue can be distinguished from the hepatic tissue by its acinar arrangement and its characteristic staining with hematoxylin and eosin. (The acinar cells have basophilic basal pole and cytoplasm rich in eosinophilic zymogen granules).

Blood is carried into the liver by the hepatic portal vein entering the posterior side of the liver and the hepatic artery. Blood flows through the branches of these two vessels into the sinusoids in the liver parenchyma. From the sinusoids the blood flows into the central veins, which empty into the hepatic vein leaving the liver at its anterior aspect. Communication between hepatic arteries and veins and also between portal and hepatic veins is ensured by a capillary network of sinusoids. These sinusoids are radially disposed around the hepatic veins and are constituted by a simple squamous endothelium without basal lamina.

Branches of hepatic portal vein (Fig.2, C) are found randomly throughout the hepatic parenchyma. The portal venules are differentiated from the hepatic venules by a higher amount of periadventitial connective tissue in the former and by the absence of blood cells in the portal venules. Hepatic arteries are found associated within the hepatic parenchyma and they differ from the veins by their narrow lumen, thick wall with more elastic fibres and endothelial cells that are more voluminous than in veins.

Bile ducts (Fig.2, E) are found in association with the exocrine pancreatic tissue surrounding the portal veins. In addition to these structural components, hematopoietic tissue and melanomacrophage centers (MMCs) (Fig.2, D) occur in the hepatic parenchyma. Melanomacrophage centers are usually located in the vicinity of the hepatic arteries, portal veins or bile ducts. They concentrate heterogeneous materials that play a role in neutralizing potentially toxic free radicals and cations produced during per oxidation of unsaturated lipids.



Figure 1. Anatomy of the liver of *Etroplus maculatus* ,showing three lobes

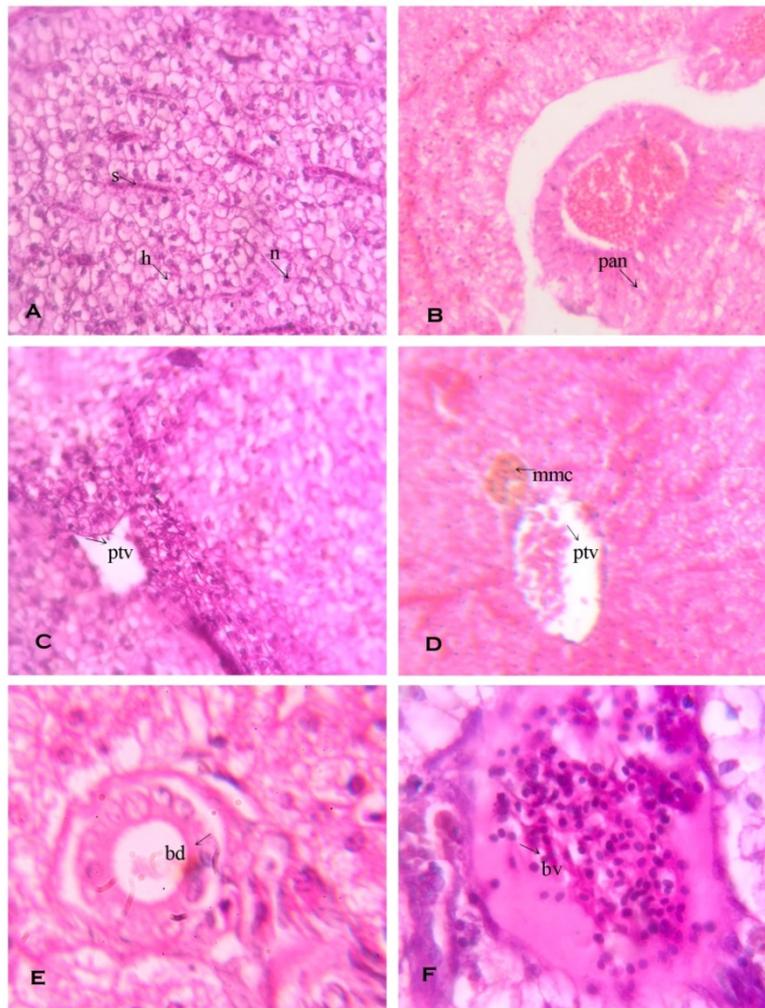


Figure.2 Histological sections of liver of *Etroplus maculatus*, by light microscopy, A. showing the nucleus (n) of hepatocytes (h), sinusoids(S)(40X), B.exocrine pancreatic tissue (pan)940X), C.portal vein(ptv)(40X), D. melanomacrophage centre (mmc)(40X) ,E. bile duct (bd)(40X), F. blood vessels(bv).

IV. DISCUSSION

This paper describes for the first time the normal anatomy and histology of the liver of *Etroplus maculatus*. The liver is a key organ that controls many life functions and plays a prominent role in the physiology of vertebrates. The liver plays a vital role in various metabolic activities and the liver is an important organ for the analysis of fish diseases [15, 16]. Fishes being poikilothermic their liver is a target organ for many biological and environmental factors that alter its structure and metabolism. In fish, liver is a digestive organ of endodermic origin and it belongs to the 'lower vertebrate category' [17]. The anatomical location of the liver was similar to other species [7], however the shape and number of hepatic lobes are variable. Teleosts do not have a defined hepatic lobe number and shape [18]. Thus, it adapts to the size and shape of this cavity and the space used by other visceral organs.

In *E. maculatus*, the liver is a dense, reddish brown organ. The colour is due to the rich vascularisation. However, when fat storage is high, the colour tends towards yellow; yellow coloured liver has been reported in *Anguilla Anguilla*, *Dicentrarchus labrax* and *Sparus aurata* fed on artificial food [19]. The liver of *G. brasiliensis* was yellow-brown, *H. aff. malabaricus* was reddish-brown and *H. francisci* was dark-yellow colour. Moreover, the liver can differ in weight, size and volume according to body weight and length of each animal. The liver of *Geophagus brasiliensis* was yellow-brown, *Hoplias aff. malabaricus* was reddish-brown and *Hypostomus francisci* was dark-yellow colour, believe that variation in liver colour may be related to different dietary habits. In fact, adult individuals of *G. brasiliensis* are omnivores, *H. francisci* are detritivorous and *H. aff. Malabaricus* are piscivores [20, 21]. There are other factors associated with liver colour such as health conditions, vascularization and hepatocyte content [7].

In chondrichthyes and Dipnoi, there are only two lobes, mainly reported in, *Oreochromis niloticus* [8], *Hemisorubim platyrhynchos* [18]. But in some teleost species such as *Oncorhynchus mykiss* [22], *Micropogon undulates* [23], *Salmo gairdneri* [24], *Liza spp.* [25], *Lutjanus bohar* [25] and *Serranus cabrilla* [26], the liver is not lobulated. In *E. maculatus*, the liver is a dense, reddish brown organ located ventrally. It is trilobed: the right and left lobes is wing-shaped and equal in size and the middle lobe is conical and elongated and extends up to posterior most tip of the stomach.

In *E. maculatus*, the hepatic parenchyma is homogeneous and is made of bicellular plates (dual plated laminae) surrounded by sinusoids. The hepatocytes are polarized and this 'muralium duplex' is different from that described by [23] in *Micropogon undulates* where muralium is restricted to only one cellular plate. In the lower teleosts (Salmonidae: *Oncorhynchus mykiss*, [24]; *Salmo salar*, [27]), the liver works like an anastomosed tubular gland in which four to nine hepatocytes surround a bile duct. But in higher teleost (Serranidae: *Serranus cabrilla*, [26]) a similar numbers of hepatocytes surround each sinusoid.

In teleosts, the pancreatic exocrine tissue develops around the portal vein during ontogenesis [8]. Various authors have been reported that the pancreatic tissue developing around the portal vein can remain extra-hepatic or penetrate more or less deeply into the liver parenchyma depending on the species [18, 28]. In *E. maculatus*, the exocrine pancreatic tissue is extra-hepatic. Usually a thin septum of connective tissue separates the hepatocytes from the exocrine pancreatic cells. In the present study hepatic lobules and portal triads are absent and also recorded in many teleosts [8, 13, 28, 29]. The network of blood capillaries showed vessels that were anastomosed and drained by centre-lobular veins. These findings were similar to other teleosts [16, 29]. The bile ducts observed had a simple cubic epithelium, which becomes columnar in large ducts similar to other teleosts [8, 18]. The exocrine pancreatic tissue has been recorded in other teleosts and its proportion depends on the species [18, 28]. The exocrine pancreatic tissue is responsible for producing digestive enzymes that act in the intestine and aiding in food digestion [26]. Moreover, endocrine part of this tissue can also secrete insulin and glucagon (Youson et al., 2006).

Pigment bearing macrophages are a prominent feature of piscine hematopoietic tissue [31]. In higher teleosts, these cells form aggregates that occur frequently in spleen, kidney and liver [9, 11, 13]. [32] called these structures "melanomacrophage centers (MMCs)". They have also been called "macrophage aggregates" [33]. These structures were observed in the liver of *E. maculatus*. The size, number and content of MMCs are highly variable depending on the species, age and health status [9, 13]. Melanomacrophage centers are believed to concentrate heterogeneous materials such as lipofuscin (natural yellowish color), melanin (natural brown or black colour), ceroid (PAS positive) or hemosiderin (Perls' positive) [9, 10, 11, 31]. Functions ascribed to MMCs include iron storage following erythrophagocytosis and antigen processing [31, 34, 35], as well as destruction, detoxification and recycling of endogenous and exogenous materials [9, 31]. Increased hemosiderin in hepatocytes (hemosiderosis) was found in teleosts in a disturbed environment [13].

The results obtained in this study enabled the characterization of the normal anatomy and histology of the liver of *Etroplus maculatus* by light microscopy, assisting in the analysis of adverse conditions, such as water contamination, nutritional status and health of fishes, which cause changes in the normal structure of the liver [36].

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The impact of employee job satisfaction toward organizational performance: A study of private sector employees in Kuching, East Malaysia.

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Abstract:

The purpose of this study to explore the impact of job satisfaction toward organizational performance based on private sector in Kuching, East Malaysia. Basically, employee behavior is very crucial for the organization. Whilst employees are satisfied to their job then it facilitates them to motivate their job, as a result, organization can get extra-ordinary result from them. Consequently, most of the researcher want to pick out this topic to discover the job satisfaction and its relationship with organizational performance. The focal point in this study is to discover which type of satisfaction (intrinsic or extrinsic) employee more expect from organization. In addition, this research additionally identifies the job satisfaction based on gender, age categories and position of the job sector. Further, this research also spotlights what kind of events

satisfy employees on their job and evaluation why employee live or leave from the organization. For the current research, researcher is engaging in precise field survey using questionnaire (primary data) from several group of employees like top level manager, middle manager, supervisor and support stuff and so on. From the detailed analysis showed that there is a strong positive relationship between employee job satisfaction and organizational performance. At the same time, analysis showed that "remuneration" and "promotion" are the two crucial factors of job satisfaction these are closely related with job satisfaction. Consequently, based on overall research findings can say that there is a strong positive relationship between employee job satisfaction and organizational performance.

Index Term:

Job satisfaction, Factor of job satisfaction, intrinsic reward, extrinsic reward, organizational performance

Introduction:

Employee job satisfaction is tremendously crucial not only for the employees but also organization as a whole Ostroff (1992). Mitchell, Holtom, & Lee (2001) has been perceived that top-level management must need to realize how an employee will be happy to their job. Because being satisfied employees are usually happy and motivated to their job, as a result, organization can gain amazing performance from them, alternatively, those employees are dissatisfied with their job will now not encouraged and concern towards the routine of work and even they're within job however escaping the responsibilities, furthermore, they might be high level of absence from their work Judge et al (2001). Whilst even they're present in the job however they've much less concern to the issues of organization, which is honestly affect the organization performance negatively. This is because based on employee performance organization made anticipated goal towards following terms.

Employee satisfaction plays a key function on the performance of organization Koys (2001). Consequently, it is

crucial for an organization to understand what employee exactly feel, thing on their job and stage of satisfaction. When organization recognize the dissatisfaction elements of employee, based on the staff perception need to make strategies that how the staff determination and dedication can be improved. By way of this motion business outcome can be improved and the same time productivity is probably increased as well.

Research objectives:

1. To examine the relationship between employee job satisfaction and organizational performance.
2. To examine the relationship between employee remuneration and organizational performance.
3. To examine the relationship between quality of work life and organizational performance.
4. To examine the relationship between employee promotion and organizational performance.
5. To examine the relationship between employee supervision and organizational performance.
6. To examine the relationship between teamwork and organizational performance.

Literature review:

1. Job satisfaction

Job Satisfaction is one of the basic attitudes that impact human conduct in the work place Newstrom, and Davis (1986). Therefore, hierarchical conduct researchers are keen on accurately measuring job satisfaction and understanding its relationships for people at work. Some of the definitions of job satisfaction provide clear impression of it and they were useful for this research study. Yousef (2017) depicted as how much people feel emphatically or adversely about their jobs. It is an enthusiastic reaction to one's commitments and to the physical and social circumstances of the work place. As a concept, job satisfaction also demonstrates degree of expectations in a person's psychological agreement is fulfilled. Occupation fulfillment is perhaps to be higher for people who comprehend an instigation commitment adjust in their association with the employing organization.

Occupation fulfillment is the measure of delight or satisfaction identified with a job. However, individuals could have extreme job fulfillment after they have effective attitudes nearer to such occupation factors comprising of the work itself, notoriety and probability for promotion. As indicated by Smith, Kendall and Hulin (2017) work fulfillment is the volume to which somebody is delighted or satisfied by his or her work. Significant research on work fulfillment demonstrates that components including a person's objectives and goals decide this outlook, together with organization and organizational components, for example, relationships with colleagues, directors, working conditions, work clues, and remuneration. Work fulfillment is noticed a person's standard state of mind toward his or her work. Nhuta, and Nhuta (2017) said that somebody with a high level of job satisfaction holds compelling attitudes nearer to the job; somebody who's baffled alongside his or her job holds negative attitudes about the job. According to Niemiec, and Spence (2017) work fulfillment is a charming or fantastic passionate kingdom as a result of the appraisal of one's job or method studies.

In addition, Job satisfaction has been perceived principal factor which is closely link with organizational productivity. Job Satisfaction is the degree which is measuring those employees resemble their job and those are most certainly not. Judge et al (2017) said that when employee is satisfied to their job than it creates charming pressure within organization, motivate employee to job well and organization can get excellent achievement from them. On the other hand, dissatisfied employee willingly tries to escape duty, high level of absents, when even they are in the job but try to hide away from the job and do not thing about issues of organization which is affect negatively organizational productivity. Therefore, most of the organization try to understand employees feeling, opinion about their job. For example, IBM is one of the organizations which is conduct detailed field survey to know the feeling of employee about their job. Boamah, Read, & Laschinger (2017) said that job satisfaction is a kind of committed factor which is related with business effectiveness. Laschinger (2017) also said that the elevated level of job satisfaction

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contributing low level of employee turnover that help organization become profitable and get outstanding reputation.

2. Defining the job satisfaction factors

2.1 Remuneration

Remuneration constitutes one of the factors that affecting job satisfaction. However, its significance may fluctuate, contingent upon the external factors (e.g. national culture) and the employees' characteristics (e.g. age or held position). Furthermore, the impact of pay on job satisfaction may rely upon employees' subjective appraisal of the entirety of compensation Rees (1993).

Remuneration given by an employer to its employees for administrations rendered. This consolidates both fixed and variable pay attached to execution levels. Swanepoel et al (2014) expressed that compensation as money related and non-monetary outward rewards given by a employer for the time, skills and endeavors made open by the employees in fulfilling job necessities pointed at achieving organizational targets. Agreeing to Absar et al (2010) detailed that employee's compensation is one of the broad limits of HR administration. Compensation is indispensable for the both managers and employees as for attracting, holding and propelling employees. Bakan and Buyukbese (2013) regarded compensation as crucial for employees since it is one of the essential reasons people work. Qasim et al (2012) described that money related rewards have significant impact in choosing work satisfaction.

Pay is one of the principal components of work satisfaction since it has a proficient effect in choosing work satisfaction. The growing needs of people with high living costs drive employees searching for higher pay that can guarantee their future and life satisfaction. Also, in the occasion that people acknowledge they are not repaid well henceforth a condition of enthusiastic disillusionment will be made. These energetic mistakes will create and gather after some time subsequently make employees gloomy and unsatisfied working for the organization. Greenberg and Aristocrat (2008) demonstrated that a seen low pay prompts work disillusionment and a noteworthy supporter to employee turnover. Khan et al (2014) set that academic staff duty can be enhanced and their level of satisfaction could be gained ground by perceiving the effect pay. Mangi et al (2011) revealed that compensation has cheerful relationship with job satisfaction. Regardless, reward is the significant forecaster of work satisfaction. It is the whole of monetary reward that is expected by pros in relationship with the services given to the organizations. The study led by Noordin and Jusoff and Mustapha (2009) detailed that pay critically affect teacher's level of job satisfaction which is excessively balanced with a study by Yang et al (2008) described that remuneration increase basically advanced the work satisfaction for Chinese junior military officers. Nawab and Bhatti (2011) itemized that remuneration affects employees in their job satisfaction, them consider help revealed that pay has a strong centrality effect on employee satisfaction among academic employees. The study led by Mafini and Dlodlo (2014), in higher guideline instruction in South Africa revealed that there is an immediate positive connection between pay/compensation and work satisfaction. In

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addition, the investigation by Strydom found that pay has a noteworthy influence in work satisfaction and disillusionment of staff people in higher guideline organizations. Ismail and Abd Razak (2016) disclosures concur that pay is viewed as one of the unpredictable and multidimensional factors of work satisfaction in higher guideline teach. Shoaib et al (2009) communicated that appealing remuneration package is one of the outstandingly basic factors that impact work satisfaction.

Smith (1996) said that high job fulfillment is dependably increment the profitability of an organization, thus the expanding organizational performance too. However, remuneration is a kind of major element which plays a vital role on the level of job satisfaction. Walters (2010) has been perceived that low salary leads one of the major contributors that makes employee unhappy and dissatisfaction toward their job latter on which is converted to escaping duties, high level of absents, low commitment and employee turnover. Kim, Leong, & Lee (2005) stated that employee commitment can be upgraded, and their degree of satisfaction could be raising by exploring the influence of remuneration.

2.2 Quality of work life

The term quality of work life was to begin with presented in 1972 amid International Labor Relations Conference. Quality of work life is a comprehensive concept which is comprised of physical and psychological health, monetary circumstances, individual conviction and connection with environment. In contemporary management, the idea of quality of work life has been changed to a social issue, while in the previous decades just the personal life was emphasized. The importance of quality of work life is subjective creative ability and the view of association personal about the physical and mental allure of workplace and their work circumstances Dhamija, & Singla (2017). Singla (2017) also characterized the quality of work life as the staff response to work; particularly its fundamental result in connection to work needs fulfillment and mental wellbeing. Agreeing to this definition, quality of work life emphasizes on individual results, work encounters and how to make strides the work in arrange to assembly the individual needs.

Sethi (2017) displayed a hypothetical demonstrate for clarifying the quality of work life that is comprised of satisfactory and reasonable emolument, secure and solid environment, constitutionalism in organization, planning the opportunity for proceeded development and security, social pertinence of work life, social integration, advancement of human capabilities and the add up to life space. Hence, the quality of work life of a person is characterized by the individual's full of feeling responses to both objective and experienced characteristics inside the SME working environment. In the administration teach in common, earlier investigates regularly connect quality of work life to job-related results such as representative work exertion, efficiency, and organizational execution.

2.3 Promotion

Promotion is a Shifting of employee for work of higher significance and higher compensation. The

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development of a worker upward in the hierarchy of the association, commonly that prompts upgrade of obligation and rank and an enhanced pay bundle is a promotion. Another meaning of Promotion is "the reassignment of an employee to a higher-rank of job.

A number of researchers give their supposition that job satisfaction is firmly related with promotion opportunities and there is an immediate and positive relationship between promotion opportunities and employment satisfaction. The dependence of the positive relationship between promotion and employment fulfillment is on seen equity by workers.

Promotion is a kind of encouragement tool that using to reward the employees for meeting organizational goal hence it delivers as a mean of integrating organizational goals and personal goals. Pandey, & Asthana (2017) stated that promotion is a kind of advancement of an employee which is providing for a better job performance, better job performance related with such thing like in terms of minced responsibility, status, minced skills and experience. Pandey (2017) has been perceived that the deciding factor for the position of an employee in the hierarchy depends on the level of talent, skill and experience.

Promotion is one of the fundamental elements which is carries committed changes to fulfill the package of an employee. Ghaffari et al (2017) stated that increment of salary demonstrated the value of promotion. Promotion pursues a set of patterns that defined in the employment bond. In the modem business world, promotion is one of incentive that makes employee productive participant in the organization which is definitely influence on the organizational performance. However, promotion focuses an employee in external environment and that is accomplished his worth in the internal environment. Therefore, the effect of promotion is found that more committed other than fixed income on job satisfaction. Shah et al (2017) those employees are dissatisfied with opportunity of position in hierarchy they have more intention to leave the organization. Yousef (2017) stated that when employee perceive that there are significant chances of opportunity of promotion, they are being satisfied to their job and more concern about issue of organization.

2.4 Supervision

Supervision is one of the principal factors which can impact employee on the level of job satisfaction. Vannucci et al (2017) expressed that supervision connect with technical knowledge, human relation, skill and coordination of work activity. In organization, the style of supervisory conduct driving the key part to accomplish organizational objective. Supervisory conduct extends massively imperious where all choice made at top level and to a great degree just way choice made by employee or subordinate in lowest level.

Stress has been perceived that is a vital topic because of mentally or physically affecting it toward individual. In workplace, job stress is one of the most serious occupational threat in our time. Stress in workplace always giving negative influence on the job satisfaction and for this reason employee commitment become poor, and high turnover intention is increased among workers. Job

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satisfaction is an attitude that determines the contentment, enjoyment and motive felt on the job. Nichols et al (2017) replied that supervisory behavior is one of the techniques that make employee happy or dissatisfied on the level of job satisfaction. According to Hakanen, Peeters, & Schaufeli (2017) the more satisfied worker become motivated worker on the level of job satisfaction.

Jia, Cheng, & Hale (2017) has been perceived that employee rated their communication with their supervisor 80% positive and 20% negatively affecting toward them, and 20% negative communication affect another five times more toward employee's mood which is more than positive communication. He also said that in organization, supervisory behavior can be creating a healthy workplace for the employee.

According to Wang, Demerouti, & Blanc (2017) supervisor high transformational leadership with employee plays a positive emotion to become happier and motivate them to concern willingly issues of organization. On the other hand, low transformational or abusive supervision has been found that lower level of job satisfaction which influence employee psychological distress to their job.

2.5 Teamwork

The expression team usually alludes to a small group wherein the people have a typical reason, associated parts and integral competencies Sohmén (2013). Teams are playing a more noteworthy part in business as organizations are searching for to "level" their structures and drive required alterations of their business forms and organizational culture. Effective teams likewise encourage organizations to let free more creativity throughout their workforce than they might if they trusted "great driving forces" to concoct brighter considerations and solutions than people can.

Teamwork requires a significant comprehension of group dynamics and the approaches wherein a group's specific "personality" turns out as the people gather a record of cooperating. An inordinate execution work environment has practical experience in developing individuals' impact at the business and also the impact of strategies, methodologies, the surrounding and age and instruments that improve their jobs. A high-performance workplace invests in its human resources and supports their technical and innovation competencies. However, the changing requirements of production activities require the organizations to shape particular groups each time a new challenge is embraced. "thus, any approaches and practices that are done with the guide of the organizations for you to enhance teamwork activities may have impacts on the execution in their drives." For a couple, the subject of collaboration in organizations is of best fringe concern.

Many cases had been made in current years by researchers, control experts, and columnists about the powerful focal points of labor teams for organizations. All the more particularly, groups are expressed to add to higher impacts for business associations because of enhanced general execution of work force, and profitability.

3. Organizational performance

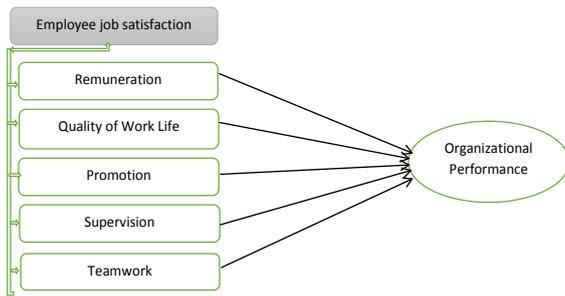
Job satisfaction plays one of the significant parts to accomplish extra ordinary organizational performance. However, organizational productiveness and execution are achieved by fulfilling employees and being sensitive to both their physiological and socio-passionate needs comprehensively. Alessandri, Borgogni, and Latham (2017) reports that there is an eminent connection between the job attitudes of individuals and their execution. They likewise found a compelling connection between singular employee fulfillment and factors, for example, motivation, activity involvement, organizational citizenship and activity execution. Judge et al (2017) was found that there is a gigantic connection between worker fulfillment and profitability, benefit, turnover and consumer loyalty.

Dekoulou (2017) affirm that there's a compelling relationship between essential worker fulfillment with the organization's financial and marketplace performance. He also played out a worker fulfillment overview of more than 40% of the organizations which are listed inside the main 100 of Fortune 500 organizations. The observe inferred that employee fulfillment, conduct and turnover foreseen the subsequent years profitability, and that those are much more noteworthy unequivocally corresponded with customer fulfillment. Which included various multinational organizations maintain that employee fulfillment and in addition diminished turnover are significant patrons of long-haul investor returns. Then again, worker disappointment in view of unpleasant working environment conditions can likewise prompt a lower in efficiency prompting poor organizational performance.

In addition, it is fundamental for management in organizations to make a workplace that encourages higher worker charm levels that is on account of employee fulfillment has a stimulus effect on the reliability and confidence of personal, enhances the remarkable of yields and will build productiveness. Satisfied employees for the most part have a tendency to perceive that the employer might be more fulfilling at last, they care about the quality of their jobs and are additional dedicated to the organization, fundamental to a sign of organizational citizenship practices likewise of the assessment that fulfilled workers have higher standards for dependability and are more effective. while workers are disappointed, their physical and emotional health is negatively affected. Thus, organizational performance may even turn out to be more terrible as more production time could be lost in light of the fact that disappointed employees are probably to take more leave, therefore, if steps are taken to enhance employee delight, average satisfaction of the company is better, and the results might be mulled over through more joyful employees, enhanced body of workers profitability, decreased workdays and higher profits. This additionally embodies the essentials of people in organizations, in light of the fact that people are the promoters of excellent organizational performance.

Therefore, satisfied employees will make fulfilled and faithful customers, so that you can bring about higher organizational performance. It is important then for service organizations to coordinate adequate resources towards employee fulfillment programs.

Research Methodology:



Research design

Basically, this study is conducting based on quantitative data that will performed to gain information or data through studies led with respondents. Other than that, by the utilization of quantitative data, it can help this research to find and acquire an exact data about job satisfaction and its relationship with organizational performance.

This is likewise clearly demonstrating that quantitative strategies are the technique that utilization a rundown of inquiries to get information and data from respondents who's are participating in this research. Furthermore, quantitative data can be measured through the system of measurement tools and estimation devices including questionnaire and sample size.

Population

For this research, population are targeted those who are working in several private companies in Kuching, Sarawak. For getting real data and information, we are giving questionnaire those who are working in private company at a time at top-bottom level employee to analyze the different perception and lacking job satisfaction these they are feel and identify which kind of satisfaction thing that they are appreciate from the organization. Besides that, from the several type of private company 160 people is targeted in this research.

Research finding

Elements	Total Questionnaires
Number of questionnaire distributed	160
Number of questionnaire collected	160
Number of questionnaire incomplete and missing	05
Number of questionnaire used in data processing	155

Frequency Distribution of Questionnaire

Respondent Demographic Profile

Variables	Characteristic	Frequency	Percentage
Gender	Male	107	69.0
	Female	48	31.0
Marital Status	Single	76	49.0
	Married	79	51.0
Age categories	20-29	79	51.0
	30-39	64	41.3
	40-49	12	7.7
	50-60	0	0
Education level	High School	6	3.9
	Diploma	25	16.1
	Bachelor degree	73	47.1
	Post Graduate	49	31.6
	Other	2	1.3
Monthly household income	Less than RM1000	4	2.6
	RM 1000- RM 2000	39	25.2
	RM 2001- RM 3000	60	38.7
	RM 3001- RM 4000	40	25.8
	RM 4001 And above	12	7.7
Experience	0 - 1 year	36	23.2
	2 - 6 year	105	67.7
	7- 11 year	10	6.5
	12- 20 year	4	2.6
Position	Top level Manager	18	11.6
	Middle Manager	45	29.0
	Supervisor	70	45.2
	Fresh/Entry level	22	14.2
	Other	0	0
Service	Accounting	15	9.7
	HR Manager	22	14.2
	Financial Advisor	23	14.8
	Risk Manager	19	12.3
	Quality Control Coordinator	15	9.7
	Business analyst	8	5.2
	Office Management	23	14.8
	Administrative Manager	15	9.7
	IT specialist	15	9.7
	Other	0	0
	Nationality	Malaysian	139
Non-Malaysian		16	10.3

Table 1.2: Respondent Demographic Profile

There are nine questions on demographic that been utilized to test the descriptive analysis for 155 respondents. The primary question is on gender. From the analysis, male includes a higher rate of 69.0% (107 respondents). Female as it were score almost 31.0% (48 respondents).

Next question is approximately marital status. From the analysis, it is appearing that married has higher percentage of 51.0% (79 respondents) and single score around 49.0% (76 respondents).

The third question is about age categories. From the analysis, it is appearing that 20 – 29 years old has higher rate which is 51.0% (79 respondents), 30-39-years old score almost 41.0% (67 respondents), 40-49-years old score almost 7.7% (12 respondents), and 50-60 age categories, there are no one response under this age.

The forth demographic that been analyze is the education level. In this question, it shows that respondent comes from different education level. The highest rate is bachelor degree which is 47.1% (73 respondents), second highest is post graduate with 31.6% (49 respondents), diploma is 16.1% (25 respondents), high school is 3.9% (6 respondents), and other is 1.3% (2 respondents).

The fifth demographic that been analyze is the monthly household income. In this question, it appears that respondent have distinctive level of income. The highest rate is RM 2001- RM 3000 which is 38.7% (60 respondents), second highest is RM 3001- RM 4000 with 25.8% (40 respondents), RM 1000- RM 2000 is 25.2% (39 respondents), RM 4001 and over is 7.7% (12 respondents), and Less than RM 1000 is 2.6% (4 respondents).

The sixth demographic that been analyze is the experience level. In this question, it appears that respondent

have different level of experience. The highest percentage is 2-6 years which is 67.7% (105 respondents), second highest is 0-1 years with 23.2% (36 respondents), 7-11 years is 6.5% (4 respondents), and 12-20 years is 2.6% (4 respondents).

The seventh demographic that been analyze is the representative position within the company. In this question, it appears that respondent have different level of position within the company. The highest rate is supervisor position which is 45.2% (70 respondents), second highest is middle manager with 22.9% (45 respondents), fresh/entry level is 14.2% (22 respondents), and top-level management is 11.6% (18 respondents).

Then, another demographic that been test in this research is service of respondent. From the analysis, financial adviser includes a highest percentage with 14.8% (23 respondents), seconds is the same level of financial adviser which is office management with 14.8% (23 respondents), HR manager with 14.2% (22 respondents), risk manager with 12.3% (19 respondents), (accounting, quality control coordinator, administrative manager, IT specialist) are the same rate which is 9.7% (15 respondents) and finally is business analyst with 5.2% (8 respondents).

Lastly is about the nationality of the respondents. There are Malaysian nationality of employee is higher rate with 89.7% (139 respondents). On the other hand, Non-Malaysian is 10.3% and respondents are only 16.

Reliability test

Variables	Number of Item	Cronbach Alpha
i. Independent Variable		
Remuneration	5	.796
Quality of Work life	5	.710
Promotion	5	.749
Teamwork	5	.724
Supervision	5	.777
ii. Dependent Variable		
Organizational Performance	11	.824

Table 1.3: Reliability Test

Reliability test is one of the traditional way researcher test their primary research variable. In this test measuring the consistency between data collected. In addition, Reliability test providing clear statement that which variable reliable and which one is not and based on the test researcher proceed the research.

As according to the demographic table above, in this research total data are collected from 155 respondents. For data, there are five items utilizing in each independent variable and at the same time 11 things utilizing in dependent variable. In any case, in reliability test the least passing esteem is 0.700. Therefore, the Cronbach's Alpha esteem must be 0.700 and over to be reliable. The first independent variable in this research is remuneration. For the remuneration, the Cronbach's Alpha esteem is 0.796 which is more than 0.700. Subsequently, Remuneration is exceptionally reliable for this research.

The second independent variable is quality of work life. For quality of work of life, the Cronbach's Alpha 0.710 which is

more than 0.700. Therefore, Quality of work life also reliable in this research.

The third free variable is promotion. For promotion, the Cronbach's alpha is 0.749 which is more than 0.700. Consequently, Promotion is exceptionally reliable in this research.

The fourth independent variable is teamwork. For the teamwork, the Cronbach's Alpha is 0.724 which is more than 0.700. Subsequently, teamwork is still reliable in this research.

The final independent variable is Supervision. For supervision, Cronbach's Alpha is 0.777 which is more than 0.700. Subsequently, Supervision is exceptionally reliable in this research.

All these five independent factors will be tested with organizational performance. For organizational performance, there are 11 items and all these items by reliability test and Cronbach's Alpha is 0.824 which is more than 0.700. In this manner, organizational performance is exceptionally reliable in this research.

Correlation test

		Correlations					
		Remuneration	Quality of work life	Promotion	Teamwork	Supervision	Organizational performance
Remuneration	Pearson Correlation	1	.354**	.534**	.453**	.421**	.580**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	155	155	155	155	155	155
Quality of work life	Pearson Correlation	.354**	1	.467**	.582**	.521**	.460**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	155	155	155	155	155	155
Promotion	Pearson Correlation	.534**	.467**	1	.465**	.498**	.696**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	155	155	155	155	155	155
Teamwork	Pearson Correlation	.453**	.582**	.465**	1	.503**	.492**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	155	155	155	155	155	155
Supervision	Pearson Correlation	.421**	.521**	.498**	.503**	1	.552**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	155	155	155	155	155	155
Organizational performance	Pearson Correlation	.580**	.460**	.696**	.492**	.552**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	155	155	155	155	155	155

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

Table 1.4 Pearson correlation Test

Based on table 1.4, Remuneration have the strong positive association with organizational performance whereby remuneration correlation is (r=0.580, p<0.000). Then, it was followed by quality of work life (r=0.460, p<0.000), promotion (r=0.696, P<0.000), teamwork (r=0.492, p<0.000)

and supervision ($r=0.552, p<0.000$). In the table it shows that every variable are significant because P value are not more than 0.05.

Hypothesis testing:

H1: There is a significant relationship between employee remuneration and organizational performance

The table 9 has two valuable indicators. One is the Pearson Relationship or also known as R value. The R value demonstrates the sort and quality of the relationship. There's a strong positive relationship between employee remuneration and organizational performance with the R value of 0.580. The second valuable indicator is the significance value or the P value. For the relationship to be noteworthy, the P value needs to be 0.05 or less. The table had appeared the P value of 0.000. Thus, the relationship between employee work satisfaction and organizational performance is significant. In other words, the hypothesis 1 that stated there is a noteworthy relationship between employee remuneration and organizational performance is upheld.

H2: There is a significant relationship between employee quality of work life and organizational performance

The second hypothesis expressed that there is a noteworthy relationship between employee quality of work life and organizational performance. Generally, there's a reasonably strong positive relationship between employee quality of work life and organizational performance with the R value of 0.460. At that point, this result is encourage backed by the P value of 0.000 which is less than 0.05. Thus, the relationship between quality of work life and organizational performance is significant. In this manner, hypothesis 2 is upheld.

H3: There is a significant relationship between employee promotion and organizational performance

The third hypothesis stated that there is a noteworthy relationship between employee promotion and organizational performance. In general, there is a strong positive relationship between employee promotion and organizational performance with the R value of 0.696. At that point, this result is assist bolstered by the P value of 0.000 which is less than 0.05. Thus, the relationship between employee promotion and organizational performance is noteworthy. In this manner, hypothesis 3 is upheld.

H4: There is a significant relationship between supervision of employee and organizational performance

The forth hypothesis stated that there is a noteworthy relationship between supervision of employee and organizational performance. Generally, there is a strong positive relationship between supervision of employee and organizational performance with the R esteem of 0.552. At that point, this result is further bolstered by the P value of 0.000 which is less than 0.05. Consequently, the relationship between supervision of employee and organizational performance is significant. Hence, hypothesis 4 is upheld.

H5: There is a significant relationship between employee teamwork and organizational performance

The fifth hypothesis stated that there is a noteworthy relationship between employee teamwork and organizational performance. In general, there is a strong positive relationship between employee teamwork and organizational performance with the R value of 0.492. At that point, this result is encourage backed by the P value of 0.000 which is less than 0.05. Thus, the relationship between employee teamwork and organizational performance is noteworthy. Subsequently, hypothesis 5 is upheld.

Multiple regression

Multiple regressions test few independent variables at once with the dependent variable to decide the conceivable linear relationship.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.766 ^a	.586	.572	2.68177

a. Predictors: (Constant), Remuneration, Quality of work life, Promotion, Supervision, Teamwork

Table 1.5: Regression model Summary

The table appear that r-square with 0.586 and this implies that there is strong positive significant relationship between independent variable (remuneration, quality of work life, promotion, teamwork and supervision) and dependent variable (organizational performance).

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1518.446	5	303.689	42.227	.000 ^b
	Residual	1071.593	149	7.192		
	Total	2590.039	154			

a. Dependent Variable: Organizational performance

b. Predictors: (Constant), Remuneration, Quality of work life, Promotion, Supervision, Teamwork

Table 1.6: ANOVA

The table above demonstrated there are independent variables that significantly have linear relationship with the organizational performance. To determine the exact variables, the next table will be assessed.

		Coefficients ^a			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta		
1	(Constant)	7.812	3.071		2.543	.012
	Remuneration	.417	.122	.223	3.418	.001
	Quality of work life	.084	.147	.040	.574	.567
	Promotion	.836	.134	.431	6.246	.000
	Supervision	.320	.117	.185	2.728	.007
	Teamwork	.154	.145	.075	1.063	.289

a. Dependent Variable: Organizational performance

Table 1.7: Coefficients

Concurring to the table above, all the P values are below 0.05 except quality of work life. This appeared that all independent variables are significantly positive related to organizational performance except quality of work life in a linear form. The B value is the portion of the variable within the overall relationship. As we can see, Promotion has the most noteworthy portion that is 0.431. Subsequently, Advancement is the strongest independent variable. On the other hand, quality of work life is the weakest independent variable since the portion of this variable is 0.040.

Conclusion

Although there is a certain limitation included in this study, the following conclusion will be providing some insights to manager to improve the level of employee job satisfaction in the private limited company in Kuching. Based on the analysis about employee job satisfaction researcher find the strong positive relationship with organizational performance. In addition, from the research we found that employees who are in higher levels tendency to more satisfy from intrinsic job satisfaction where employees who are working in lower position tendency to more satisfaction with extrinsic job satisfaction. At the same time, those employees are working in competitive industries they are more satisfied their job compare those employees working in less competitive industries. From this study we also found that professionals or managers are willing to provide more effort to the job than non-managers. Furthermore, we found that those employees are older in company they are more satisfy compare to younger employees. Another thing, high experienced employees are satisfying in the private limited company in the Kuching compare to less experience employees. In addition, we found that sex is not significantly effect on the job satisfaction, satisfy employee has less absenteeism in work, less turnover from the company. At the same time, we found that there are two factor that mostly satisfy as an employee in organization which are remuneration and promotion. From the coefficient table we found that remuneration p value is 0.01 and promotion is 0.000. Therefore, we can say remuneration and promotion have highly strong factor of job satisfaction that can help employees to motivate their job in the companies. Finally, we found that satisfied employees have highly commitment to the companies than dissatisfied employees.

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POTENTIALS OF *Moringa oleifera* LEAF EXTRACT IN INCREASING MAIZE (*Zea mays* L.) PRODUCTIVITY IN NIGERIA

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Abstract

In averting the menace of the adverse effects caused by the application of inorganic fertilizer to agricultural crops, there is the need to adopt the use of organic yield enhancers. One of such is the use of *Moringa oleifera* leaves, known to be in abundant supply especially in the South west, Nigeria. This study was conducted in the screen house of the Department of Sustainable Forest Management (SFM), Forestry Research Institute of Nigeria (FRIN), Jericho, Ibadan, located on the latitude 07⁰23'N and longitude 03⁰51'E. The objective was to evaluate the potential of Moringa leaf extract (MLE) and frequency of application on increased maize productivity. The five treatments included application of 25 ml aqueous MLE once (3 WAP), twice (3 and 6 WAP), thrice (3, 6, and 9 WAP), four times (3, 6, 9 and 12 WAP) and the control (no Moringa leaf extract) on maize plants at interval of 3 weeks and the experiment was monitored for 15 weeks. Significant differences at five percent level of probability were observed for the growth parameters and the yield components viz: vigour score, height, stem diameter, number of leaves, root length, shoot dry matter production, number and weight of cobs. The application of Moringa leaf extract (MLE) twice, thrice and/ or four times enhanced the growth and productivity of maize hence, farmer can adopt this method as a substitute for mineral fertilizer (NPK) in increasing maize productivity.

Keywords: Moringa leaf extract, Maize, inorganic fertilizer, growth and yield parameters

1.1 Introduction

Moringa is the sole genus in the flowering plant family Moringaceae made up of 13 species but the commonest one is *Moringa oleifera*. It is a tropical multipurpose tree and one of the world's most used plants. It is a fast growing tree for human consumption, livestock forage, medicine, dye and water purification. It is grown

traditionally as backyard trees or hedges. Its importance as medicine and nutritional values have been widely highlighted and documented. However, there are limited reports on the frequency of application of the Moringa leaf extract and its impact on maize productivity in Nigeria. Trials carried out by Foidl *et al.* (2001) and Fuglie (2008) have shown that Moringa is suitable for intense production of many crops due to its growth hormone activity. As a leguminous plant, Moringa fixes atmospheric nitrogen thus reducing the need for fertilizer application and as green manure can also help improve soil fertility. It can be grown as intercrop in association with other annual crops and the leaf extract can be used as foliar spray to increase plant growth. Moringa contains zeatin, a plant hormone derived from the purine adenine. It is a member of the plant growth hormone family known as cytokinins. These plant hormones help cell division, differentiation, growth, protect against oxidation and help in nutrient assimilation (Hwang *et al.*, 2012). Maize (*Zea mays* L.) is a very important staple food of great socio-economic importance in the sub-Saharan African of which Nigeria is inclusive with per capita kg year of 40 (IITA, 2007). Nigeria is currently the tenth largest producer of maize in the world and the largest maize producer in Africa (IITA, 2012; 2018). Fajemisin (1985), stated that maize has established itself as a very significant component of the farming system, in that it determines the cropping pattern of the predominantly peasant farmers. The fact that maize can produce higher yield within its short maturity period coupled with its ability to respond to good cultural practices, particularly fertilizer, has therefore made it to perform better than other cereals like sorghum and millet. It is a multipurpose crop that provides food for human, feeds for animals especially poultry and livestock and raw materials for industries. The use of maize has shifted primarily from domestic crop to industrial crop (Khaliq *et al.*, 2004; Iken and Amusa, 2014).

In spite of the great potentials of maize both as industrial and domestic crop several problems have constrained its maximum production. The major constraint to increased maize production is low soil nitrogen and the non-availability of mineral fertilizer at the right time of farming to augment the soil nutrient deficiency and even when available most peasant farmers cannot afford it (Abera *et al.* 2005, Farhad *et al.*, 2009). Furthermore, concerns over the negative environmental impacts of mineral fertilizers have increased the need to develop alternative strategies that will help alleviate or minimize the use of such inorganic fertilizers. It is therefore imperative that alternatives sustainable climate-smart Agroforestry practices should be developed to improve and enhance maize productivity.

2.1 Materials and methods

2.1.1 Study area

The study was carried out in the screen house of the Department of Sustainable Forest Management (SFM), Forestry Research Institute of Nigeria (FRIN), Jericho, Ibadan, Nigeria. FRIN is located on the latitude 07⁰23'N and longitude 03⁰51'E with the main total rainfall of 1548.9 mm, falling in approximately 90 days. The mean maximum temperature was 31.9⁰C, minimum 24.2⁰C and the relative humidity was 71.9% (FRIN, 2014).

2.1.2 Experimental Procedure

The experiment consisted of five treatments viz: Spraying of maize seedlings with Moringa leaf extract at only 3 Weeks after planting (WAP); 3 and 6 WAP; 3,6 and 9 WAP and 3,6,9 and 12 WAP and the control(No spraying with leaf extract) laid out in a Complete Randomized Design replicated five times. The maize variety PVA SYN3 F2 was sourced from the International Institute of Tropical Agriculture (IITA), Ibadan. Two seeds were planted in each polythene pots containing 4 kg of soil top soil. Leaves of 40 day old Moringa were collected and grounded in water at ratio 1kg of Moringa leaves to 1 liter of water. The extract was squeezed out of the paste using microfilament cloth. This was further diluted in the ratio 1 to 10. 25 ml of the extract was sprayed on each of the maize plants at 3 WAP, 3 and 6 WAP, 3,6 and 9 WAP and 3, 6, 9 and 12 WAP according to specifications. All these were replicated 5 times arranged in a Complete Randomized Design (CRD) lay out. Watering was done when necessary. Data were collected at 3 weeks interval on the vigour score, height, stem diameter, number of leaves, dry matter production, number and weight of cobs of the maize plants till 15 WAP.

2.1.3 Leaf extract analysis

Analysis of the Moringa leaf extract was carried out using the procedures described by Ryan *et al.*, (2001) using flame photometer

2.1.4 Data analysis

The data collected on the growth and yield parameters of the maize plants were then subjected to one-way Analysis of Variance (ANOVA) to compare the effect of the different treatments on the growth and yield of the maize plants. Means found to differ significantly were separated using Duncan Multiple Range Test (DMRT) procedure. Results were summarized in tables.

3.0 Results and Discussion

3.1 Composition of Aqueous Moringa Leaf Extract (MLE)

The composition of the aqueous MLE analysis indicated it as an organic productive nutrient carrier for both growth and yield productivity (Table 1)

Table 1: Nutrient composition of the aqueous MLE

Nutrient	Percentage (%)
Nitrogen	4.10

Phosphorus	1.20
Potassium	1.83
Calcium	14.1
Magnesium	0.11
Sodium	1.22
Organic carbon	12.2
C:N	2:8

3.2 Influence of Application Frequencies of MLE on Growth Parameters

3.2.1 Influence of frequencies of MLE on crop vigour score (CVS) of maize

There were no significant differences in the growth parameters of the maize plants at 3 WAP, this indicates that there was still enough food reserves in the endosperm of the maize planted coupled with the effects of 30kg/ ha NPK applied at 2 WAP to all the maize plants. Fiodl, (2001) suggested that for effective use of MLE, the necessary agronomic requirements must be provided for the specific crops. The nutrients at this stage were still sufficient and available to meet the growth requirements of the seedlings (Oaks, 1997; Bettye *et al.*,2000).

(Table 2)

At 6 WAP and throughout the life cycle of the maize plants, differences among the vigour of maize plants treated with MLE at various frequencies were highly significant (≤ 0.05) compared to the control with no leaf extract (Table 2). At the early stage about 4 WAP of maize growth, the endosperm reserves becomes exhausted and the differences in their canopy size, colour and general appearance are as a result of the differences in their abilities to produce assimilates (Revilla *et al.*, 1999), hence the need for additional nutrients for optimum maize productivity. At 6, 12, and 15WAP, maize plants treated with MLE twice, thrice and fourthly had significantly higher CVS than those treated once and the ones in the control(no MLE application) However, the CVS of maize plants in which MLE was applied once were significantly higher than those of control.

Table 2: Influence of frequencies of MLE on crop vigour score (CVS) of maize

Frequency	CVS			
	6	9	12	15
Once	6.6 ^b	7.2 ^a	6.2 ^b	6.4 ^b
Twice	7.6 ^a	7.4 ^a	8.0 ^a	7.6 ^a
Thrice	7.8 ^a	8.0 ^a	8.0 ^a	7.6 ^a
Four times	7.4 ^a	7.6 ^a	7.8 ^a	7.2 ^a

Control	5.4 ^c	5.6 ^b	4.6 ^c	4.4 ^c
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3.2.2 Influence of frequencies of MLE application on the height of maize plants

The height of the maize plants in which MLE was applied once, twice, thrice and fourthly were significantly different from those of the control (Table 3). At 12 and 15 WAP, the heights of the maize plants treated with MLE once and control were highly suppressed compared to those treated with MLE twice, thrice and four times. Maize plants treated with MLE twice, thrice and four times had significantly taller plants than those treated once with MLE and control. This result corroborates with the findings of Mvumi, *et al.* (2013) and Abdalla (2015) that there was improved growth of maize with the increasing frequencies of MLE and this was suggested to be due to the presence of the abundant zeatin in the MLE. However, the application time plays a very significant role as the maize reaches the reproductive stage of tasseling, silking and kernel formation and grain filling (6 to 12WAP) to maturity. At 12 WAP, the mean values were 166.34, 163.0, 162.48, 146.5, 122.48 and at 15 WAP: 166.80, 165.68, 164.08, 148.60 and 122.0 for four times, thrice, twice, once and control respectively. At 9 WAP, all treated maize plants had taller plants than the control. Abdel (2016) also reported that Moringa extract significantly increased the plant height, number of leaves per plant, neck diameter and yield parameters of garlic.

3.2.3 Influence of frequencies of MLE application on the Leaf number

Significant differences were also observed in the number of maize leaves treated with MLE compared with the control especially at 12 and 15 WAP (Table 3). The mean values were 12.4, 11.6, 11.6, 10.8 and 7.2 at 12 WAP; 11.8, 11.6, 10.0 and 7.0 at 15 WAP for four times, thrice, twice, once and control respectively. Higher number of leaves on the maize plants treated with MLE twice, thrice and four times may be as a result of the presence of growth hormones in the MLE that helps in the metabolic processes. This report corroborates those of Gingula *et al.* (2005) that increased leaf area and photosynthetic capacity was associated with increase nitrogen on the cells and tissue growth. Adequate growth factors supply can help delay leaf senescence in maize thereby maintaining the leaf green pigment and functionality for a longer period. Cytokinins are vital hormones found in MLE and have been reported to cause increased cell division by stimulating the process of mitosis. Increased mitosis results in plant growth and the formation of shoots and buds as well as development of fruits and seeds (Schmulling, 2002). Werner *et al.* (2001) also reported that cytokinin deficient plants developed stunted shoots with smaller apical meristem. The leaf cell production was only 3 to 4 % of the wild type

indicating an absolute requirement of cytokinin for leaf growth. Berchtold *et al.* (1993) observed higher senescence in plots of maize low in nutrients rate. Leaf senescence greatly affects photosynthetic capacity, dry matter production and allocation in plants (Gingula *et al.* 2005). The reduction in the leaf number observed at 6 and 9 WAP on maize plants sprayed once and the control however, suggested that the maize plants might have been under inadequate nutrient supply and therefore failed to support their own energy requirements because of reduction in net photosynthesis due to senescence.) The presence of the growth hormones in the treated plants may therefore be responsible for the higher number of leaves as cytokinins delay senescence (Sanjay *et al.*, 2013; Abosede and Ayodeji, 2018).

3.2.4 Influence of frequencies of MLE application on the stem diameter

Significant differences were observed on the stem diameter of maize plants treated with the MLE at the various frequencies (Table 3). At 9 WAP, maize plants treated with MLE twice had significantly thicker stem diameter than those treated thrice, four times, once and the control. The mean values of the stem diameter follow the order 9.51>9.02>8.94>8.0>6.75 respectively. At 12 and 15 WAP however, all maize plants treated with MLE four times, thrice and twice had significantly thicker stem than those treated once and the control. The mean values order were 10.80>10.33>10.31>8.32 for 12 WAP and 11.34>10.91>10.34>8.72>7.09 at 15 WAP respectively. This could be due to the presence of the zeatin. Photosynthetic rate, leaf surface area, size of the sink will all increase with increased growth nutrients consequently resulting in higher vigour, height, number of leaves and stem diameter. A similar report was observed with the work done by Maishanu *et al.*, 2017 where they reported that MLE treated *Vigna unguiculata* had thicker stem than those treated with urea and the control(untreated). This further corroborates the report of Fuglie *et al.*, 2001 that the zeatin in MLE can boost crop productivity in the range of 10-45%.

Table 3: Influence of frequencies of MLE application on the growth parameters assessed on maize plants

Frequency	Height				No of leaves				Stem diameter			
	6	9	12	15	6	9	12	15	6	9	12	15
Once	108.0 _{8^b}	137.1 _{2^a}	146.5 ^b	148.6 ^b	8.6 ^b	10.8 ^b	10.8 ^a	10.0 ^a	8.23 _{ns}	8.0 ^c	8.32 _b	8.72 ^b
Twice	109.3 _{4^b}	143.2 _{2^a}	162.4 _{8^a}	164.0 _{8^a}	9.2 ^{ab}	11.8 ^a	11.6 ^a	11.6 ^a	8.11 _{ns}	9.51 _a	10.3 _{1^a}	10.34 _a
Thrice	109.1 _{2^b}	142.0 _{2^a}	163.0 ^a	165.6 _{8^a}	9.2 ^{ab}	10.8 ^a	11.6 ^a	11.6 ^a	7.37 _{ns}	9.02 _b	10.3 _{3^a}	10.91 _a

Four times	127.4 8 ^a	136.1 2 ^a	166.3 4 ^a	166.8 ^a	9.6 ^a	10.2 ^c	12.4 ^a	11.8 ^a	7.94 ^{ns}	8.94 ^b	10.8 ^{0^a}	11.34 ^a
Control	96.58 ^b	112.7 2 ^b	122.4 8 ^c	120.4 ^c	6.8 ^c	6.6 ^d	7.2 ^b	7.0 ^b	6.3 ^{ns}	6.74 ^d	6.63 ^c	7.09 ^c

Means±SE with different alphabet in columns are significantly different from each other (p≤0.05)

3.2.5 Influence of frequencies of MLE application on the Root length and dry matter production

Significant differences were observed on the root length and dry matter production at 15 WAP. Root length of the maize plants in the various treatments follow the order: 73.8>69.7>67.0>64.5>38.3 and the dry matter production: 41.4>39.87>38.2>36.5>21.1 for four, thrice, twice, once and control respectively (Fig. 1 and 2). These results may be due to the increasing level of the cytokinins at the various frequencies (Werner *et al.*, (2001). Cytokinin combine with auxin to elongate the roots while adequate supply delays leaf senescence thus increasing photosynthetic capacity, dry matter production and allocation to economic parts (Aluko and Fischer, 1989, Gingula *et al.*, 2005).

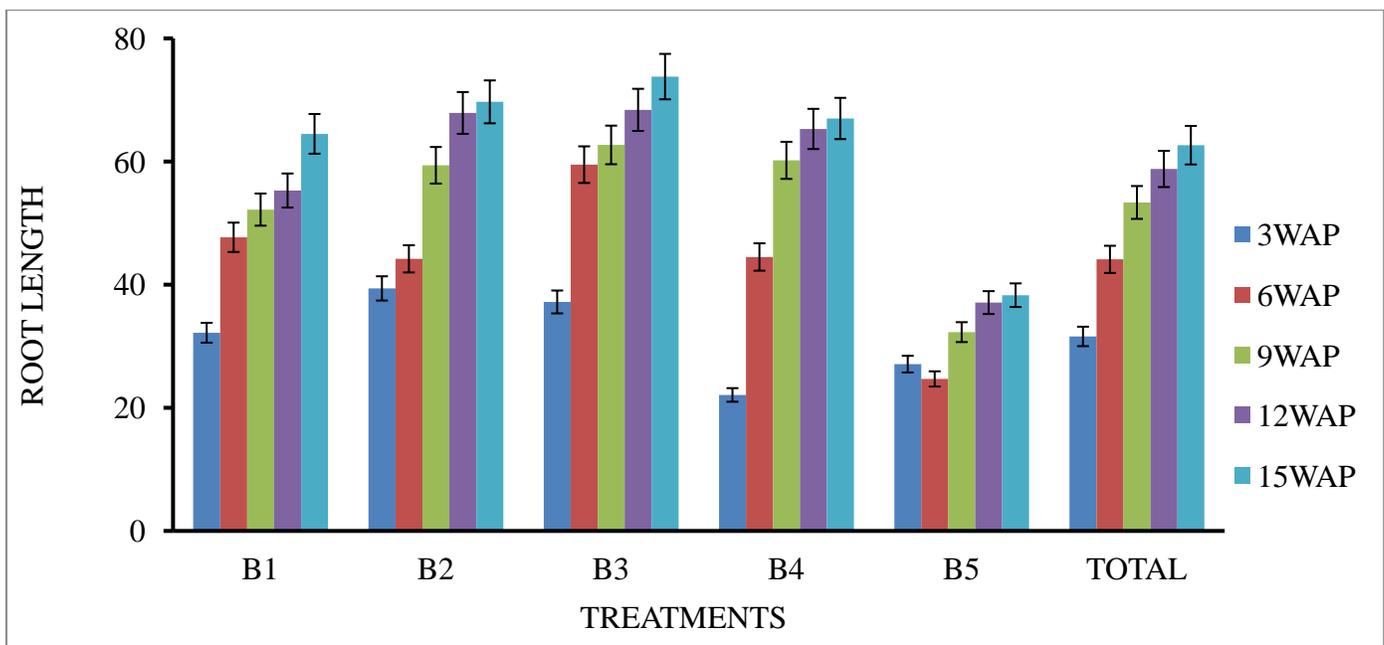


Fig. 1: Influence of frequencies of MLE application on the Root length

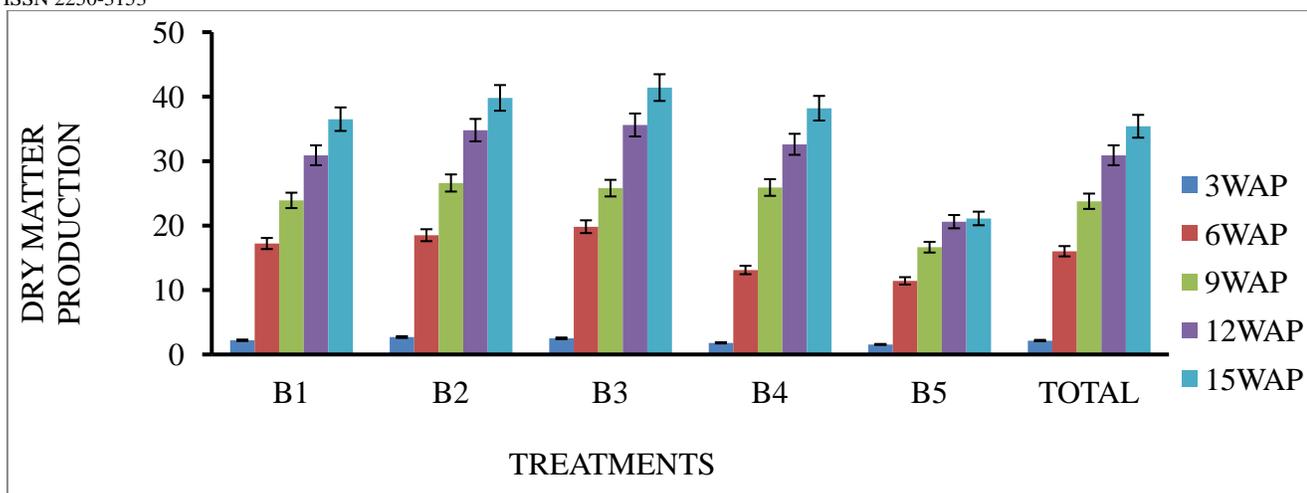


Fig. 2: Influence of frequencies of MLE application on the dry matter production

3.2.6 Effect of MLE application on number and weight of cobs

Significant differences were also observed on the number and weight of cobs harvested from the maize plants treated with MLE at the various frequencies (Table 4). All the maize plants treated with MLE at various frequencies produced higher number than the control while maize treated with MLE four times, thrice and twice had significantly higher cob weight (158.68, 151.44, 147.20) than those treated once and those in the control (113.20, 36.1) respectively. However, those treated with MLE once also had cobs weight bigger than those in the control (Table 4). These results agreed with those of Sanjay *et al.*, (2013) and Utietians *et al.*, (2013); they recorded higher yields on pea and garden egg when treated with MLE respectively. Plants with high early seedling vigour, height and number of leaves are expected to establish faster by maximizing the use of available water, nutrients and solar energy thereby increasing the photosynthetic ability of the plant. This will result into more dry matter accumulation, which may be partitioned to the sink with consequent increased grain yield (Adetimirin, 2006). The complementary effect of the MLE with the minimum nitrogen applied provided the necessary growth requirements for the growth and establishment of the treated maize plants with resultant higher number and weight of cobs. Makkar *et al.*, (2007) and Chang *et al.*, (2007) reported that the application of MLE on stem and leaves led to increased yield. Furthermore, Anyaegbu (2014), reported that the application of MLE increased the availability of micro and macro nutrients in the soil for plant uptake.

Table 4: Effect of MLE application on number and weight of cobs

Treatment	Number of cobs	Weight of cobs(g)
Once	1.2a	113.2b

Twice	1.8a	147.20a
Thrice	1.8a	151.44a
Four times	1.6a	148.68a
Control	0.4b	36.10c

Means±SE with different alphabet in columns are significantly different from each other (p≤0.05)

4.1 Conclusion

The results from this study indicated that foliar application of Moringa leaf extract on maize plants had significant effects on both the growth and yield components of maize plants. The application of MLE twice and thrice (3 and 6 WAP, 3, 6 and 9 WAP), especially at the critical stage prior to flowering and grain filling will enhance the productivity of maize plants and reduce the use of inorganic fertilizer that is not always available or too expensive for the poor resource farmer. Moringa grows fast, tolerates drought and thrives in many soils as well as seen growing almost everywhere in the country. The potentials of Moringa as high nutrients carrier especially the growth hormones components can therefore be harnessed and applied either as mulch, improved fallow or foliar spray to enhance and improve maize production and soil nutrient status. Necessary collaborations should therefore be intensified among the government, farmers, institutions, extension workers and NGOs to promote and impart such technology through On-farm demonstrations or trials, agricultural based radio programs and seminars.

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Critical Appraisal of Female Students' Attitude to Mathematics and Their Career Aspiration in Science and Technology in Nigeria

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Abstract- The aim of this study was to assess the attitude and perception of female students towards Mathematics and determine the relationship of attitude to mathematics and career aspiration of female students. Four hundred and twenty five (425) SSII and SSIII students participated in the research. Questionnaire was used for data collection and the data collected was subjected to statistical analyses in SPSS using frequency, percentage, Pearson correlation and bivariate t test. A very weak positive correlation between female career aspiration and female students' attitude to mathematics was observed ($r = 0.004$, $p > 0.01$). The results also revealed significant difference in the female attitude to mathematics and female career aspiration ($t = 52.572$, $df = 424$, $p < 0.01$). The aspiration of female students into Science and Technology was very low.

Index Terms- Female, Attitudes, Mathematics, Career aspiration

I. INTRODUCTION

Attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor (Eagly and Chaiken, 1998). Attitude can also be viewed as a mental predisposition to act that is expressed by evaluating a particular entity with some degree of favor or disfavor Scholl (2007). Science, Technology, Engineering and Mathematics (STEM) play a critical role in the national growth and economy. Any nation that wants to achieve its developmental objectives must give emphasis to science, technology, engineering and mathematics. Mathematics and mathematics skills are considered essential and a prerequisite to the success in STEM education.

Gender is a social construct. It is defined as the socio-cultural differences between males and females respectively. Butler (1990). It is a sociocultural construct, a category that sorts and organizes social relationships between human male and female. Scott (1986). The national bureau of statistics gave the estimated population of Nigeria close to two hundred million people, that is, 193,392,517 (NBS, 2016). Of this figure, 98,630,184 were males and 94,762,333 were females. In Kebbi state, the total population was estimated as 4,440,050 people. 2,264,425 were males while 2,175,625 were females. It can be observed from the figures that half of the Nigeria's population and indeed Kebbi state were females. It can be argued therefore, that no meaningful development can be achieved without the

contribution of females, in other words, it is a great necessity for females to contribute to the development of Nigeria and Kebbi state in particular. It is a necessity in the sense that female education is an efficient asset that a country can invest for sustainable development. Female education affects economic productivity positively, it also improves the mother's knowledge and use of healthcare practices thereby reducing mortality rates (Hartnett and Heneveld, 1994). The length of educational pursuit helps in reducing early marriage and reduces fertility rates through proper use of family planning which can eventually help in reducing poverty (Herz et al 1991).

Researchers have written a lot of literatures on the disparity among males and females in the study of science, technology and mathematics. Evidence shows that girls' self-efficacy and attitudes related to STEM are strongly influenced by their immediate family environment, especially parents, but also the wider social context. Parents' own beliefs, attitudes and expectations are themselves influenced by gender stereotypes, which can cause differential treatment of girls and boys in care, play and learning experiences. Mothers, more than fathers, appear to have a greater influence on their daughters' education and career choices, possibly due to their role model function. Parents with higher socio-economic status and higher educational qualifications tend to have more positive attitudes towards STEM education for girls than parents with lower socio-economic status and education, of immigrant status and ethnic minority background or single parents. Media representations of women and the status of gender equality in society also has an important influence, as it influences the expectations and status of women, including in STEM careers. UNESCO (2017)

Etukudo (2002) revealed a significant gender difference in performance in mathematics. He however opined that such gender difference can be removed when computer assisted instruction is used. Markus (2014) revealed a low enrolment of females in science and technology when compared to the males. She identified the factors leading to the low enrolment of females in science, technology and mathematics to include the attitude of the society towards the role of females as child bearing and housekeeping among other factors. Female participation in educational pursuits has been a topic of concern to the society and the government in Nigeria. Despite huge resources committed to encourage females to participate in education, the progress recorded so far needs more effort especially in the Northern part of the country. Domestic issues and

responsibilities, culture of marginalization, gender stereotyping of knowledge and skills were found to be the barriers to effective participation of females in science, technology and mathematics (Iwu and Azoro, 2017). This agrees with the findings of Maryam and Patience (2017) that home, school and society are the factors influencing female participation in science and technology in Nigeria. They observed that females are saddled with lot of domestic chores, gender intimidation, gender stereotyping, paucity of role models as contributing factors bedeviling female participation in science and technology. Baran (2016) revealed that the lower participation of female in physics is not because of their abilities, but their interests. Moreover, it can be concluded that female students have a potential for physics just as male students do but environmental conditions cause them to generate negative perceptions concerning the fields of science.

However, some researches reveal that female show more positive attitude towards mathematics at higher level than their male counterpart (Iji et al, 2017). The research established a statistically significant difference in the impact of cloud services on students' attitude towards mathematics education between male and female mathematics education students in public universities. It further revealed that female students tend to better perceive their ability to study mathematics education than male students. Similar research also revealed that female students are more responsible to technological innovation in mathematics education as related to attitude towards mathematics than their male counterparts (Wong and Hanafi, 2007), Sanders (2006). Isa and Balarabe (2009) observed a significant difference in the performance of males and females in science and technology. Research has shown that the negative effects of societal affluence on attitudes toward mathematics are not limited to girls, however. Boys too show a significantly weaker orientation toward mathematics and related fields in post materialist contexts. Both girls and boys view mathematics more negatively in these societies. Charles et al (2014).

Sunday and Adebawale (2013) observed that, textbook as an instructional guide, can affect the learner's attitude towards mathematics. Their findings revealed that there is positive multiple correlation of the textbook features and students' attitude towards mathematics where 2.8% of variation of students' attitude to mathematics is based on the features of textbook used. A research finding have shown that although females had less positive attitude towards mathematics, they aspired to mathematics related careers in equal numbers as males Jensen (1997). The finding raised the possibility that gender could moderate relationship between attitudes and career aspirations.

II. FEMALE PARTICIPATION IN SCIENCE, TECHNOLOGY AND MATHEMATICS IN KEBBI STATE.

Available statistics have shown that the percentage pass of female students in Mathematics in ordinary level exams has been higher than performance of males.

Table 1: Kebbi State Distribution of National Examinations Council (Senior Secondary Certificate) Examination Result by Year and Sex

Year	Credit Pass in Mathematics	Total Number of candidates Sat	Percentage Pass in Mathematics
	Male Female	Male Female	Male Female
2012	4,125	16,515	24.98
	1,363	5,899	23.11
2013	8,115	18,162	44.68
	3,056	6,689	45.69
2014	8,561	19,421	44.08
	3,318	7,389	44.90
2015	15,232	20,396	74.68
	5,538	7,985	69.36
2016	13,188	19,416	67.92
	6,111	8,198	74.54

Source: National Examination Council (NECO)

Despite the yearly improvement in the percentage pass of the female students in Kebbi State, there is low enrolment into the degree awarding institutions when compared to their male counterpart. According to the national bureau for statistics, the 2013 to 2015 average percentage enrolment in Kebbi state was 78.8% and 21.2% for males and females respectively. Also, the average percentage female participation in science at graduate level was as low as 18.2% compared to the males 81.8%. (NBS, 2017)

III. OBJECTIVES OF THE STUDY

This study intended to;

1. Examine the perception of mathematics by female students,
2. Examine the attitude of female students towards mathematics,
3. Examine the career choice of the female students for the future,
4. Assess the relationship between female students' attitude to mathematics and female students' career aspiration.

IV. BACKGROUND OF THE STUDY

Despite the growing population of females in Kebbi state, it can be observed from the foregoing that there is low enrolment of females in the tertiary institutions in Kebbi state. Consequently, their participation in science and related courses is poor. The study therefore, seeks to examine the attitude of females towards mathematics as a tool for science and technology.

V. RESEARCH QUESTIONS

1. What is the perception of female students to mathematics?
2. What is the attitude of female students to mathematics?
3. Is there any significant relationship between female career choice and female students' attitude to mathematics?
4. Is there any significant difference between female attitude to mathematics and female career aspiration?

VI. RESEARCH HYPOTHESES

- (i). There is no relationship between attitude of female students to mathematics and their career aspiration.
- (ii). There is no significant difference between female students' attitude to mathematics and female students' career aspiration.

VII. METHODOLOGY

The population of the study was the entire senior secondary II and III female students in Argungu, Arewa, Augie and Dandi local government areas of Kebbi State Nigeria. A stratified random sampling was used to select a sample of four hundred and twenty five (425) female students. Each local government was considered as a stratum. The sample size was calculated based on proportional allocation as follows: Argungu 125, Arewa 100, Augie 110, Dandi 90. Questionnaire was used for the collection of data. The questionnaire has a reliability coefficient of 0.87 and validated by three experts in test, measurement and evaluation.. The questionnaire was divided into four sections. Section A contained the list of five mathematics modules. The respondents were required to rank the modules as 1 to 5 based on preference.

The modules are: Arithmetic, Trigonometry and geometry, Algebra, Statistics and probability, and Structure.

The most preferred is ranked 1 and the least preferred is ranked 5. Section B contained seven mathematical activities to be ranked in order of preference as in section A. These activities include Word problems, Approximations, Geometrical constructions etc. Section C consisted of 16 items on attitude to mathematics. Eight items were positive attitude to mathematics and eight were negative. It had a Linkert type scale (Agree, disagree and undecided). Each agreed response to positive attitude was scored 3 and disagreed was scored 1. The undecided response was regarded as neutral and scored 2. The scores were reversed in the negative attitude items. That is, agreed was scored 1 and disagreed was scored 3. The items in this section are:

- (i). Mathematics is interesting,
 - (ii). I like to study Mathematics in future
 - (iii). Mathematics is simple
 - (iv). I like Mathematics
 - (v). School Mathematics have real life applications
 - (vi). I want to make sense of what I learn in Mathematics
 - (vii). I think I can cope with harder Mathematics courses
 - (viii). Women can do just as well as men in mathematics
 - (ix). Mathematics is not relevant to my future career,
 - (x). Mathematics is more important to males than females
 - (xi). I learn Mathematics well without really understanding it
 - (xii). I will avoid Mathematics once I leave school
 - (xiii). I cannot pass Mathematics examination
 - (xiv). Mathematics is very demanding
 - (xv). One must be very intelligent to learn Mathematics
 - (xvi) Males are naturally better in Mathematics than females
- Section D consisted of five items containing the aspired fields of study after the completion of secondary school. The fields were; Medicine and health related fields, Science and technology, Arts, humanities and social sciences, Education and philosophy, if the student does not intend to go further, she selects Termination of education upon completion of secondary school.

VIII. RESULTS AND DISCUSSION

Table 2: Mathematics Modules Based on Female Students' Preference.

Module	1 st		2 nd		3 rd		4 th		5 th	
	Freq.	%								
Arithmetic	88	20.7	100	23.5	75	17.6	81	19.1	81	19.1
Trigonometry and geometry	65	15.3	85	20	77	18.1	96	22.6	102	24.0
Algebra	98	23.1	85	20	83	19.5	90	21.2	69	16.2
Statistics and probability	83	19.5	88	20.7	88	20.7	85	20	81	19.1
Structure	94	22.1	90	21.2	83	19.5	79	18.6	79	18.6

Table 3: Female Students' Preferred Mathematics Activity

Activity	1 st		2 nd		3 rd		4 th		5 th		6 th		7 th		8 th	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Working with equations and formulae	77	18.0	52	12.2	62	14.6	62	14.6	44	10.4	42	9.9	44	10.4	42	9.9
Geometrical	27	6.3	50	11.8	60	14.1	65	15.3	50	11.8	60	14.1	46	10.8	67	15.8

constructions																
Collecting/analyzing data	46	10.8	31	7.3	46	10.8	67	15.8	62	14.6	56	13.2	73	17.2	44	10.3
Proving theorems	20	4.6	44	10.4	42	9.9	79	18.6	67	15.8	73	17.2	46	10.8	54	12.7
Word problems	25	5.9	65	15.3	62	14.6	44	10.4	52	12.2	58	13.6	54	12.7	65	15.3
Approximation/reading tables	63	14.8	44	10.4	62	14.6	42	9.9	58	13.6	48	11.3	54	12.7	54	12.7
Interpreting graphs and charts	44	10.3	65	15.3	50	11.8	45	10.6	65	15.3	44	10.3	50	11.8	62	14.6
Sorting, grouping and Venn diagrams	55	12.9	50	11.8	73	17.2	48	11.3	46	10.8	39	9.2	62	14.6	52	12.2

Table 4: Female students' career aspiration

Aspired field of study after school	Number of students	Percentage
Science and technology	85	20.0
Medicine and health related fields	91	21.4
Education and Philosophy	48	11.3
Arts, humanities and social sciences	96	22.6
Terminate my education after school	105	24.7

A bivariate correlation test was conducted to calculate the Pearson correlation coefficient between female career aspiration and female attitude to mathematics. The results obtained indicated a weak positive correlation between female career aspiration and attitude to mathematics ($r = 0.004$, $p > 0.01$). Also, a paired samples produced the mean scores of female attitude to mathematics (mean = 34.07, SD = 12.13) and female career aspiration (mean = 2.89, SD = 1.49). The test revealed a significant difference in the female attitude to mathematics and female career aspiration ($t = 52.572$, $df = 424$, $p < 0.01$, $r = 0.004$).

Table 2 gives the list of five modules of ordinary level mathematics for the respondents to rank in order of preference. 98 respondents (23.1%) ranked algebra first which is the highest in that column. This indicates that algebra is preferred most. 65 respondents (15.3%) ranked trigonometry and geometry first, which is the lowest in that column. 102 respondents (24.0%) ranked trigonometry and geometry last or fifth position which is the highest in the extreme end or last column. This showed that trigonometry and geometry is the module that is least preferred by the female students. Arithmetic and statistics/probability are the second least preferred by female students with 81(19.1%) respondents each. Structure is the second module preferred most by the female students with 94 (22.1%) respondents.

Table 3 gives eight mathematical activities to rank based on preference. Working with equations and formulae was ranked most preferred by the female students with 77 respondents or 18.0% followed by approximation/reading tables with 63 or 14.8% of the respondents. At the extreme end, geometrical construction and word problems had highest score in the last position or least preferred with 67 (15.8%) and 65 (15.3%) respectively. Only 20 female students (4.6%) ranked proving theorems first. It can be observed from tables 2 and 3 that trigonometry and geometry as the least preferred among the modules.

Table 4 contains the aspired educational fields the female students hope to study after the completion of the secondary

school. 85 of the female students or 20% showed interest in studying science and technology. 91 or 21.4% of the respondents wanted to study medicine or related fields. 105 (24.7%) do not intend to continue their education after secondary school. This group of students may have probably wanted to get married at that level.

An SPSS analysis of the data obtained indicated a very weak positive correlation between female career aspiration and female students' attitude to mathematics ($r = 0.004$, $p > 0.01$). Analyzing the mean scores, we obtained ($t = 52.572$, $df = 424$, $p < 0.01$). Therefore, we reject the null hypothesis and conclude that there is a significant difference in the female attitude to mathematics and female career aspiration. This is in agreement with findings of Razali *et al* (2018) and Yerdelen *et al* (2016) that reported significant relationship between students attitude and developing science, technology, engineering and mathematics career.

IX. CONCLUSION

This paper provided an insight into the female students attitude to mathematics as it relates to their career aspiration. It can be concluded from the results that the career aspiration of the female students have a very little impact on the attitude to mathematics. However, there is a significant difference in the career aspiration of the female students and their attitude to mathematics. It is that a good number of the female students are not willing to go further in their studies. The probable reason may be due to cultural and traditional restrictions of females to child bearing and housekeeping role. UNESCO (2017) reported that, despite gains in access to education by the females, socio-economic, cultural and other obstacles still prevent female learners from completing or benefiting fully from good quality education of their choice in many settings. These barriers increase in adolescence, when gender roles for girls become more entrenched and gender discrimination more pronounced. Barriers include household and care responsibilities, early

marriages and pregnancies, cultural norms that prioritise boys' education. This is very worrisome despite unrelenting efforts by the government to encourage the participation of females in science and technology. The research also revealed that there is need for mathematics teachers to give special attention to those modules that are less preferred by the students and devise suitable methods of teaching that will encourage the students improve in such areas. The government should do more to encourage female participation in science and technology.

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Effect of Financial Literacy and Parental Socialization on Students Savings Behavior of Bangladesh

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Abstract- This study explores the effect of financial literacy and parental socialization on savings behavior of university going students of Bangladesh. Savings is one of the crucial wheels of economic growth and university students are the future peddler of that wheel. Not only that, total number of university students are 872891 which is a handsome amount. So their savings habit is very significant for the economy. On the other hand recently student's loan is very available but due to lack of financial knowledge students spend improperly and can't save. But students are unaware of the effect of different factors which influence their savings behavior. Though a lot of study has focused on this problem in outside countries, it is still untouched in Bangladesh. So determining the effect of factors in savings behavior of the students of Bangladesh is momentous. This is a quantitative research consisting of 130 sample size where the primary data has been collected through face to face interaction by using self-administered structured questionnaire. In this paper savings behavior has been used as dependent and parental socialization and financial literacy have been used as independent variables. Descriptive statistics has been used to generalize demographic information. Pearson Correlation and multiple regression analysis tools are used to investigate the effects or relationship and both of them found good relation with parental socialization and moderate relation with financial literacy. In multiple regression analysis, F test found significant relationship. All these findings are very important because it will help the loan provider to develop policies to penetrate the young savers and parents will be conscious about fostering their child to save from their childhood.

Index Terms- Savings Behavior, Financial Literacy, Parental Socialization

I. INTRODUCTION

The world economy is growing and developing rapidly day by day and as an important factor of economic growth, savings is playing a crucial role in the continuation of this development. All the countries (developed, developing and underdeveloped) are endeavoring to keep pace with this development process for gaining a better locus in the world of survival. In the chain of this economic development savings may oil more to get rapidity.

Savings takes place when an individual is able to spend less than his/her income which later leads to investment. Higher investment leads to the accumulation of assets which results in

higher living standard of the people through higher economic growth. The growth model of Solow (1956) emphasizes on savings for steady economic growth. According to Aurthur Lewis (1954), Growth is accelerated by savings and this growth is also termed as traditional development. Not only that solid savings is the best cure for economic woes and it increases the ability to cope with financial hardship and speed up financial recovery (Elmerraji, 2010). Financial literacy has potential to affect the economic growth by making contribution to savings and development of financial sector. (Bayar et al, 2017). In a developing country like Bangladesh savings act as a life blood of growth as savings helps to get rid of so called equilibrium trap and vicious cycle of poverty by creating a big push.

In Bangladesh almost 27.1 % (male 18512114 and female 21129073) people are aged from 15 to 29 (Wikipedia, 2017) and almost 872891 people are university (Both private and public) going students among which 493110 are public university students (BANBIES, 2015) and such a huge number of people can largely affect the overall savings of a country. Among all the students, university going students are at the vicinity of stepping down as a leader in the future economy. But most of them are not aware of their savings behavior. Savings decision basically depends on many significant factors such as habits, financial literacy, parental socialization, peer influence, social, economic, political conditions, regulatory flexibility etc. Among them parental socialization and financial literacy has an immense impact on students savings behavior. Financial Literacy consists of knowledge regarding finance, attitude and behavior towards finance and to be financially literate is important to make a good financial decision (Kumar et al, 2017). Financial literacy such as better understanding of credit management, investment knowledge, ability to prepare budget etc. have strong impact on savings behavior of any people. Not only that sometimes students having financial literacy may behave like a rational investor.

Student life specially the college and university life is the inception of using money without the supervision of parents (Fluellen, 2013). In these stages they learn how to make spending budget, proper use of money, and also faces financial stress. These learning help them in future financial decision making. It is said that financial social learning opportunities has a great effect on financial behavior (Fluellen, 2013). With regards to savings behavior, different peoples need for the savings are different because the mind-set, culture, social environment, economic environment, knowledge may be different (Jamal et al. 2015). And different factors have different effect on the financial behavior of people. So it is important to determine the effect of

different factors on financial or savings behavior as people are more prone to consume rather than savings (Ismail et al, 2013). So the researcher tried to find whether there is actually any relationship with/ effect of financial literacy on savings behavior of students.

Parents are the first teacher of any children. Most of the habits among children and implicit socialization occur through the unconscious communication of norms and hopes, look-out or imitation of behaviors and subtle cues from parent's behavior (Jorgensen and Savla, 2010). So how the parents are, their background, their culture, their influencing power, their savings habit, and their perspective about spending all has a strong effect on the behavior of their children. For this reason the researcher also tried to find out whether this variable has any effect on savings behavior of students or not.

Not only that Bangladesh is a country of villages with little technological knowledge where most of the students of public universities are from villages having no or very little financial skills that results in different types of money management problem. Recently financial institutions are offering students loan and different types of scholarship which has become the major source of financing among students. But because of financial illiteracy students don't using the money efficiently. As a result they are facing financial stress. But they don't know how they can come out from this situation and by practicing what they can build savings habit. Even parents don't know whether they should discuss the financial matter and savings habit with their children. Till now a lot of research work has been done on factors affecting student's savings behavior or the effect of different factors on savings behavior but none of them focused on Bangladeshi student. As Bangladesh culture is completely different from those countries the researcher focused on this gap.

II. RESEARCH OBJECTIVES

The primary objective of this paper is to observe the effect of financial literacy and parental socialization on savings behavior of students. To attain these objectives the researcher has introduced some other specific objective:

- ✓ To determine the relationship between financial literacy and savings behavior
- ✓ To determine the relationship between parental socialization and savings behavior

III. LITERATURE REVIEW

There are huge numbers of papers that have concentrated on financial literacy and savings behavior of student as it has become a significant issue with the onward economic development, student's room for involving with economic activity and easy accessing of student loan etc.

Delafrooz. N & Paim. L. H (2011) focused on the relatedness of financial literacy and savings behavior of workers where they tried to discover whether financial literacy can predict financial puzzle that boost the savings and traced significant relationship. In addition savings regularity, earnings, gender has a relationship with savings which is arrived by Mahdzan and Tabiani (2013). Asmawi (2015) attempted to

exhibit the relatedness of financial literacy, parental socialization, peer visitation, self-control and savings bearings of university pupils and discovered significant relationship between parental socialization and savings behavior.

Bayar et al. (2017) has investigated The Impact of Financial Literacy on Personal Savings of Usak University Staff through a logistic regression analysis where it is found that financial knowledge, earnings level, age and education level affected the personal savings positively where risk tolerance affected the personal savings negatively. On the other hand Kumar et al. (2017) has focused on the influence of financial literacy on financial behavior and how financial behavior influences on financial decision among college students where they found that financial literacy affect financial behavior and financial behavior affect financial decision making. Not only that it was also found that parents are the first people to the children and they should give good financial literacy to the children because it has a strong effect on financial behavior of children.

Salikin et al. (2012) analyzed the effect of parents background on savings behavior of students in Malaysian local university and found that parents financial condition and educational background has significant relations with savings behavior of student. Students who have discussion with their parents about money management have more and positive knowledge on behaving in more financially responsible way. So it is clear that parents has an important effect on students savings and thus the researcher has used it for investigating whether it is same for this papers also. Wong (2013) also explores saving practices among secondary, college or university students and found that financial knowledge and parents' socialization are two important factors for influencing savings. The research also found student's future retirement plan also affected saving tendency. College students are more curious and serious about savings than university students.

Alwi et al. (2015) studied Factors Affecting Savings habits within Millennial in Malaysia by using the same variables called financial literacy, peer influence, self-influence, parental socialization and found strong influence of parental socialization. Family involvement plays a major role in nurturing student's savings behavior, followed by financial literacy and peer visitation. In addition, it is said that students have more favorable financial attitude when they are financially literate.

Jorgensen and Savla (2010) investigated financial literacy among Turkish college students and the role of formal education, learning approach and parental teaching in financial literacy where the regression result found that formal finance education in college, a deep approach to learning, and direct financial teaching by parents have a significant association with financial literacy.

Nationality, gender, religion, field of study also has an effect on savings and investment behavior of students found by (Massol and Molines, 2015). Falahati and Paim (2012) found the effect of gender on the relatedness of childhood consumer experiences, primary and secondary socialization, agents visitation, financial wisdom and financial skills on savings behavior. Akhter & Lima (2015) studied consumption behavior of Bangladeshi students and their academic performance. All these studies give the researcher a view of the factors that affect

consumption behavior and financial decision which helps in determining savings fact.

Most of the paper above somehow tried to explain the factors affecting savings behavior of students and other people. But all of the paper which focused on factors affecting savings behavior are based on foreign culture, norms, values, environment and practices. And we know that the culture, values norms practices and environment of Bangladesh is completely different. The researcher of this paper basically tried to focus on the research paper of Thung et al. (2012) and tried to analyze it from Bangladesh perspective.

IV. METHODOLOGY

Sample Selection and Data Collection

This research is an explicative study in terms of applied signification, carried grounded on descriptive-survey. The exploration is materially a quantitative study since the research objectives requires quantitative analysis for assessment and analysis and getting the optimum and expected outcome. Here the research objective is to specify the effect of financial literacy and parental socialization on savings behavior of students where to visualize the true picture, the researcher has used some statistical tools which deal with relationship such as Pearson correlation analysis and multiple regression analysis. These sorts of statistics require quantitative data. That's why to meet the objectives of the study the investigator has used quantitative data rather than qualitative.

For this research the aimed population is the whole group of people the researcher is inquisitive in that means all the students currently studying in all sessions and all study areas in the public universities of Bangladesh. Public university students have been focused because all type of students (Poor, middle class, Rich) comes here for studying and they are from different areas of Bangladesh. Thus public university is more representative than that of others. Not only that most of them live far away from their parents and every month there is an absolute amount of income (this may be from parents, from part time job, from tuition etc.) which they can use according to their wish and can save also.

To represent the population and fulfill the objectives of the research, the researcher picked Jahangirnagar University's students as most of the public university's students of Bangladesh have almost same characteristics. Not only that it is time consuming, need more financial support and has other barriers to consider all students of all public universities. Moreover as the researcher is from same university, respondents will feel more comfortable to provide proper information and this is also another reason for considering Jahangirnagar University. Here the sample frame is all the currently studying students of Jahangirnagar University from all background. Random sampling technique is employed because it is able to better estimate the characteristics of the population (Tharanika and Andrew, 2017). Most of the research such as Albeurdy and Gharlegh (2015) used 105 samples for 3 independent and 1 dependent variables. Asmawi (2015) used 158 samples for four independent and 1 dependent variables. Not only that, Cattell (1978) has referred 250 sample sizes for 4-6 independent variables. Zikmund (2013) said using a sample size similar to the

sample sizes used in the previous studies provides the inexperienced researcher with a comparison of other researcher judgment. So, as in this research the independent and dependent variables are two and one respectively, by following the previous discussed research area, the researcher selected 130 random respondents for the sample irrespective of gender, background etc. in order to represent and generalize the population of 493110 public university students.

All the data are collected through primary sources. Primary data are generated from the researcher's self-administered close ended structured questionnaire. Close ended questionnaire is used because in open ended question when quantitative value is allotted their initial meaning may reduce. Moreover here the researcher has tried to communicate similar meaning to all respondents which is only possible by close ended question. That's why close ended question is used. The 1st part of the questionnaire consists of all factors (financial literacy and parental socialization) that have effect on savings behavior and the savings behavior itself and the 2nd part consist of the demographic information. Most of the questions are formed by following likert scale and some questions used category scale. The questionnaire has been made by following previous research paper on this issue which is developed based on their respective country and culture.

These questions are developed based on Albeurdy and Gharleghi (2015) and Thung et al. (2012). Savings behavior questions are made based on Ismail et al. (2013) and Asmawi (2015) research paper which was regarding money saving interval, spending behavior, importance of spending and amount of spending etc. Parental influence question has been made based on Thung et al. (2012), Jorgensen and Savla (2010) and it is regarding degree of parental influence, discussion with parents etc. All the questions of this section include 5 point likert scale where 5 is the best value. The researcher personally has gone to each room of different halls and classrooms to collect the responses by face to face interaction. Each question are tried to be explained and justified so that no confusion can arise among respondents.

Variable Construction

Here the researcher has used three types (Demographic, Dependent and Independent) of variables. Dependent and independent variables are constructed by considering 8 questions for each.

Demographic variables

The demographic part of questionnaire consists of 6 questions where gender, marital status, area of study, tuition or part time job information are nominal scale data and parents contribution and age are ordinal scale data. All these demographic information is used because it provides us basic information regarding the sample and moreover present different characteristics of the people which make them behave differently and this can be identified by this information. From allowance and engagement in part time job data, the attitude of the students regarding taking money from parents can be observed and by this it can be understood how much students are still more or less dependent on their parents. As all these are directly or indirectly

related to the savings behavior of students the researcher considered these by following (Thung et al, 2012).

Dependent Variable (Savings behavior)

Saving is the residual income after deducting current consumption for a certain period of Time (Browning and Lusardi, 1996). 8 questions are adopted from Ismail et al. (2013) and Asmawi (2015), Thung et al. (2012) and Nga et al. (2010) and the respondents were asked to rate on the statement of their savings behaviors based on 5 point likert scale where the higher scale represent the respondents effective savings practice and vice versa.

Independent variable (Financial Literacy)

Financial literacy has significant impact on individual's savings, as more knowledge on financial matters helps people to make more informed and effective decision regarding money management and therefore savings. For determining financial literacy variable 8 questions regarding investment knowledge, financial institutions, instruments knowledge and ability to maintain money are asked. Lots of paper like Akben-Selcuk and Altiok-Yilmaz (2015), Thung et al. (2012), Bayar et al. (2017) used financial literacy as independent variable.

Independent Variable (Parental socialization)

Parental socialization has an influence on building children's habit, character and therefore influence money management. A lot of research paper such as Madzan & Tabiani (2013), Thung et al. (2012), Asmawi (2015), Delafrooz and Paim (2011), Jamal et al (2016), Akben-Selcuk and Altiok-Yilmaz (2015), Alwi et al. (2015), Salikin et al. (2012) has used parental socialization as independent variables to determine savings behavior. Here also 8 questions are asked to determine this variable.

Tools for Analysis

After getting the responses, the researcher has reviewed the completeness of the data, assigned numerical values to each question and then analyzed the data. Three types of statistics have been used for analysis. Descriptive statistics, scale measurement and inferential statistics. Here Descriptive statistics is used to get some general idea about the basic features of the data. Not only that the researcher also has tried to apprehend some simple summaries by this statistics. To display the number of observation within a given interval, frequency distribution has been used. This is applicable only for demographic data. Mean is used to determine central tendency where Standard Deviation and Skewness used to know variability.

Reliability Test

When multiple likert scale question is used in a questionnaire which form a scale, sometimes this scale may not be internally consistent that means the questions asked may not reliably support that latent variable fully. So to have consistent result it is emergent to ensure that these measurements are free from bias. Reliability test has been conducted to conform this. As in this survey multiple likert scale question has been used and also set multiple scale such as nominal, ordinal and interval,

Cronbach's alpha value is appropriate for testing reliability (Brown, 2011).

Inferential Statistics

Inferential statistics include Pearson correlation analysis and multiple regression analysis. These two are basically measures of association. As the objectives of this research requires identifying the effect of parental socialization and financial literacy on savings behavior and the data set are continuous (interval) these two statistics are appropriate. The difference between correlation and multiple regressions is that correlation doesn't distinguish between independent and dependent variables. It treats variables symmetrically. On the other hand in regression independent variables affect dependent variables. The significance level in correlation analysis and multiple regression analysis is 5%. P value is used for accepting or rejecting the hypothesis.

Pearson correlation analysis

Correlation analysis is carried out to identify the tradeoff between the dependent and independent variables. It can be represented like this

Savings Behavior= f (Financial Literacy and Parental Socialization)

Where, it is indicating that firm's value is a function of liquidity.

Multiple Regression Analysis

According to Cooper & Schindler (2014) multiple regression analysis is used in three types of situation. Among them the first is to develop a self-weighted estimation of equation to predict the dependent variables from the independent variables. The 2nd situation is causal relationship or impact and changes that means how much the dependent variable changes if independent variable changes. And the third one is it predicts future trend. Here the researcher's objective is to determine the effects of independent variables on dependent variable which support the two situations. It determines the relationship between independent variable (two or more) and the dependent variable. It gives an idea about whether there is any relationship or not. If has, how strong or weak, positively or negatively skewed etc. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables — that is, the average value of the dependent variable when the independent variables are held fixed. The model would be

$$Y_t = a + B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_tX_t + u_t$$

Where

Y=Dependent Variable (Savings behavior)

X1= Independent Variable (Financial Literacy)

X2= Independent Variable (Parental Socialization)

a= Intercept

U=Residual or error term

To determine the degree of strength, correlation of determination has been used as it measures the proportion of variation in dependent variables explained by independent variables. To prove the hypotheses parametric test (ANOVA or F) test have been used. As in this research the data are interval and the researcher want to compare 3 groups or conditions

(savings behavior, financial literacy and parental socialization), 1 way ANOVA test is appropriate because it helps to find out whether there is any significant difference among the means and if have difference, it can be said that the variables have been manipulated that means independent variables have an effect on dependent variables (Cooper & Schindler, 2014). Two hypotheses have been developed to prove the relationship.

- H1: There is significant relationship between financial literacy and savings behavior
- H2: There is significant relationship between parental socialization and savings behavior

The researcher has developed these hypotheses by following different previous research work conducted on this same area. Thung et al. (2012) found strong relationship between parental socialization and savings behavior. Jamal et al. (2016), Alwi et al. (2015) found that both financial literacy and parental socialization has strong effect on savings. So from all these studies it is clear that there is some relationship between savings, financial literacy and parent’s socialization and that’s why the researcher used these hypotheses. All these analysis has been conducted by using SPSS 18 and excel 2013.

V. ANALYSIS AND FINDINGS

Descriptive statistics:

Table 1: Demographic Presentation

Demographic Constructs	Types	Percentage
Gender	Male	35.4
	Female	64.6
Age	18 or less	1.5
	19-20	16.9
	21-22	27.7
	23 or above	53.8
Marital Status	Single	92.3
	Married	7.7
Course of Study	Business	32.3
	Non-Business	67.7
Part Time Job	Yes	27.7
	No	72.3
Parents Allowance	1000-2000	10
	2001-3000	14.6
	3001-4000	26.2
	40001-5000	26.9
	5001 or Above	22.3

Source: Developed by the researcher

The table shows that 64.5% respondents are female and male are 35.4%. Here very few respondents have age 18 or bellow which is only 1.5%. On the other hand almost 53.8% respondents are aged with 23 or above. 16.9% and 27.7% respondents are aged with 19-20 to 21-22 respectively. Only 7.7% student is married and most of the students are single. The Respondents are mostly from Non-business Background. Only

32.3% people are from business background. 72.3% people are not engaged in any types of job or income. Only 27.7 % are engaged in part time job. Most of the people take allowance from their parents ranged from 3000tk -5000 tk. 10% take 1000-2000 and 14.6% take 2000-3000tk. Almost 26.9% respondents take 4001-5000tk and 22.3% take more than 5000tk.

Central tendency of Financial Literacy:

Table 2: Central tendency of Financial Literacy

	Financial Literacy	Mean	STD Deviation	Skewness	Kurtosis
FL1	I have better understanding of how to invest my money	3.5154	1.16296	-.623	-0.574
FL2	I have better understanding of how to manage my Borrowed money or credit use	3.5462	1.02004	-.772	0.114
FL3	I have better understanding of financial instruments such as bonds, stock, T-bill, mutual fund etc.	2.8385	1.22509	.057	-1.055
FL4	I have the ability to prepare my own monthly budget	3.5231	1.15615	-.760	-.292
FL5	I have the ability to maintain financial records for my income and expenditure	3.4692	1.14247	-.493	-.670
FL6	I have no difficulty in managing my money	3.0846	1.09993	.150	-.887

Source: Generated by the researcher

The table shows that FL (financial literacy) question no 2 has the highest mean value that means most of the respondent demanding that they know how to manage their money. And the standard deviation is highest for question no 3 that means in this question the response of the respondent deviate more than that of others. Except FL6 and FL3 all the questions answer have

negative Skewness and except FL2 all has negative kurtosis. All this indicating that the distribution is flatter. Not only that all the Skewness and kurtosis except FL3 are within range from +1 or -1, which is indicating that most of the responses are normally distributed.

Central tendency of Parental Socialization:

Table 3: Central tendency of Parental Socialization

Parental Socialization		Mean	Std. Deviation	Skewness	Kurtosis
PS1	My parents are good example for me when it comes to money management	4.0154	1.02666	-0.991	0.439
PS2	I always talk about money management with my parents	3.2	1.33759	-0.117	-1.232
PS3	It's good when my parents control my spending	3.4769	1.21499	-0.722	-0.286
PS4	It's a good thing to ask my parents to keep hold of my money sometimes to help me save	3.5769	1.02576	-0.736	0.32
PS5	My parents are proud of me for saving	3.3231	1.18266	-0.368	-0.633
PS6	I appreciate it when my parents give me advice about what to do with my money	3.8308	1.0502	-0.959	0.467
PS7	I save money because I don't think my parents should pay for things I don't really need but like	3.5154	1.12914	-0.793	-0.139
PS8	Saving is something I do regularly because my parents wanted me to save when I was little	3.1923	1.14185	-0.418	-0.471

Source: Generated by the researcher

Here the table shows that PS1 has the highest mean. PS2 has the highest standard deviation that means deviation from mean response is higher in this question. In parental socialization all the items have negative Skewness and except PS1, PS4 and PS6 all questions response have negative kurtosis. But as all the Skewness and kurtosis (except PS2) are within range from +1 or -1, they are normally distributed.

Central tendency of Savings Behavior:

Table 4: Central tendency of Savings Behavior

Q	Savings Behavior	Mean	Std. Deviation	Skewness	Kurtosis
SB1	I put money aside on a regular basis for the future	3.0615	1.22477	-.145	-1.101
SB2	In order to save, I often compare prices before I make a purchase	3.8077	.91581	-.837	.554
SB3	In order to save, I often consider whether the real necessity before I make a purchase	3.6846	.99639	-.619	-.095
SB4	In order to save, I always follow a careful monthly budget	3.4769	1.02840	-.458	-.473
SB5	I have money available in the event of emergency	3.2077	1.19233	-.216	-.950
SB6	In order to save, I plan to reduce my expenditure	3.4154	.99444	-.531	-.047
SB7	I save to achieve certain goals	3.5077	1.09436	-.506	-.468
SB8	I save until the end of my semester or year end	2.8846	1.14550	.072	-.657

Source: Generated by the researcher

In saving behavior the 2nd question has the highest mean that means most of the respondents compare prices when make any purchase. Standard deviation is for the question no 1 that means there is huge deviation from the mean response. All the questions skewness is less than one. Kurtosis value for all the questions are also less than 1 except SB1. So both the Skewness and Kurtosis result indicating that the responses are within -1 to +1. So the responses data are normally distributed.

Reliability Test:

Table 5: Reliability value

Construct	Cronbach's Alpha	No of Items
Financial Literacy	0.613	6
Parental Socialization	0.718	8
Savings Behavior	0.669	8

Source: Developed by the researcher

The table shows that all variables Cronbach's Alpha value is greater than the minimum level alpha value of 60%. So the construct measures seemed to be reliable and all questions or item in the construct measures are retained.

Pearson Correlation Analysis:

Table 6: Pearson Correlation Result

		Savings Behavior
Financial Literacy	Pearson Correlation	0.369**
	Sig. (2-tailed)	0.000
Parental Socialization	Pearson Correlation	0.461**
	Sig. (2-tailed)	0.00
Savings Behavior	Pearson Correlation	1
	Sig. (2-tailed)	0.000

Source: Developed by the researcher

According to the table both financial literacy and parental socialization has positive relationship with the savings behavior. Both the independent variables are moderately related followed by 36.9% to 46.1% but parental socialization has more effect than the financial literacy on savings behavior. All the hypotheses (H₁ and H₂) accepted here as the p value is less than 5%.

Multiple Regression Analysis:

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.461	0.213	0.207	4.21811
2	0.516	0.266	0.254	4.09005

Source: Developed by the researcher

1. Predictors: (Constant), Parental Socialization

2. Predictors: (Constant), Parental Socialization, Financial Literacy

The Table shows that the R square for the model 1 is 0.213 that means only parental socialization can explain the savings behavior by 21.3 % and combinedly parental socialization and savings behavior can explain 26.6%. Here the adjusted R square for model 2 is 25.4%. This represents the models goodness of fit for the population. Standard error is 4.09. This is the standard deviation of actual values of dependent variables from the estimated value.

ANOVA

Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	769.205	2	384.602	22.991	0.000
Residual	2124.518	127	16.728		
Total	2893.723	129			

a. Predictors: (Constant), parental Socialization

b. Predictors: (Constant), parental Socialization, financial literacy

c. Dependent Variable: Savings Behavior

In the table, the calculated value of F is 22.99. From the F table with 5% significance level and (2, 127) degrees of freedom, the critical value is 3.09. So as the $F_{cal} > F_{crit}$ ($22.991 > 3.09$) and also the p value is less than 5%, alternative hypothesis is accepted here that means financial literacy and parental socialization can explain the variation in savings behavior very well.

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	11.670	2.311		5.050	0.000
parental Socialization	0.341	0.072	0.381	4.734	0.000
financial literacy	0.290	0.096	0.243	3.023	0.003

a. Dependent Variable: Savings Behavior

From the column headed B, an equation can be drawn
 $SB = 11.67 + 0.341PS + 0.290FL$

And it is clear from the equation that parental socialization and financial literacy have significant positive relationship with savings behavior as $P < 5\%$. From the beta coefficient of 0.381 it can be concluded that if one unit of parental socialization increase savings will increase by .381, holding all other things constant. Parental socialization has stronger effect than that of financial literacy as if increased.

6.0 Discussion of Major Findings

1st Hypothesis:

H1: There is significant relationship between financial literacy and savings behavior

Based on the previous analysis and findings section there is sufficient evidence to conclude that the Savings behavior has significant relationship with financial literacy as P value is less

than 5% in both empirical tests (Pearson correlation test and F test). This indicates that the more the students are financially knowledgeable the more they tend to save. This findings is supported by Thung et al. (2012), Delafrooz et al. (2011), Jamal et al. (2016), Wong (2013), Alwi et al. (2015) etc. All of them found positive relationship between savings behavior and financial literacy. Therefore it can be educed that higher level of financial literacy enables the students to understand the importance of savings.

2nd Hypothesis:

Furthermore it also proved in the previous section that parental socialization has a great impact on savings behavior as the $P < .05$ in both Pearson correlation test and multiple regression test analysis. Similar findings also found by Salikin, et al. (2012), (Wong, 2013), Alwi et al. (2015) and Thung et al. (2012). Thung et al. (2012) tried to determine the effects of financial literacy, parental socialization, peer influence on savings behavior of Malaysian students and found strong relation between parental socialization and savings behavior. Alwi et al. (2015) studied Factors Affecting Savings habits within millennial in Malaysia and used the same variables that are financial literacy, peer influence, self-influence, parental socialization and found strong influence of parental socialization.

VI. CONCLUSION

The research has been conducted to determine the effect of parental socialization and financial literacy on savings behavior of University students in Bangladesh, specifically to determine the relationship between savings behavior and parental socialization and relationship between savings behavior and financial literacy. It is found that financial literacy and parental socialization has positive effect on savings behavior and parental socialization can affect savings behavior more than financial literacy.

Here the researcher has considered only two factors, parental socialization and financial literacy. But there may have other major factors that directly or indirectly affect the savings behavior of students and thus affects the reliability of the data. Not only that the data has collected based on a single timeframe. But with time the respondent's behavior may change and with those results may change.

This study is only confined to the public university students. If private university, college or school level students are considered then completely different result may come out. Not only that, as the sample used only Jahangirnagar university students data, considering a university outside the Dhaka city like Rajshahi university may bring different result as this university is situated in a place where living cost is lower. So the student may be more able to save here.

The future researcher can consider the sample respondents from other universities, college and school level. With this, completely new idea may come out as the behavior, consumption pattern and environment is different in each level. They also can use different tools for analysis which may consider the effect of other factors because the statistical tools used here is not able to determine the biasness and showing the effect of other factors. They can also observe the respondents for a longer period of time so that most changes in their behavior can be considered and most appropriate data can be collected.

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Application of Ford-Fulkerson Algorithm to Maximum Flow in Water Distribution Pipeline Network

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Abstract- In this paper, well known Ford-Fulkerson algorithm in graph theory is used to calculate the maximum flow in water distribution pipeline network. The maximum flow problem is one of the most fundamental problems in network flow theory and has been investigated extensively. The Ford-Fulkerson algorithm is a simple algorithm to solve the maximum flow problem and based on the idea of searching augmenting path from a started source node to a target sink node. It is one of the most widely used algorithms in optimization of flow networks and various computer applications. The implementations for the detail steps of algorithm will be illustrated by considering the maximum flow of proposed water distribution pipeline network in Pyigyitagon Township, Mandalay, Myanmar as a case study. The goal of this paper is to find the maximum possible flow from the source node s to the target node t through a given proposed pipeline network.

Index Terms- Flow network, Ford-Fulkerson algorithm, Graph Theory, Maximum flow, Water distribution network.

I. INTRODUCTION

In many fields of applications, graphs theory [1] plays vital role for various modelling problems in real world such as travelling, transportation, traffic control, communications, and various computer applications and so on [2]. Graph is a mathematical representation of a network and it describes the relationship among a finite number of points connected by lines. The maximum flow problem is a type of network optimization problem in the flow graph theory [3]. A flow network is a directed graph where each edge has a capacity and receives a flow as weighted values. A flow must satisfy the restriction that the amount of flow into a node equals the amount of flow out of it except source node, which has only outgoing flow, and sink node, which has only incoming flow [4]. In practice, the flow problems can be seen in finding the maximum flows of currents in an electrical circuit, water in pipes, cars on roads, people in a public transportation system, goods from a producer to consumers, and traffic in a computer network, and so on.

II. RESOURCES AND METHOD

A simple, connected, weighted, digraph G is called a transport network if the weighted value associated with every directed

edge in G is a non-negative number. This number represents the capacity of the edge and it is denoted by c_{ij} for the directed edge from node i to node j in G [5]. We consider a network of pipelines of water distribution system and the case of network of pipes having values allowing flows only in one direction. This type of network is represented by weighted connected digraph in which District Metered Areas (DMA) are represented by vertices and lines which given water flows through by edges and capacities by weights. To provide the maximum flow from source vertex to sink vertex is one of the most important things in all transmission network. Source vertex is produced flows along the edges of the digraph G and sink vertex is received [1]. The residual graph can be defined by providing a systematic way in order to find the maximum flow. The residual capacity of an edge can be obtained by using the formula $cf_{ij} = c_{ij} - f_{ij}$ and a residual network can be defined by giving the amount of available capacity.

A. Problem Definition

The maximum flow problems involve finding a possible maximum flow through a single-source to single-sink flow network. The maximum flow problem can be seen as a special case of more complex network flow problems, such as the circulation problem [6]. The problem is given by a directed graph G with a start node s and an end node t . Each edge has associated with it a positive number called its capacity. A flow in a network is a collection of chain flows which has the property that the sum of the number of all chain flows that contain any edge is no greater than the capacity of that edge [7]. The goal is to provide as much flow as possible from s to t in the graph. The flow in any edge is never exceeded its capacity, and for any vertex except for s and t , the flow in to the vertex must equal the flow out from the vertex. On any edge we have $0 \leq f_{ij} \leq c_{ij}$. This is called capacity constraint or edge condition. As a flow constraint, flow into vertex is equal to flow out of vertex for any vertex. In a formula,

$$\sum_k f_{ki} - \sum_j f_{ij} = \begin{cases} 0 & \text{if vertex } i \neq s, i \neq t \\ -f & \text{at the source node} \\ f & \text{at the target (sink)t,} \end{cases}$$

inflow – outflow

where f is the total flow. Subject to these constraints, the total flow into target node t can be maximized.

B. Ford-Fulkerson Algorithm for maximum flow

In 1955, Ford, L. R. Jr. and Fulkerson, D. R. created the Ford-Fulkerson Algorithm [7]. This algorithm starts from the initial flow and recursively constructs a sequence of flow of increasing value and terminates with a maximum flow [8]. The idea behind the algorithm is simple. We send flow along one of the paths from source to sink in a graph with available capacity on all edges in the path that is called an augmenting path and then we find another path, and so on [6].

1). Notation and Steps of the Algorithm

For every edge connected from node i to node j , we use the notation (i, j) :

- $\Delta_{ij} = c_{ij} - f_{ij}$ for forward edges
- $\Delta_{ij} = f_{ij}$ for backward edges
- $\Delta = \min \Delta_{ij}$ taken over all edges of a path.

The Ford-Fulkerson algorithm has two main steps. The first step is a labelling process that searches for a flow augmenting path and the second step is to change the flow accordingly. Otherwise, no augmenting path exists, and then we get the maximum flow [4]. The detail steps of the algorithm are stated as follows [1]:

- Step 1. Assign an initial flow f_{ij} (or may be given), compute f .
- Step 2. Label s by \emptyset . Mark the other vertices “unlabelled.”
- Step 3. Find a labelled vertex i that has not yet been scanned. Scan i as follows. For every unlabelled adjacent vertex j , if $c_{ij} > f_{ij}$ compute

$$\Delta_{ij} = c_{ij} - f_{ij}$$
 and $\Delta_j = \begin{cases} \Delta_{ij} & \text{if } i = 1 \\ \min(\Delta_i, \Delta_{ij}) & \text{if } i > 1 \end{cases}$
 and label j with a “forward label” (i^+, Δ_j) or if $f_{ji} > 0$, compute $\Delta_j = \min(\Delta_i, f_{ji})$ and label j by a “backward label” (i^-, Δ_j) .
 If no such j exists then OUTPUT f . Stop.
 Else continue (i.e., go to step 4).
- Step 4. Repeat Step 3 until t is reached.
 [This gives a flow augmenting path $P: s \rightarrow t$.]
 If it is impossible to reach t , then OUTPUT f . Stop. Else continue (i.e., go to Step 5).
- Step 5. Backtrack the path P , using the labels.
- Step 6. Using P , augment the existing flow by Δ_t . Set $f = f + \Delta_t$
- Step 7. Remove all labels from vertices $2, \dots, n$. Go to Step 3.

This is the end of the algorithm. The flowchart illustrating for the maximum flow of water distribution network is as follow:

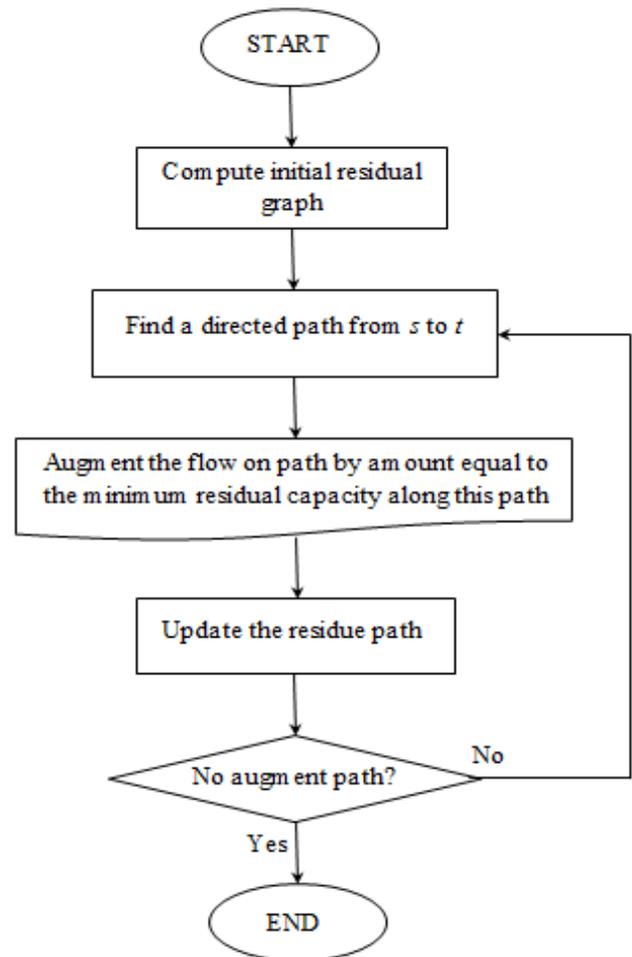


Fig. 1 Flowchart for maximum flow of water distribution network

III. RESULTS AND DISCUSSION

In this paper, the application of graph theory to find the maximum flow of water distribution network has been illustrated by using the Ford-Fulkerson algorithm [1] to the proposed water distribution pipeline network of Pyigyitagon Township in Mandalay, Myanmar. One who wants to know the possible maximum flow required the detail implementation of this algorithm. The weights on the links are referred as capacities and current flows for corresponding edges.

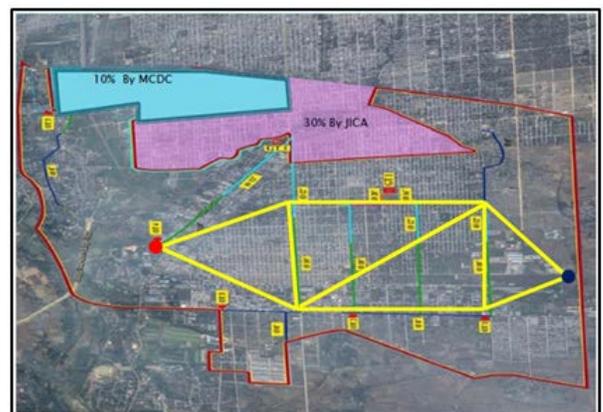


Fig. 2 Proposed network of water pipeline (yellow) in Pyigyitagon Township, Mandalay, Myanmar [9]

The flow network of pipeline is a directed graph with two distinguished nodes; source and sink. Since the sizes of pipes used in this network may not be the same, the capacity for each pipe may also be different. So it can only maintain a flow of a certain amount of water. Anywhere those pipes meet, the total amount of water coming into that junction must be equal to the amount going out. Each edge between two nodes has a non-negative capacity c and receives a flow f where amount of flow on an edge cannot exceed its capacity [3]. The first number on each edge represents capacity and the second number represents current flow (liter/sec). In this pipeline network, we denote the source node 1 as “s” and the sink (target) node 6 as “t” as shown in Fig. 3.

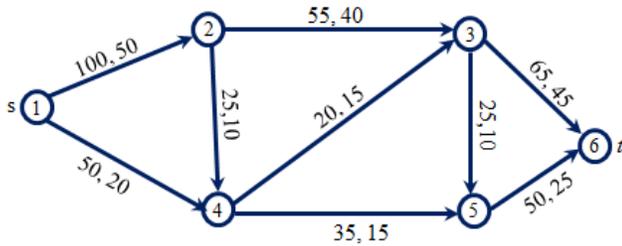


Fig. 3 Representation of digraph for proposed network of water pipeline in Pyigyitagon Township, Mandalay, Myanmar

A. Implementation of the Algorithm

The implementation of the Ford-Fulkerson algorithm is illustrated to find the maximum flow for proposed water distribution pipeline network in Pyigyitagon Township, Mandalay from source node s to sink node t . We can choose any path from source to sink for each iteration step as an augmenting path by using the edge with the non-zero residual capacity in previous step. This means that the edge with maximum flow cannot be used as a segment of augmenting path.

The detail implementation of algorithm can be seen as follows:

Step 1 An initial flow $f = 50 + 20 = 70$ (Given).

Step 2 Label ($s = 1$) by \emptyset . Mark 2, 3, 4, 5, 6 “unlabelled”

Step 3 Scan 1

Compute $\Delta_{12} = 100 - 50 = 50 = \Delta_2$. Label 2 by $(1^+, 50)$.

Compute $\Delta_{14} = 50 - 20 = 30 = \Delta_4$. Label 4 by $(1^+, 30)$.

Step 4 Scan 2.

Compute $\Delta_{23} = 55 - 40 = 15, \Delta_3 = \min(\Delta_2, \Delta_{23})$

$\Delta_3 = \min(50, 15) = 15$. Label 3 by $(2^+, 15)$.

Scan 3.

Compute $\Delta_{36} = 65 - 45 = 20, \Delta_6 = \min(\Delta_3, \Delta_{36})$

$\Delta_6 = \min(15, 20) = 15$. Label 6 by $(3^+, 15)$.

Step 5 $P: s = 1 \rightarrow 2 \rightarrow 3 \rightarrow 6 = t$ is a flow augmenting path.

Step 6. $\Delta_t = 15$. Augmentation gives $f_{12} = 65,$

$f_{23} = 55, f_{36} = 60$.

Augmented flow $f = 70 + 15 = 85$.

Step 7 Remove labels on vertices 2 ..., 6. Go to Step 3.

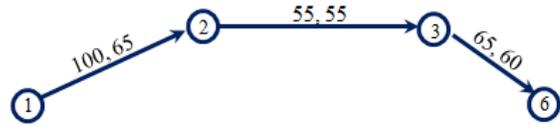


Fig. 4 Flow augmenting path 1-2-3-6

Step 3 Scan 1

Compute $\Delta_{12} = 100 - 65 = 35 = \Delta_2$. Label 2 by $(1^+, 35)$

Compute $\Delta_{14} = 50 - 20 = 30 = \Delta_4$. Label 4 by $(1^+, 30)$

Step 4 Scan 2.

Compute $\Delta_{24} = 25 - 10 = 15, \Delta_4 = \min(\Delta_2, \Delta_{24})$.

$\Delta_4 = \min(35, 15) = 15$. Label 4 by $(2^+, 15)$.

Scan 4.

Compute $\Delta_{43} = 20 - 15 = 5, \Delta_3 = \min(\Delta_4, \Delta_{43})$

$\Delta_3 = \min(15, 5) = 5$. Label 3 by $(4^+, 5)$.

Scan 3.

Compute $\Delta_{36} = 65 - 60 = 5, \Delta_6 = \min(\Delta_3, \Delta_{36})$.

$\Delta_6 = \min(5, 5) = 5$. Label 6 by $(3^+, 5)$.

Step 5 $P: s = 1 \rightarrow 2 \rightarrow 4 \rightarrow 3 \rightarrow 6 = t$ is a flow augmenting path.

Step 6 $\Delta_t = 5$. Augmentation gives $f_{12} = 70, f_{24} = 15,$

$f_{43} = 20, f_{36} = 65$.

Augmented flow $f = 85 + 5 = 90$.

Step 7 Remove labels on vertices 2 ..., 6. Go to Step 3.

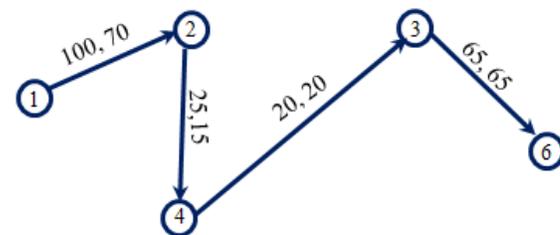


Fig. 5 Flow augmenting path 1-2-4-3-6

Step 3 Scan 1

Compute $\Delta_{14} = 50 - 20 = 30 = \Delta_4$. Label 4 by $(1^+, 30)$.

Step 4 Scan 4.

Compute $\Delta_{45} = 35 - 15 = 20, \Delta_5 = \min(\Delta_4, \Delta_{45})$.

$\Delta_5 = \min(30, 20) = 20$. Label 5 by $(4^+, 20)$.

Scan 5.

Compute $\Delta_{56} = 50 - 25 = 25, \Delta_6 = \min(\Delta_5, \Delta_{56})$.

$\Delta_6 = \min(20, 25) = 20$. Label 6 by $(5^+, 20)$.

Step 5 $P: s = 1 \rightarrow 4 \rightarrow 5 \rightarrow 6 = t$ is a flow augmenting path.

Step 6 $\Delta_t = 20$. Augmentation gives $f_{14} = 40, f_{45} = 35,$

$f_{56} = 45$.

Augmented flow $f = 90 + 20 = 110$.

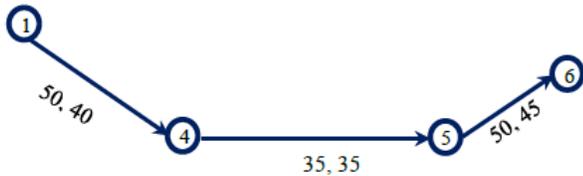


Fig. 6 Flow augmenting path 1-4-5-6

Finally, there are no augmenting paths possible from s to t , and then the flow is maximum flow. The maximum flows for all pipelines in network have been calculated by iteration process of Ford-Fulkerson algorithm and can be seen in Fig. 7.

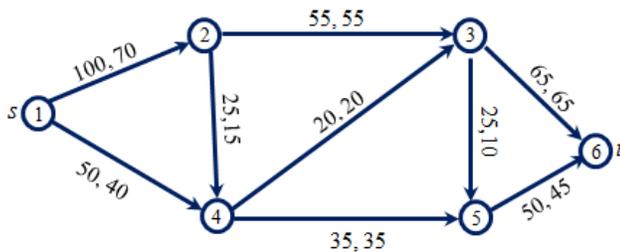


Fig. 7 Maximum flows in pipeline network from source node s to sink node t

The maximum flow will be the total flow out of source node which is also equal to total flow in to the sink node. In this case, total flow out from source node s is $70 + 40 = 110$ and total flow in to the sink node t is $65 + 45 = 110$ and hence maximum possible flow for this network is 110 liters/sec.

B. Comparison and Recommendation

The maximum flow problem has been studied by many researchers because of its importance for many areas of applications [3]. There are many algorithms to find the maximum flow problems, among them the most popular algorithms are Ford-Fulkerson algorithm, Edmonds-Karp algorithm, and Goldberg-Tarjan algorithm. Ford-Fulkerson uses depth-first-searches to find augmenting paths through a residual graph, while Edmond-Karp uses breath-first-searches to achieve a polynomial time complexity, and Goldberg-Tarjan solves the problem by gradually pushing flow through the residual graph. Although they all are algorithms to find maximum flow, the special features of them are different. Ford-Fulkerson algorithm can be applied to find the maximum flow between single source and single sink in a graph, while Edmonds-Karp algorithm and Goldberg-Tarjan algorithm use breath-first-searches and are performed from the sink, labelling each vertex with the distance to the sink [10]. All the works above and some other works gave algorithms that have good computational performance. But the algorithms in these works are very complicated and some of them are only suitable for the flow networks with specific

structure [6]. The comparison for calculation times can be checked in the following table [4].

TABLE I
 COMPARISON FOR TIME COMPLEXITY OF MAXIMUM FLOW ALGORITHMS

Maximum-flow Algorithm	Time Complexity*
Ford-Fulkerson	$O(nm c)$
Edmonds-Karp	$O(nm^2)$
Goldberg-Tarjan	$O\left(mn \log\left(\frac{n^2}{m}\right)\right)$

* n, m and c are number of nodes, edges and capacities respectively.

Although the calculation time for Ford-Fulkerson algorithm is higher than other algorithms, it is simple to implement in finding the maximum flow. The Edmonds-Karp algorithm is a small variation on the Ford-Fulkerson algorithm. Goldberg and Tarjan algorithm manipulates the preflow rather than an actual flow in a graph. Other modified algorithms are developed to reduce computation time [3], [6], but these algorithms are complicated and required high speed processors such as supercomputer to simulate the problem with 1000 nodes and over 94000 arcs and run for optimal flow [6]. The Ford-Fulkerson algorithm is guaranteed to terminate if the edge capacities are nonnegative real values. For these reasons and above comparison, we strongly recommend that Ford-Fulkerson algorithm is an algorithm to get the solution for finding maximum flow with simple procedure.

IV. CONCLUSION AND FUTURE WORKS

In this paper, Ford-Fulkerson algorithm in flow graph theory has been implemented to find the maximum possible flow in water distribution pipeline network of Pyigyitagon Township, Mandalay, Myanmar. The main idea of the algorithm is to find a path through the graph from the source to the sink, in order to send a flow through this path without exceeding its capacity. Then we find another path, and so on. A path with available capacity is called an augmenting path. Maximum flow for proposed water distribution pipeline network has been developed to implement the algorithm. Actually, the flow rate of water in pipeline is depending upon the size of used pipes and pressure at each node. But we have considered only capacity and flow rate of water in the network and other factors such as size of pipes and pressure at each node are not considered in this paper.

As the future works, this algorithm can also be used to model traffic in a road system, fluids in pipes, currents in an electrical circuit, or anything similar in which something travels through a network of nodes. Moreover, based on the flowchart and detail calculation procedure, one can create computer codes such as C/C++, or JAVA, running these codes by using nonnegative real weighted values from actual information and data to solve general Ford-Fulkerson maximum flow problems.

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A study on investor's awareness and perception regarding investment in Crypto currency with special reference to Bitcoin

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Abstract- After the financial crises, it is evident that Bitcoin has emerged to be the most successful crypto currency since its appearance back in 2009. The success can be attributed primarily to its security robustness, along with two main properties i.e. anonymity and decentralization. The robust network of decentralized payment transactions has attracted a lot of attention among e-commerce users. This paper investigates whether bitcoin as an investment asset offers diversification benefits, more specific whether bitcoin has hedge or safe haven properties. Bitcoin is a decentralized digital cryptographic currency which has gone through and still goes through spectacular developments leading to a lot of media but also academic attention

A cryptocurrency works best when the volume of transactions is large relative to the individual transaction size (e.g., as in a retail payment system). It uses peer to peer payment network involving negligible cost with no involvement of third party or financial institution in the payment transaction. Such anonymity in the bitcoin network is the unique propagation which was not inherently present in any e-commerce transaction. Although blockchain technology brings innovation and a variety of new applications to many industries, it is clear that the crypto currencies based on this technology entail numerous risks. In this paper, we have made an attempt to find out if Bitcoin or any cryptocurrency is a feasible investment alternative for investors seeking to compound the value of their wealth over time. Since public awareness eventually defines Bitcoin's price, the future for Bitcoin lays with increasing positive public perception.

It uses a peer-to-peer network which consists of nodes of computer systems, which provide the computer necessary power to run the software for the network. The USP of these networks is that they have implemented the distributed ledger technology, which uses cryptographic techniques for the identification and validation of payments by network nodes; that are subsequently recorded decentralized in a public distributed ledger, called the blockchain

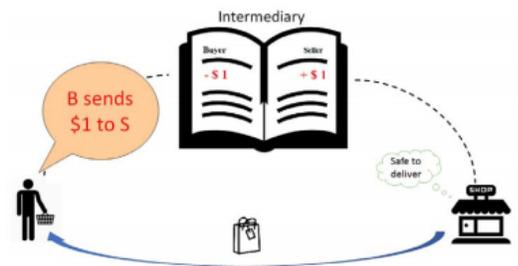
I. INTRODUCTION

The most valuable and sought after commodities in the world today is money, and it has affected people in almost every facet of their lives. Nakamoto (2008) introduced the world's first decentralised crypto currency, called bitcoin. Since 2008, Bitcoin is considered to be the most controversial innovations in this field is cryptocurrencies. Bitcoin works on a new payment technology, wherein it allows payers and payees to directly transfer value to each other electronically and anonymously without the need to use the services of trusted third parties, like financial institutions (Nakamoto, 2008).

(a) Physical tokens (e.g. cash)



(b) Digital tokens with a trusted third party (e.g. PayPal)



(c) Digital tokens in a decentralized network (e.g. Bitcoin)

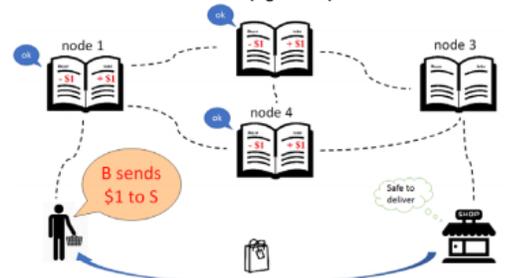


Figure 1: Different Currency Systems

The big question which remains unanswered is why the demand for Bitcoin increasing continuously!

The demand is increasing mainly because of have several advantages associated crypto currencies such as decentralization and anonymity, low transaction costs and use of crypto currency as a financial instrument to generate profit from its price volatility or to diversify a portfolio. Since the introduction of bitcoin, it has received considerable media attention worldwide, as it was believed that cryptocurrencies have the potential to bring a drastic change in the existing retail payment ecosystem by eliminating traditional financial institutions like banks, which act as intermediaries between consumers and retailers, superfluous. Moreover, it was thought that, if the accessibility of crypto currencies increases on a large scale, they could even affect the functioning of the monetary system (Halperin, 2013; Stevens, 2017). Considering this, Countries with strict capital control such as China and Iceland have prohibited crypto transactions, eliminating possibilities of bypassing capital control restrictions.

So it is most unlikely for Bitcoin to recognized as an official currency for the economy as it has too many faults and has too many risks, the most prominent being the scope of theft , fraud or technical glitches where stolen Bitcoins are lost forever.

II. BITCOIN AND OTHER CRYPTO CURRENCIES

Since the creation of Bitcoin in 2009, numerous private crypto currencies have been introduced. Bitcoin is by far the

<i>Name of the Cryptocurrency</i>	<i>Market Capitalization(billion \$)</i>	<i>Price (\$) As on 30th march,2017</i>	<i>Circulating supply</i>	<i>Percentage in Price fluctuation (24 hour -\$) As on 30th march,2017</i>
Bitcoin	120.56	7311.35		-7.56%
Ethereum	38.92	406.03		-6.91%
Ripple	20.02	0.52		-8.73%
litecoin	6.74	124.35		-3.29%
Dash	2.59	330.66		-4.61%

Source: www.bithumb.com

Bitcoin is most preferred Cryptocurrency with a market Cap of 120.56 billion \$trading at a price of 7311.35 as on march 30th march,2017. Apart from Bitcoin, Ethereum and ripple are also preferred Cryptocurrency. From a user’s perspective Bitcoin is nothing more than a mobile application or computer program that provides a personal Bitcoin wallet and allows a user to send and receive Bitcoin with them. This is how Bitcoin works for most users.

III. REVIEW OF LITERATURE

Singh Aarti and Nidhi Chawla (2016) discuss that future of Ecommerce is difficult to predict but there are various segments that would grow in the future like: emerging new technologies, education, awareness regarding new technology and frauds, Reduced search and transaction cost, Reduced

most successful one. It has been getting a lot of media attention, and its total market value has reached **20 billion USD in March 2017**. More importantly, a number of central banks started recently to explore the adoption of crypto currency and block chain technologies for retail and large-value payments. Bitcoin can be explored as futuristic virtual currency in e-commerce transactions if the risk involved is managed efficiently. Present paper explores the perception and awareness regarding Bitcoin in Pune with special reference to all the generations. Bitcoin is encrypted digital currency which can be bought, sold and exchanged from market places. The value of Bitcoin continuously changes and is traded like stocks on various exchanges. Bitcoins are stored using Bitcoin wallets.

Given the exponential growth in Bitcoins and other virtual currencies since they first came onto the scene in January 2009, it is only a matter of time before your investment company client asks you about the implications under the US Investment Company Act of 1940 (Investment Company Act) of making an investment or accepting payment on a loan in Bitcoins. This article provides the necessary starting point for you to advise your client on these matters by getting you up to-speed on virtual currencies, flagging the main Investment Company Act questions posed by them and suggesting potential answers and solutions to these questions.

The following table highlights the as on date market capitalization and price level at which the crypto currencies are traded.

process lead-time and faster time to market, Increased customer service, Improved convenience and shopping experience, Increased information transparency, Knowledge generation, Novel products and services.

Mittal Alka (2017) focuses on merchants and traders who accept this digital currency as a medium of exchange to overcome its problem of volatility. This will boost the market of Bitcoins not only in India but also in other developing economies. This emphasizes that to survive in the system; Bitcoin has to adapt itself to the required technical and operational innovations. In addition to this, government should impose proper legal framework, to protect the consumers or users of these digital currencies, as the progress seen in the transactions in this currency during the past few months is tremendous.

IV. RESEARCH OBJECTIVES

1. To study the level of awareness among investors regarding bitcoin as a virtual currency
2. To study the perception of investors regarding acceptance of bitcoin as mode of cash less transaction
3. To know investors opinion about future of bitcoin in India
4. To understand the investor opinion regarding government intervention and involvement to develop bitcoin as legal mode for cash less transactions

V. RESEARCH METHODOLOGY

The objective of the study is sought to be fulfilled through the analysis of the primary data. Field survey becomes essential for the purpose of studying consumer awareness and perception about crypto currencies and therefore gathering information related to the same with the help of questionnaire. For the purpose of the field work, the unit of study comprises working profession/individual residing in different parts of Pune city.

Data collection Method

A Descriptive Research has been conducted by reviewing the literature on the subject, followed by survey method to elicit information from investors. A structured questionnaire has prepared using different variables. The primary and secondary data has collected by using Simple Random Sampling technique.

Sampling

A sample of 114 respondents belonging to a segment of society would be taken on random basis for the present study. However, as far as we know, there are no primary studies available to identify the level of awareness about the adoption of crypto currency as a mode of payment among a large diverse group of working individual. This paper fills that gap.

In our analyses we have paid due attention to the factors which influence consumer demand for crypto payments, transactional benefits of receiving crypto payments relative to other means of payment, and non-financial barriers to individual' adoption intention and actual acceptance of crypto payments.

The primary research also attempts to find out the level of the acceptance of payment methods, their perceptions regarding crypto payments as well as mainstream online payment methods, their attitudes towards cryptos and their intention to adopt them as a means of payment. We use the resulting rich dataset to answer our research question. Pune provides a good setting for this research, as it has a well-developed online retail market.

Data interpretation and Analysis

A survey of 114 respondents was conducted to study the consumer's awareness and perception regarding investment in crypto currencies, as well as the factors of consumer's decision on whether or not to use Bitcoin as mode of cashless payment. Considering the change in payments landscape in India after the demonetization, the survey helps to identify opportunities for a coordinated state approach in addressing the cashless payments issues as well as promote compliance security and protection for consumers.

The level of awareness varied by Gender, Age group, Income and Education.

Demographic	Category	Percentage
Age	20-35 years	67.2%
	36-50 years	27.6%
	Above 50 years	5.2%
Gender	Male	81%
	Female	19%
Income level	Less than 5 lakhs	15.5%
	5 to 10 lakhs	39.7%
	10 to 25 lakhs	31%
	Above 25 lakhs	13.8%
Education Level	Graduates	12.1%
	Post Graduate	79.3%
	Professional	6.9%
	Others	1.7%

Among 114 respondents Over 98.2% respondents said they had heard of Bitcoin .Men we more likely to be aware about the cryptocurrency Bitcoin than women. Almost 98% of men were aware about Bitcoin as compared to 91% of the women.

Generation Z (age 20-35 years)were more likely to have heard about Cryptocurrencies than Generation Y(Age 36-50 years) and Generation Z(above 50 years)

As the following charts say, over 97% of Generation Z was more likely than Generation Y (88%) and Generation X (75%) to have heard about the crypto currency.

More individuals residing in households with income over 10 lakh have heard of crypto currencies than those in lower-income households.

A higher percentage of post graduates (98 %) are more aware of Bitcoin or another form of crypto Currency, with remaining respondents having a graduate's degree or less (80%)

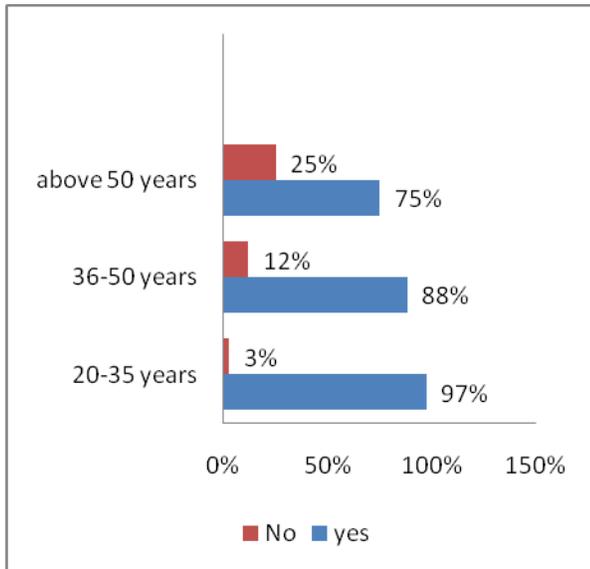


Figure 1 Awareness about Bitcoin(Age wise distribution)

Note: This graph provides the percentage of individuals who answered “YES” to the question – “Have you heard of Bitcoin?” Results are broken down into age groups. The sample consists of 114 respondents aged 20 or older.

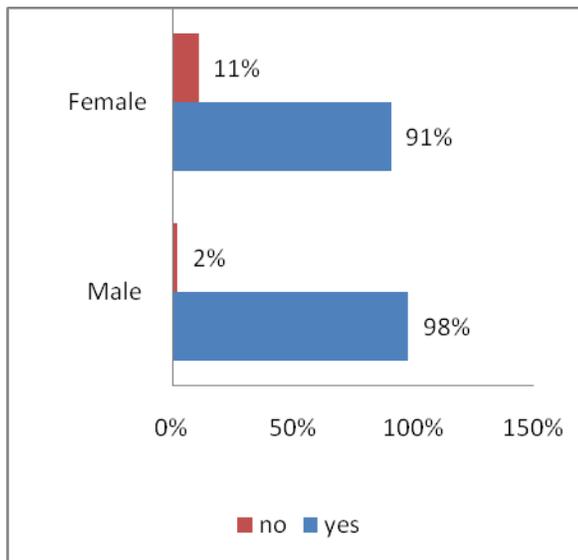


Figure 2 Awareness about bitcoin (gender wise distribution)

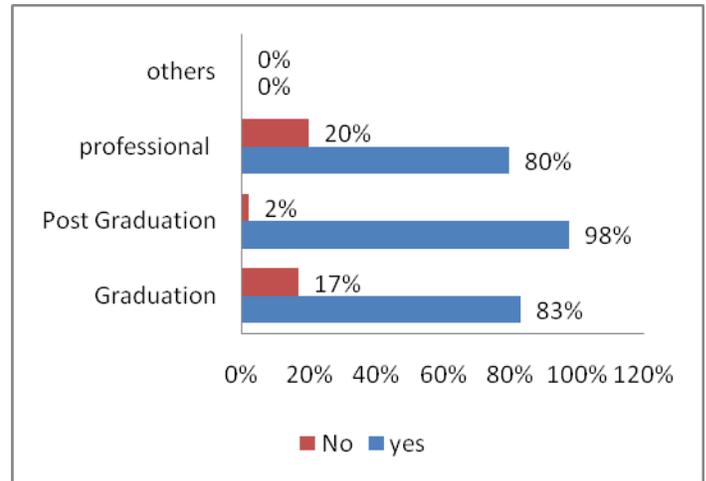


Figure 3 Awareness about Bitcoin (education wise distribution)

Investment in Bitcoin or other Crypto currencies

Of the Respondents who had heard of Bitcoin, 27 % of respondents had invested Bitcoin. Of those most likely to have purchase were young respondents, aged 20-35 years old, as well as post graduates.

The investment pattern of Bitcoin varied dramatically by population subgroup:

The younger respondents reported much greater willingness to investment in Bitcoin and other currencies than older respondents. Among 20-35 year olds, 29% have invested in Bitcoin, compared to 14 % of those older than 50 years. Moreover among those respondents who were 36- 50 years old were very unlikely to invest in Bitcoin (76%)

A greater Proportion of Male(28%) than Female (18%) have invested in Bitcoin.

Respondents with High household income (above 25 lakhs) have not invested in Bitcoin whereas 39% of respondents with medium income (5 -10 lakhs) have invested in Bitcoin. it is assumed that high household income were least likely to invest in Bitcoin in future v/s 39% of those with less than 10 lakhs.

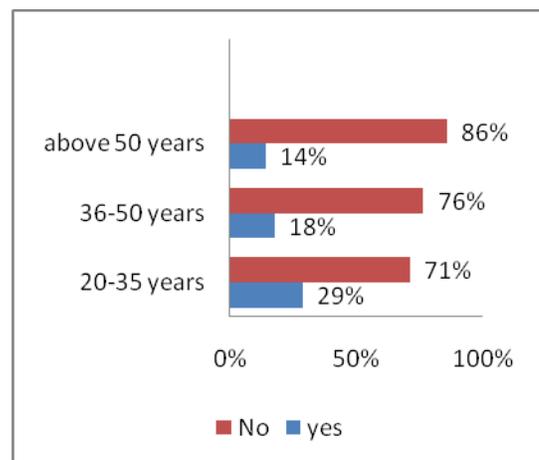


Figure 4 how many respondents have invested in Bitcoin ? Age wise distribution

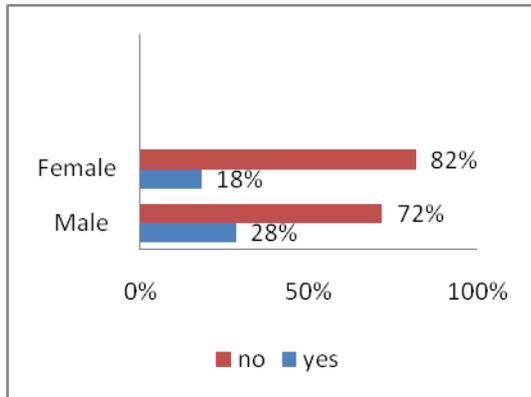


Figure 5 how many respondents have invested in Bitcoin?
(gender wise distribution)

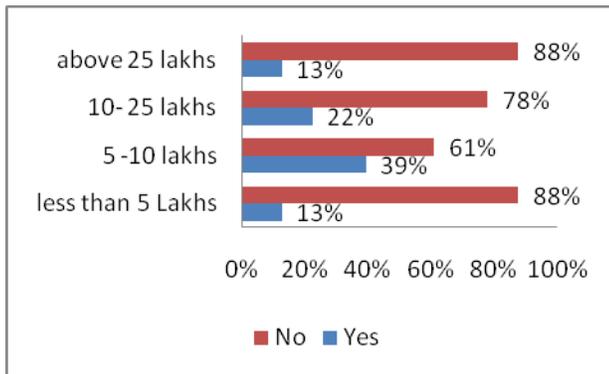
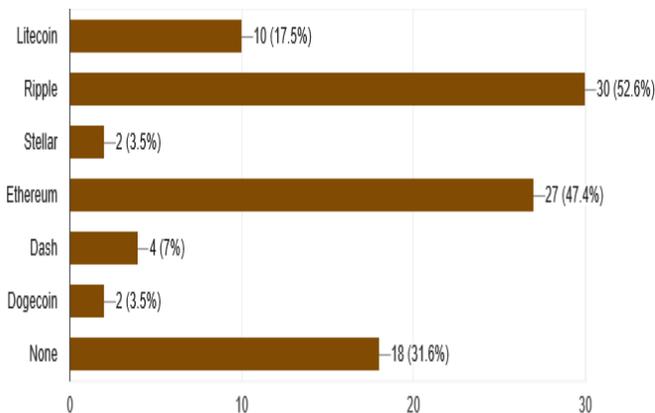


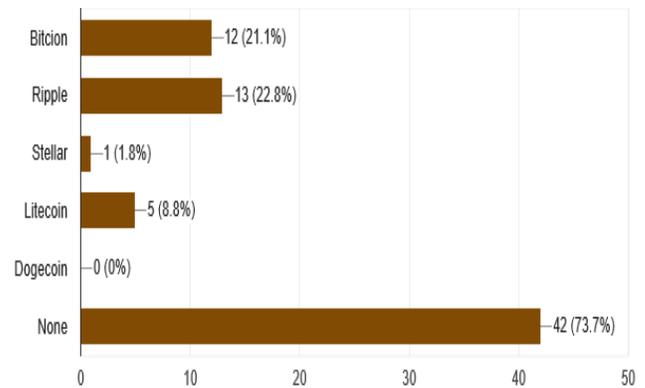
Figure 6 how many respondents have invested in Bitcoin?
(Income wise)



This graph provides the distribution of responses to the question –“Are you aware about other Crypto currencies apart from Bitcoin”. Results are highlighted with respected to 114 respondents in multiple choice format wherein respondents were asked to tick all the crypto currencies that they have ever heard apart from Bitcoin.

Of all the respondents who have heard of Bitcoin, 52.6% of respondents are also aware of Ripple followed by Ethereum (47.4%).

Surprisingly there are 31% of respondents who have heard of only Bitcoin, but have never heard of any other crypto currencies



This graph provides the distribution of responses to the question –“Have you invested in Bitcoin as well as other Crypto currencies?”. Results are highlighted with respected to 114 respondents in multiple choice formats wherein respondents were asked to tick all the crypto currencies that they have ever invested including Bitcoin.

Of all the respondents who have invested in Bitcoin(21.1%), 13% of respondents have also invested in Ripple.

Respondents expressed opinion regarding future of Bitcoin. Most respondents (43.9%) agreed that Bitcoin is a bubble that will explode. Some of the respondent (12%), however, were of the opinion that Bitcoin will survive and grow.

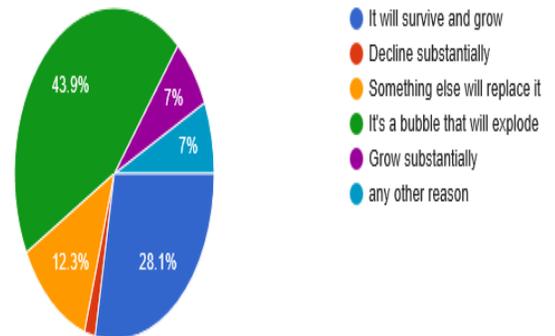


Figure 7 opinion about the future of bitcoin

The following graph provide the distribution of response to the question-“Do the respondents consider the replacement of Bitcoin transaction in the international currency transaction”

The majority of respondents,45.6% feel that the prevailing system of currencies and mode of transaction will continue on for a much long time because of the resistance to change and hence they find difficult to comment over the question.

Few, 29.8% also feel that bitcoin could replace all monetary transaction in domestic as well as international market.

The following graph provides the distribution of responses to the question-“what is the opinion of respondents regarding government intervenes to regulate the identity authentication of Bitcoin users?”. Most respondents (80%) feel that government intervention is very important for future and growth prospects of

Bitcoin. Most respondents fear that the governments would declare it as legally invalid.

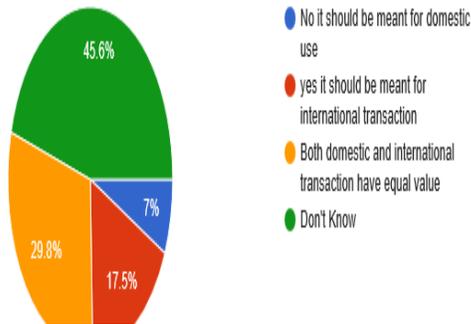


Figure 10 The opinion of respondents regarding the replacement of Bitcoin transaction in the international currency transaction

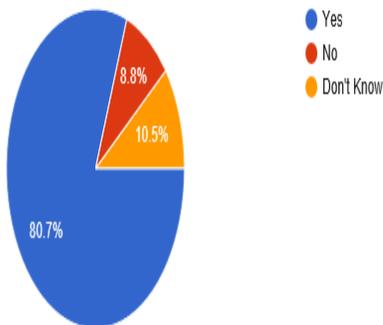


Figure 8 The opinion of respondents regarding government intervention to regulate the Identity Authentication of Bitcoin users

Digital Asset and Blockchain Foundation of India (DABFI) is planning to lay down self-regulatory regimes for trading of bitcoins and other blockchain based digital assets. The opinion of respondents regarding such intervention is optimistic with an majority of 61% of respondent agrees that such intervention will adds to the advantages of bitcoin.

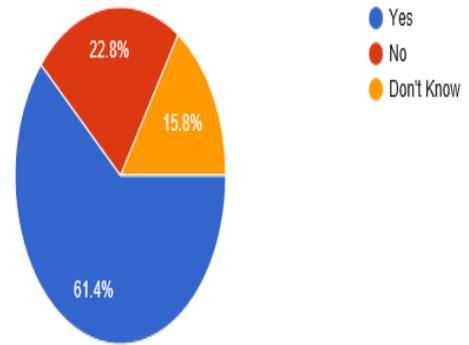


Figure 9 The opinion of respondents regarding Digital Asset Blockchain Foundation of India .

The following graph shows the opinion of respondents regarding a standardize KYC norms for the member companies that would amplify the benefits of Cryptocurrency for most marginalized people, merchants, tax departments and regulatory authorities.

Of all the respondents 73.7% feels that a standardize KYC norms for the member companies will amplify the benefits of Crypto currency. Bitcoin being a new concept in India needs to standardize certain norms and regulations.

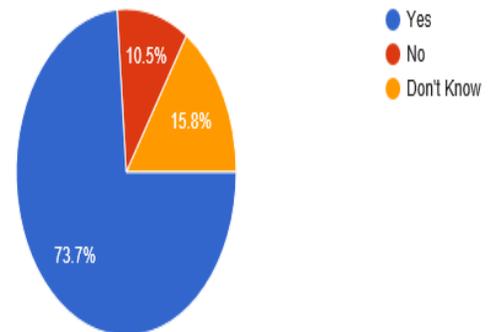


Figure 11 The respondents regarding a Standardize KYC norms for the member companies that would amplify the benefits of Bitcoin

Of 114 respondents who answered the below question concerning about the advantages of using Bitcoin or crypto currency, most respondents feels that international acceptance of Bitcoin as a mode of exchange currency is very important and has a majority of 93 respondents .

87 respondents or 76 % said that low transaction charge is considered to be advantageous factor for the use of Bitcoin. 45 respondents or 39% said that lack of centralized is the least advantageous factor for the use of Bitcoin.

Advantages	Low advantage	Medium advantage	High advantage	Weighted Average Mean of advantages of cryptocurrency
Anonymous and invisibility related to Bitcoin transaction	28	28	45	1.8
<i>Speed of transaction</i>	8	34	96	2.4
No Central Authority	37	10	45	1.6
<i>Very low transactions/commission charges</i>	13	30	87	2.28
<i>International Acceptance especially as mode of exchange currency</i>	9	34	93	2.386
Easy to use and access	32	30	30	1.614
No inflation	22	32	57	1.9
No Chance to use personal data for fraud	16	30	78	2.18

Of 114 respondents who answered the below question concerning about the disadvantages of using Bitcoin or crypto currency, most respondents feels that theft of hacking of Bitcoin and Technical glitches or errors are the disadvantages of bitcoin. 96 respondents or 84% said that volatility of exchange rate is considered to be disadvantageous factor for the use of Bitcoin in the pursuit of cashless economy.

Disadvantages	Low disadvantageous	Medium disadvantageous	High disadvantageous	WAM
Exchange Risk	11	32	90	2.3
Theft & Hacking	8	22	114	2.5
Technical Hitches	7	32	102	2.5
Volatility of Exchange Rate	10	30	96	2.4
Required Expertise	9	40	84	2.3
No Central Authority	12	14	114	2.46

Of 114 respondents who answered the below question concerning about easy adaptation of Bitcoin as a method of cashless payment or crypto currency, most respondents feels that Bitcoin should be regulated by government legislation or Government stamps for approval should be considered.

	Not at all important	Somewhat important	Particularly important	Most important	WAM
If Bitcoin is regulated by government legislation	5	8	42	136	3.350877
If there is more advertising/education about Bitcoin	9	24	63	60	2.736842
If bitcoin prices are more stable	6	34	57	60	2.754386
If you could obtain bitcoin at your banks	10	24	39	72	2.54386
If Major retail websites start accepting Bitcoin	6	20	39	88	2.684211
If Major Bricks and Mortar stores start accepting Bitcoin	10	24	33	88	2.719298
If Simplified and secure procedure for Bitcoin purchase is adopted	7	22	42	100	3
If there is more secure storage methods for Bitcoin	3	22	45	112	3.192982
If Governments stamps of approval	3	10	30	144	3.280702
If the Transaction savings on Bitcoin is passed on to consumers	5	24	54	88	3
If Existing monetary transactions are changed to accept Bitcoin	5	24	54	88	3

VI. CONCLUSIONS

Currently, the acceptance of crypto payments by individual who are educated and have a net worth of 5 to 10 lacs is modest. However, there is interest among respondents to adopt crypto payments in the near future; indicating that acceptance may rise once certain (perceived) barriers are lowered. In this paper we examine which factors drive individual in adoption intention and actual acceptance of crypto payments. As Bitcoin is a fully decentralized currency, the value is appreciating in the financial economy because its supply is limited and there is huge demand for it. The demand is mainly because of its low transaction costs, anonymity, investment possibilities and possibilities for use in illegal activities.

The future of bitcoin is questionable as Bitcoin has severe disadvantages such as high price volatility, susceptibility to hacking, no protection from a central bank and no consumer protection. Bitcoin is a bubble because just like any other bubble that we might have noticed i.e. dotcom bubble or housing bubble, Bitcoin has no inherent value and the investors are willing to pay the price which is far more than its intrinsic value. Moreover the price is determined solely by the balance between buying and selling.

It is therefore unlikely that it will catch on as an established currency to the general public, as its two main strengths, anonymity and low transaction costs are not necessarily what the average consumer demands. However the technology behind cryptocurrency and Bitcoin can be applied to other currency or payment systems which could have a lasting impact on how people spend money in the future.

However, the primary research performed so far has proven that most respondents feels that theft of hacking of Bitcoin and Technical glitches or errors are the disadvantages of bitcoin. Although interesting research has been performed in this topic, the dynamism of the bitcoin ecosystem that constantly modifies and enhances the bitcoin usage implies that some of the hypotheses assumed for those block chain analysis may not completely hold and, for that reason, block chain analysis still presents interesting open questions. Most respondents are of an opinion that standardizes KYC norms for the member companies that would amplify the benefits of Cryptocurrency for most marginalized people, merchants, tax departments and regulatory authorities. Moreover Digital Asset and Block chain Foundation of India (DABFI) is planning to lay down self-regulatory regimes for trading of bitcoins and other blockchain based digital assets. The opinion of respondents regarding such intervention is optimistic with an majority of respondent agrees that such intervention will adds to the advantages of bitcoin.

Furthermore, some structural parts of the bitcoin system, like the blockchain approach as an append-only ledger, may open interesting challenges for future developments on secure decentralized systems

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The Effect of Organizational Culture and Job Satisfaction on Organizational Commitments and the Implementation on Organizational Citizenship Behavior in Employees of Pt. Bali Towerindo Sentra Tbk

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Abstract- The purpose of this study is to understand and describe the impact of organization culture and job satisfaction on organizational commitment, and its implementation on organizational citizenship behavior (OCB) for employees of PT. Bali Towerindo Sentra Tbk. This research is an explanatory survey quantitative research. Data were analyzed by the method of Structural Equation Modeling (SEM), and processed using SmartPLS 3.2.7. The data used a questionnaire, with the number of respondents as much as 135 peoples. The results of this study indicate that: 1) organizational culture has a positive and significant effect on organizational commitment to OCB, (2) job satisfaction has a positive and significant effect on organizational commitment but does not have a direct effect on OCB, (3) organizational commitment has a positive and significant effect on OCB, (4) organizational culture and job satisfaction simultaneously effect organizational commitment and (5) organizational culture, job satisfaction and organizational commitment have a simultaneous effect on OCB.

Index Terms- Organization Culture, Job Satisfaction, Organizational Commitment, Organizational Citizenship Behavior (OCB)

I. INTRODUCTION

In the current era of globalization, advances in science and technology cannot be avoided. In order to face these challenges, the quality of human resources are needed. Within the existence quality of human resources, it is expected to contribute well to the company, and not only do the work as long as the responsibility or *in-role* behavior but *extra-role* behavior as well.

The extra-roles behaviour in organizations is also known as Organizational Citizenship Behavior (OCB). Organizational Citizenship Behavior is a behavior which bryond the job description that has been determined by the company, but has a good impact to the company, so it can be said that OCB is the ability and behavior of employees in carrying out their duties at work whose contributions exceed expectations.

In accordance with its vision of "Being the largest Telecommunication and Multimedia Infrastructure Company in

Indonesia", Balitower requires an employee who are not only competent, but have high organizational commitment and can implement OCB) as well. This is aiming for competing in the telecommunications industry which is currently very competitive.

Based on the writer's data and observations, one of the problems that appears to Balitower employees is Organizational Citizenship Behavior, which relates to employee compliance with regulations, procedures and regulations. Based on the employee attendance data in 2017 that the average number of late Balitower employees is 12%. In addition there are several employees who do some activities during work hours for activities which has no relation to the main work, such as smoking, drinking coffee outside the office. This shows that there are employees who still do not use work time effectively. Further, the survey was conducted on 20 employees to find out the factors that triggered the low figures of OCB. The result is 60% are unwilling to be asked to replace the work of friends who are unable to attend, related to organizational culture as much as 65% do not know the company's Vision and Mission, related to the job satisfaction, 60% of employees are not satisfied with their compensation received. Furthermore, related to organizational commitment, the 2017 turnover data obtained is an average of 13.29%.

From the description above, the researcher interested in conducting the research on "The Effect of Organizational Culture and Job Satisfaction on Organizational Commitment, and its implementation on Organizational Citizenship Behavior (OCB)".

The purpose of this study is to find out and explain: (1) the effect of organizational culture on organizational commitment, (2) the effect of job satisfaction on organizational commitment, (3) the effect of organizational culture and job satisfaction on organizational commitment. (4) the effect of organizational culture on OCB, (5) the effect of job satisfaction on OCB (6) the effect of organizational commitment on OCB, (7) the influence of organizational culture, job satisfaction and organizational commitment on OCB (OCB) .

II. LITERATUR REVIEW

The literature review explains the literature used to discuss the research topics that the writer examined, so that the existing research problems can be solved by the literature that the writer described below:

Organizational Citizenship Behavior (OCB)

Robbins & Judge (2008:40) define OCB as a choice behavior that is not part of an employee's formal work obligations, but supporting the functioning of the organization effectively.

Organizational Citizen Behavior (OCB): "Individual Behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient and effective functioning of the organization" (Organ, Podsakoff & MacKenzie, 2006).

Another opinion expressed by Kreitner and Kinicki (2014:173), organizational citizenship behavior) are employee behaviors that are outside the task. Examples are attitudes as constructive statements about departments, disclosure of personal interests in other people's work, suggestions for improvement, training of new employees, respect for enthusiasm and writing of building maintenance rules, caring for company property, and time and attendance above standards or level implemented.

From the explanation above, it can be concluded that OCB is a form of extra role behavior that is shown by employees, which is voluntary but can make a good contribution to the company

Organizational Culture

According to Robbins and Judge (2015: 512) organizational culture is a system of shared meanings adopted by members who distinguish an organization from other organizations. Edgar H. Schein (2010: 18) defines organizational culture as a pattern of shared basic assumptions that certain groups learn to address external adaptation problems and official internal integration and have worked well and are therefore taught / passed on to new members as the right way to understand, think and feel is related to these problems.

According to Hofstede (2010:3) Culture is a collective programming of thoughts that distinguishes members /one group / category of people from others. Culture in this sense, including systems of values and values is the essence of culture.

Mangkunegara (2013:113) defines organizational culture as a set of assumptions or systems of belief, values and norms developed in organizations that serve as guidelines for behavior for its members to overcome external adaptation and internal integration.

From some of the meanings above, it can be concluded that organizational culture is a value that exists within an organization, which is used as a guideline by members in achieving goals, and differentiating them from other organizations.

Job Satisfaction

According to Gibson et al (2009), job satisfaction is the attitude of workers regarding work resulting from their perceptions of their work based on factors found in the work environment such as leader style, policies and procedures, work

group affiliation, working conditions, and other benefits for workers.

Keith Davis in Mangkunegara (2013) suggested that job satisfaction is a feeling of supporting feeling by employees in working.

According to Robbins (2011) job satisfaction is a general attitude towards one's work, which shows the difference between the number of awards received by workers and the amount they believe they should receive.

From the description that has been stated above, it can be concluded that job satisfaction is a positive attitude which felt by the employees in work, which reflecting the compatibility between the rewards they receive with the work that has been finished.

Organizational Commitment

Robbins and Judge (2014) define organizational commitment as a situation where an employee sided with a particular organization and its goals and desires to maintain membership in the organization.

Others, according to Mathis and Jackson (2011) organizational commitment is the level of where employees are believe and accept the organizational goals, and willing to live with the organization.

Mowday in Sopiah (2008: 155) states that organizational commitment is the identification and involvement of someone who is relatively robust towards the organization. Organizational commitment is the desire of organizational members to maintain their membership in the organization and willing to strive for the achievement of organizational goals.

Robbins in Nurfadillah et.al (2018) Organizational commitment has three separate dimensions, namely (a) affective commitment, is the emotional feeling for an organization and belief in values; (b) continuance commitment, is economic value based on staying in the organization as a comparison with leaving the organization; (c) normative commitment, is the responsibility for survival or stay in an organization for moral or ethical reasons.

From the explanation above, it can be concluded that organizational commitment is a form of individual acceptance of organizational goals and has a willingness to remain in the organization.

Theoretical Framework

Based on the background of the problem, theoretical review and previous research described above, a theoretical framework is drawn up that describes the flow of thought in this study. In general, the framework in this study explains the direct relationship between independent variables, such as organizational culture and job satisfaction and dependent variable organizational commitment and OCB.

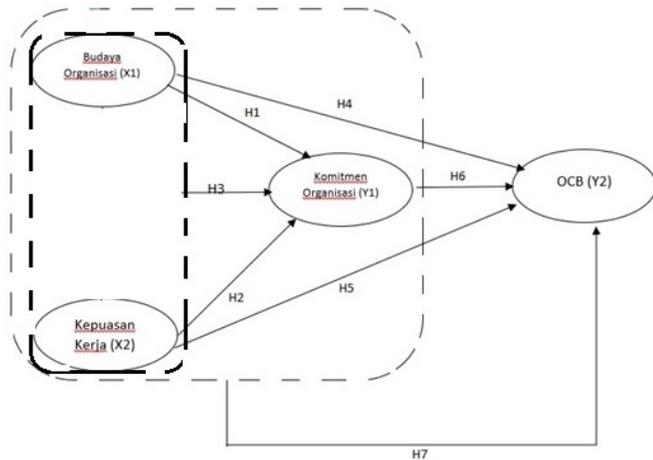


Figure 1 Research Theoretical Framework

Research Hypothesis:

H1: Organizational culture has an effect on organizational commitment.

H2: Job Satisfaction has an effect on Organizational Commitment.

H3: Organizational Culture and Job Satisfaction have an effect on Organizational Commitment.

H4: Organizational culture has an effect on Organizational Citizenship Behavior (OCB).

H5: Job Satisfaction has an effect on Organizational Citizenship Behavior (OCB).

H6: Commitments of Organizations have an effect on Organizational Citizenship Behavior (OCB).

H7: Organizational Culture, Job Satisfaction, Organizational Commitment have an effect on Organizational Citizenship Behavior (OCB).

Method

This research uses quantitative type with explanatory survey method. The perspective of the quantitative research approach that will be carried out in this study is included in the design of causality research.

The variables in this research are: independent variable (X1) organizational culture and (X2) job satisfaction, mediator variable (Y1) organizational commitment and dependent variable (Y2) OCB.

**Table 1
 Variable, Dimension and Research Indicator**

Variable	Dimension	Indicator	Statement number	Item
Organizational Culture (Robins & Judge : 2015)	<i>Innovation and Risk Taking</i>	a. Motivating employees to be innovative	1	
		b. Encouraging employees to make a decision	2	
	<i>Attention to detail</i>	a. Working analyzing ability	3	
		b. Working im detail ability	4	
	<i>Result orientation</i>	a.Focus on the result achieved	5	
		a.Considering the employee in policies	6	
	<i>People orientation</i>	b. Receiving suggestion andcritism from employee	7	
		a. Assesing team performance	8	
	<i>Team orientation</i>	b. Supporting the team	9	
		<i>Aggressiveness</i>	a. Have passion in work	10
	b. Able to compare		11	
	<i>Stability</i>	a. Encouraging consistent work	12	
		a. Job according to expertise	13	
	<i>The job</i>	b. workload in accordance with responsibility	14	
Job Satisfaction Luthans (2008)		<i>Supervisor</i>	a. Supervisor figure on employee	15
	b. Supervisor support		16	
	<i>Co-workers</i>	a. Co-workers support	17	
		b. Co-workers attitude	28	
	<i>Promotion</i>	a. Career opportunity	19	
		b. Fair Advancement	20	
	<i>Salary</i>	a. Salary appropriateness received by employees	21	

Variable	Dimension	Indicator	No statement numbers
Organizational Commitment Robbins & Judge (2014)	<i>Affective commitment</i>	a. The employee emotional attachment to the organization	22
		b. The sense of being part of the Organization	23
	<i>Continuance commitment</i>	a. Disadvantages of leaving the organization	24
		a. Loyal with the organization	25
	<i>Normative commitment</i>	b. Duty in organization	26
OCB Organ (2006)	<i>Altruism</i>	a. Willingness of helping co-workers	27
		b. Replacing an absent/day off co-workers	28
	<i>Conscientiousnes</i>	a. Completing the job in time/before deadline	29
		b. Willing to work overtime if needed	30
	<i>Sportmanship</i>	a. Doing a job without complaining	31
		b. Following the new policy sincerely	32
	<i>Courtesy</i>	a. Controlling and avoiding conflict.	33
		a. Willingness to involve in company activities.	34
	<i>Civic Virtue</i>	b. Providing an input for company progress.	35

Samples and Population

The population in this research are the employees of PT. Bali Towerindo Sentra Tbk regional Jakarta totals 210 people. By using the Slovin formula with an error tolerance of 5%, a sample of 135 respondents was obtained.

Analysis Method

To examine the hypothesis that will be proposed in this study, the analysis technique that will be used is SEM or Structural Equation Modeling which is operated through the Smart PLS program version 3.2.7.

III. RESULTS AND DISCUSSION

In this research, the results of respondents were processed through evaluation of the measurement model (outer model) which is beneficial for knowing the validity and reliability, and also evaluation of structural models (Inner Model) to examine the hypothesis.

Evaluasi Model (Outer Model)

Based on the results of data processing using Smart PLS 3.2.7 the results are as follows:

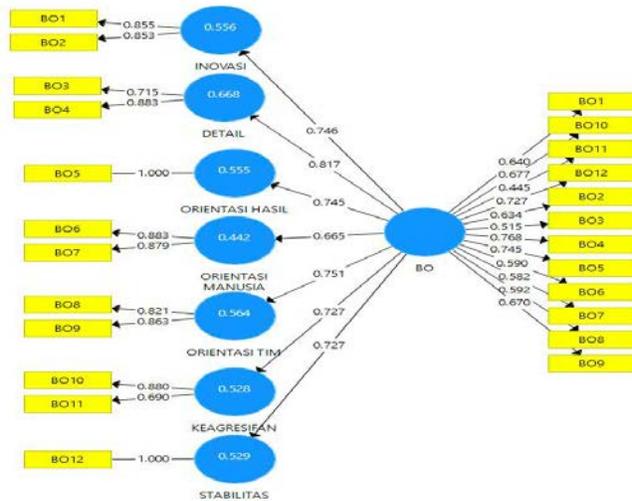


Figure 2. Outer Model Organizational Culture Variable

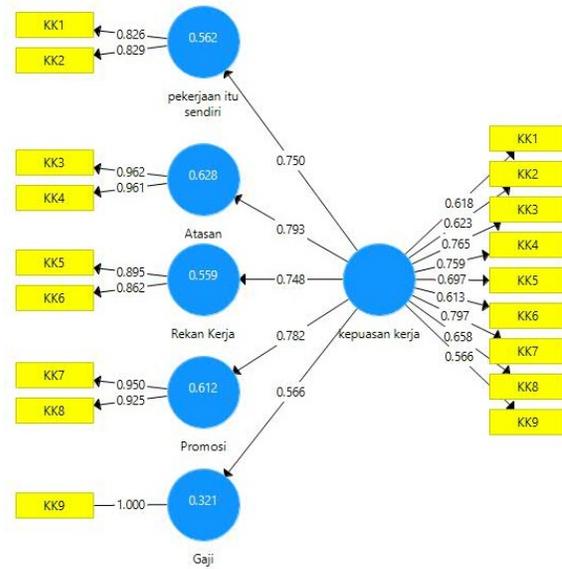


Figure 3. Outer Model Work Satisfaction Variable

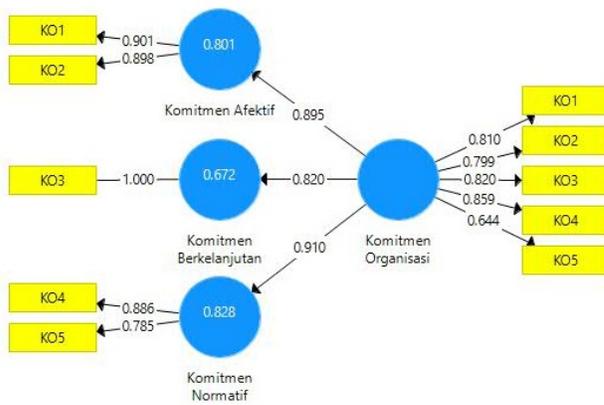


Figure 4. Outer Model Organizational Commitment Variable

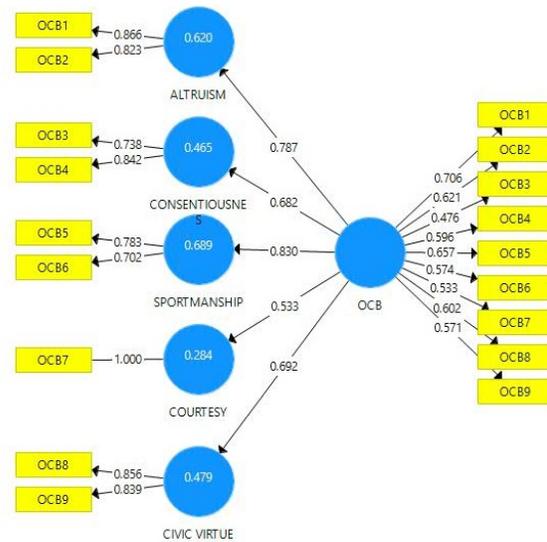
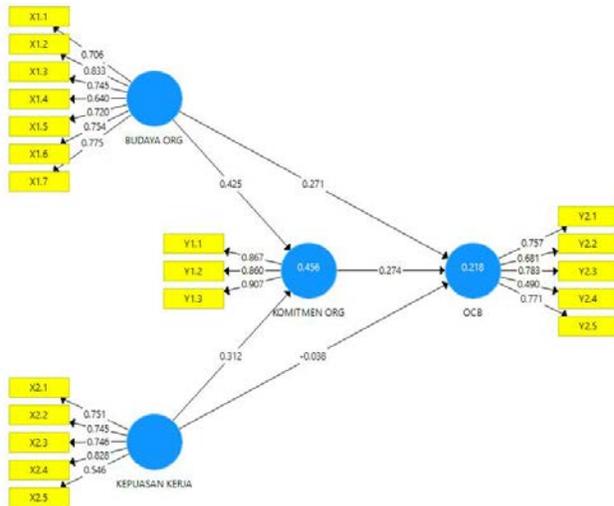


Figure 5. Outer Model OCB Variable

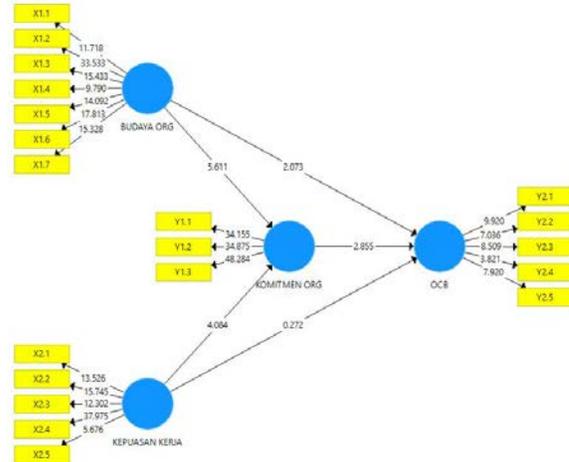
Figures 2 to 5 show that the outer loading of each indicator is > 0.50 , indicating that the indicators on each of these variables are valid.

Structural Model Evaluation (Inner Model)

Based on the calculation results using *calculate SmartPLS version 3.0 bootstrapping* the path coefficient is obtained which describes the strength of the relationship between constructs / variables as well as t statistics.



Gambar 6. Path Coefficient Value



Gambar 7. t Statistik Value

The structural equations of the coefficients in the figure are formulated as follows:

- **Organizational Commitment (Y1):** $0,425y_1 + 0,312y_2 + \zeta$
- **OCB (Y2):** $0,271y_3 + (-0,038)y_3 + 0,2746_1 + \zeta$

Table 2 The Effect of Partial Independent Variables on Independent Variables

	Original (O)	Sample (M)	Mean	Standard Deviation (STDEV)	T ((O/STDEV))	Statistics P Values
ORG CULTURE -> KOMITMEN ORG	0,425	0,432		0,076	5,611	0,000
ORG CULTURE -> OCB	0,271	0,274		0,131	2,073	0,039
JOB SATISFACTION -> KOMITMEN ORG	0,312	0,310		0,076	4,084	0,000
JOB SATISFACTION -> OCB	-0,038	-0,047		0,142	0,272	0,786
ORG COMMITMEN -> OCB	0,274	0,282		0,096	2,855	0,004

Table 3 The Effect of Simultaneously Independent Variables on Dependent Variables

	R square	F Statistik	F Tabel	Alpha	Kesimpulan
(ORG CULTURE, JOB SATISFACTION) -> ORG COMMITMEN	0.456	37,07	2.44	0.05	(H ₃ accepted)
(ORG CULTURE, JOB SATISFACTION, ORG COMMITMEN) -> OCB	0.218	121,6	2.44	0.05	(H ₇ accepted)

The results of statistical calculations obtained are presented in tables 3 and 4 for structural models with the following hypothesis.

Hypothesis 1 - Organizational Culture has an effect on Organizational Commitment.

Obtained path coefficient of 0.425 with p of 0.000, thus H1 is accepted (p <0.05), Organizational Culture has a positive and significant effect on organizational commitment.

Hypothesis 2 - Job Satisfaction has an effect on Organizational Commitment.

The path coefficient obtained is 0.312 with p equal to 0.000, thus H2 is accepted (p <0.05), Job Satisfaction has a positive and significant effect on Organizational Commitment.

Hypothesis 3 - Organizational Culture and Job Satisfaction have an effect on Organizational Commitment.

The Organizational Culture and Job Satisfaction Variables have (R2) that is 0.456 with the value of f statistic 37.07 and the value of f table at alpha 0.05 is 2.44. This means that f count (37.07) > f Table (2.44), then H3 is accepted and H0 is rejected. Thus it can be concluded that hypothesis 3 is proven which states that the variable Organizational Culture and Job Satisfaction has a positive and significant influence on organizational commitment.

Hypothesis 4 - Organizational Culture has an effect on OCB

Obtained path coefficient of 0.271 with p of 0.039, thus H4 is accepted (p > 0.05). Organizational culture has a positive and significant effect on OCB.

Hypothesis 5 - Job Satisfaction has an effect on OCB

Obtained path coefficient of -0.038 with p equal to 0.786, thus H5 is rejected (p > 0.05), Job Satisfaction does not significantly influence OCB.

Hypothesis 6 - Organizational Commitment influences OCB
Obtained path coefficient of 0.274 with p equal to 0.004, thus H6 is accepted (p <0.05). Organizational Commitment has a positive and significant effect on OCB.

Hypothesis 7 - Organizational Culture, Job Satisfaction, Organizational Commitment have an effect on OCB.

Organizational Culture Variable, Job Satisfaction, and organizational commitment have (R2) that is 0.218 with the value of f statistic 121.6 and the value of f table at alpha 0.05 is 2.44. This means f count (121.6) > f Table (2.44), then H7 is accepted and H0 is rejected. Thus it can be concluded that hypothesis 7 is proven which states that the variables of Organizational Culture, Job Satisfaction, and Organizational Commitment have a significant influence on OCB

Interdimensional Correlation Analysis

In this study the Organizational Culture variable consists of 7 dimensions, the Job Satisfaction variable consists of 5 dimensions, the Organizational Commitment variable consists of 3 dimensions and the OCB variable consists of 5 dimensions.

Table Results of Independent & Dependent Variable Inter-Dimension Matri

Variabel	Dimensi	Komitmen Organisasi (Y1)			OCB (Y2)				
		Y1.1	Y1.2	Y1.3	Y2.1	Y2.2	Y2.3	Y2.4	Y2.5
Budaya Organisasi (X1)	X1.1	0,367	0,323	0,320	0,116	0,173	0,023	0,045	0,367
	X1.2	0,438	0,502	0,400	0,316	0,140	0,161	0,208	0,403
	X1.3	0,518	0,491	0,370	0,182	0,110	0,099	-0,041	0,176
	X1.4	0,342	0,330	0,307	0,090	0,298	0,247	0,139	0,376
	X1.5	0,441	0,388	0,353	0,211	-0,004	0,031	0,082	0,262
	X1.6	0,483	0,394	0,377	0,262	0,188	0,238	0,167	0,416
	X1.7	0,460	0,527	0,465	0,338	0,205	0,269	0,186	0,308
Kepuasan Kerja (X2)	X2.1	0,273	0,321	0,364	0,161	0,068	0,064	0,048	0,281
	X2.2	0,305	0,408	0,437	0,060	0,000	0,060	0,103	0,169
	X2.3	0,312	0,342	0,353	0,226	0,235	0,323	0,002	0,262
	X2.4	0,592	0,506	0,557	0,190	0,241	0,145	0,050	0,333
	X2.5	0,125	0,253	0,227	-0,011	-0,022	-0,033	-0,083	0,187
Komitmen Organisasi (Y1)	Y1.1				0,312	0,233	0,220	0,039	0,361
	Y1.2				0,233	0,282	0,202	0,026	0,281
	Y1.3				0,314	0,292	0,177	0,151	0,413

From Table 4 it can be concluded as follows:

1. In the organizational culture variable toward organizational commitment variables, the highest dimension correlation is stability to the dimension of ongoing commitment, amounting to 0.527. While the lowest dimension correlation in this variable is the orientation dimension to humans towards normative commitment, which is equal to 0.307.

2. In the organizational culture variable toward the OCB variable, the most important dimension correlation is a notice to detail on the *civic virtue* dimension, at 0.403. While the lowest dimension correlation in this variable is the team orientation dimension towards the *consentiousnes* dimension, which is equal to -0.004.

3. In job satisfaction variable toward organizational commitment variables, the most important dimension correlation is promotion of the dimensions of affective commitment, amounting to 0.592. While the lowest dimension correlation in

this variable is the salary dimension to affective commitment, which is equal to 0.125.

4. In job satisfaction variable toward OCB variables, the highest dimension correlation is promotion of the civic virtue dimension, amounting to 0.333. While the lowest dimensional correlation in this variable is the superior dimension of *consentiousness*, which is equal to 0,000.

5. In the organizational commitment variable towards OCB variable, the highest dimension correlation is normative commitment to civic virtue, amounting to 0.413. While the lowest dimension correlation in this variable is the dimension of ongoing commitment to courtesy, which is equal to 0.026.

Discussion.

Organizational Culture has an Effect on Organizational Commitments (Hypothesis 1)

The finding of this research indicates that organizational culture has a positive and significant effect on organizational commitment. This research is in line with the results of research from Mondan et al (2016) and also Steven et al (2016) which states that organizational culture has a positive and significant effect on organizational commitment. The highest correlation of dimensions of organizational culture to organizational commitment is a dimension of stability to the dimension of sustainable commitment. This shows that a stable work environment has a strong influence to create sustainable commitment, so that employees feel loss when leaving the company.

Job Satisfaction has an Effect on Organizational Commitment (Hypothesis 2)

The finding of this study indicates that job satisfaction has a positive and significant effect on organizational commitment. This is in line with the findings of Wong Swee Mun et al (2016) and also Asman Ismail et al (2016) which stating that there is a significant effect between job satisfaction toward organizational commitment. The highest correlation of dimensions of job satisfaction with organizational commitment is a promotion dimension to the dimension of affective commitment. This shows that the opportunity to develop a career provided by the company is felt capable to create an emotional bond of employees towards the company, as well as employee confidence in the values adopted by the company. Those are able to create good commitment to employees.

Organizational Culture and Job Satisfaction have an Effect on Organizational Commitments (Hypothesis 3)

The finding of this study indicates that there is a positive and significant influence between organizational culture and job satisfaction on organizational commitment. This is in line with the findings of Serpian et al (2016) which states that organizational culture and job satisfaction have a positive influence on organizational commitment.

The compatibility of cultural values creates a secure atmosphere for employees to carry out their work activities. A secure organizational culture will lead on to high commitment from employees to the company. In addition, people who are relatively satisfied with their work will be more committed to the organization.

Organizational Culture has an Effect on OCB (Hypothesis 4)

In this reserach was found that organizational culture had a positive and significant effect on OCB. This is in line with the findings of previous researchers, by Asif (2015) and also research from Seikh (2015) which state that organizational culture has a significant effect on OCB. The highest dimension correlation between organizational culture and OCB is a dimension of notice to detail towards the civic virtue dimension. This shows that the accuracy of the accuracy of the employee when working on his assignment indicates a large responsibility of employees at the company.

Job Satisfaction with OCB (Hypothesis 5)

In the finding of this study it was found that job satisfaction had no significant and negative effect on OCB. This

is different from previous study by Samanvitha (2013) and also Siti (2017) which states that job satisfaction has a positive effect on OCB. Conversely, if mediated by variable organizational commitment, job satisfaction has a positive influence on OCB. This shows that organizational commitment is an important variable in mediating job satisfaction, before employees create OCB for employees

The Effect of Organizational Commitment to OCB (Hypothesis 6)

In this study it was found that Organizational Commitment Variables had a positive and significant influence on OCB. This is in line with previous research from Maria (2015) which states that there is a positive relationship between organizational commitment to OCB. Furthermore Sofiah (2015) in her research also states that organizational commitment was related to OCB. The highest dimension correlation of organizational commitment to OCB is the dimension of normative commitment to civic virtue. This shows that commitment is formed with moral / ethical reasons for employees, forming behaviors that indicate employee responsibility in the life of the company's organization.

Organizational Culture, Job Satisfaction and Organizational Commitment have an Effect on OCB (Hypothesis 7)

In this research was found that organizational culture, job satisfaction, and organizational commitment had a positive and significant effect on OCB. This means that the higher the variable organizational culture, job satisfaction and organizational commitment, the higher OCB shown by Balitower employees. The results of this study are in line with previous research from Chamdan (2013) which states that organizational culture, job satisfaction and organizational commitment influence OCB

IV. CONCLUSION

Organizational culture variable has a positive and significant effect on organizational commitment, job satisfaction has a positive and significant effect on organizational commitment, organizational culture and job satisfaction have a significant and simultaneous effect on organizational commitment, organizational culture has a positive and significant effect on OCB, job satisfaction has no effect on OCB , organizational commitment has a positive and significant effect on OCB, organizational culture, job satisfaction, and organizational commitment simultaneously have a positive and significant effect on OCB.

V. SUGGESTION

The company is expected to be able to maintain a conducive and stable work environment, so that employees can increase their stronger commitment, and can use work valuation as a reference to provide career opportunities to an outstanding employee, so that employees feeling more attached to company. In addition, it is expected that the company can put more concern to the SOP on the work provided, so that employees can feel more responsible in working their duties, and also enhance the

appreciation of employees so employees always show the responsible behavior as part of the OCB dimension.

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Health Insurance and Child Health Outcomes in West Africa

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Abstract- In developing countries, the health status of millions of kids is affected by financial problems arising from unexpected out-of-pocket health expenditures. Therefore, the aim of this paper is to assess the impact of health insurance on child health outcomes using a panel of 10 West African countries over the period from 2005 to 2015. After controlling for income, education and the 2014-2016 Ebola outbreak experienced in the sub-region, it is found that the compulsory as well as the voluntary health insurance schemes significantly increase life expectancy at birth and significantly decrease both the under-five and the neonatal mortality rates. Therefore, it is recommended that public health authorities organize sensitization campaigns to educate the population and create awareness about the benefits of health insurance. They should also reinforce the compulsory health insurance scheme and create incentives for the development of the voluntary one.

Index Terms- Compulsory health insurance, voluntary health insurance, child health outcomes

I. INTRODUCTION

As revealed by Escobar et al. (2010), developing countries are associated with health systems impaired by inefficiency, inequitable access, inadequate funding, and poor quality services; putting at stake the lives of more than 2 billion people. Each year, these vulnerable adults and kids account for 92% of global deaths from communicable diseases, 68% of deaths from non-communicable illnesses, and 80% of deaths from injuries. Furthermore, more than 150 million of these people often experience financial problems arising from unexpected out-of-pocket health expenditures.

The magnitude of these public health issues calls for prompt and decisive measures to be taken. Among the solutions proposed by the scientific community, the increase of public health expenditures and the implementation of health insurance stand out as key measures that can help bring about the structural change needed in developing countries. Indeed, it is argued that health insurance offers a financial protection against impoverishing medical expenses, improves the access to timely and quality medical care, and ultimately leads to better health outcomes (Bovbjerg et al., 2007; Bernstein et al., 2010; Escobar et al., 2010; OECD, 2016; Bonfrer et al., 2016; Sommers et al.,

2017). Furthermore, for the vulnerable people afflicted by low incomes, suffering from chronic medical conditions or living in environments characterized by endemic diseases, the effects of health insurance could even be magnified.

Given that a substantial part of these vulnerable people live in sub-Saharan Africa in general and West Africa in particular, this paper aims to assess the impact of health insurance on their health status. Thus, based on data availability, a panel of 10 West African countries is selected to cover the period from 2005 to 2015. Both the compulsory and the voluntary health insurance schemes account for health insurance while life expectancy at birth, the under-five mortality rate and the neonatal mortality rate account for child health outcomes. The paper contributes to the existing literature by assuming that in the case of West African countries, the nexus between health insurance and child health outcomes could be altered by income, education, and the Ebola outbreak of 2014-2016.

The remainder of the paper is organized as follows: the literature related to the effects of health expenditures in general and health insurance in particular on health outcomes is reviewed in section 2. The methodology is presented in section 3 while the main findings are reported and discussed in section 4. Finally, the paper is concluded in section 5 with some policy recommendations.

II. LITERATURE REVIEW

The effects of health expenditures in general and health insurance in particular on health outcomes have inspired numerous studies; with these studies paying a special attention to developing countries because of their relatively poor health systems. Thus, Anyanwu and Erhijakpor (2007) analyze the nexus between health expenditures and health outcomes using a data related to 47 African countries from 1999 to 2004. Controlling for income, the number of physicians, urbanization, education, HIV prevalence and the ethnolinguistic characteristics of those countries, they find that total as well as government expenditure on health significantly improve health outcomes. The study also reveals that the control variables have a significant impact on health outcomes and the researchers conclude that non-expenditure factors should be taken into consideration in the improvement of health systems in Africa.

Novignon et al. (2012) study the effect of public and private health expenditures on health status using a panel of 44 sub-Saharan African countries between 1995 and 2010. After running a fixed as well as a random effects model, they find that both public and private health expenditures have a positive and significant impact on health outcomes. The paper also reveals that compared to private health expenditures, public spending has a greater impact on health outcomes.

Paying attention to developed countries, Kim et al. (2013) analyze the impact of government health expenditures on health outcomes. Using a mixed-effect model on a sample of 17 OECD countries between 1973 and 2000, the paper reveals that government health expenditures significantly improve health outcomes in those countries. Indeed, they find that government health expenditures are negatively associated with infant mortality rate and positively associated with life expectancy.

Bonfrer et al. (2016) study the effects of the Ghanaian National Health Insurance Scheme on maternal and infant health. On a sample of 2002 children and 1959 mothers, they apply propensity score matching and analyze health outcomes before and after the implementation of the NHIS. The study reveals that the NHIS significantly increases the proportion of pregnancies with at least 4 antenatal care visits, attended deliveries as well as caesarian sections. Indeed, they find that in the wake of the NHIS, those health outcomes increased by 7%, 10% and 6% respectively.

Escobar et al. (2010) study the impact of health insurance in 7 low and middle-income countries (Namibia, Ghana, Costa Rica, Peru, Indonesia, rural China and Colombia) and argue that despite the heterogeneity in design, target groups, coverage, and financing mechanism, health insurance improves health by easing the access to health care. They reveal that in all those countries, uninsured people are more likely to be denied access to treatment or to rely on self-medication. Those people also benefit less from preventive care, and their out-of-pocket expenditures represent a higher share of their total income. In Colombia for instance, it is found that people with health insurance are 41% more likely to go for preventive care. In Ghana, insured mothers pay 90% less for prenatal and delivery care while in China, self-treatment is 30% lower for the insured population.

III. METHODOLOGY

A. Data

Assessing the impact of health insurance on child health outcomes, the paper uses annual data collected from the World Health Organization and the World Bank. Based on data availability, 10 West African countries¹ are selected to cover the period from 2005 to 2015. Health insurance is proxied by two variables: the first variable (compulsory insurance) represents the yearly amount spent by households on any health insurance policy made compulsory by public authorities; while, the second variable (voluntary insurance) represents the amount spent by

¹ Those ten countries are: Benin, Cabo Verde, Ivory Coast, Ghana, Guinea, Guinea Bissau, Mali, Niger, Nigeria and Senegal.

households on any non-compulsory health insurance policy. Both proxies of health insurance are expressed as percentages of current health expenditure. As for child health outcome, it is proxied by life expectancy at birth, the under-five mortality rate and the neonatal mortality rate.

Three control variables are included in the analysis because they could alter the nexus between health insurance and child health outcomes. The first variable (the growth rate of the GDP per capita) captures the average income of the population and it is assumed that people with higher income are more likely to buy health insurance for their kids. The second variable (the percentage of primary school enrollment) accounts for basic education because it is assumed that educated people are more favorable to health insurance. As for the last control variable, it is a dummy variable designed to account for the Ebola outbreak experienced in West Africa from 2014 to 2016. This dummy variable is included because it is assumed that the Ebola outbreak could have both increased the demand for health insurance and deteriorated health outcomes in the region.

B. Econometric model

The model used is given by the following equation:

$$HO_{it} = \alpha_1 + \alpha_2 CHI_{it} + \alpha_3 VHI_{it} + \alpha_4 Inc_{it} + \alpha_5 Edu_{it} + \alpha_6 Ebola_{it} + Trend_t + \delta_i + \epsilon_{it} \quad (1)$$

Where HO_{it} stands for the three proxies of health outcome for country i in time t ; CHI_{it} and VHI_{it} represent the compulsory, and the voluntary health insurance schemes respectively; Inc_{it} , Edu_{it} , and $Ebola_{it}$ stand for income, education, and the Ebola outbreak respectively. Finally, $Trend_t$ stands for the time trend, δ_i represents country-specific fixed effects, ϵ_{it} is the residual and α_a ($a = 1, \dots, 6$) are the parameters to be estimated.

The model is estimated using the generalized least squares (GLS) method to address the issues related to heteroskedasticity and serial correlation inherent to the data. Finally, robust standard errors are generated using the bootstrapping technique with 1000 replicates.

IV. RESULTS

The results reported in Table 1 reveal that both the compulsory and the voluntary health insurance schemes significantly increase life expectancy at birth. Indeed, a 10 percent increase in the amount allocated to either of those insurance schemes could increase life expectancy by 7 years. The table also reveals that the level of income has a negative and insignificant impact on life expectancy. Such a negative impact is contrary to expectations but could be due to the fact that in its early stages, economic development is often associated with some flaws (pollution and environmental degradation) that could reduce life expectancy. This is particularly relevant for West African countries because most of those economies are still in the early stages of development, moving toward their industrial revolution.

Table 1. The impact of health insurance on life expectancy at birth

	Coef.	Boot. Err.	Std.	Prob
CHI	0.724***	0.075		0.000
VHI	0.770***	0.067		0.000
Inc	-0.139	0.089		0.118
Edu	0.003	0.014		0.808
Ebola	-0.489	0.555		0.379
Cons.	56.370***	1.945		0.000
Wald Chi ² (7)	386.24			
Prob > Chi ²	0.000			
Obs.	110			
Adj. R ²	0.6152			

Source: Authors' estimations

Note: * Denotes significance at the 10% level; ** denotes significance at the 5% level; and *** denotes significance at the 1% level. A time trend and country-specific fixed effects were included in the analysis but are not reported.

As for Education and Ebola, they both exhibit the expected sign but are both insignificant. Indeed, education is positively associated with life expectancy as it could incite people to subscribe to health insurance while the lethal nature of Ebola could explain its negative impact on life expectancy.

Paying attention to the under-five mortality rate, it is found that both the compulsory and the voluntary health insurance significantly reduce it. Thus, a 10 percent increase in either health insurance scheme could reduce the under-five mortality rate by more than 50 per 1000. Moreover, it should be noted that the effect of the compulsory health insurance is more pronounced than that of the voluntary one. Table 2 also reveals that the level of income still exhibits a counter-intuitive sign while education is negatively associated with the under-five mortality rate. As for Ebola, it tends to increase the mortality rate as expected but its effect not significant. The effect of Ebola not being significant could be due to the fact that among the ten West African countries included in the panel, the World Health Organization (2016) classifies only Guinea as a center for the 2014-2016 outbreak.

Table 2. The impact of health insurance on the under-five mortality rate

	Coef.	Boot. Err.	Std.	Prob
CHI	-5.492***	0.292		0.000
VHI	-5.253***	0.315		0.000
Inc	0.590	0.446		0.186
Edu	-0.079	0.094		0.399
Ebola	4.136	3.442		0.230
Cons.	149.384***	12.331		0.000
Wald Chi ² (7)	1270.99			
Prob > Chi ²	0.000			
Obs.	110			
Adj. R ²	0.7322			

Source: Authors' estimations

Note: * Denotes significance at the 10% level; ** denotes significance at the 5% level; and *** denotes significance at the 1% level. A time trend and country-specific fixed effects were included in the analysis but are not reported.

Finally, in the case of the neonatal mortality rate, it is still found that both the compulsory and the voluntary health insurance schemes significantly improve child health outcome. Indeed, a 10 percent increase in the funds allocated to either health insurance could reduce the neonatal mortality rate by at least 14 per 1000. Contrary to the previous case, it is the voluntary health insurance that has the greatest effect on the neonatal mortality rate. Table 3 also reveals that the level of income and education have a counter-intuitive sign while Ebola leads to an increase in the mortality rate as expected.

Table 3. The impact of health insurance on the neonatal mortality rate

	Coef.	Boot. Err.	Std.	Prob
CHI	-1.426***	0.137		0.000
VHI	-1.785***	0.165		0.000
Inc	0.076	0.204		0.707
Edu	0.191***	0.052		0.000
Ebola	1.479	1.769		0.403
Cons.	26.862***	8.354		0.001
Wald Chi ² (7)	424.25			
Prob > Chi ²	0.000			
Obs.	110			
Adj. R ²	0.4855			

Source: Authors' estimations

Note: * Denotes significance at the 10% level; ** denotes significance at the 5% level; and *** denotes significance at the 1% level. A time trend and country-specific fixed effects were included in the analysis but are not reported.

V. CONCLUSION

Assessing the effects of health insurance on child health outcomes while controlling for income, education and the 2014-2016 Ebola outbreak experienced in West Africa, it is found that the compulsory as well as the voluntary health insurance schemes significantly increase life expectancy at birth. It is also found that both of those insurance schemes significantly decrease the under-five and the neonatal mortality rates. These findings are in line with Bovbjerg et al. (2007), Bernstein et al. (2010), Escobar et al. (2010), OECD (2016), Bonfrer et al. (2016) and Sommers et al. (2017) as they support the argument that health insurance improves health outcomes.

It is therefore recommended that public health authorities organize sensitization campaigns to educate the population and create awareness about the benefits of health insurance. They should also reinforce the compulsory health insurance scheme and create incentives for the development of the voluntary one.

Finally, it could be argued after the OECD (2016) that universal health coverage is within reach for many developing countries if they can implement the necessary fiscal cave-out and channel out-of-pocket expenditures to a pooled funding for health.

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SILC – A Newer Technique With Conventional Instruments: Does it really need “novel” instruments ?

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Abstract- Gallstone surgery by laparoscopic method is most commonly performed procedure worldwide. Now a days there is more and more trend towards minimally invasive procedure. Single incision laparoscopic cholecystectomy (SILC) is becoming more popular in this field. First SILC was performed by Navarra et al¹ in 1997 through a single periumbilical skin incision. There were many modifications in SILC procedure also since then. Some authors have used few special devices such as designed SILSTM port (Covidian), TriportTM, Single Site Laparoscopy Access System (Ethicon) and Gelpoint (Applied Medical System) ²etc. Whereas, others have used specially designed instruments to shorten the learning curve. Aim: To evaluate the need of such costly devices or instruments over conventional instruments in SILC procedure. Method: We used those instruments, which are used for conventional laparoscopic cholecystectomy (cLC) in 50 cases in IGMC Shimla, with 25 cases each in SILC and cLC groups.

Results: SILC was safe and cosmetically better option and was no difference in complication rates between SILC and cLC performed through conventional instruments. Duration of surgery (DOS) was prolonged in SILC group.

Conclusion: SILC procedure through conventional instruments is a safe, less costly, and feasible option in any centre where laparoscopic surgeries are regularly performed.

Index Terms- Single incision laparoscopic cholecystectomy (SILC), Laparoscopic cholecystectomy (cLC), Conventional, Novel

I. INTRODUCTION

Conventionally, laparoscopic cholecystectomy was performed using four or three ports. For last few years conventional laparoscopic cholecystectomy (cLC) as less invasive method, has replaced open cholecystectomy in the treatment of patients with symptomatic gallstone disease. In recent years, a search for even more minimally invasive approaches has led to innovative techniques of single incision laparoscopic surgery (SILS) and natural orifice transluminal endoscopic surgery (NOTES). While substantial drawbacks of NOTES technique including technical challenges and scarcity of instrumentation, have limited its adoption for common use.³ Whereas, SILS has met more favorable acceptance in surgical community because of its feasibility, safety and with no special instrument requirement. SILC is a good option for gall stone surgery with few drawbacks like prolonged surgical time and more learning curve.

First laparoscopic cholecystectomy by single incision was performed by Navarra et al¹ in 1997 with the removal of gall bladder through a single peri umbilical skin incision. He originally described a technique using transabdominal sutures to suspend the gallbladder during single incision laparoscopic cholecystectomy.

Romanelli et al⁴ performed the SILC with the newer devices called triport system. They were among the first surgeons to perform lap cholecystectomy through these devices. They also compared cholecystectomy through these devices.

Bresadola et al⁵ in 1999 compared the transumbilical technique of laparoscopic cholecystectomy (2port) with standard laparoscopic cholecystectomy on 40 patients. He concluded that once the learning curve has been completed, transumbilical cholecystectomy is possible without some of difficulties associated with standard laparoscopic cholecystectomy.

A RCT was done by Lei Zhao et al in 2016, comparing SILC and conventional laparoscopic surgery by “novel” instrument (dissector with long adjustable and rotating wrist) to that of conventional instruments. They concluded that SILC with novel instrument had fewer complications and was safer than SILC with conventional instruments.⁶

BV Sharath (2016) have used some special device like SILSTM and specially designed “Reticulating instrument” in his cases with no added benefit in terms of duration of surgery or complication rates.⁷

Aim of our study is to evaluate comparatively the real usefulness of these various instruments or devices used for SILC procedure over conventional instruments.

II. METHOD

Present prospective study included ultrasonographically proved 50 patients of symptomatic cholelithiasis and were posted for elective cholecystectomy. These patients were admitted in Surgical Wards of Indira Gandhi Medical College, Shimla. SILC were performed on 25 (50% of patients) and cLC were conducted in rest of 25 (50%) patients. The patients were selected randomly. Relevant history, clinical examination and investigations were recorded. SILC was done by infra umbilical incision and cLC was done by three /four Trocar Technique. Patients with acute cholecystitis /pancreatitis, choledocholithiasis jaundice / hypoproteinemia/malignancy, conversion of cLC to open cholecystectomy, patients on oral contraceptive pills/pregnancy, intra operative injury to adjacent organs/structures etc. are excluded from study.

III. SILC PROCEDURE

Equipment and Instruments:

We used conventional laparoscopic instruments and equipment for performing SILC. We used 5mm laparoscope for performing the procedure. A sharp image that allows clear distinction between tissue planes and tissue texture is essential for safe dissection.

Position of the patient, team and equipment:

The patient was positioned supine on the operating table with the legs split apart and strapped firmly to the leg boards. Both arms of the patient were placed on arm boards at an angle less than 90° to the torso. The surgeon stood on the left side of the patient, with the assistant opposite to him during the placement of the first port. For rest of the procedure, the surgeon stood between the legs and the camera person stood to his right (near the left leg of the patient). The monitor trolley was placed above the patient's right arm. The diathermy pedal was placed near the surgeon's left foot and all tubes and cables were fixed such that they do not interfere with the camera person.

Placement of ports:

We had made an infraumbilical curved incision (Fig.1). The umbilicus was everted and held with two-toothed forceps in a cephalic and caudal position prior to making an incision of length 2-2.5 cm. This was deepened through the fat and the flaps were undermined to expose the fascia over a distance of 2-2.5 cm. The left edge of the skin incision was retracted and a fascial stab incision was made. A Veress needle was introduced through this incision and after confirmation of its intraperitoneal position, CO₂ pneumoperitoneum was induced and maintained at 12 mm Hg. In the initial cases a 10 mm port was inserted at the incision line and the two five mm ports were placed 0.5 cm inferiorly and laterally on either side through the same skin incision. A grasper introduced through the right lateral port was used for fundal traction. The dissector introduced through the left lateral port was used to dissect the fine Calot's triangle. The instrument port and the telescope were crossed by a chopstick method to avoid "sword fighting" and clashing of instruments in the abdomen. At this stage, the patient's position was changed to an anti-Trendelenberg one with a left-sided tilt which helped in the better exposure of the Calot's triangle. Later we used only two ports one five mm port for five mm camera and another was 10 mm working port through which laparoscope, needle holder, grasper and extractor were introduced at the various steps of SILC procedure (Fig.1)

Placement of traction sutures:

This was the key step of the SILC i.e. "puppeteer"⁸ technique, in which traction sutures were used to hold gall bladder (Fig.1). At the beginning of the procedure, a grasper or a dissector was used to move the omentum away from the right upper quadrant so as to obtain a view of the fundus of the gallbladder. Flimsy omental adhesions, if present, were teased off at this stage. We used a strand of 1-0 vicryl on a 60-mm straight needle for placing the traction sutures. The needle was introduced laterally through one of the intercostal spaces above the level of the costal margin on right side. A laparoscopic needle holder brought the needle into the peritoneal cavity and placed it on the omentum. The needle was then regrasped at its midpoint, a bite of the fundus of the gallbladder was taken and the needle was driven out through the same intercostal space. The needle was retrieved using an open needle holder and the suture was pulled out leaving two ends of 5-6 cm. The suture was divided and a haemostat was applied to both ends close to the skin, resulting in elevation of the gallbladder fundus. Another traction suture was taken in which the needle was introduced from the epigastric region just below the xiphi sternum. This needle was passed through the Hartmann's pouch with the help of needle holder and then taken out from lateral abdominal wall. Both ends were held with hemostats. This helped in lifting the Hartmann's area and helped in better dissection.

Dissection of the Calot's triangle:

The posterior peritoneum was divided to free the Hartmann's pouch. This was followed by further dissection of the anterior and posterior peritoneal leaves overlying the Calot's triangle with the help of a hook and/or a Maryland dissector. The cystic artery and the cystic duct were skeletonised - the endpoint of this dissection was obtaining a "critical view". (Fig.2)

Control of the cystic artery:

The two windows in the Calot's triangle were dissected more widely than during a conventional LC so as to safely observe the tips of the instruments controlling the artery and the duct. We had clipped the cystic artery with a 10-mm reusable clip applicator. Subsequently, the cystic artery was divided.

Control of the cystic duct:

If the cystic duct appeared narrow, it was clipped thrice with 10-mm clips and divided. If the duct appeared wide, we preferred to pass a No. 1 polyglactin suture around it, exteriorize the same and fashioned an extracorporeal Meltzer's knot. This knot was then snugged down onto the cystic duct with the help of a metal knot-pusher. The duct was divided between two extra corporeally tied ligatures. If there was a suspicion of an impacted stone in the cystic duct, it was controlled on the gallbladder side, divided partially to allow the stone to be milked out, and then the stump was ligated using extracorporeal knotting. A 10-mm port was used for introducing a spoon forceps for the retrieval of stones from cystic duct or those that may spill from the gallbladder if it was perforated during dissection. The divided ends of the cystic artery and duct were carefully inspected to confirm their secure closure.

Dissection of the gallbladder:

Alternating medial and lateral rotation of the gallbladder using the ends of the suture placed on Hartmann's pouch was done to dissect the gallbladder from the liver bed using a diathermy hook. Prior to the final detachment of the gallbladder, meticulous haemostasis in the liver bed was ensured and the subhepatic space lavaged with saline. The fundal traction suture was loosened and the gallbladder was freed from the liver (Fig.2).

Specimen extraction:

Gall bladder was then held at neck with the grasper and extracted through the umbilical 10 mm port (Fig.2).

Closure of the incision:

Careful closure of the fascial incision was done to prevent formation of port-site hernia. The edges of the fascial incision were identified, grasped and elevated using fine Kocher's forceps. We closed the rectus sheath using vicryl no.1 suture. The fascia and the skin were infiltrated with a local anaesthetic and the skin was closed using sutures(Fig.3).

Postoperative course:

The postoperative care was identical to that of patients undergoing standard laparoscopic cholecystectomy. Intravenous analgesics and anti-emetics were administered for the duration of hospital stay. Patients were allowed to ambulate and take liquids after 6-8 hours of

surgery.

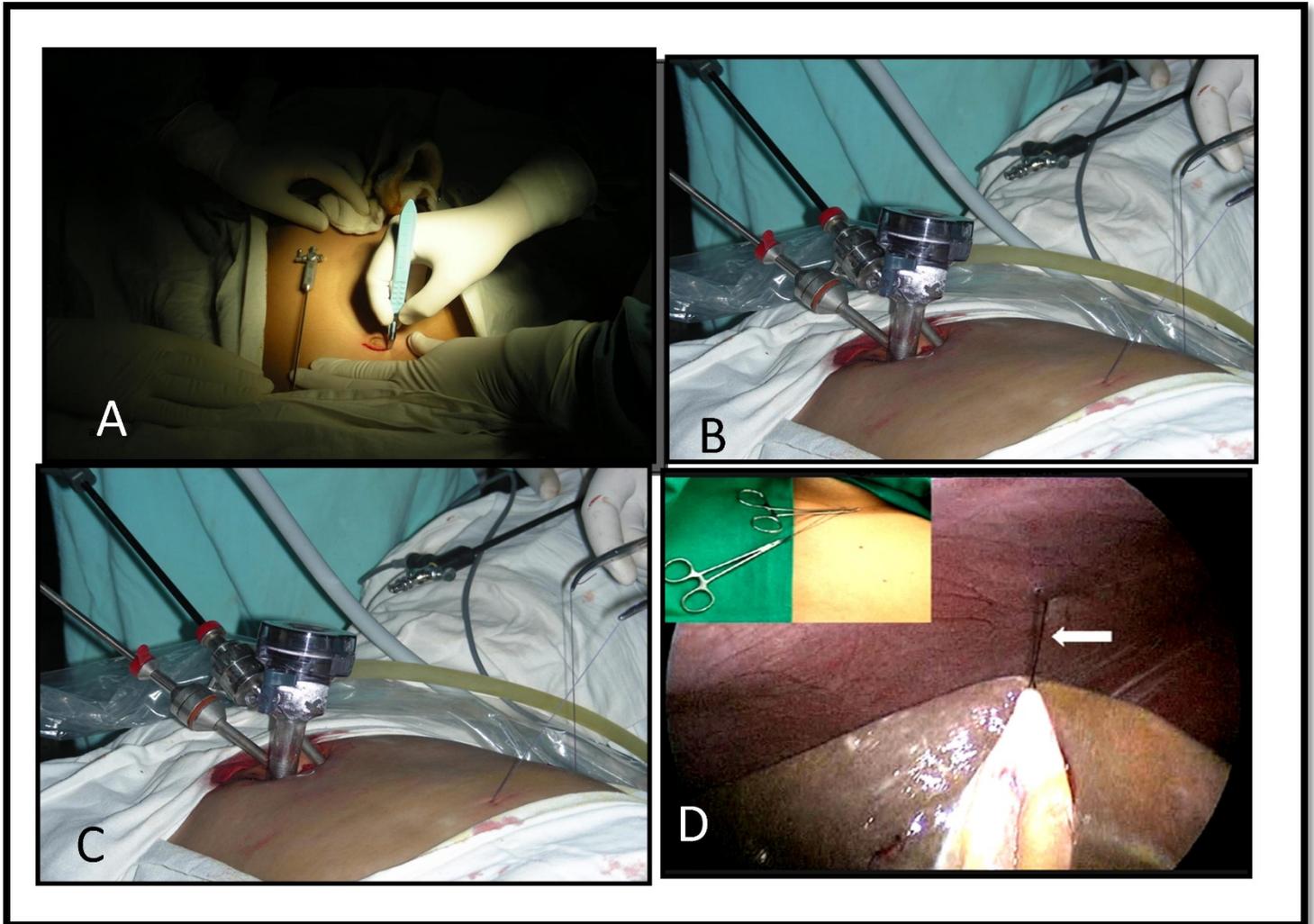


Figure 1: (A) Showing infraclavicular incision (B) and (C), Conventional instruments used. (D)Puppeteer technique.

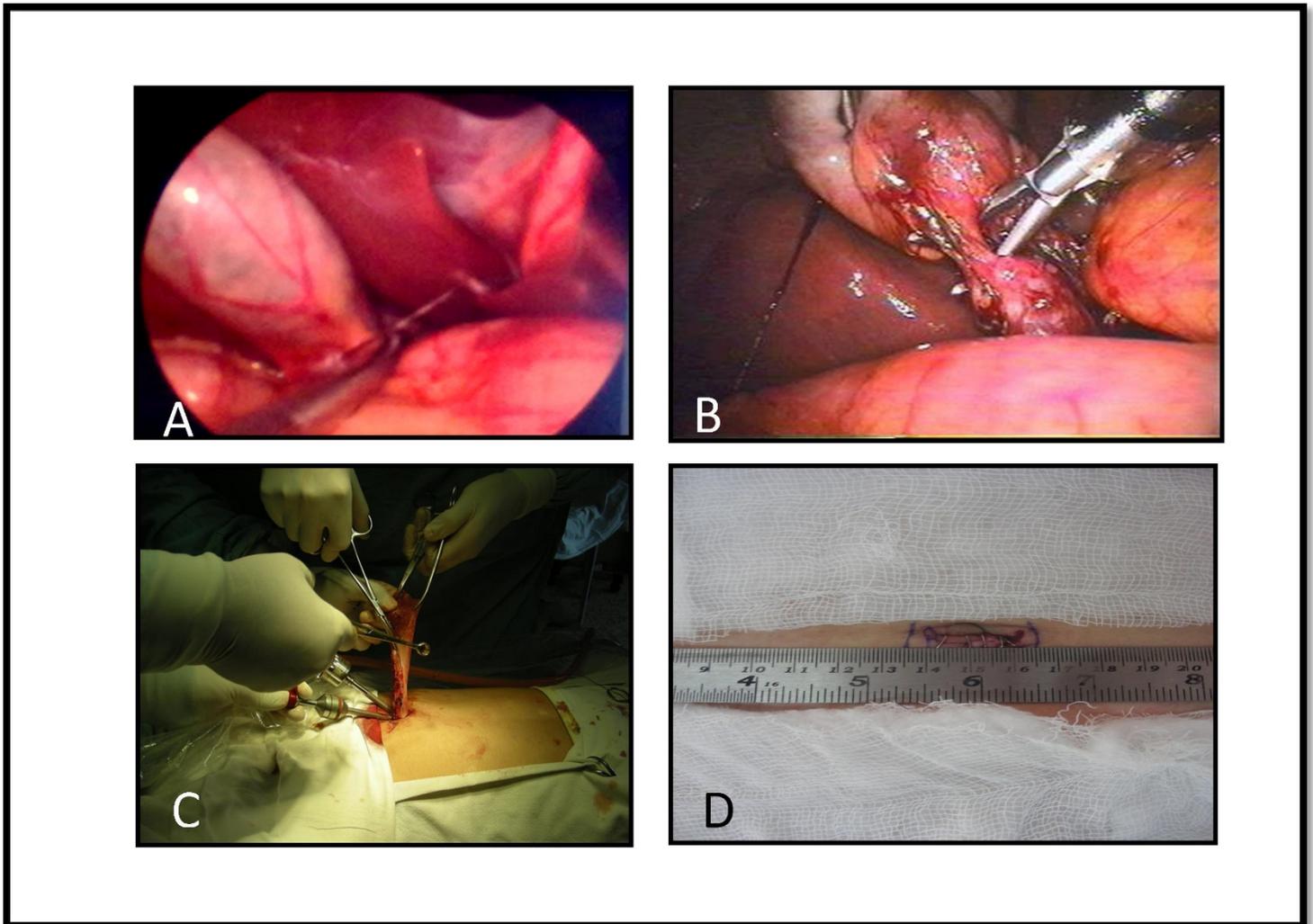


Figure 2: (A) and (B) Dissection of Calot's Triangle. (C) Extraction of specimen with conventional instruments .(D) Immediate post-operative incision.

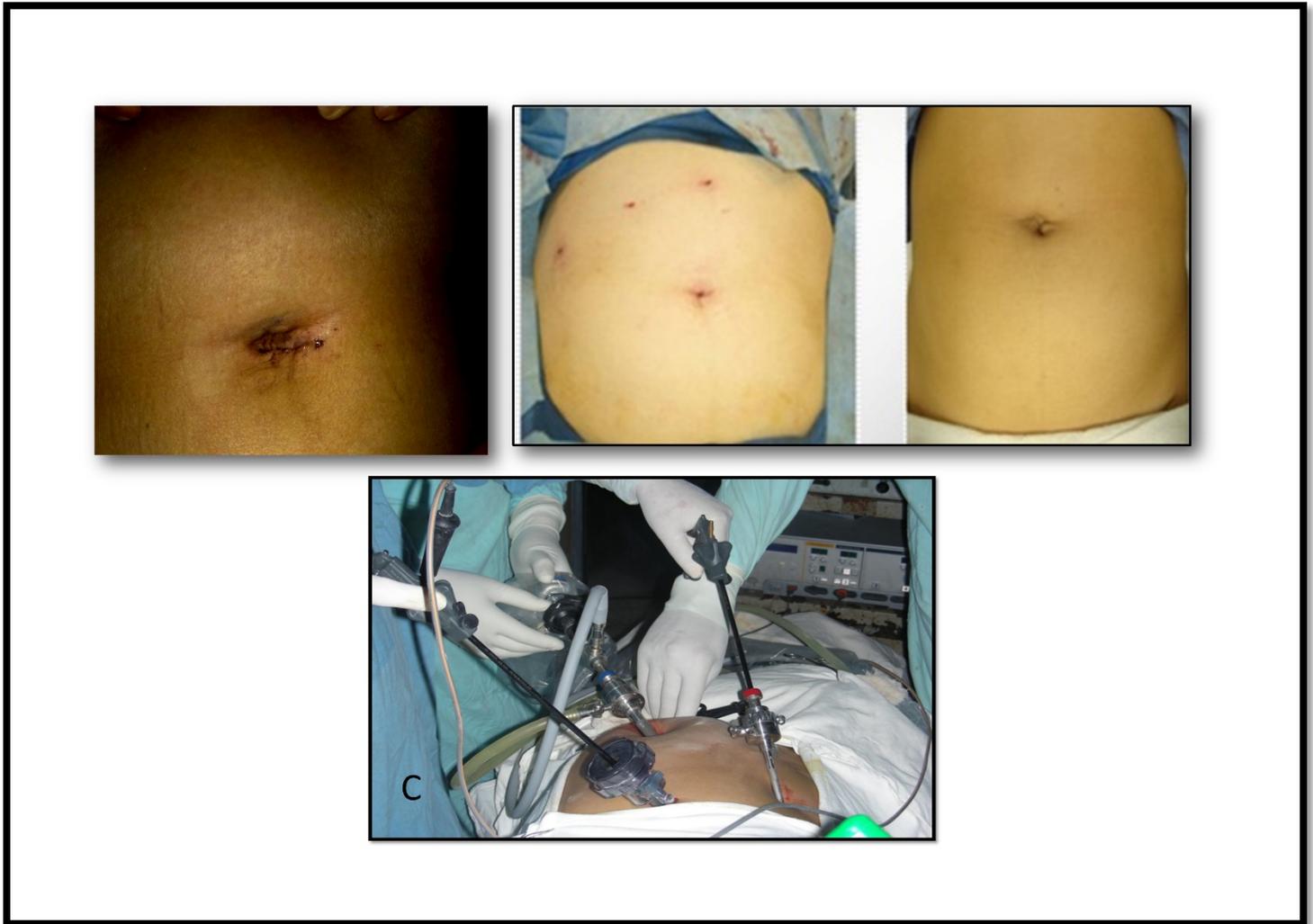


Figure 3: Scar marks Or cosmesis : Immediate post -operative in SILC , following conventional laparoscopic cholecystectomy and after 6 weeks in SILC patients respectively (Above) . Figure showing conventional instruments being used in cLC.(Below).

IV. RESULTS

Age of patients in the present study ranged from 15 to 58 years. In SILC group, the age ranged from 15 to 58 years and the mean age was 30.88 ± 9.248 (standard deviation) years, whereas in cLC group, the age ranged from 15 to 54 years and the mean age was 35.20 ± 9.923 (standard deviation) years.

Out of 50 patients, 43 patients (86%) were female and 7 patients (14%) were male. In the SILC group 24 patients (96%) were female and only patient (4%) was male, whereas in the cLC 19 patients (76%) were females and 6 patients (24%) were males.

BASAL METABOLIC INDEX (BMI):-

The BMI ranged from 18 to 30 kg/m² with mean BMI of 21.08 whereas it was 21.04 and 21.88 in the SILC and cLC groups respectively. The p value is 0.20 which is statistically insignificant. (Table 1)

BMI(Kg/M ²)	SILC		cLC	
	No. of patients (n=25)	% age	No. of patients (n=25)	% age
18-20	16	64	2	8
21-23	9	36	15	60
24-26	0	0	6	24
27-29	0	0	1	4
30-32	0	0	1	4
MEAN	21.04		21.88	
p value= .20 (p >0.05- insignificant).				

Table 1:- Showing Basal Metabolic Index (BMI)

COMPARISON OF DURATION OF SURGERY (DOS):-

Only one (4%) patient of SILC group was operated during the time interval of 20-39 minutes while in cLC group 13(52%) were operated during the similar time interval. During 40-59 minutes of time interval 16(64%) patients in SILC group had undergone surgery while in cLC group 12(48%) patients were operated in this time interval. In 60-79 minutes of time duration 8 (32%) of the patients were operated in SILC group while the entire patient in cLC group had been operated before this time interval. The mean time for the duration of surgery was 53.32 min in SILC group and in cLC group mean operating time was 39.40min, with p value 0.001 showing that the operating time in the SILC group was significantly high as compared to the cLC group. (table2)

Time (in minutes)	SILC GROUP		cLC GROUP	
	No. of patients (n =25)	%Age	No. of patients (n =25)	%Age
20-39	1	4	13	52
40-59	16	64	12	48
60-79	8	32	0	0

MEAN	53.32	35.20
p value= <.001 (p <0.05- significant).		

Table 2:- Comparison Of Duration Of Surgery (DOS)

Values of age, gender and duration of surgery (DOS) were also analysed by using t- test (2- tailed) , also showing significantly prolonged DOS in SILC with p- 0.000. (table3)

Independent Samples Test				
		t-test for Equality of Means		
		Sig. (2-tailed) p-value	Mean Difference	Std. Error Difference
Age	Equal variances assumed	.008	-8.320	3.018
	Equal variances not assumed	.008	-8.320	3.018
BMI	Equal variances assumed	.206	-.840	.655
	Equal variances not assumed	.206	-.840	.655
DOS	Equal variances assumed	.000	13.920	2.301
	Equal variances not assumed	.000	13.920	2.301

Table 3: Showing 2 tailed analysis using t –test.

Evaluation of Post-operative Pain:

Post-operative pain among the study groups was assessed using numeric pain scale scoring system (Fig.4).Operationally the scale is usually a horizontal line, with scaling done from 0 to 10 as illustrated in figure below. The patient is asked to score his/her pain on scale from 0 to 10; a higher score signifies severer pain perceived by patient. Both set of patients were prescribed standard analgesics post-operatively. The pain scoring was done at four hours, twelve hours and twenty four hours following surgery.

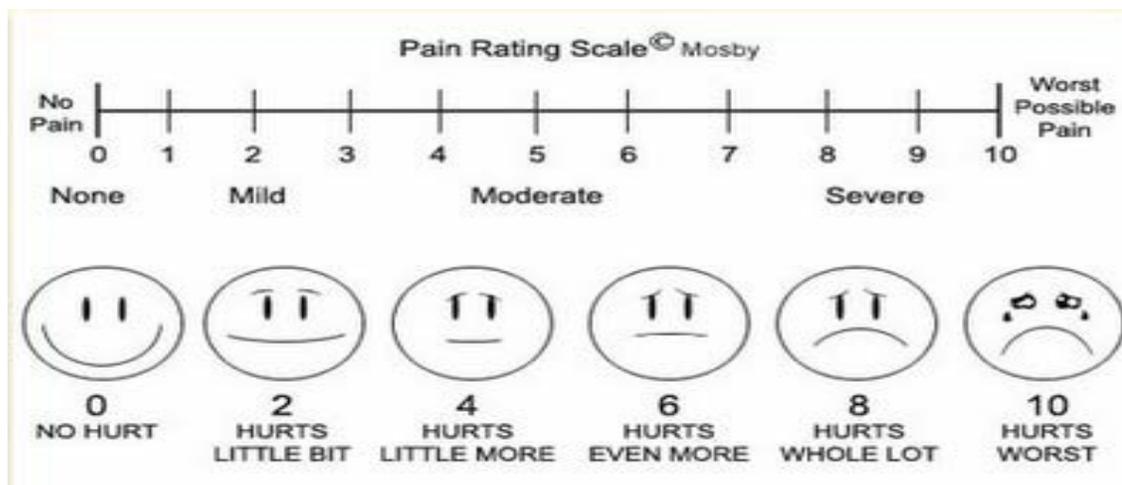


Figure 4: Showing numeric pain scale scoring system.

Evaluation of Cosmetic Outcome:

The cosmetic outcome evaluation between conventional laparoscopic cholecystectomy and SILC group was done using Body Image Questionnaire consisting of body image score (items 1 to 5) and cosmetic score (items 6 to 8) filled 12 weeks following surgery.(Fig.3)

Body Image Questionnaire:-

1. Are you less satisfied with your body since the operation?

- 1 = yes, extremely
- 2 = quite a bit
- 3 = a little bit
- 4 = no, not at all

2. Do you think the operation has damaged your body?

- 1 = yes, extremely
- 2 = quite a bit
- 3 = a little bit
- 4 = no, not at all

3. Do you feel less attractive as a result of your operation?

- 1 = yes, extremely
- 2 = quite a bit
- 3 = a little bit
- 4 = no, not at all

4. Do you feel less feminine/masculine as a result of your operation?

- 1 = yes, extremely
- 2 = quite a bit
- 3 = a little bit
- 4 = no, not at all

5. Is it difficult to look at yourself naked?

- 1 = yes, extremely
- 2 = quite a bit
- 3 = a little bit
- 4 = no, not at all

6. On a scale from 1 to 7, how satisfied are you with your scar(s)?

- 1 = very unsatisfied
- 2 = quite unsatisfied
- 3 = a bit unsatisfied
- 4 = not unsatisfied/not satisfied
- 5 = a bit satisfied
- 6 = quite satisfied
- 7 = very satisfied

7. On a scale from 1 to 7, how would you describe your scar(s)?

- 1 = revolting
- 2 = quite revolting
- 3 = a bit revolting
- 4 = not revolting/not beautiful
- 5 = a bit beautiful
- 6 = quite beautiful
- 7 = very beautiful

8. Could you score your own scar(s) on a scale from 1 to 10

(1 = ugliest scar imaginable, 10 = almost scarless)

Body Image Score:-

Cosmetic Score:-

The pain score following four, twelve and twenty four hours after surgery was significantly lower in SILC compared to conventional four port LC. The mean pain score after four hours for SILC was 4.46 while that for cLC was 7.72. Similarly mean pain score after twelve hours was significantly lower for SILC (2.96) compare to cLC (5.08) and continuing the same progression the mean pain score following 24 hours was significantly lower for SILC (1.80) compared to cLC (2.80). From it can be concluded that SILC inflicts considerably less pain than conventional four port LC.

The cosmesis and body image score evaluated following 12 weeks after surgery had significantly better score in SILC compared to cLC. Majority of patients 15(60%) in SILC group had score in range 41 to 48 on the other hand majority of patients 24(96%) in cLC group had score in range 33 to 40. Mean score in for SILC patients was 40.76 while that for cLC group was 38.28. This proves that SILC is aesthetically and cosmetically superior to conventional four ports LC.

V. DISCUSSION

SILC being a safe, feasible and cosmetically well accepted surgery, now a days is becoming more common minimally invasive procedure. Learning curve is still an issue with SILC surgery. In recent past, many authors have been using different instruments or new operative devices or some novel instruments across the world to improvise learning curve and shorten duration of surgery. Few authors have used different types of single access ports like SILSTM port (Covidian), TriportTM Single Site Laparoscopy Access System (Ethicon) and Gelpoint (Applied Medical System) etc.²

Some authors have used curved instruments for traction of gall bladder as special instruments.

Lei Zhao et al (2016), used special instrument with adjustable and rotatable wrist so called “novel” instrument in 150 cases in SILC surgery. In such instruments(novel), wrist movements are divided into two types in terms of relation of the directions of both the wrist at the surgeons’ hand side and instrument’s tip, ie. Syntropic and adverse wrist⁶.

Technique with new instrument (novel) may be convenient to small sub group of laparoscopic surgeons but this may not be really an easy and comfortable tool to most of surgeons to work with such complexity of hand and wrist movements or co-ordinations, which may further increase operative time as well as learning curve, which is already a big drawback of SILC procedure till date.

Whereas, complication rates were similar in patients undergoing SILC surgery or cLC with these conventional instruments or some special devise used.

We have made a comparative evaluation of different kind of instruments and devices used by many authors from 2012 to 2018. We found that complication rates are similar with procedure performed by using newer devices/instruments to those performed with conventional instruments except in study conducted by Lei Zhao et al, 2016. Whereas

,duration of surgery(DOS) is not shortened even by novel /special instruments or devices used (Fig.4). We have also found that with these instruments there is no added advantage.

AUTHORS	JOURNAL	YEAR	NUMBER OF PATIENTS.(N)	SPECIAL DEVICE OR INSTRUMENTS USED	COST (OVER CONVENTIONAL INSTRUMENTS)	RESULTS	ADDED ADVANTAGE OF THESE INSTRUMENTS OVER CONVENTIONAL ONES
Lei Zhao et al ⁶	Indian journal of surgery	2016	N= 150	Adjustable and rotatable wrist “novel instrument”	N.A. (Expected higher)	Fewer complication rate DOS=more in SILC group	Yes
H.Cinar ¹⁰ et al	Annal of medicine and surgery	2018	N=144	SILS Port™ (Covidien) , Roticulating dissector, Roticulating endoshear	N.A. (Expected higher)	DOS- More in SILC group Compications-same	No
BV Sharath ⁷	WJOLS	2016	N=100	SILS™ · Roticulating dissector	N.A. (Expected higher)	DOS- More in SILC group Compications-same	No
Rajendra Hojong ⁹ et al	JCDR	2016	N=64	Conventional instruments	Same	DOS- More in SILC group Compications-same	-
M.A. Karim et al ²	Indian journal of surgery	2012	N =183	SILS™ port (Covidian) , Triport™ · Single Site Laparoscopy Access System (Ethicon) and Gelpoint (Applied Medical System	N.A. (Expected higher)	DOS- More in SILC group No difeference in complication rates	No
DOS= Duration of Surgery , N.A= information not available							

Table 4 : Comparative evaluation of different types of instruments used by various authors .

Safety and complications of SILC

Safety of the procedure is commonly determined by the incidence and rate of complications. SILC is considered to be a safe and effective procedure for the treatment of carefully selected patients with uncomplicated benign gallbladder disease. Although there is a reported higher complications rate with SILC as compared to cLC, but not statistically significant. Common post-operative complications include wound site infection (4.0% vs 1.6%) and gallbladder perforation (1.9% vs 1.3%). In our study, single case underwent conversion to open cholecystectomy due to dense adhesions in Calot’s triangle in SILC group as well as in cLC. No biliary

fistula or bile duct injury was seen in our study. As we have experienced not much difficulty in visualizing and in order to facilitate safe dissection of Calot's triangle. Intraoperative blood loss was not significantly high in SILC.

Cost-effectiveness

Although, there is no such comparative data available comparing cost of these specially designed instruments. But few of devices and instruments are expensive. Whereas, some of devices used are made for one time use only, which poses extra cost to patient. This does not seem to be a cost effective measure in SILC procedure, as there is no added advantage of using such instruments.

In our study, we have used instruments which are very commonly used, readily available and very convenient to almost all laparoscopic surgeons those who are doing conventional laparoscopic cholecystectomy. These conventional instruments add no extra cost to patients as well.

User friendly

Many instruments are quite new with some specially designed features such as curved instruments, adjustable and rotatable wrist - "novel instrument", roticulating dissector etc. Few of these instruments have unique method of its use such as wrist movements are divided into two types in terms of relation of the directions of both the wrist at the surgeons's hand side and instrument's tip, i.e. Syntropic and adverse wrist. These type of instruments may not be convenient and user friendly to all laparoscopic surgeons across the world increasing learning curve further.

VI. CONCLUSION

SILC is relatively a newer technique in the field of minimal invasive laparoscopic surgery, which is a safe and feasible option for gall stone surgery with better cosmesis and less post operative pain by using conventional instruments. However, using novel/special instruments have not shown any decrease in duration of surgery (DOS) and complication rates are also same in cLC and SILC by using those common conventional instruments. Whereas, learning curve is still another practical issue especially with newer or newly designed instruments. Cost of procedure also seems to be relatively higher with these special/novel instruments and devices used.

On the other hand, easy availability and good familiarity of conventional instruments among most of laparoscopic surgeons may help in reducing learning curve also in coming future.

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Towards Sustainable Sports Development in Nigerian Universities

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Abstract The paper is a review on efforts needed to reposition University sports in Nigeria. If sports in Nigerian Universities will meet the global best practice, then attempts must be made upgrade sport facilities in Nigerian Universities. Provide coaches with the requisite training and certification. The Nigerian University Games Association being the umbrella organisation for University sports must organize sports in division level. The greatest challenge for sports growth which has to do with sponsorship and branding has to be pursued with utmost vigor and determination. Private and corporate organisation must come to the aid of University Sports by carrying out their corporate social responsibility through building of sports facilities.

Keywords Repositioning sports, Sustainability, University sports

1. Introduction

Sustainability is a concept that has become ubiquitous in sports development policy and practice. It is clear from literature that research on sport and sustainability is limited and lacks theoretical underpinning. In this regard, most literature on sustainability focuses on four major areas; individual, community, institutional and organisational sustainability (Lindsey, 2008; Fyall & Jago, 2010; & Smith, 2010). To better understand the purpose of sports within the context of University education, it is expedient to appreciate the immeasurable role of University education as an institution promoting sport. Sports development is regarded as the gradual increase, and advancement of sports from the cradle strata to a higher level with due cognizance and consideration of the indices that enhance the realization and actualization of sport in every society (Yazid, 2014). Apparently, these indices include among other things, infrastructure, personnel, funding, sport policy, viable sports programmes including competitions. Sport remains a veritable tool that unites the people of every nation; it brings people together no matter their socio-economic status, educational status, religious belief and gender. It has inherent values of enhancing physical, mental, social and psychological well-being of individuals besides the economy value derivable from its participation (Hamafyelto, 2006). In

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this regard, the fourteenth objective of the National Policy of Sports (2009) seeks to address the inclusion of sports in all the strata of our educational curriculum including the universities.

It is a well-known fact that Federal Government of Nigeria regards education as an instrument for effecting national development. This confirms why Nigerian universities are best regarded as citadel of knowledge and or centre of excellence in domain of human learning and holistic development. As such universities provide avenues for youth to acquire knowledge, lifesaving skills and productive life. To this end, university therefore design programmes to include curricula and extra-curricular activities integrated to meet the developmental goals harped in the national policy of education (NPE, 2014).

Universities world over are noted for producing the best and high profile athletes that bring honour to their nations. While other nations make best use of their universities to distinguish themselves in sports, Nigeria universities are yet to imbibe the global trend of engaging the students' body actively. Nigeria flag was hoisted at the 1983 Summer

Universiade, also known as World University Games in Edmonton, Canada when five U. S. based student-athletes won gold medals for the nation. Sunday Uti (400m), Yusuf Ali (long jump), Ajayi Agbgbaku (triple jump), Innocent Egbunike (200m), and Chidi Imo (100m) (Ighadiuno, 2005). If Nigeria universities will ever win at the World University Games (FISU) it must rely on students studying outside the country. This is because they have better training facilities, trainers and proper incentives and motivation. Obviously, universities remain the leading way to Olympic honour. But it appears Nigerian universities do not take pride in making their students stand out tall among their peers by reading and sporting. It is amazing that of the five hundred and fifty (550) Team USA Olympians for Rio 2016, four hundred and thirty (430) were college athletes (Swain, 2016). It remains a fact that the concern of Nigeria universities is about knowledge-based education rather than all-inclusive education which is a major factor militating against the desired growth and development of sports in our universities. This is most unfortunate and lamentable because by this thinking university sport that is in perilous state would continue to have decrease in number of students engaging in sports.

Although sport is one of the many activities of any Nigeria universities, it remains obviously the least in the priority list of any Nigeria University Governing Council or indeed the top management of any university. That makes sport a mere frill or appendage. To change this ugly trend, the future of Nigeria university sports begins now particularly with the fabulous decisions that this summit will take on university education in Nigeria. This paper addresses the means by which university sports can be retooled, repositioned and rehabilitated to return the nation to its past glory.

2. Challenges of University Sports in Nigeria

With the overarching goals of the universities providing quality education, there has been emphasis on structures that promote learning and teaching at the disadvantage of sports infrastructure. The basic cog in the wheel of progress of university sports in Nigeria are therefore the sports infrastructure, finance, personnel, sport programmes, tight university calendar, lack of sponsorship for athletic prowess for example, accommodation for student-athletes, scholarships for academic, sport tours and medical care. It may be observed that most of the university sport facilities were developed at the inception of the university or when a major sport event was hosted, for example, NUGA, FASU, and WAUG etc. If such facilities are visited today, we would find that the facilities condition indexes have worsened due to lack of maintenance or they are nonexistent, obsolete, insufficient, or substandard. Ojeme (2009) observed that sport facilities in Nigerian Universities are rickety perhaps with exception to few listed universities; Ahmadu Bello University, Zaria; University of Portharcut,

University of Nigeria, Nsukka, University of Benin, University of Lagos and lately Bayero University Kano, university of Technology Akure and University of Ilorin. Going by the history of these universities it will be noted that they had at one time or another hosted the NUGA, FASU or WAUG. University of Maiduguri due to poor funding only benefited from the hosting with an Olympic size swimming Pool and an indoor hall.

Funding is a critical challenge bedeviling sports development in Nigerian Universities. The beleaguered sport Directors and coaches are faced with paucity of funds to run sport programmes. Universities do not have any budget other than the games fees/levies paid by students' not more than one thousand naira in some instances and as low as five hundred naira in some cases. There is anecdotal evidence supporting the cut in participation of students in some sports due to lack of funds by universities in competitions. In these cases, the Universities send students in sports not requiring large number of contingents (football, volleyball, and basketball) but sport where fewer student-athletes are required for example, tennis, table tennis, and athletics. There are seventy-nine universities (79) currently on the list of Nigerian University Games Association (NUGA). When all these universities pay their dues it amounts to 7.9 million per annum. This amount falls below the budget of NUGA for any meaningful preparation for the series of activities required on or before selection, camping, travels and competition for example, FISU. In 2013 World University Games, NUGA budgeted N80 million to enable it take Nigeria student-athletes to Kazan, Russia. This was never achieved due to lack of funds (Akalonu, May, 17, 2013). In 2015, NUGA budgeted N200 million to participate in Gwangju, South Korea with five sports. It was able to participate in four sports due to the benevolence of the ACVNU that approved that the airfare of student-athletes from each university should be borne by the universities of each athlete. One of the registered sports, judo could not feature in the games due to the delay in the response of some of our universities and as a result we also arrived late and could not participate in table tennis and badminton due to late entries. The feeling of the student-athletes could better be imagined as they were not there for jamboree.

Perhaps by adding up all other challenges university sports face, what finally cramps sports development in Nigerian university include the tight university calendar where students have chucked lecture time tables and no spare time for sports. The Nation (2015) reported a situation where students began boycotting sports in University of Nigeria Nsukka due to crowded lecture timetable.

3. Promoting Policy Adherence

Adhering to national policies and rules is one key antecedent of successful coordination and functioning within an organisation. The perpetual lackadaisical posture in implementing sport policies in Nigeria has continued to rub the institution of its development. Ojeme (1992) in

Aibueku and Ogbouma (2014) posited that sports development in Nigeria has been hampered for a long time due to lack of comprehensive policy document that will set to maximize the gains of sports on a sustainable basis. As a result, the sector has not been properly midwived leading to abortive consequences and hemorrhage of implementation framework. While acknowledging the hiccups in policy formulation, it may be observed that often no follow-through action that aids in translating successful implementation of these policies. For instance, the National Policy of Sports in Nigeria (2009) chapter 4.6 focused attention on sport in Education. The chapter was emphatic that sports is an integral part of formal system of education, as such it stipulates that all schools shall establish structured sporting programmes which covers every student except those exempted on medical grounds. There are universities in Nigeria that deliberately encroached into their sport grounds to build lecture halls or offices. The policy also stipulates in 4.6.3 that no student shall suffer any penalty or discrimination for participating in sports. Many students had feared lecturers' penalty by boycotting sports on Wednesday lecture-free day provided by the Federal Government for institutions of higher learning (The Nation, 2015). Most importantly, the policy reiterated that all university students shall offer minimum of 4 credit unit courses in sports. The aim was to enhance physical fitness and wellbeing among students as well as fish out sport talented students. This policy has not found place in our Nigerian universities till date.

The student welfare Division of the Nigerian Universities Commission has four critical areas including sports development with some of the following objectives:

- Ensuring the contribution of games to the social, cultural and economic regeneration of our university communities.
- Ensuring the availability and monitoring of sporting facilities in the Universities.
- Enhance suitable collaboration between the commission and the Federal Ministry of Sports and other sporting Federation e.g., NFF, NFL, AFN, NHF.
- Ensure the organization of periodic collegial games to ensure maximum use of sporting facilities.
- Ensuring continuous improvement in student Welfare Programmes being rendered in the Universities and identifying areas that require intervention (NUC Student support services, 2016).

The NUC Executive Secretary was quoted as saying that universities neglected the development of sports as part of extra curricula activities for three decades. This assertion was credited to Prof. Julius A. Okogie when declaring open the National conference on sports development in the Nigerian Universities. It was noted that part of NUC's mandate is to give necessary support to undergraduate students to fully realise their potentials (Hassan, July,31, 2008). Going by this strong position of the NUC one would have expected that sports will be given proper attention by having its accreditation separately. Surprisingly, there has never been a time NUC embarked on sports facilities

accreditation because government hardly give universities funds to develop sport facilities. All programme accreditation never include extra-curricular activities. The NUC's students support objectives are succinctly clear on the area of collaboration with the commission, Federal Ministry of Sports and other sport federations. This is a far cry from the reality of things on ground.

4. Opportunities for University Sports

Sport is viewed as an important means of drawing attention to universities. For example, ABU Zaria has been known in sport circle for its strength in basketball and other sports in Nigeria. So is the university of Portharcut for swimming and judo, Bayero university has taken lead now in taekwondo etc. It is indeed the primary responsibility of the universities to provide opportunities for all-round development of the students by means of curricular and extra-curricular activities. Apart from the personal gains of sports to athletes in terms of physical, mental, social and economic benefits, students are bound to contribute their quarter to national development by representing the nation in international competitions. One of the objectives of NUGA is the development of sports facilities by the host university. The sport facilities and equipment of few of the universities that ever hosted NUGA, FASU, FISU championship, and WAUG have not remained the same since they hosted the games. These universities are today noted as good in terms of sports facilities. They also have been able to host other sporting activities on their facilities. Youth athletics meet just ended in university of Ilorin. The meet was organized by the Grassroots Sports Development Department of the Federal Ministry of Sports. The University of Portharcut has Hi- Performance Centre equal to none in Nigeria. With ever increasing focus on achieving results, the Hi-performance centre focuses on enhancing sports performance. Many athletic preparations for national athletes do take place there. Students who win medals at NUGA competitions often go home with cash awards in some universities while other universities translate it to scholarships.

College athletics provide incredible job opportunities for people seeking career in sports for example, sports facilities and equipment developers, coaches, exercise physiologists and physiotherapists, sports doctors, sport psychologists, sport managers, administrators, sport journalism, sport goods companies, sport engineering, sport scholarships, sport volunteers, health, marketers, and many others (University of Birmingham, 2011).

5. Reflection of FISU Philosophy in Nigeria University Sports

University according to Joseph (2012) is an assemblage of health and intelligent youths, who learn easily the techniques of sports, when motivated well they are ready to give in their best. One thing that gladdened the heart of

parents at every university convocation are the words that their children and wards were found worthy in character and learning. The university is a place where character is molded. Sports greatly contribute to character building as an adjunct of national education strategy for holistic development of the individual. The sport arbiters are ready to sanction erring sport men or women. The acclaimed sportsman spirit dictum

is well sounded by sport handlers frequently. That does not mean that there are no athletes with bad character.

The International Universities Sport Federation (FISU) founded in 1949 has its philosophy thus:

FISU was formed within university institutions in order to promote sports values and encourage sports practice in harmony with and complementary to the university spirit. Promoting sports values means encouraging friendship, fraternity, fair-play, perseverance, integrity, cooperation and application amongst students, who one day will have responsibilities and even key positions in politics, the economy, culture and industry. FISU also brings together the university community in a broader sense, necessarily transcending the conflicts which divide countries and people, to achieve harmony between academic excellence and top-level sport, or competition and leisure sport. The world university sports movement also aims to become a powerful channel of communication for bringing together the various communities, the rich diversity of which is all too often a source of conflict today. This philosophy necessarily implies that FISU not only has an international dimension, but is also independent and free, regardless of the source of financial and technical support from its institutional, academic, and financial or media partners (www.fisu.net/FISU-today).

The National Collegiate Athletic Association is a non-profit association which regulates athletes of 1,281 institutions in America and Canada. Student-athletes' success on the field, in the classroom and for life is at the heart of its mission. Therefore the organisation distributes more than 2.7 billion dollars in scholarships each year along with access to medical care, academic support services and first class training opportunities (www.ncaa.org).

In Nigeria we have one hundred and forty-four (144) universities, federal, state and private universities. The universities in terms of sports organisation are on different streams. NUGA on one side and Nigeria Private University Games (NPUGA) on another side. There are indeed internal and external driving forces orchestrating the divorce of these organisations being under one umbrella. Definitely the disadvantages outweigh the advances in every sense of sustainable university sports development. For sustainable sports development in our universities, these umbrella bodies must be on one stream.

6. Global Trend in the Strengthening University Sports

The umbrella bodies for sports organisations in Nigeria, NUGA, NIPOGA, and NACEGA are still at apron strings of their mother institutions. The role of these bodies in unifying students from all geo-political was highlighted by Akinola (2013). Our universities just like the NCAA should go beyond having sports for leisure, fun and recreation. NUGA is considering reorganizing university sports to fall in line with the practice of NCAA where universities are rated as Divisions 1, 2, 3 teams. If this is achieved student-athletes would have opportunity for higher training

facilities, coaches, medical care and scholarships to support their academic pursuit, sport tours and competitions. Sperber (2000) argued that college athletics is financial burden to any college. However, if college athletics is abolished, many unhappy people will be out of money too. Although college athletics is capital intensive, Barr (2016) made expository explanation of how colleges are classified; college athletic programmes are classified according to school's size, budget, sports facilities, comprehensiveness and extent at which it awards scholarships based on athletic ability. When universities are classified as Divisions 1, 2, and 3 their interest in winning will propel them to recruit, train and retrain their coaches and other personnel. This way, universities can hire coaches and cut cost for employing permanent coaches that are not productive. Coaches with the longest winning streaks wanting to build teams in universities for national honour would be attracted.

Involvement of university alumni and fraternities is necessary for identifying students with potential for sports. Student-athletes who demonstrate sport excellence can gain sports scholarships. Although this practice formed the beginning of scholarships award to athletes in the United States, Sperber (2000) contained that due to the increasing growth in student incentives for winning in sport, sport scholarships was introduced in the early 19th century. The introduction of scholarships was viewed with skepticism by many people then but was later endorsed with the establishment of NCAA IN 1953.

With lean financial support by government to sports, if sport scholarships gain policy direction and legislation, university sports will have a big boost in Nigeria.

The private sector participation in sports has been globally acknowledged. Apart from sponsoring competitions for schools, colleges and universities, private sector funded facilities can generate revenue for the company and the university through ticket sells. In addition, there is accountability for customers, competition and contestability, clear performance measures specified and management flexibility (Kahle, 2014).

This therefore calls for independence of these organizing bodies to make them viable and more purpose driven like the NCAA. The three bodies have many things in common as such they should have bigger umbrella body that would manage Collegiate sports. Now that most of the colleges and all the Polytechnics have become degree awarding institutions.

7. Conclusions

The Nigeria University sport is a veritable tool for national development that requires retooling for sustainable growth and development. The objective of sport is to educate the entire individual. When good character is molded, the individual becomes resourceful to the entire society. The Kanu heart foundation is one of the numerous contributions sportsmen and women have ploughed back to a nation. This can hardly be achieved with lame policy implementation that characterized the university system

when it concerns issues of sport. For greater strides to be achieved, the Nigeria University Games Association and other sporting bodies of higher institutions should have independence like the National Collegiate Athletic Association.

8. Recommendations

The following are recommendations for this paper.

1. Universities must invest in sports by building top class sport facilities on their campuses
2. There should be more avenues for driving funds to sponsor sporting activities such as encouraging private sector to invest in university sports
3. The quest for high sport performance can only be achieved with increase in quality of coaching and coaches
4. There is need to merge all the collegiate sports umbrella bodies into one and grant them independence

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The Influences Of Transformational Leadership And Compensation To Employee Performance On Their Motivation And The Implementation At X Institution

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Abstract- The purposes of this study is to examine and analyze the influences of transformational leadership and compensation to employee performance on their motivation and the implementation at X institution. The primary research data is surveys, and secondary data are performance values and interview results. Saturated sampling as a sampling method in this study, the subjects were taken from all employees at X Institution consists of 93 people. The analytical method in this study is using the SmartPLS software there is variant based structural analysis (SEM) that can simultaneously test to measurement model and target the structural model.

Index Terms- Transformational Leadership, Compensation, Motivation, Employee Performance, X Department at X Institution.

I. INTRODUCTION

According to Rivai (2009) employee performance assessment refers to a formal and structured system that is used to measure, assess and influence traits related to work, behavior and results. Thus, performance appraisal is used by companies to find out and analyze the activities produced by employees in accordance with the company's objectives that have been previously set.

One of the factors that influence employee performance is motivation. According to Sutrisno (2011), motivation is a driving factor or driving force for employees in a company, because with motivation, employees will have high enthusiasm in carrying out their duties and responsibilities, so that it can be increasing the work productivity of these employees and will affect the achievement of company goals.

In the relation of work motivation, the role of the leader will be able to related caused of the leader will be able to give a stimulus for employees to give motivation to work. The leaders directed their employees by providing motivation will create employees conditions to feel inspired to hard work conditions. Employees who have high motivation are one of the requirements if high work results are to be achieved consistently. (Robbins, 2006).

In the related of that, one of leadership style that emphasizes the importance of a leader to create a vision and environment that give employee motivation to achieve beyond their expectations is transformational leadership (Burns in Dewi, 2012).

Besides the transformational leadership, one of the other factors that can affect work motivation is giving compensation to employees. According to Mondy (2008) compensation is the total of all the rewards accepted by employees as substitutes for services that have been given to companies whose general purpose is to attract, keep and motivate employees.

Agreeing with Mondy, according to Dessler (2009) compensation is all forms of payment or gifts that given to employees and has 2 (two) components, there are: direct payments (wages, salaries, incentives, commissions and bonuses) and indirect payments (insurance and holidays paid by the company).

One of the organizations / state institutions that are required to have optimal performance is X Agency. However, it is known that the performance value of X Institution has decreased between 2016 and 2017. In 2016, the performance value of X Department is 106.59%, while the value of performance in 2017 is 104.6%. This indicates a decrease in performance value of 1.99%.

Furthermore, based on the results of interviews with officials, at X Institution known has staffing problems faced, such as: the lack of guidance provided by the leadership to some employees and significant differences of individual performance incentives. Besides that, the employee absentee level in the last 3 months in 2017, there was a decrease of 28%. This indicates there is a decrease in work motivation of X Agency employees.

Based on the information that has been submitted above, the researcher needs to conduct research with the theme "the influences of transformational leadership and compensation to employee performance on their motivation and the implementation at X institution"

Furthermore, the purpose of this study are: (1) To find out and explain the effect of transformational leadership for motivation; (2) To find out and explain the effect of compensation for motivation; (3) To find out and explain the effect of transformational leadership and compensation for

motivation; (4) To find out and explain the effect of transformational leadership for performance; (5) To find out and explain the effect of compensation for performance; (6) To find out and explain the effect of motivation for performance; and (7) To find out and explain the effect of transformational leadership, compensation and motivation for performance.

II. LITERATURE REVIEW

Transformational Leadership

Newstrom and Bass in Sadeghi and Pihie (2012) suggest that transformational leaders have certain components of behavior, including integrity and justice, setting clear the goals, having high expectations, providing support and recognition, arousing subordinates emotion, and making subordinates to see a thing that goes beyond its own interests to achieve something that is impossible.

In connection with that, according to Bass & Riggio (2006: 6-7) there are 4 (four) dimensions in transformational leadership, there are inspirational motivation, emphasizing how to motivate and inspire subordinates to job challenges, ideal influence, emphasizing the type of leader showing trust, confidence and admired by subordinates, intellectual stimulation, emphasizing the type of leader who seeks to encourage subordinates to think of innovation, creativity, new methods, and individualized consideration, emphasizing the type of leader who gives attention to the development and needs of subordinates achievement.

Compensation

Hariandja (2005: 54) argues that compensation is the overall remuneration received from carrying out work in the organization in the form of money or other, such as salaries, wages, bonuses, incentives and other benefits, such as health allowances, holiday allowances, meals allowances, leave money, etc.

According to Dessler (2015: 417), there are 2 (two) dimensions in compensation, there are direct financial compensation and indirect financial compensation. Forms of compensation such as salaries, wages and incentives are included in direct financial compensation, considering that paid by the company as a consequence of this position as an employee who contributes energy and mind in achieving company goals.

Motivation

Kadarisman (2012: 278) argues that motivation is a driving force in a person to want behave and work diligently and well based on their duties and obligations that have been given to their.

The dimension of motivation according to Herzberg (in Robbins, 2007) consist of 2 factors, there are motivational factors and hygiene factors (maintenance). Motivational factors are drives for achievement in intrinsic characters, it's means sourced from within person, while hygiene factors is factors that are extrinsic it's means that they originate from outside of someone.

Employee Performance

Wirawan (2009: 5) argues that performance is output that is produced by functions or indicators of a job or a profession in a certain time. Based on the definition that has been informed, it can be concluded that performance is the work of

employees both quality and quantity achieved by employees in a certain period in accordance with the given responsibilities.

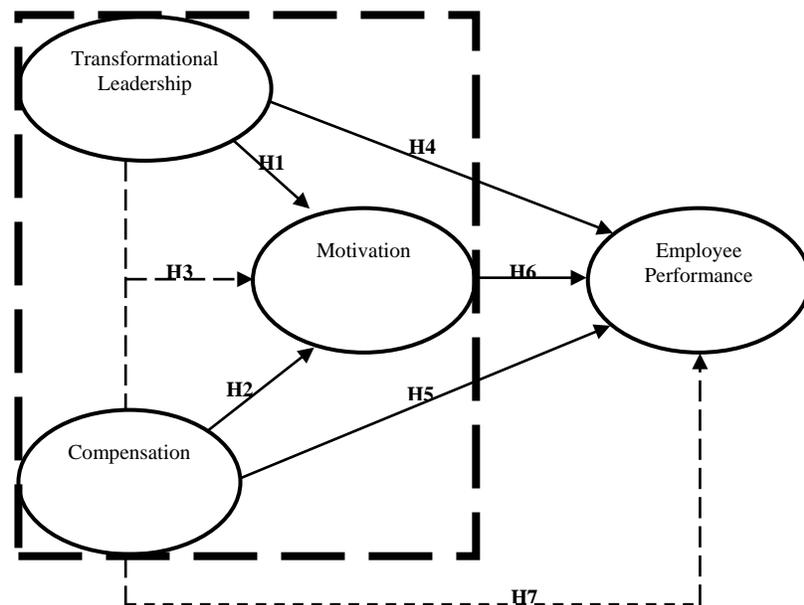
Miner (2005) suggest that to measure the performance can use some dimensions, such as quality, quantity and time. Quality dimensions such as the level of error and accuracy, while the quantity, such as product and costs. For time. The dimensions measured are the level of attendance, the level of delay and working time effective.

Framework

Based on previous research found that transformational leadership has a positive and significant effect for motivation (Tucunan, Supartha and Riana (2014)), compensation has a positive and significant effect for motivation (Ulfa, Rahardjo and Ruhana (2015)), transformational leadership and compensation positive and significant effect for motivation.

Furthermore, transformational leadership has a positive and significant effect for performance (Dola, 2015), compensation has a positive and significant effect for performance (Larbi, 2014), motivation has a positive and significant effect for performance (Omollo and Oloko (2015)), and transformational leadership, compensation and motivation have a positive and significant effect for performance.

Based on the explanation of the relationship between the variables described above, it can be used a frame of mind in the form of a chart that will be presented in the figure as follow



Picture 1. Research Framework

Hypothesis

H1: Transformational leadership influences motivation

H2: Compensation influences motivation

H3: Transformational leadership and compensation influences motivation

H4: Transformational leadership influences employee performance

H5: Compensation influences employee performance

H6: Motivation influences employee performance

H7: Transformational leadership, compensation and motivation influence employee performance

III. RESEARCH METHODS

This study uses quantitative research methods and used questionnaires data through a Likert Scale approach (Sugiyono, 2012: 13; Arikunto, 2013: 27).

Furthermore, the operational definition of each variable in this study based on the indicators. In this study uses two variables there are independent variables and dependent variables. According to Sugiyono (2013: 64), independent variables are variables that influence or become caused the change or the emergence of the dependent variables (bound), while the dependent variable is a variable that is influenced or which becomes a result, caused of the existence of independent variable.

In this regards, the independent / independent variables identified in this study are transformational leadership and compensation, while the dependent variable is work motivation and employee performance.

Population and Samples

The population in this study was determined and limited at X Institute employees about 93 people who are permanent employees. For the sample in this study using saturated sampling techniques, so the number of samples in this study were 93 people.

Data Analysis Method

This study uses data analysis techniques using SmartPLS software version 3.2.7, while the correlation matrix between dimensions uses SPSS software version 24.

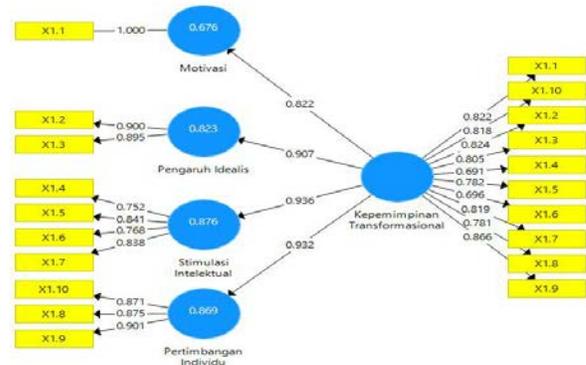
IV. FINDING AND DISCUSSION

Research Results and Discussion

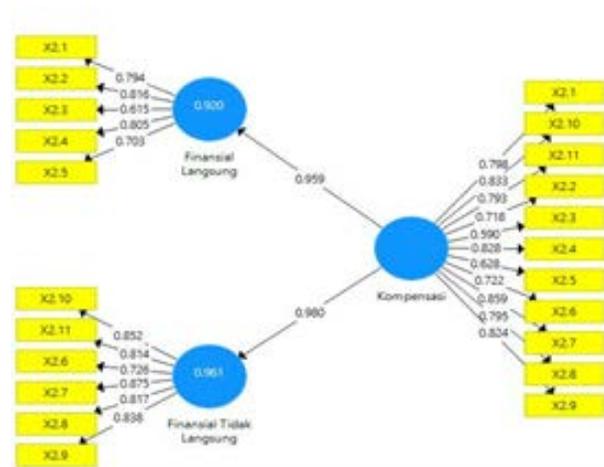
The test study used in the study are the test indicator (outer model) and hypothesis testing (inner model).

Test Indicator (Outer Model)

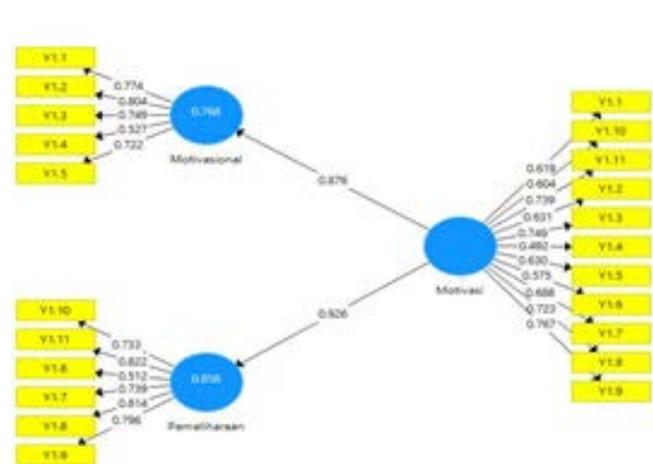
Test indicators are to determine the validity and reliability of indicators that measure latent variables. Test indicators in this study is test convergent validity, there is a set of indicators representing a latent variable and the underlying latent variable. Convergent validity test can be seen from the outer loading of each variable indicator. An indicator can be a good reliability if the outer loading value is above 0.70 (Sarwono, 2014). However, the value of outer loading can be tolerated up to 0.50, while the lower value of 0.50 can be excluded from the analysis (Ghozali, 2014).



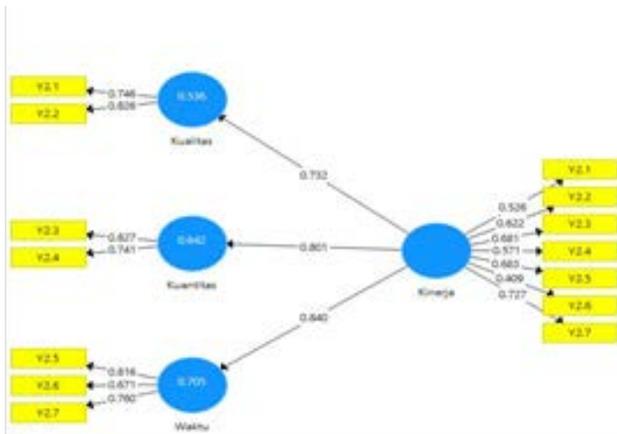
Picture 2. Outer Model Transformational Leader



Picture 3. Outer Model Compensation



Picture 4. Motivation Outer Model



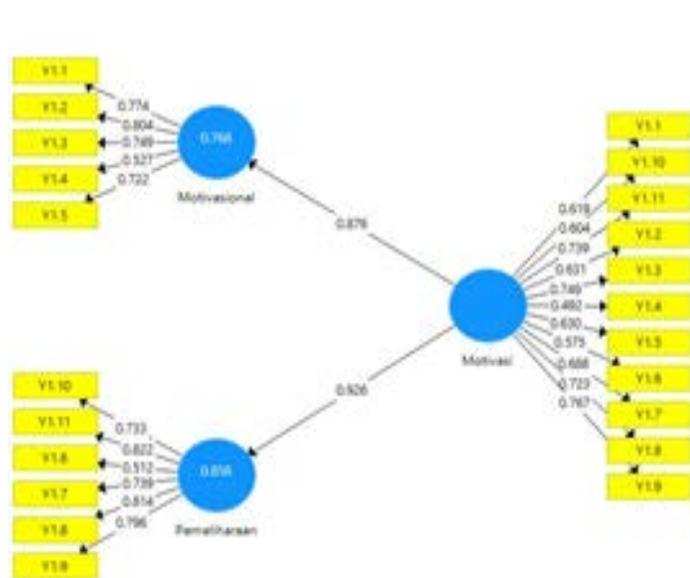
Picture 5. Employee Performance Outer Model

Based on the results of data processing with version 3.0 of SmartPLS above, it indicates that the indicators of all variables have a value of loading factor > 0.50. This shows that all indicators are valid.

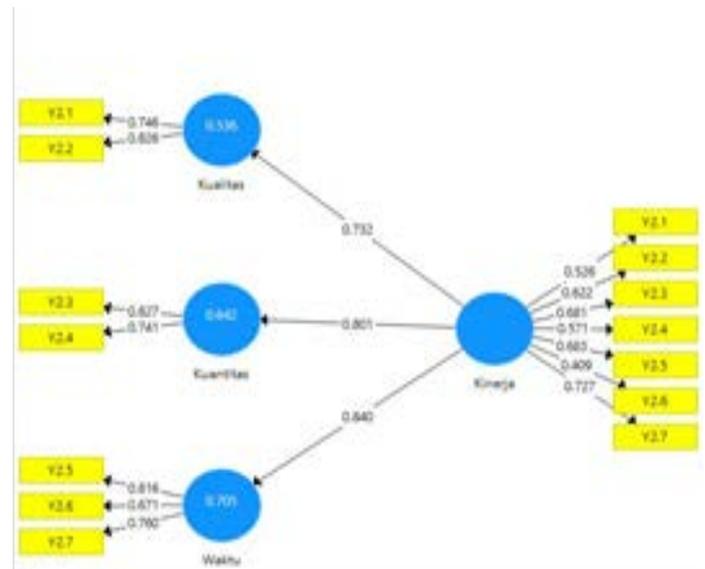
Hypothesis Test (Inner Model)

After the outer model is done, the next stage is the evaluation of the structural model (inner model) or hypothesis testing. The inner model is a structural model that describes the relationship between latent variables based on substantive theory. The design of the structural model of relations between latent variables is based on the research hypothesis.

To test the hypothesis doing through evaluate the path coefficient. Based on the results of calculations using calculate SmartPLS version 3.0. bootstrapping, the path coefficient is obtained which describes the strength of the relationship between constructs / variables as referred in 6 and 7 picture below:



Picture 4. Motivation Outer Model



Picture 5. Employee Performance Outer Model

Based on Figure 6. the structural equations in this study are as follows:

$$\text{MOTIVATION (Y1)} = 0,287 \Lambda_1 + 0,483 \Lambda_2$$

$$\text{PERFORMANCE (Y2)} = 0,417 \Lambda_3 + 0,141 \Lambda_3 + 0,008 B$$

The magnitude of the parameter coefficient for the Transformational Leadership variable (X1) on the Motivation variable (Y1) is 0.287 it's means there is a positive influence between transformational leadership and motivation variables. The t-value of statistics is 2.851 from t-table of 1.66, it's means significant.

The magnitude of the parameter coefficient of Transformational Leadership (X1) on the Performance variable (Y2) is 0.417 and the statistical t value of 4.529 is greater than t-table of 1.66. In this regard, there is a positive and significant influence between transformational leadership variables for performance variables.

The magnitude of the Compensation parameter coefficient (X2) for the Motivation variable (Y1) is 0.483 and the statistical t value of 4.892 is greater than the t-table of 1.66. So that there is a positive and significant influence between the compensation variables for the motivation variable.

The amount of the Compensation parameter coefficient (X2) for the Performance variable (Y2) is 0.141 and the statistical t value of 1.054 is lower than the t-table of 1.66. For this reason, there is no significant influence between compensation variables for performance variables.

The magnitude of the Motivation parameter coefficient (Y1) for the Performance variable (Y2) is 0.008 and the statistical t value is 0.064 lower than the t-table of 1.66. Therefore, there is no significant influence between motivation variables and performance variables.

The magnitude of the parameter coefficient for the Transformational Leadership variable (X1) through the Motivation variable (Y1) for Performance (Y2) of 0.002 <direct

effect is 0.417, so that Y1 does not mediate influences for X1 on Y2.

The magnitude of the parameter coefficient for the Compensation variable (X2) through the Motivation variable (Y1) for Performance (Y2) is 0.004 <direct effect of 0.141, so Y1 does not mediate influences for X2 to Y2.

Interdimensional Correlation Matrix

Interdimensional correlation analysis purposes to measure the level of relationship between dimensions in variable X with variables Y dimensions, and between dimensions variables Y. In this study, transformational leadership variables consist of 4 dimensions, compensation variables consist of 2 dimensions, motivation variables consist of 2 dimensions, and variable employee performance consists of 3 dimensions.

Table 2. Results of the Correlation Matrix Between Independent Variable Dimensions and Dependent Variables

Variable	Dimension	Y1		Y2		
		Y1.1	Y1.2	Y2.1	Y2.2	Y2.3
X1	X1.1	0,383	0,423	0,387	0,298	0,287
	X1.2	0,522	0,392	0,450	0,277	0,219
	X1.3	0,463	0,309	0,467	0,293	0,198
	X1.4	0,466	0,292	0,495	0,318	0,245
X2	X2.1	0,399	0,585	0,222	0,215	0,244
	X2.2	0,470	0,651	0,295	0,273	0,248

Source: SPSS based on primary data reprocessed by researchers (2018).

Table 3. Results of the Correlation Matrix Between Dimensions of Dependent Variables and Dependent Variables

Variable	Dimention	Y2		
		Y2.1	Y2.2	Y2.3
Motivation	Y1.1	0,352	0,168	0,159
	Y1.2	0,307	0,136	0,053

Source: SPSS based on primary data reprocessed by researchers (2018).

On the transformational leadership variable to the motivation variable, the highest dimension correlation is the idealistic influence on the motivation about 0.522 while the lowest dimension correlation in this variable is the individual's consideration of the maintenance dimension, there is equal to 0.292.

On transformational leadership variables on employee performance variables, the highest dimension correlation is individual consideration of the quality dimension about 0.495, while the lowest dimension correlation is intellectual stimulation of the time dimension, which is equal to 0.198.

In the compensation variable for the motivation variable, the highest dimension correlation is indirect financial towards the maintenance dimension about 0.651, while the lowest dimension correlation is direct financial to the motivational dimension, which is equal to 0.399.

In the compensation variable for employee performance variables, the highest dimension correlation is indirect financial towards the quality dimension about 0.295, while the lowest

dimension correlation is direct financial to the quantity dimension, which is equal to 0.215.

In the motivation variable on employee performance variables, the highest dimension correlation is motivational to the quality dimension about 0.352, while the lowest dimension correlation is maintenance of the time dimension, which is 0.053.

Discussion

The influences of transformational leadership for motivation (Hypothesis 1). Based on the results of the study, transformational leadership has a positive effect on work motivation. The results of this study support previous research conducted by Ariyani (2009) with the title "The Influence of Transformational Leadership on Motivation of Lecturer Work at Universities in the City of Madiun". The conclusion of the study proves that transformational leadership has a significant positive effect on lecturers' work motivation, because transformational leadership is a determining factor that influences employee attitudes, perceptions and behaviors with increased trust in leaders, motivation, job satisfaction and being able to reduce a number of conflicts that often occur within an organization.

The influences of compensation for motivation (Hypothesis 2). Based on the results of the study, compensation has a positive influences for work motivation. This is consistent with the results of previous studies conducted by Ulfa, Rahardjo and Ruhana (2015) with the title "The Influences of Compensation for Work Motivation and Employee Auto 2000 Performance: Case Study of Malang Sutoyo Employees)". The conclusion of the study shows that compensation has a positive influence on work motivation, it is proven that the compensation provided by it can motivate employees to work harder and improve the quality of their work.

The influences of transformational leadership and compensation for motivation (Hypothesis 3). Based on the results of the study, it is known that transformational leadership and compensation simultaneously have a positive influences for motivation. The results of this study support previous research conducted by Priyanto (2016) with the title "Effect of Transformational Leadership Style and Compensation for Employee Performance with Motivation as Intervening Variables". The conclusions from the study indicate that transformational leadership and compensation have a positive influences for motivation, because transformational leadership and compensation applied can motivate employees.

The influence of transformational leadership on employee performance (Hypothesis 4). Based on the results of the study, shows that transformational leadership has a positive influences for employee performance. The results of this study support previous research conducted by Tucunan, Supartha and Riana (2014) with the title "The Effect of Transformational Leadership on Motivation and Employee Performance (Case Study at PT. Pandawa)". The results of this study indicate that transformational leadership has a positive influences for employee work, this is evidenced that the stronger transformational leadership will be able to be better the employee's performance.

The influences of compensation for employee performance (Hypothesis 5). Based on the results of the study, shows that compensation does not have a significant influences

for employee performance. The results of this study support previous research conducted by Arhama (2012) with the title "Effects of Compensation, Motivation and Work Discipline for Employee Performance In Baitul Maal Watamwil Tulungagung ". The results of this study indicate that compensation does not have a significant effect for employee performance, the compensation given is seen from the family among employees, so that all of the compensation given based on the results of employee working.

The influences of motivation for employee performance (Hypothesis 6). The results of the research is motivation does not have a significant influences for employee performance. The results of this study reject previous research conducted by Aima, Adam and Ali (2017) with the title "Model of Employee Performance: Competence Analysis and Motivation (Case Study at PT Bank Bukopin, Tbk Center). The results of the study indicate that motivation has a positive and significant influences for the employee performance at PT. Bank Bukopin. However, the results of this study support previous research conducted by Dwihartono (2012) with the title "Analysis of the Effect of Compensation, Motivation and Job Satisfaction for Civil Servants' Performance in the Semarang City Culture and Tourism Service". The results of this study indicate that motivation has no influence for employee performance significantly, because motivation may not influences performance and the motivation given is very far from the expectations for fulfilling the individual needs, so caused decrease employee enthusiasm.

The influences of transformational leadership, compensation and motivation for employee performance (Hypothesis 7). Based on the results of the study, it is known that transformational leadership, compensation and motivation simultaneously have positive and significant influences for employee performance. The results of this study support previous research conducted by Priyanto (2016) with the title "The Influence of Transformational Leadership Style and Compensation on Employee Performance with Motivation as Intervening Variables". The conclusions from the study indicate that transformational leadership and compensation influence and significantly affect employee performance through motivation. Furthermore, the results of the study indicate that the leader has the ability to motivate and supervise their subordinates to achieve better work standards as an effort to anticipate work failures.

V. CONCLUSION AND SUGGESTION

Conclusion

Based on the results of research and discussion, it can be concluded that transformational leadership has a positive and significant effect for motivation. Compensation has positive and significant influences for motivation. Transformational leadership and compensation simultaneously have positive and significant influences for motivation. Transformational leadership has positive and significant influences for employee performance Compensation does not have significant influences for employee performance variables. Motivation does not have significant influences for employee performance variables. Transformational leadership, compensation and motivation simultaneously have positive and significant influences for employee performance

Analyze and understand all the provided review comments thoroughly. Now make the required amendments in your paper. If you are not confident about any review comment, then don't forget to get clarity about that comment. And in some cases there could be chances where your paper receives number of critical remarks. In that cases don't get disheartened and try to improvise the maximum.

Suggestion

Transformational leadership is the most powerful variable to influence employee performance variables. Leaders in the X Institutions need to spend more time to pay attention for subordinates need, help solve work problems, listen to complaints, and teach in a good way.

Compensation influences on motivation. For this reason, management of X Institutions needs to pay attention to employee rights in terms of indirect financial compensation, such as health allowances, holiday allowances and other allowances. If indirect financial compensation is considered, it is hoped that this will lead to high motivation for the employees.

In work motivation, the highest dimension correlations is motivational to the quality dimension. For this reason, the leaders need to improve the fulfillment the employees needs, both from the needs of affiliation and appreciation. If these needs are met, they tend to be motivated to do good work. Therefore, by fulfilling the needs of employees, it is expected that employees will have higher motivation, so that their performance will be expected to increase.

Besides that, the expectations of the authors the further research can examine deeper related transformational leadership variables and compensation influences employee motivation and performance.

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The Effect Of Compensation And Employee Engagement On Organizational Commitments And Its Implementation Toward Employee's Performance Of Pt Xyz Jakarta

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Abstract- The purpose of this study is to understand and describe the impact of compensation and employee engagement to organizational commitment and the implementation for employee performance at PT XYZ Jakarta's offices. There were 84 respondents. Data collection is done by using a questionnaire. Path analysis (using smartPLS3.0) and matrix correlation among variable dimension were applied (using SPSS24).

This study found that: (1) compensation and employee engagement have a significant impact on organizational commitment; (2) compensation and employee engagement have a significant impact on employee performance; (3) organizational commitment does not have a significant impact on employee performance; (4) It is not proven that organizational commitment is as mediator variable from the impact of compensation and employee engagement for employee performance. Based on matrix correlation among variable dimension were applied, to improve employee performance, it is recommended to maintain and improve the following variable dimensions, such as; (1) financial compensation for the work quality; (2) Dedication to employee attendance. In addition, to improve employee performance: (1) management is advised to keep compensation attention, (2) management is advised to maintain employee loyalty. This is needed to ensure a comfortable working environment at work place.

Index Terms- Compensation, Employee Engagement, Employee Performance, Organizational Commitment.

I. INTRODUCTION

In this globalization era, Science and Technology is rapidly growing. The rapid development is creating the global structure which is a structure that will lead to all the nations of the world, including Indonesia, will inevitably be involved in an equal global order. To face the global competition, the quality of human resources must be the one to concern. Especially for every company they are required to have a good quality of human resources.

In other words, human resources are the most important asset that should be owned by the organization and should be considered in the management associated with vision / mission / company strategy. Responding to the importance of human resources in a company, it is proper that for the employee performance to gain more attention in order to carry out their duties and responsibilities properly and correctly. So the company can continue to grow and to achieve the organizational goals. Afterwards, in order to achieve the organizational goal, it needs a strong commitment to the organization as well. Commitment is not always about the employee's willingness to be loyal to the company, but rather, a commitment is an attitude that is reflecting the loyalty of employees to the organization and its sustainable process in which employees express their concern for the organization in success and prosperity for the organization. One of the effort to increase the commitment is to put more concern on employee welfare. Empirical evidence shows that many companies that compensate well, so that employees become loyal and prefer to remain in their place. Therefore, good compensation and the company's ability to develop a sense of engagement can increase employee commitment to the organization and is expected to improve employee's performance as well.

PT XYZ Jakarta is a company engaged in retailing fuel oil (BBM) and non-fuel oil (Non-BBM). Based on KPI data for 2015-2017 the percentage of employee performance that has not achieved the goal has increased. In 2015 it was 16%, 2016 was 23%, and 2017 was 34%.

Then, based on the pre survey result which conducted on 25 respondents, it was proven that the decline in performance was caused by a low commitment factor. Where as many as 40% of respondents choose organizational commitment as the factor that most influences their performance. In addition, there are two main factors that lead to low employee commitment, specifically 30% of respondents choose compensation and 23.3% choose employee engagement. Based on empirical data and facts, the title of this study is **the effect of compensation and employee engagement on organizational commitment and its implementation toward employee's performance of PT XYZ Jakarta.**

The purpose of this study is to understand and explain: (1) The effect of compensation on organizational commitment; (2) The effect of compensation on employee performance; (3) The effect of employee engagement on organizational commitment; (4) The effect of employee engagement on employee performance; (5) The effect of organizational commitment on employee performance; (6) The effect of compensation and employee engagement together on organizational commitment; (7) The effect of compensation, employee engagement and organizational commitment together on employee performance. In addition, also tested the validity (8) Variables of organizational commitment as mediator variables of compensation variables and (9) Variables of organizational commitment as mediator variables of employee engagement variables.

II. LITERATURE REVIEW

Theoretical Review

Theoretical study is a summary or resume and theory found from reading sources (literature) that have a connection within the topic in this research.

Compensation

Compensation is all income in the form of money, goods directly or indirectly received by employees in return for services provided to companies (Hasibuan, 2014: 118). This is in line with the opinion of Mondy (2008: 4) which defines compensation as the total of all benefits received by employees in lieu of the services they have provided. According to Mondy (2008: 5) compensation is divided into two types, namely: (1) financial compensation based on (a) Direct compensation and (b) indirect compensation. (2) Non-Financial Compensation.

Employee Engagement

Robbins & Judge (2017: 48) argues that employee engagement is an individual's involvement, satisfaction, and enthusiasm for the work they do. Then, Dessler (2016: 377) defines involvement, which refers to psychological involvement that is connected to commitment to complete the work. Employees involved experience a high level of connectivity with their work assignments, therefore will work hard to complete the duties. Then, According to Schaufeli and Bakker 2004 (in Akbar 2013: 13), there are three characteristics in employee engagement, namely: (1) Vigor; (2) Dedication; (3) Absorption.

Organizational Commitment

Baldwin et.al. (2013: 243) Defines organizational commitment as an attitude that reflects the extent to which an employee identifies with the organization and has the desire to remain a member of the organization where he works. Whereas Robbins and Judge (2017: 47) define organizational commitment as the level at which a worker identifies an organization, its goals and expectations is to remain a member. Meyer and Allen (in Luthans, 2011: 148) state that there are three dimensions of organizational commitment, namely: (1) Affective Commitment; (2) Continuance Commitment; (3) Normative Commitment.

Employee Performance

Employee performance is a work performance or work result of both quality and quantity achieved in carrying out its work duties in accordance with the responsibilities given. (Mangkunegara, 2013: 67). Whereas according to Abdullah (2014: 3) performance is work performance which is the result of the implementation of work plans made by an institution held by leaders and employees (HR) who work in the institution both government and companies (businesses) to achieve the organizational goals. According to Dessler (2015: 329) performance can be measured through the following dimensions and indicators: (1) Quality of Work; (2) Productivity; (3) Job knowledge; (4) Reliable; (5) Attendance; (6) Independence.

Framework

Some studies reveal that compensation has a significant positive influence on the form of organizational commitment (Nawab & Bhatti, 2011). Shoko & Zinyemba, (2014) stated that there was a significant positive relationship between employee engagement and organizational commitment. Therefore, it can be found that compensation and employee engagement have a positive and significant influence on organizational commitment. Then previous research also revealed that there was a positive and significant influence between compensation for employee performance (Odunlami & Matthew, 2014). Dajani (2015) revealed that employee engagement has a significant influence on employee performance. Then, Khan et al. (2010) also revealed the existence of a positive and significant relationship between organizational commitment and employee performance. Therefore, it can be found that compensation, employee engagement and organizational commitment have a positive and significant influence on employee performance. Based on previous research, the theoretical framework of this research will be presented in Figure 1.

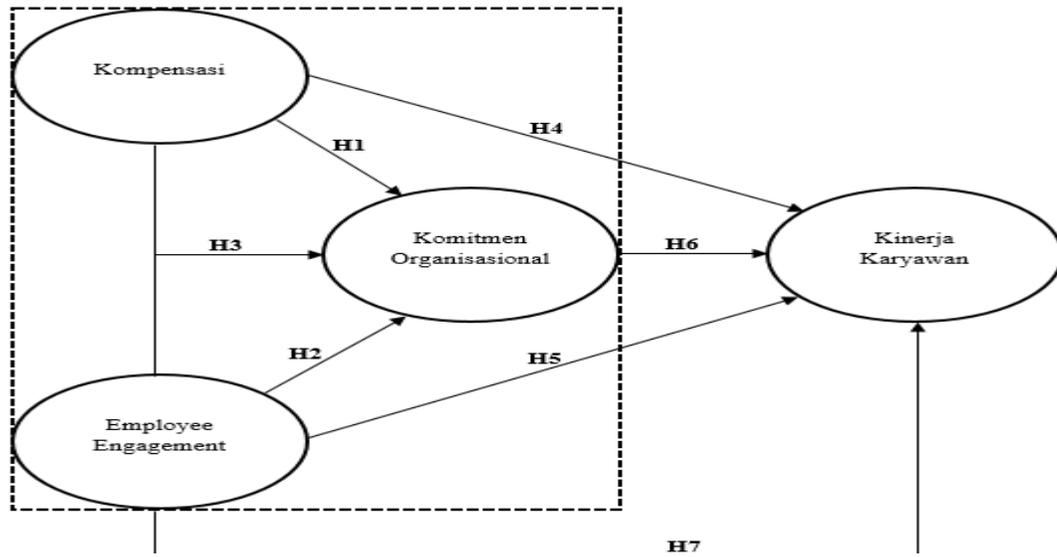


Figure 1. Research Framework

Hypothesis

- H1: Compensation has an effect on organizational commitment.
- H2: Employee Engagement affects organizational commitment.
- H3: Compensation and Employee Engagement affect organizational commitment.
- H4: Compensation affects employee performance.
- H5: Employee Engagement affects employee performance.
- H6: Organizational Commitment influences Employee Performance.
- H7: Compensation, Employee Engagement, Organizational Commitment affect Employees performance.

III. RESEARCH METHODS

The type of research used is quantitative research by using primary data in the form of surveys. To get the complete, relevant and complementary data, in addition to the primary data in the form of surveys, researcher used secondary data in the form of employee Key Performance Indicators (KPI) in 2015 - 2017 issued by the Human Resources Department of PT XYZ Jakarta. This study was designed with the aim to be able to understand, explain and analyze the correlation between independent variables on the dependent variable.

According to Sugiyono (2013: 64), independent variable is referred as stimulus variable, predictor, antecedent. In Indonesian it is often called as variabel bebas. The independent variable is a variable that influences, causes the change, and the emergence of the dependent variable. The independent variable in this study is a compensation and employee engagement. Then, According to Sugiyono (2013: 64), Bound / Dependent Variable is often referred to as output variables, criteria, consequently. In Indonesian it is often referred to as the dependent variable. Dependent variable is a variable that is influenced or which becomes a result, because of the existence of independent variables. The dependent variable in this study is organizational commitment and employee performance.

Population and Samples

The population in this study were employees of the head office of PT. XYZ Jakarta at JL. K.H Wahid Hasyim No 100-102, Menteng, Central Jakarta, Indonesia. A sample of 84 respondents from 106 permanent employees at PT. XYZ Jakarta.

Data analysis method

This study uses data analysis techniques using SmartPLS software version 3.2.7, while the correlation matrix between dimensions uses SPSS version 24 software.

IV. FINDINGS AND DISCUSSION

Research Results and Discussion

The test which used in the study is the indicator test (outer model) and hypothesis test (inner model).

Outer Model Test

Outer models are often also called (outer relations or measurement models) that define the characteristics of latent variable with indicator or manifest variable (Wiyono, 2011: 398). To find out whether the indicator used is valid or not, it can be seen through the value of the loading factor. Hair, et. al. (2010) revealed that the KMO range and factor loading that meet the requirements are those that have values above 0.50. However, the factor loading value can be tolerated up to 0.50, while the lower value of 0.50 can be excluded from the analysis (Ghozali, 2014). For the factor loading value in this study can be seen in Figures 2, 3, 4 and 5.

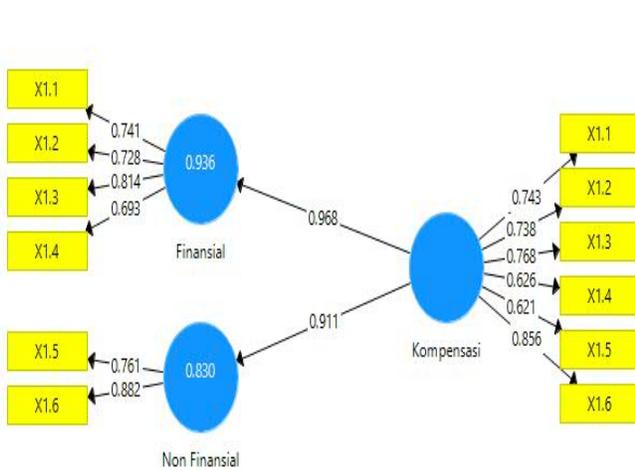


Figure 2. Outer Model Compensation

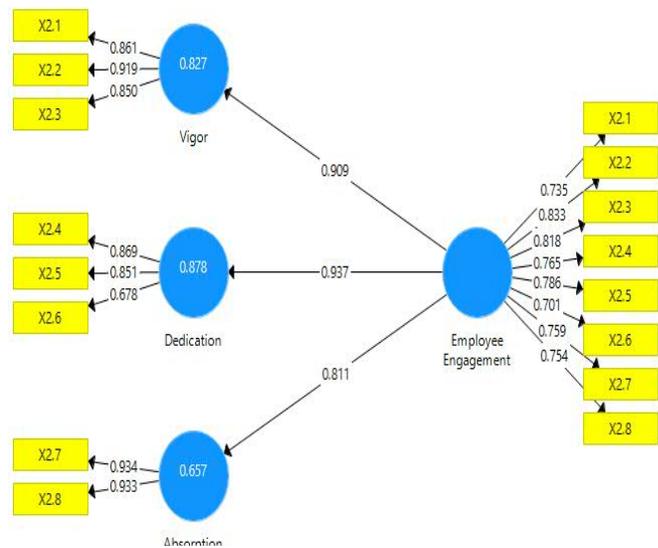


Figure 3. Outer Model Employee Engagement

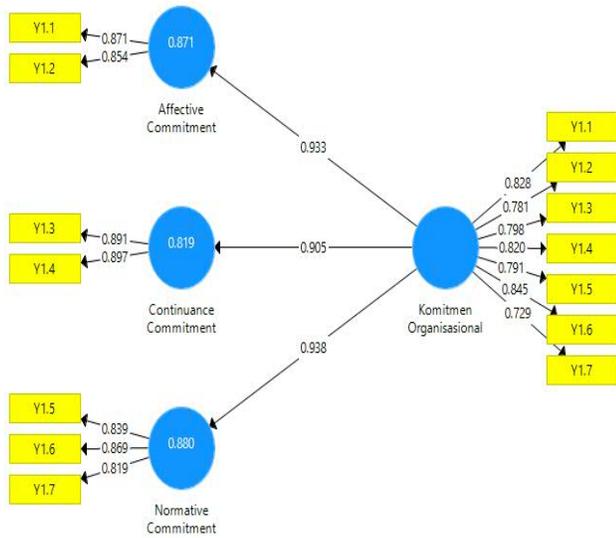


Figure 4. Outer Model Organizational Commitment

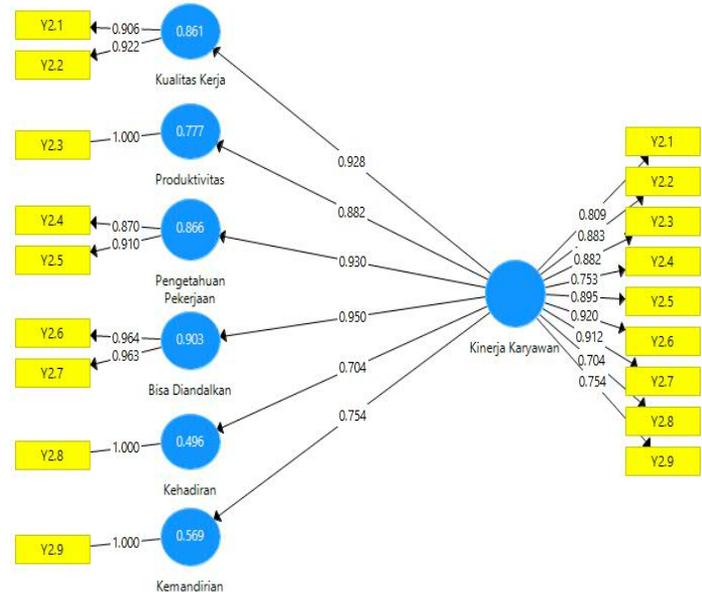


Figure 5. Outer Model Employee Performance

The picture above state that the results of data processing with version 3.0 SmartPLS, produce indicators of all variables having a value of loading factor > 0.50. This shows that all indicators are valid and still used in the model.

Hypothesis Test (Inner Model)

The next step after evaluating the construct or variable measurement model is evaluating the structural model or inner model or testing the hypothesis. Hypothesis testing can be done by evaluating the path coefficient.

Based on the results of calculations using calculating SmartPLS 3.0 bootstrapping, this is generated from the path coefficients and t-statistic values that describe the impact between constructs / variables as shown in figures 6 and 7.

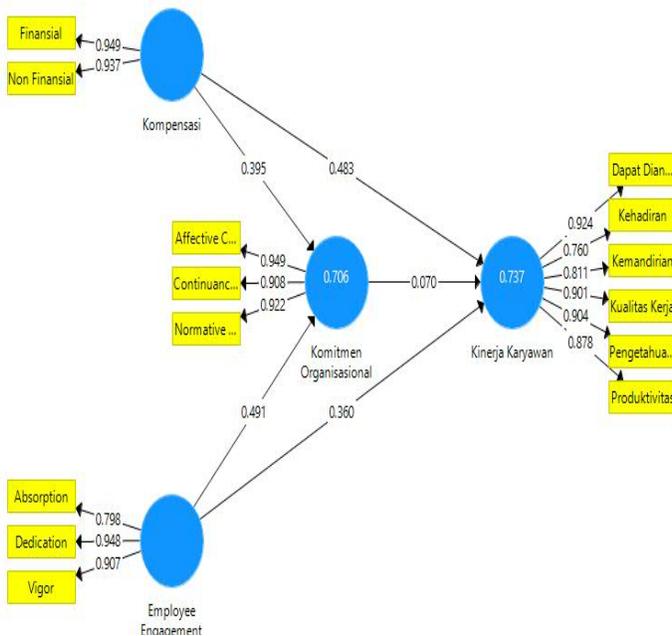


Figure 6. Path Coefficient Value

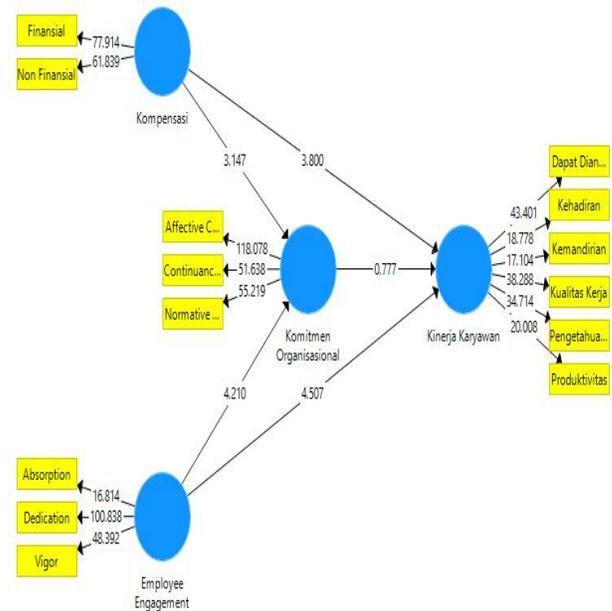


Figure 7. t Statistik Value

Based on Figure 6. The structural equation of this study can be formulated as follows:

$$\text{Organizational Commitment (Y1)} = 0,395 \text{ x1} + 0,491 \text{ x2}$$

$$\text{Employee Performance (Y2)} = 0,483 \text{ x3} + 0,360 \text{ x4} + 0,070 \text{ } \beta$$

The dimensions of the parameter coefficient for the Compensation variable (X1) on the Organizational Commitment variable (Y1) is 0.395, which means that there is a positive influence between compensation for organizational commitment. Value of t - Statistics of 3.147> from t-table 1.66, which means significant.

The dimensions of the parameter coefficient for the Compensation variable (X1) for the employee performance variable (Y2) is 0.483, which means that there is a positive influence between compensation for employee performance. Value of t - Statistics of 3,800> from t-table 1.66, which means significant.

The dimensions of the parameter coefficient for the Employee Engagement variable (X2) on the Organizational Commitment variable (Y1) is 0.491, which means that there is a positive influence between Employee Engagement on organizational commitment. Value of t - Statistics of 4.210> from t-table 1.66, which means significant.

The dimensions of the parameter coefficient for the Employee Engagement variable (X2) on the Employee Performance variable (Y2) is 0.360, which means that there is a positive influence between employee engagement on employee performance. Value of t - Statistics of 4.507> from t-table 1.66, which means significant

The dimensions of the parameter coefficient for the Organizational Commitment variable (Y1) on the Employee Performance variable (Y2) is 0.070 which means there is no influence between organizational commitment to employee performance. Value of t - Statistics of 0.777 <from t-table 1.66, which means not significant.

The dimensions of parameter coefficient for the Compensation variable (X1) through the Organizational Commitment variable (Y1) on Employee Performance (Y2) is 0.028 <from direct effect 0.483 which means that Y1 does not mediate the effect of X1 on Y2.

The dimensions of parameter coefficient for the Employee Engagement variable (X2) through the Organizational Commitment variable (Y1) on Employee Performance (Y2) is 0.034 <from direct effect 0.360 which means Y1 does not mediate the effect of X2 on Y2.

Interdimensional Matrix Correlation

Correlation analysis aims to measure the level of relationship between dimension in variable X with dimension in variables Y1 and Y2 and dimension in variable Y1 with dimensions in variable Y2. In this study compensation variables consist of 2 dimensions, employee engagement variables consist of 3 dimensions, organizational commitment variable consist of 3 dimensions and employee performance variable consist of 6 dimensions.

Table 1. Results of the Matrix Correlation Between Dimensions of Independent Variables and Dependent Variables

Variable	Dimension	Compensation (X1)		Employee Engagement (X2)		
		Financial	Non Financial	Vigor	Dedication	Absorption
Organizational Commitment (Y1)	1. Affective	.793	.679	.806	.819	.504
	2. Continuance	.688	.568	.624	.629	.318
	3. Normative	.708	.648	.721	.753	.577
Employees Performance(Y2)	1. Quality of Work	.722	.614	.603	.704	.469
	2. Productivity	.679	.656	.568	.661	.416
	3. JobKnowledge	.683	.636	.663	.739	.378
	4. Reliable	.703	.633	.637	.710	.392
	5. Attendance	.696	.646	.599	.809	.450
	6. Independence	.650	.703	.681	.749	.439

Table 2. Results of the Matrix Correlation Between Dimensions of Dependent Variables and Dependent Variables

Variable	Dimension	Employees Performance (Y2)					
		Quality of Work	Productivity	Job Knowledge	Reliable	Attendance	Independence
Organizational Commitment (Y1)	1.Affective	.745	.601	.780	.703	.658	.556
	2.Continuance	.578	.452	.615	.500	.557	.554
	3.Normative	.599	.454	.593	.516	.628	.444

Source: Data processed by researcher

In the compensation variable for organizational commitment variables, the highest dimension correlation is financial compensation for the dimension of affective commitment, amounting to 0.793. In other words, the dimensions of affective

commitment held by employees are strongly influenced by the dimensions of financial compensation such as salary, reward and benefit.

In the compensation variable for employee performance variables, the highest dimension correlation is financial compensation for work quality of 0.722. In other words, the quality of work of employees will be maximized when their financial compensation is fulfilled.

In employee engagement variable on organizational commitment variable, the highest dimension correlation is dedication to the dimensions of affective commitment, amounting to 0.819. Thus, employees' affective commitment is strongly influenced by employee dedication.

In employee engagement variables on employee performance variables, the highest dimension correlation is Dedication to attendance of 0.809. In other words, attendance is greatly influenced by employee dedication.

In the variable of organizational commitment to employee performance variables, the highest dimension correlation is an affective commitment to work knowledge of 0.780. In other words, work knowledge is greatly influenced by affective commitments.

Results and Discussion

The Effect of Compensation on Organizational Commitment (Hypothesis 1). From the results of the study it was revealed that compensation had an effect on organizational commitment. This result is in line with the results of the study (Nawab & Bhatti, 2011: 26), which states that if organizations that have a good compensation management system will have a very positive impact on their employees. This result is also in line with Ahmad, et al., (2016) research that there is a significant relationship between compensation and organizational commitment. That is, the higher the compensation given to employees, then the commitment of employees to the company will be high as well.

The Effect of Employee Engagement on Organizational Commitment (Hypothesis 2). From the results of this study, it can be indicated that there is a positive and significant relationship between employee engagement and organizational commitment. The results of this study are supported by previous research conducted by Phaik Lin & Lee Ping, (2016) which shows the results that there is a significant relationship between employee engagement and organizational commitment. Organizational commitment refers to the emotional attachment of employees to a particular organization, alignments with certain organizations, and involvement in certain organizations. That is, the better employees who feel bound to the organization or their responsibilities, the better the commitment shown by employees to the organization.

The Effects of Compensation and Employee Engagement on Organizational Commitment (Hypothesis 3). The finding of the study indicate that hypothesis 3 is proven which states that the compensation and employee engagement variables simultaneously have a positive influence on organizational commitment supported by data on employees of PT. XYZ. Compensation and employee engagement each influence organizational commitment if each stands alone as a variable. Then, if both are combined, simultaneous compensation and employee engagement also affect organizational commitment. It proves that in forming organizational commitment, compensation and employee engagement variables can be a shaping factor for these organizational commitments.

The Effect of Compensation on Employee Performance (Hypothesis 4). From the results of this study it can be indicated that there is a positive and significant relationship between compensation and employee performance. This is in line with the research conducted by Odunlami & Matthew, (2014) which shows the results that there is a significant relationship between compensation and employee performance. That is, the better the compensation given to employees, the better the employee's performance

The Effect of Employee Engagement on Employee Performance (Hypothesis 5). From the results of the study it is known that employee engagement has a significant positive effect on employee performance. This result is in line with the results of Dajani's research (2015) which states that employee engagement has a significant impact on employee performance. According to Harter et al., (2002) in (Ahmed et al., 2017) Organizations that have employees with high levels of involvement will get maximum organizational results through the performance of their employees. That is, high employee engagement will improve employee performance.

The Effect of Organizational Commitment on Employee Performance (Hypothesis 6). From the results of the study, it has discovered that organizational commitment does not affect employee performance. The results of this study are supported by previous research conducted by Renyut, et al., (2017) which states that organizational commitment does not have a significant effect on employee performance. According to Mangkunegara (2010: 13) there are factors that can influence performance, namely the ability and motivation factors. This theory is supported by research by Aima, et al., (2017) which says that competence and motivation have a positive and significant influence on employee performance. Then, based on the results of interviews with employees, it was found that the factors that most affected their performance were "huge workload". So it can be concluded, even though the employees have a high commitment, if the workload they carry is beyond the ability, then their performance will still not be achieved. Thus, a decrease in the performance of employees at PT XYZ Jakarta is not influenced by organizational commitment, but is more influenced by other factors, namely workload.

The Effects of Compensation, Employee Engagement, and Organizational Commitment on Employee Performance (Hypothesis 7). The findings of the study indicate that hypothesis 7 is proven which states that the compensation variable, employee engagement and organizational commitment simultaneously have a positive and significant influence on employee performance supported by data from employees of PT. XYZ. The results of this study are supported by the results of the previous research conducted by Odunlami & Matthew, (2014) which shows the results that there is a significant positive relationship between compensation and employee performance. Then, the results of Dajani's research (2015) which states that employee attachments have a

significant impact on employee performance. In addition, these results also support the research conducted by Hafiz, (2017) which shows that there is a positive and significant relationship between organizational commitment and employee performance.

V. CONCLUSION AND SUGGESTION

Conclusion

Based on the results of the research and discussion in the previous chapters, several conclusions can be stated as follows: (1) The compensation variable has a positive and significant effect on organizational commitment; (2) Employee engagement variables has a positive and significant effect on organizational commitment; (3) Compensation and employee engagement variables have a simultaneous and significant positive effect on organizational commitment; (4) Compensation variable has a positive and significant effect on the performance of employees of PT. XYZ; (5) Employee engagement variable has a positive and significant effect on employee performance at PT. XYZ; (6) Variable organizational commitment as a mediator in this study does not affect the performance of employees of PT. XYZ; (7) The compensation variable, employee engagement and organizational commitment simultaneously have a positive and significant influence on employee performance.

Suggestion

The results showed that the dimension of dedication from employee engagement is the strongest dimension influencing organizational commitment. Dedication is characterized by enthusiasm, inspiration, and pride. Based on the results of the research, companies can consider being able to make the sense of enthusiasm and pride of the employees keep maintaining well. This can be done by concerning to employee welfare, providing a comfortable working atmosphere or giving employees the freedom to innovate so that employees can be more committed to the company.

Dedication is also the most powerful dimension in influencing employee performance. Employees who give full dedication or in other words have a high level of involvement for the company, the organization will get maximum results through the performance of its employees. Considering that this dimension is very strong in influencing commitment and performance, the company can consider continuing to maintain employee dedication in several ways such as improving employee welfare, providing a comfortable work atmosphere, or providing training to employees to be able to motivate employees at work.

The role of compensation can affect the employee performance as well. Due to the compensation is a sign of remuneration received by employees for their contribution, then providing good compensation will motivate employees to complete their tasks properly. Direct compensation is the most powerful dimension affecting employee performance. Based on the results of the research, companies can consider providing good compensation to employees such as providing salaries and benefits in accordance with the position and employment of employees, then fulfilling the needs and work facilities of employees.

The writer expects that for further research would discover more into the variables that affect organizational commitment and employee performance.

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Kinematic Modeling for Twin Spherical Balls Robot

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Abstract- — The goal is to build and stabilize a robot balancing on twin balls. The robot consists of six omni wheels in a special configuration standing on twin balls which gives it inverse pendulum dynamics. The robot is stabilized by rotating the wheels which makes it move in the xy-plane. First, the kinematics of omni wheels was investigated by studying different mounting configurations on platforms moving on the ground. The robot was built to verify and visualize the kinematics and special properties of omni wheels. The model is derived from energy equations and using Euler-Lagrange formulation. The energy equations are potential and kinetic energies. The obtained equations relate torque to Twin Spherical Balls Robot parameters.

Index Terms- Six omni wheels, Euler-Lagrange formulation, kinematic modeling, Twin Balls

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I. INTRODUCTION

This Twin Spherical Balls Robot System is the combination of mechanical structure, electrical and electronic components and so called the Mechatronic system. This twin balls balancing robots is tested and examined with a digital control algorithm and a Kalman filter for sensor fusion. The digital control algorithm is so called Proportional-Integral-Derivative controller (PID controller) that is investigated as path of self-balancing robot. The satiability and the performance of the control algorithm will be used on the balancing robot to provide system stability and to keep the stability based on the result of the simulation. Another vital important addition to the digital control system on the robot is the use of the complementary filter. The complementary filter is used as part of this system to provide the sensor fusion between the accelerometer and gyroscope. The digital filter provides the reliable sensor data that will be used by the robot to get the tilt angle information. The control and filter algorithms are all be written in Arduino software and implemented an Arduino board.

This is approximately the dynamics of a robot with three two-dimensional couple system. A goal can only be achieved with a strong focus on control. The aim is able to utilize the full potential of agility, which is a core feature of the robot. The prototype of Twin Spherical Balls Robot has been built with the goal of demonstrating the stable level of agility and capacity of such a driving force system [8]. The stepper-motors used in balancing robot are considered as essential component of all robot system as stepper motors are widely used in robotics and in the numerical control of machine tools to perform high precision positioning operations. Furthermore, this robot is equipped with two sets of accelerometer and gyroscope (MPU-6050) that could accurately measure the robot deflection angle and angular velocity. The complementary filtering method is used to reduce the error noise that get from the sensor fusion [9].

Nowadays, the transport devices in robotics are absolutely emerged and they are restricted to motion in a single direction and various steering constrains [1]. The omni-directional wheels robot was developed as BallIP in 2008 at Tohoku Gakuin University, Japan, to carry loads and is used for cooperative transportation [2][7]. So, the dynamics of wheel mobile robot motion needs to be developed to offer students a general framework for simulation analysis and model based control system design [3][4]. Rezero was developed in 2010, Switzerland [5] and re-emphasized the fast and graceful motions that can be achieved using ballbots [10].

This research (TSBs) robot aims to transport items from place to place on the upper plate of robot. This designed model is tested in real world and driving with six stepper motors in various speeds and this robot is based on the omnidirectional self-balancing or otherwise known as ballbot. It is selected two basketballs which made of rubber and this Twin Spherical Balls (TSBs) Robot system is composed of six omnidirectional wheels, the compliance of the frame connecting the twin-spheres is added to move and is appeared by the new type of balancing robot mechanism.

The robot mechanism is discussed in section 2. In the following section of this research is to obtain a kinematic model of an omni-directional wheeled vehicle based on Euler-Lagrange equation [6]. So, the coordinate system and the spherical wheel kinematic constraint of this robot is described in section 3. After that, wheels speed calculation for balls driving forces is described in section 4. These model is tested by combining PID control method and this experiment results are shown in section 5. The conclusion is described in section 6.

II. DESIGN OF TWIN SPHERICAL BALLS (TSBS) Robot

The new design of balls-wheel omnidirectional mobile (TSBs) robot has the total net weight is 7kg and it contains the net weight of robot frame which made of acrylics plate and the weight of electronics devices, lipo battery 10000 mAh and omniwheels. This arrangement allows the wheel to be always contact with the ball at any given time. The measurements of the robot are 780mm in length, 382mm width and 380mm in height including the ball with the total mass of approximately 7kg. The designated 3D-CAD model of robot is shown in Fig. 1. The fully assembled prototype system of TSBs robot which six stepper motors attached with omnidirectional wheels and all requirement electronics devices for TSBs robot is shown in Fig. 2. The main body of the Twin Spherical Balls Robot (TSBs) consists of a platform that has two stores. The first store includes the circuit board, 10000mAh (14.8V) 4 cells battery, the six devices TB6600 stepper motor drivers those weight are 1.2kg, IMU sensor etc. The IMU sensor is proposed in tracking and controlling the ball movement and it is based on Arduino Uno microcontroller that was used for tilt sensing and controlling respectively. The PID tuning for TSBs Robots is shown in Fig.3.

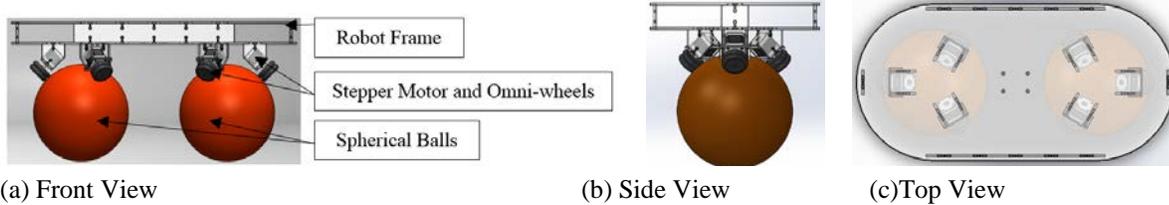


Figure.1. Design for TSBs Robot



Figure.2. Actual for TSBs Robot with electronic devices

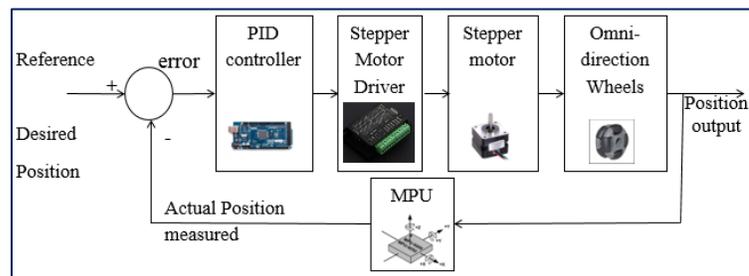
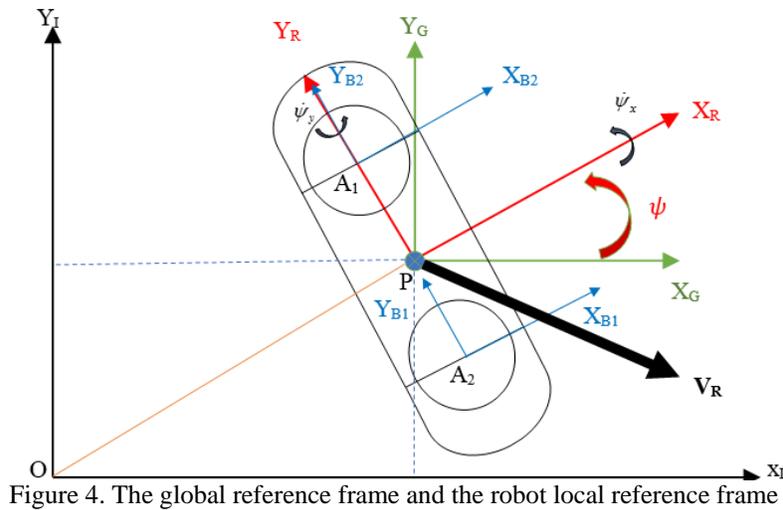


Figure.3. PID control system for TSBs Robot

III. COORDINATE SYSTEM OF KINEMATIC MODEL

In order to describe the position of the robot in its environment, two different coordinate systems (frames) need to be defined.



At first, the inertial coordinate system is considered and the coordinated system is a global frame which is fixed in the environment or plane in which the TSB moves in. Moreover, this frame is considered as the global reference frame from the same origin and is denoted as $[X_I, Y_I]$. Next, the robot coordinate system is considered to specify the position of the robot the mid-point P on the axis between the balls as its position reference point [6]. This coordinate system is a local frame attached to the TSB and that it moves in this frame denoted as $[X_R, Y_R]$. The two coordinate frames for robot is illustrated in Fig.4. The point in the global reference frame is specified by coordinate X and Y, and the angular difference between the global and local reference is given by the assign of ψ . It can describe the pose of the vector with these three elements. The use of the subscript I to clarify the basis of this pose as the global reference frame as shown in Fig.4. The robot position and orientation in the Inertia Frame can be defined as by Eq.(1). Using in the calculation of the dynamics movement of global reference frame and the robot local reference frame parameters is defined in Table 1.

Table 1. Required Parameters of Coordinated System

Symbol	Parameter
X_I	Inertia of global frame with respect to the X axis
Y_I	Inertia of global frame with respect to the Y axis
X_{B1}	First Ball of chassis frame with respect to the X axis
Y_{B1}	First Ball of chassis frame with respect to the Y axis
X_{B2}	Second Ball of chassis frame with respect to the X axis
Y_{B2}	Second Ball of chassis frame with respect to the Y axis
X_G	Global reference frame of robot body with respect to the X axis
Y_G	Global reference frame of robot body with respect to the Y axis
A_1	First Ball center's point
A_2	Second Ball center's point
ψ	Rotation angle of Z axis
$\dot{\psi}_x$	Angular velocity of ψ with respect to X axis
$\dot{\psi}_y$	Angular velocity of ψ with respect to Y axis
P	Halfway between the two spherical balls

$$\xi_I = \begin{pmatrix} x \\ y \\ \psi \end{pmatrix}$$

(1)

To describe the robot motion in terms of component motions, it will be necessary to map motion along the axes of the global reference frame of motion along the axis of the robot's local reference frame. Of course, the mapping is a function of the current pose of the robot. This mapping is accomplished using the orthogonal rotation and inverse orthogonal rotation matrixes are described by Eq.(2). and Eq.(3).

$$R(\psi) = \begin{bmatrix} \cos\psi & \sin\psi & 0 \\ -\sin\psi & \cos\psi & 0 \\ 1 & 1 & 0 \end{bmatrix} \tag{2}$$

$$R(\psi)^{-1} = \begin{bmatrix} \cos\psi & -\sin\psi & 0 \\ \sin\psi & \cos\psi & 0 \\ 1 & 1 & 0 \end{bmatrix} \tag{3}$$

The matrix can be used to motion in the global reference frame $[X_I, Y_I]$ to motion in terms of the local reference frame $[X_R, Y_R]$. The operation is denoted by $\psi(\xi)$ because the computation of this operation depends on the value of ψ . Given some velocity $(\xi \ \psi \ \xi)$ in the global reference frame and it can compute the components of motion along this robot's local axis X_R and Y_R .

Firstly, the contribution of each wheels spinning speed to the translation speed at P in the direction of $+X_R$ is considered. If one wheel spins while the other wheel controbutes notion and is stationary, since P is halfway between the two wheels, then it will move instantaneously with the half the speed: $\xi_{B1} = \frac{1}{2} \cos\theta_{B1}$ and $\xi_{B2} = \frac{1}{2} \cos\theta_{B2}$. Second, there is lateral motion. The contribution of each wheels spinning speed to the translation speed at P in the direction of $+Y_R$ is considered. If one wheel spins while the other wheel controbutes notion and is stationary, since P is halfway between the two wheels, then it will move instantaneously with the half the speed: $\xi_{B1} = \frac{1}{2} \sin\theta_{B1}$ and $\xi_{B2} = \frac{1}{2} \sin\theta_{B2}$. Third, the rotational component ψ_R of ξ_R must be computed. The relation velocity ψ_{B1} at P can be computed because the wheel is instantaneously moving along the arc of a circle of radius $2l$: $\psi_{B1} = \frac{r_{B1} \xi_{B1}}{2l}$. The same calculation applies to the left wheel, with the exception that forward spin results in clockwise rotation at point P: $\psi_{B2} = \frac{r_{B2} \xi_{B2}}{2l}$. In this case, due to specific angle of the robot, motion along X_R equal to ξ and motion along Y_R equal to $-\xi$.

$$\xi_I = \begin{bmatrix} \xi \\ \psi \\ \xi \end{bmatrix} = R(\psi)^{-1} \xi_I \tag{4}$$

$$\xi_I = R(\psi)^{-1} \begin{bmatrix} \left(\frac{r_{B1} \xi_{B1}}{2} + \frac{r_{B2} \xi_{B2}}{2} \right) \cos\psi \\ \left(\frac{r_{B1} \xi_{B1}}{2} - \frac{r_{B2} \xi_{B2}}{2} \right) \sin\psi \\ \frac{r_{B1} \xi_{B1}}{2l} - \frac{r_{B2} \xi_{B2}}{2l} \end{bmatrix} \tag{5}$$

$$\xi_I = R(\psi)^{-1} \begin{bmatrix} \cos\psi & 0 & 0 \\ 0 & \sin\psi & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \left(\frac{r_{B1} \omega_{B1}}{2} + \frac{r_{B2} \omega_{B2}}{2} \right) \cos\psi \\ \left(\frac{r_{B1} \omega_{B1}}{2} + \frac{r_{B2} \omega_{B2}}{2} \right) \sin\psi \\ \frac{r_{B1} \omega_{B1}}{2l} - \frac{r_{B2} \omega_{B2}}{2l} \end{bmatrix} \quad (6)$$

$$\xi_I = R(\psi)^{-1} \begin{bmatrix} \cos\psi & 0 & 0 \\ 0 & \sin\psi & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} (\omega_{B1} + \omega_{B2}) \cos\psi \\ (\omega_{B1} + \omega_{B2}) \sin\psi \\ \frac{r_{B1} \omega_{B1}}{2l} - \frac{r_{B2} \omega_{B2}}{2l} \end{bmatrix} \frac{r_B}{2} \quad (7)$$

$$\xi_I = \frac{r_B}{2} R(\psi)^{-1} \begin{bmatrix} \cos\psi & 0 & 0 \\ 0 & \sin\psi & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \\ \frac{1}{l} & \frac{-1}{l} \end{bmatrix} \begin{bmatrix} \omega_{B1} \\ \omega_{B2} \end{bmatrix} \quad (8)$$

$$\xi_I = \frac{r_B}{2} R(\psi)^{-1} \begin{bmatrix} \cos\psi & 0 & 0 \\ 0 & \sin\psi & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \\ \frac{1}{l} & \frac{-1}{l} \end{bmatrix} \begin{bmatrix} \omega_{B1} \\ \omega_{B2} \end{bmatrix} \quad (9)$$

$$\xi_I = \frac{r_B}{2} R(\psi)^{-1} \begin{bmatrix} \cos\psi & 0 & 0 \\ 0 & \sin\psi & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \cos\psi & \cos\psi \\ \sin\psi & \sin\psi \\ \frac{1}{l} & \frac{-1}{l} \end{bmatrix} \begin{bmatrix} \omega_{B1} \\ \omega_{B2} \end{bmatrix} \quad (10)$$

$$\xi_R = V_R = \begin{bmatrix} x_1 & y_1 & \psi_1 \end{bmatrix}^T = R(\psi) \xi_I \quad (11)$$

$$\omega_{B1} = \begin{bmatrix} \omega_1 & \omega_2 & \omega_3 \end{bmatrix}^T \quad (12)$$

$$\omega_{B2} = \begin{bmatrix} \omega_4 & \omega_5 & \omega_6 \end{bmatrix}^T \quad (13)$$

The robot velocity in global coordinates is defined as the Eq.11. The angular velocity of the omnivheels and peripheral velocities of the first ball's wheels and second all's wheels are defined as Eq. 12 and Eq.13, and they are assigned as ω_{B1} and ω_{B2}

IV. WHEEL SPEED CALCULATION FOR BALLS DRIVING FORCES

The robot body consisted of an electronics circuit including sensor and ball drive with six stepping motor and the omnidirectional wheels.

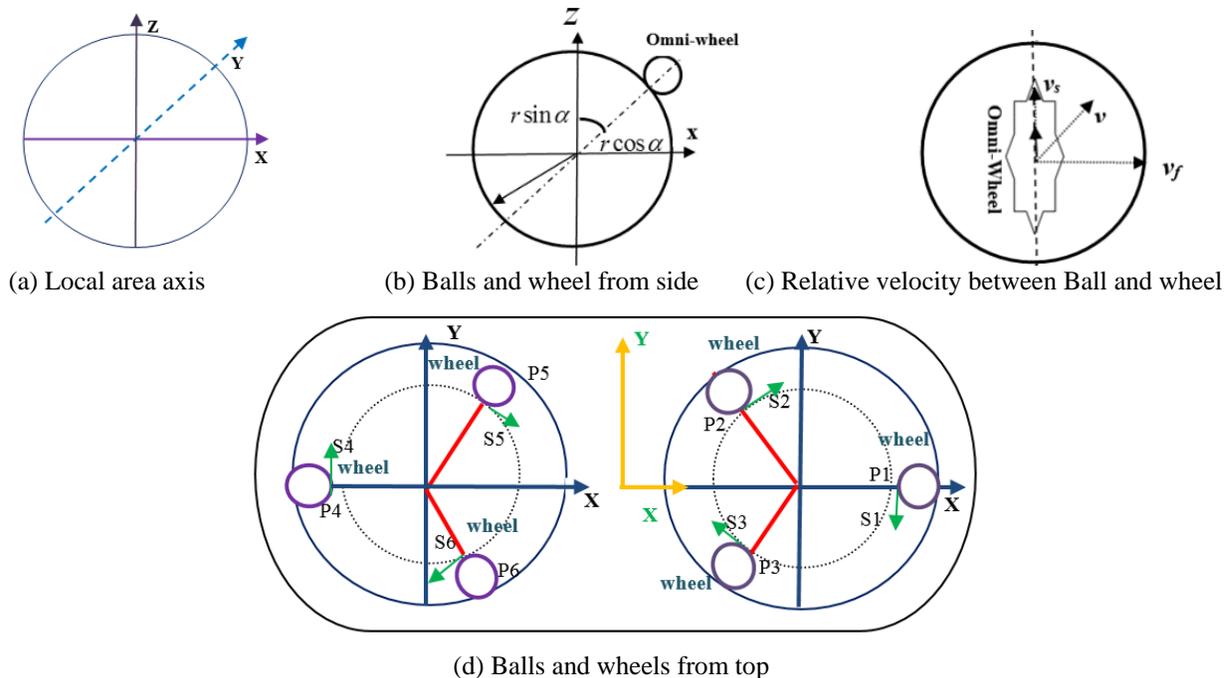


Figure 5. Defined Axis and relationship of balls and omnidirectional wheels

The local coordinate frame with its origin each ball center is shown in Fig.5(a). Robot axis are fixed on the robot body. The z axis is along the vertical line passing through the ball center and the robot center of mass, and the x and y axes perpendicular of the z axis. The wheel speed is getting the balls angular velocity ω is derived by the contact point between the omni-wheel i and the balls be P_i and whose position vector is P_1, P_2, P_3, P_4, P_5 and P_6 . The orientation S_i , zenith angle α and velocity v_i at position P_i corresponding to each ball's angular velocity ω is obtained at following Eq.12 and Eq.13. This is independent of the number of wheel for more stable support multiple ball contact with three omni-wheels for each ball. This wheels arranged on each ball are shown in Fig.5(d).

V. EXPERIMENTAL RESULTS

Kalman and complementary filters are used comparatively to get the required data from MPU 6050 sensor. The sensor gives gyro and accelerometer data. In this journal, the acceleration is considered as feedback to the controller. Therefore, accelerations of X and Y axes are calculated. Although Kalman filter is good at estimating future state, the complementary is better for this work as shown in Fig.7 and Fig.5.8. The experimental results for balancing for robot are shown in Fig.8. and Fig.9. In real-time, the robot can't move on the balls because the steppers can't drive the balls. Therefore, the testings in real-time are conducted with making the inclinations of the robot frame without moving the robot on the balls, and collecting the speeds and directions of the six steppers controlling via two PID controllers for X and Y data from MPU 6050 sensor. The following results are obtained from real time system data. The body angle (XY plane) was varied manually and the speed values generated by the controller are recorded. These results are then plotted as shown in Fig.8 and Fig.9.

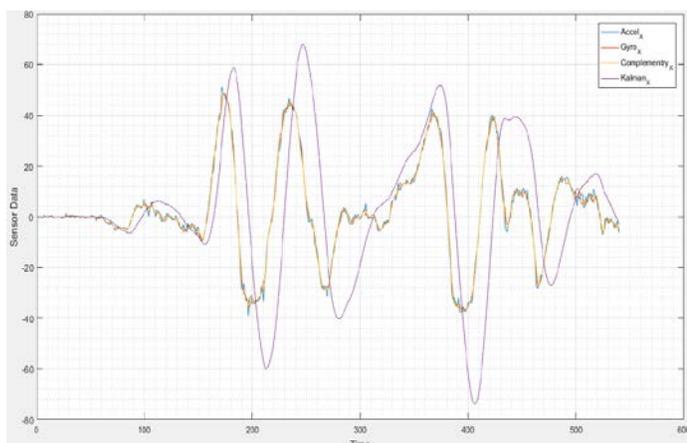


Figure 6. Kalman vs. Complementary Filters for X Axis

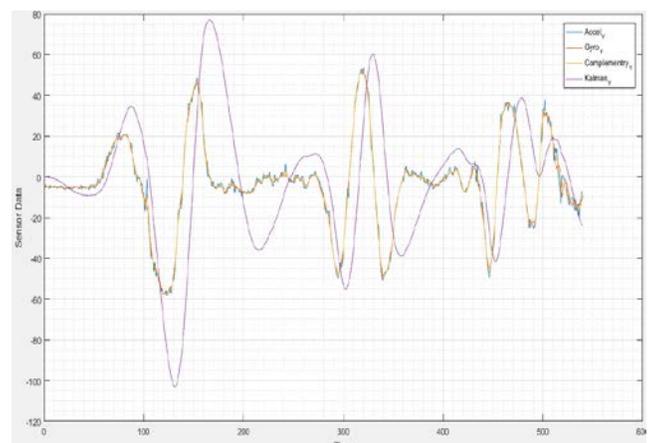


Figure 7. Kalman vs. Complementary Filters for Y Axis

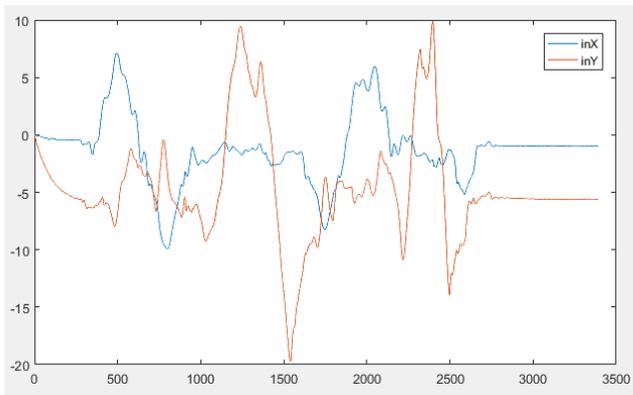


Figure 8. Filtered Sensor Data for X and Y Axes

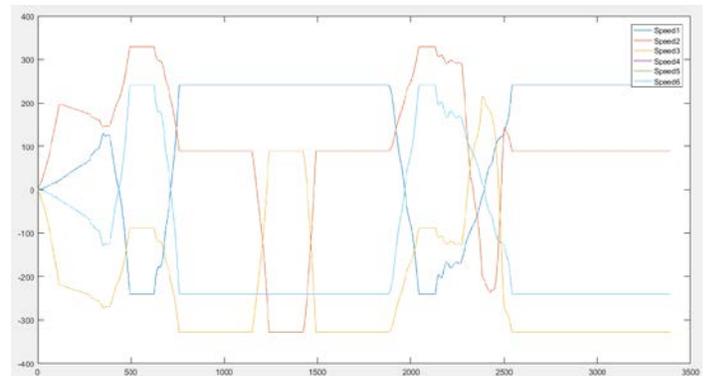


Figure 9. Speeds of Six Steppers for X and Y Axes

VI. CONCLUSION

This is the designating of the kinematic model for TSBs Robot, so required a planar mathematical model was derived using Euler-Lagrange formulation. For balancing the TSBs Robot using PID controller with combination feedback of MPU 6050 sensor. A balancing controller was designed to stabilize the double spherical wheeled dynamically stable mobile robot. The ballbot represents a new class of wheeled mobile robots capable of agile, omni-directional motion. Although the controller is talking precise corrective actions, it was observed that the system stabilizes about a plane with assistance, but fails to stabilize without assistance. The solution would be to use a set of six motor drivers with current control for both (1/8) micro-stepping as well as specific torque control.

FURTHER EXTENSION

For the further extension of the two wheeled balancing robots. Adding encoders to the robot to allow it to measure and control its speed is needed because it will prevent the falling over with maximum speed. There is need to designation to control algorithm for robot with model predictive control (MPC) or linear quadratic control (LQR) to get smart the robot balancing in time of operation. By using the brushless DC geared motors to get better torques instead of steppers.

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Self-Management on Employability Skills of Hospitality Management Students

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Abstract- Globalization is inevitable and Philippines as a member of ASEAN regard this reality of economic integration and interdependence. HEI's have raised concerns regarding graduate preparedness as part of the free flow of skilled labor and are now up on their heels to meet the demand and the issue of employability of the graduates has been a significant topic. The challenges of acquiring employment of graduates after graduation mainly due to the skills gap acquired from training and demanded by the employers. The study concluded that the higher the emotional self-control, the better would be the chances of gaining employability skills.

Index Terms- employability skills, emotional self-control, self-management, higher education institution

I. INTRODUCTION

Globalization is here to stay! The United Nations declared that global economic interdependence has inevitably grown tremendously as an outcome of massive technological progress and policies that are aimed at opening national economies to competition internally and externally (United Nations Secretariat, 2009, 2011). Philippines being a member of the Association of Southeast Asian Nations (ASEAN) regard this reality of economic integration and interdependence as becoming even more imminent as it moved to become integrated into one community since 2015 together with the rest of the ten (10) country-members.

Higher education institutions (HEIs) have raised pressing concerns regarding the preparedness of college graduates who are going to be an inevitable part of this free flow of services and the free flow of skilled labor (AEC Blueprint, A2, A5). Competency-based courses are among the highly focused programs in the Philippine colleges and universities where diverse competencies are defined by the Commission on Higher Education (CHED) and the Technical Education and Skills Development Authority (TESDA). This anticipated change is driven by the market and is forcing universities, especially private universities in ASEAN countries, to change its mode of operation (Louangrath, 2013).

It is of no surprise that HEIs are up on their heels in meeting the demands of this globalized integration especially that of preparing and forming the needed human resources in the global employment arena. Issues on the employability of the

graduates have been considered as significant topics in the higher education agenda in the first decade of the 21st century worldwide. Many educators believed that traditional courses might become less relevant when these present day batches of students graduate. Social scientists likewise projected the substantial alteration of the contemporary workplace considering global competition, an increase of knowledge-based economy, technology and the multigenerational workforce (Gedye and Chalkey, 2006).

Filipino graduates are facing with the challenge of acquiring employment right after graduation (Ballon, 2007). This was recently affirmed by SEAMEO Innotech Research Updates of 2014. The Updates reported that Philippine graduates frequently become underemployed and further stressed on the need for the Commission on Higher Education as well as HEIs to launch into more aggressive measures that address the expansion of graduates' employment opportunities.

To meet the demands of the industry, there has been a collaborative effort done between industries and HEI's to supply skilled graduates. However, while the HEI's are doing their best to produce employable graduates, Shivpuri and Kim (2004) noted that a skills gap exists in college graduates which are considered by the employers as important. Dael (2006) cited Secretary's Commission on Achieving Necessary Skills (SCANS, 1991) who expressed that more than half of the graduates leave school without the knowledge or foundation required to find and hold a good job. With this, employers stressed a considerable dissatisfaction with employees' entry-level preparedness.

Employability skills are viewed as job specific skills or competencies that a person acquires through education, training, work experience, interests and extra-curricular activities (RMIT Career Development and Employment, 2014). These skills equip individuals to carry out complexities of new job market demands brought by globalization. Employability skills may be basic and generic in nature, but these are very important in capacitating a person entering the workforce (Hofstrand, 1996; Robinson, 2006). Harvey (2001) believes that employability is not so much of skills, but of attributes, qualities, competencies, and dispositions as well. Employability skills such as team working, communication, self-management and analytical skills are broadly considered critical in graduating students (Bowman, 2010).

Considering the present day students, HEIs at the very least, need to look consciously preparing students to enter the complexities of their prospective world of work. Reviewing existing practices and working on developing the students' employability skills to increase their competence in meeting the rigors of the current workforce can be a wise head start. HEIs are encouraged therefore to develop students with into employable graduates with competency based skills and the appropriate soft skills. This means that while HEI's focus in sharpening the professional skills of students, they should not forget developing personal skills, qualities, and experiences that would enable them to compete in the labor market (de Guzman and de Castro, 2008).

This study attempted to establish the employability skills of students in selected HEIs within the context of self-management. The value of this study lies in the information on students' employability and offers additional insights into what could influence employability and the use of these data toward a developing a concrete action plan.

Statement of the Problem

This study examined the interrelationships of self-management and employability skills. Specifically, this was guided by the following questions:

1. How do students assess their self-management competencies?
2. How do the teachers perceive the competence of students' employability skills?
3. Is there a significant relationship between self-management and employability skills?
4. Which of the independent variables influence employability skills?

Hypotheses

Ho1: No significant interrelationship exists between self-management and employability skills

Ho2: None of the independent variables significantly influence employability skills

II. METHODOLOGY

This study employed mix method design as a means of collecting the needed data to attain the objectives. This method allows the researcher to collect and analyze data, integrates the findings, and draws inferences using both qualitative and quantitative approaches and methods in a single study or program of inquiry (Tashakkori and Creswell, 2008). Clark and Creswell et al., (2011) posited that the mixed method design provide the best understanding of a research problem that either of the approach alone could not suffice.

This study employed three (3) sets of questionnaires for gathering data. Part 1 composed of two sections. Section A used a competency model for self-management of Emotional Intelligence Theory developed by Daniel Goleman (1995). The adapted questionnaire was taken from the study Abdullah Sani, Masrek, Sahid and Mohd Nadzar (2013) entitled "*Assessing the Emotional Intelligence Profile of Public Librarians in Malaysia: Descriptive Analysis*". Section B, on the other hand, utilized an

adapted questionnaire measuring the openness of students to diversity and challenge taken from the study of Barkely et al., (2005) "*Openness to Diversity and Challenge: Assessment of Undergraduate Attitudes and Experiences in the College of Agriculture at Kansas State University*".

Part 2 was developed by Robinsons (May, 2006) in the dissertation "*Graduates' and Employers' Perceptions of Entry-level Employability Skills needed by Agriculture, Food and Natural Resources Graduates*" the same instrument employed by Ogbeide (December, 2006) in the dissertation on "*Employability Skills and Students' Self-Perceived Competence for Careers in the Hospitality Industry*".

III. ANALYSIS AND DISCUSSION

The data obtained by the researcher were collected, processed and interpreted by descriptive and its statistical treatment.

Table 1 shows the summary of students' responses on their self-management competencies. The result displays a mean of 3.22 supported with almost 63% of total population of the respondents. The .409 standard deviation shows homogenous response of the respondents.

The data exhibit competencies of self-management. The data demonstrates adaptability as the competency with the lowest mean 3.08. The result significantly implies students' adaptability skills need to be enhanced and developed to become more flexible in the challenges and changes of workplace requirements and processes, particularly with the ASEAN integration.

Considered as an imperative factor, adaptability enables to understand people of different cultures; thus, schools should give emphasis to training and development of the hospitality management students.

Emotional intelligence according to Goleman (1995) are taught and developed through training, the main reason why hospitality management students are encouraged for exposures (i.e. Educational Tour, On-the-Job Training, Hotel Exposure/Ocular Inspection) in order to facilitate changes due to the growth of technology espoused with modern economy requiring highly trained and skilled human resource. Jordan and Troth (2004) and Matthews, Zeidner and Roberts (2002) cited Goleman (1998) who significantly expressed EI is more focused on social and emotional competencies.

On the other hand, according to the study of Economist Intelligence Unit (2008) entitled Growing Global Executive Talent, the ability to facilitate change to fit circumstances ranked 3rd as the top qualities that will be significant over the years. The study expressed that adaptability is a crucial skill for everyone and an important dimension of emotional intelligence. However, openness to diversity and challenges rated with the highest mean 3.55 and interpreted as high competence. The result disclosed students' enthusiasm in working at diverse workplaces.

On the basis of the findings of the study, while students are open to diversity and challenge, however, their adaptability competence must be enhanced. Barkley's (2005) study reported that while there is a relatively good determinant of openness to diversity and challenge among college students, their experience to this opportunity may be very low. As suggested in the study of Barkley's (2005) that to refine by the institutions the policy on

students' adaptability to diversity through provision of opportunities for students with higher measurable levels of openness to diversity and challenges, diversity appreciation and understanding. Pitts, Melton, Hawes and Hicklin (2010) cited Richard (2000) and Zqourides, Johnson and Watson (1993) that diversifying employees with varied education background creates opportunities for greater innovation and more creative solutions to problems.

Table 1. Students' Assessment of Self-Management Competencies

Variable	Mean	Description	Interpretation	SD
Emotional Self-control	3.10	Almost Always	Moderate Competence	.522
Transparency	3.26	Almost Always	Moderate Competence	.568
Adaptability	3.08	Almost Always	Moderate Competence	.544
Achievement Orientation	3.22	Almost Always	Moderate Competence	.615
Positive Outlook	3.13	Almost Always	Moderate Competence	.654
Openness to Diversity and Challenges	3.55	Strongly Agree	High Competence	.372

Table 2 exhibit teachers' summary of perceived students employability skills according to the teachers' ratings. The result shows a mean of 3.31 described as moderate competence. Almost 74% responses of the population with the standard deviation .333 showing a homogenous response from the respondents supported the result of the study.

The findings of the study reveal that students' employability skills were of moderate competence. Dael (2006) asserted that schools need to look consciously into and workout on the employability skills of the students in order to meet the current workforce demand (Hofstrand, 1996; Robinson, 2006). Thus, de Guzman et al., (2008) encouraged colleges and universities to produce employable graduates.

The data was evident that students have not fully acquired employability skills regardless of the training and formal education provided in the curriculum. Hence, the result supported to the study of Ballon (2007) that Filipino graduates are facing the challenge of acquiring employment right after graduation due to lack of employability skills. In this study, Robinsons (2006) argued that these skills be perceived important by stakeholders in entry-level positions for employment.

On the other hand, participants addressed to the questions "What challenges do you encounter in your training? Do you see it as a preparation for your future endeavor?". They commented that:

Student a: "The on-the-job training hour requirement cannot provide the kind of training one wants to learn the varied operation of hotel."

Student b: "As a trainee, there are instances we are asked to do things outside our immediate responsibility."

This means to say that there is a discrepancy of skills acquisition because of the kind of training they received from training providers. As asserted by Ogbedie (2006), students may learn skills, but there should be reinforcement, direct test and evaluation on those skills. Thus, the company training should serve as reinforcement to develop and apply these skills in real-life situations (Riebe, Roepen, Santarelli and Marchioro, 2010).

In this study, it can be observed that the item "Oral Communication" got 3.13 mean and "Written communication" received 3.14 mean. The findings confirmed that students' have difficulty in terms of their communication skills. There is a good number literature about the importance of communication skills. For example, Covey (1989) stated that communication is the most important skill in life and is widely valued by employers (Crawford, Helliard and Monk, 2011; Jogan and Herring, 2007), however, Coplin (2003) articulated that it is frequently unfulfilled desire. Furthermore, teachers commented on the question "What challenges do you see on students' communication skills?". They articulated that:

Teacher a: "Our students are coming from other rural areas within the region with varied background and training in their basic education."

Teacher b: "We are challenged to improve their communication skills since a study conducted in our school that our students have problems in terms of their communication skill."

With this in mind, it supports the result of this endeavor of the deficiency of students' communication skills both oral and written as confirmed by the result. On the other hand, results of the study also show students' competence in "Lifelong learning" with 3.52 mean described as high competence and "Coordinating" 3.51 mean interpreted as high competence. The result confirmed that while students may have the deficit in terms of other employability skills, however, they manifest lifelong learning competence as they would pursue more in life.

Table 2. Employer's Assessment on Students' Employability Skills

Variable	Mean	Description	SD
Problem Solving and Analytic	3.26	Moderate Competence	.379
Decision Making	3.17	Moderate Competence	.437
Organization and Time Management	3.17	Moderate Competence	.435
Risk Taking	3.15	Moderate Competence	.435
Oral Communication	3.13	Moderate Competence	.486
Written Communication	3.14	Moderate Competence	.488
Listening	3.32	Moderate Competence	.427

Interpersonal Relationship	3.28	Moderate Competence	.386	Visioning	3.47	Moderate Competence	.410
Managing Conflict	3.25	Moderate Competence	.427	Ability to Conceptualize	3.37	Moderate Competence	.411
Leadership and Influence	3.41	Moderate Competence	.381	Lifelong Learning	3.52	High Competence	.346
Coordinating	3.51	High Competence	.391	Motivation-Personal Strength	3.48	Moderate Competence	.349
Creativity, Innovation and Change	3.40	Moderate Competence	.370				

Table 3. Pearson r to Establish Relationship between Self Management and Employability Skills

Ho1: No significant interrelationship exist between self-

Employability Skills (n=148)	Self-Management (n=148)											
	Emotional Self-Control (mean=3.10)		Transparency (mean=3.26)		Adaptability (mean=3.09)		Achievement Orientation (mean=3.22)		Positive Outlook (mean=3.13)		Openness to Diversity (mean=3.55)	
	r	sig	r	sig	r	sig	r	sig	r	sig	r	sig
Problem Solving and Analytic (mean=3.26)	-0.25	0.00 (sig)	0.01	0.89 (ns)	-0.03	0.73 (ns)	-0.14	0.09 (ns)	0.03	0.74 (ns)	0.06	0.44 (ns)
Decision Making (mean=3.17)	-0.22	0.01 (sig)	0.02	0.80 (ns)	-0.03	0.73 (ns)	-0.12	0.13 (ns)	0.01	0.95 (ns)	0.02	0.84 (ns)
Organization and Time Management (mean=3.17)	-0.17	0.04 (sig)	0.01	0.88 (ns)	0.04	0.59 (ns)	-0.11	0.20 (ns)	0.03	0.76 (ns)	-0.03	0.69 (ns)
Risk Taking (mean=3.15)	-0.21	0.01 (sig)	-0.01	0.92 (ns)	-0.04	0.65 (ns)	-0.07	0.37 (ns)	0.01	0.95 (ns)	-0.02	0.83 (ns)
Oral Communication (mean=3.13)	-0.13	0.12 (ns)	0.06	0.45 (ns)	0.04	0.60 (ns)	-0.04	0.63 (ns)	0.07	0.42 (ns)	-0.01	0.91 (ns)
Written Communications (mean=3.14)	-0.15	0.06 (ns)	0.05	0.56 (ns)	0.07	0.39 (ns)	-0.05	0.56 (ns)	0.11	0.18 (ns)	-0.07	0.42 (ns)
Listening (mean=3.32)	-0.17	0.04 (sig)	0.03	0.74 (ns)	-0.03	0.68 (ns)	-0.06	0.49 (ns)	-0.06	0.47 (ns)	-0.02	0.84 (ns)
Interpersonal Relationship (mean=3.28)	-0.17	0.04 (sig)	0.01	0.86 (ns)	-0.11	0.19 (ns)	-0.08	0.36 (ns)	-0.08	0.36 (ns)	0.00	0.96 (ns)
Managing Conflict (mean=3.26)	-0.20	0.02 (sig)	-0.04	0.66 (ns)	-0.07	0.39 (ns)	-0.19	0.02 (sig)	-0.14	0.09 (ns)	-0.06	0.50 (ns)
Leadership and Influence (mean=3.41)	-0.11	0.20 (ns)	0.02	0.82 (ns)	-0.03	0.75 (ns)	-0.06	0.47 (ns)	0.00	0.98 (ns)	0.04	0.66 (ns)
Coordinating (mean=3.52)	-0.02	0.83 (ns)	0.06	0.49 (ns)	0.07	0.42 (ns)	-0.01	0.87 (ns)	0.07	0.37 (ns)	0.07	0.43 (ns)
Creativity, Innovation, and Change (mean=3.41)	-0.08	0.35 (ns)	0.00	0.9 (ns)	-0.08	0.35 (ns)	-0.04	0.66 (ns)	-0.06	0.46 (ns)	0.06	0.50 (ns)
Visioning (mean=3.47)	-0.10	0.21 (ns)	-0.08	0.32 (ns)	-0.07	0.38 (ns)	-0.03	0.70 (ns)	-0.09	0.28 (ns)	0.06	0.48 (ns)
Ability to Conceptualize (mean=3.37)	-0.08	0.32 (ns)	-0.02	0.82 (ns)	-0.02	0.77 (ns)	0.01	0.92 (ns)	-0.02	0.84 (ns)	0.11	0.19 (ns)
Life Long Learning (mean=3.52)	-0.10	0.23 (ns)	-0.04	0.62 (ns)	-0.07	0.38 (ns)	-0.01	0.91 (ns)	-0.03	0.74 (ns)	0.14	0.08 (ns)
Motivation-Personal Strength (mean=3.48)	-0.06	0.44 (ns)	-0.02	0.81	-0.03	0.68	-0.02	0.79	-0.03	0.72	0.06	0.51

management and employability skills

Table 3 shows the Pearson (r) values for the correlation between self-management and employability skills. While the study found no significant relationship between self-management and employability skills, however, study shows that certain employability skills can be associated with some dimensions of self-management.

The data reveals that emotional self-control was found to be significantly related to employability skills such as problem-solving and analytic, decision-making, organization

and time management, risk taking, listening, interpersonal relationship and managing conflict. The null hypothesis that self-management and employability skills are not significantly interrelated is rejected in these dimensions of both variables. Relationships were found to be not only significantly but also positively correlated. The result suggests that the higher the students' emotional self-control response scores, the greater the tendency for higher employability skills scores in these specified aspects of the variable mentioned above. This further means that when a student possesses emotional self-control would most likely have better employability skills.

Given these findings, the result confirmed Carmeli (2003) that emotional intelligence can strongly associate with employment. The study was supported by Khokhar et al., (2009) that emotional intelligence brings about better quality of work performance.

Table 4 illustrates multiple linear regression analysis of teachers' perception of students' employability skills and students' assessment on their emotional self-control. The data shows that emotional self-control can predict employability skills in general. It further presents the influence of the self-management in terms of emotional self-control to employability skills in general. The value of adjusted R2 indicates that 2.3% of the changes in the students' employability skills can be explained by their emotional self-control. With f-value of 4.482, the model is highly significant at 0.036.

Table 4. Multiple Linear Regression Analysis of Emotional Self-Control and Employability Skills

Variables that influence Employability Skills	Employability Skills (mean=3.31)		
	Beta*	T-value	Sig.
Emotional Self-Control (mean=3.10)	0.211	-2.117 (sig)	.030
Constant T-value	3.657		
Adjusted R2	.023		
F value	4.482		

Sig. Level (F)	0.036
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Ho2: None of the independent variables significantly influence employability skills.

In this case, the hypothesis is rejected. Emotional self-control can explain and or predict the students' employability skills. Given this model below, the influence of the variables is explained by this equation below:

$$\text{Employability skills} = 3.657 + 0.211\text{Emotional Self Control}$$

The model shows that emotional self-control accounts for 21.1% in the changes of students' employability skills. This further means that the greater the students' tendencies for emotional self-control, the higher would be their chances of gaining employability skills. It is worthy to note that only emotional self-control figured out in the equation, and this only explains 21.1% of the changes employability skills. This study then speculates that the remaining 78.9% of the changes can be attributed to the other self-management variables or other variables that can be theoretically associated with employability skills. It is then of paramount importance that future investigations may be focused towards this direction.

The result revealed that there is a significant relationship between the emotional self-control and students' employability skills. Tarullo, Obradovic and Gunnar (2009) supported by Diamond and Taylor (1996), Lewis and Todd, (2007), H. N. Mischel and Mischel (1983), Thompson, Barresi and Moore (1997) expressed that this ability to control one's emotion is critical to success. This implies that students' ability to control emotions plays a significant role in their employment.

CONCLUSIONS AND RECOMMENDATION

The general findings on the students' moderate competence on their self-management skills and employability skills are quite alarming considering that these data were taken from graduating students. These have grave implications for the students' readiness for the world of work. Many studies claimed of the challenges and difficulty of new graduates (Ballon, 2007; OECD, 2012). The moderate and or average competence gained by students in their schools can aggravate the situation of difficulty in finding jobs after graduation. It would do well for the school involved in this study to review their curriculum and their manner of implementing the curriculum. The findings that self-management regarding emotional self-control is a good predictor of employability skills can be a good input to the decisions of curriculum revisions.

Furthermore, this study did not confirm the assumed relationship of Goleman's (1995) emotional intelligence's theory and Bandura's (1986) social-cognitive learning theory. Nonetheless, it can be asserted that in the context of emotional self-control of self-management, it is positively correlated with employability skills. The result supports Khokhar et al., (2009) that the higher the students' control over their emotion, the higher they gain employability skills and better performance at work.

From the drawn conclusions and the homogeneity of the results from the participants, the following measures are recommended to:

1. Intensify students' awareness and utilization of their emotional intelligence by embedding social and emotional learning into teaching practices;
2. Involve stakeholders in the design and delivery of the curriculum to facilitate quality training and learning to meet the demands of the industry;
3. Strengthen the reinforcement and evaluation of students' training performance; and
4. It is strongly recommended that future studies consider other variables that would predict the employability skills of future graduates other than emotional self-control.

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Quality of Life and Livability in selected Neighborhoods in Port Harcourt, Rivers State, Nigeria

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Abstract- Building livable and sustainable cities has become one of the imperatives of modern planning more so that the rate of world's urbanization is now on the increase especially among the less developing nations. There is also a renewed concern that improving the quality of life and livability of urban dwellers is no longer a simple matter of 'bricks and mortar', but a matter of human satisfaction with different urban attributes. Building livable cities and neighborhoods are also hinged on the fact that urban designs and structures can be very influential in the life of a city, its dwellers and indeed to the building of community itself. The present study examined the Quality of Life (QOL) and livability in selected neighborhoods in Port Harcourt with a view to highlighting the factors that predict quality of life and livability in the study area. The study adopted quasi experimental research design since there was no manipulation of the variables under study. The sample size consists of 396 heads of households who were randomly selected during the study period. The Multiple Classification Analysis (MCA), a variant of multiple regression techniques was used in data analysis. The result of the study revealed that monthly income, occupation and level of education are important factors predicting quality of life and livability in the study area. The joint explanation (R²) of the three independent variables (occupation, monthly income and level of education) on neighborhood safety is (.537). It was also observed that, monthly income and education status collectively account for significant variation in perceived neighborhood livability for housing in the three (3) neighborhoods in Port Harcourt. When the level of relationship between neighborhood population density and the independent variables of income, level of education and occupation were examined, it was also observed that there is indeed a bivariate relationship between them. The R² value of 0.693 was obtained implying that 69% variation in the dependent variable is explained by the independent variables. Since neighborhood livability and QOL focuses on the manner in which urban spaces work, the interface between public and private realms and their relationships with the natural environment, including built and social heritage, planning must strive to produce livability cities by crating governance model that supports the civic ecology through participatory democracy.

Index Terms- Livability; Quality of life; planning; livable cities; public space; sustainability

I. INTRODUCTION

One of the challenges that modern planning has to grapple with deals with the ability of planning prescriptions to precipitate livable and yet sustainable cities and communities. This challenge has become even more imperative as the rate of world's urbanization is now on the increase especially among the less developing nations. Urban quality of life and livability are planning concepts aimed at restoring existing urban areas and control the development of new communities. The renewed interests on quality of life and livability of urban dwellers among planners hinge on the concern that improving the quality of life in cities is no longer a simple matter of 'bricks and mortar', but the human satisfaction with different urban attributes such as transportation, quality of public spaces, recreational opportunities, land use patterns, and ease of access for all to basic goods, services and public amenities.(HamamSerag, et.al,2013)

It is in the light of the above that goal 3 of the Sustainable Development Goal (SDGs) seeks to ensure healthy lives and promote well-being for people at all ages. Recognizing that sustainable urban development and management are crucial to the quality of life, the goal advocates for city planning that enhances human settlements that fosters community cohesion; personal security and stimulate innovation and employment.(UNDP,2017). Building livable cities and neighborhoods have become imperative in view of the fact that urban designs and structure can be very influential in the life of a town or city, its dwellers and indeed to the building of community in and of itself. (Chris et. al, 2006). Related to the above is the concern that the quality of urban space affects and is in turn affected by the quality of life of residents of such space. It is for this reason that building livable and sustainable cities has become of prime human imperative in the 21st Century that need to be addressed early within planning processes so as to reconcile the imperatives of sustainable development. (Dale, 2001). Port Harcourt is facing rapid growth occasioned by very high rural-urban migration. Also important is the very haphazard nature of growth in Port Harcourt (Weje and Bright, 2018). The uncoordinated growth of the city, manifest in steady decline in the vibrancy and vitality of the city with negative implications on the quality of life and livability. This study, therefore seeks to examine the perception of residents on quality of life and urban livability in selected neighborhoods using selected socio-economic indicators as predictive factors.

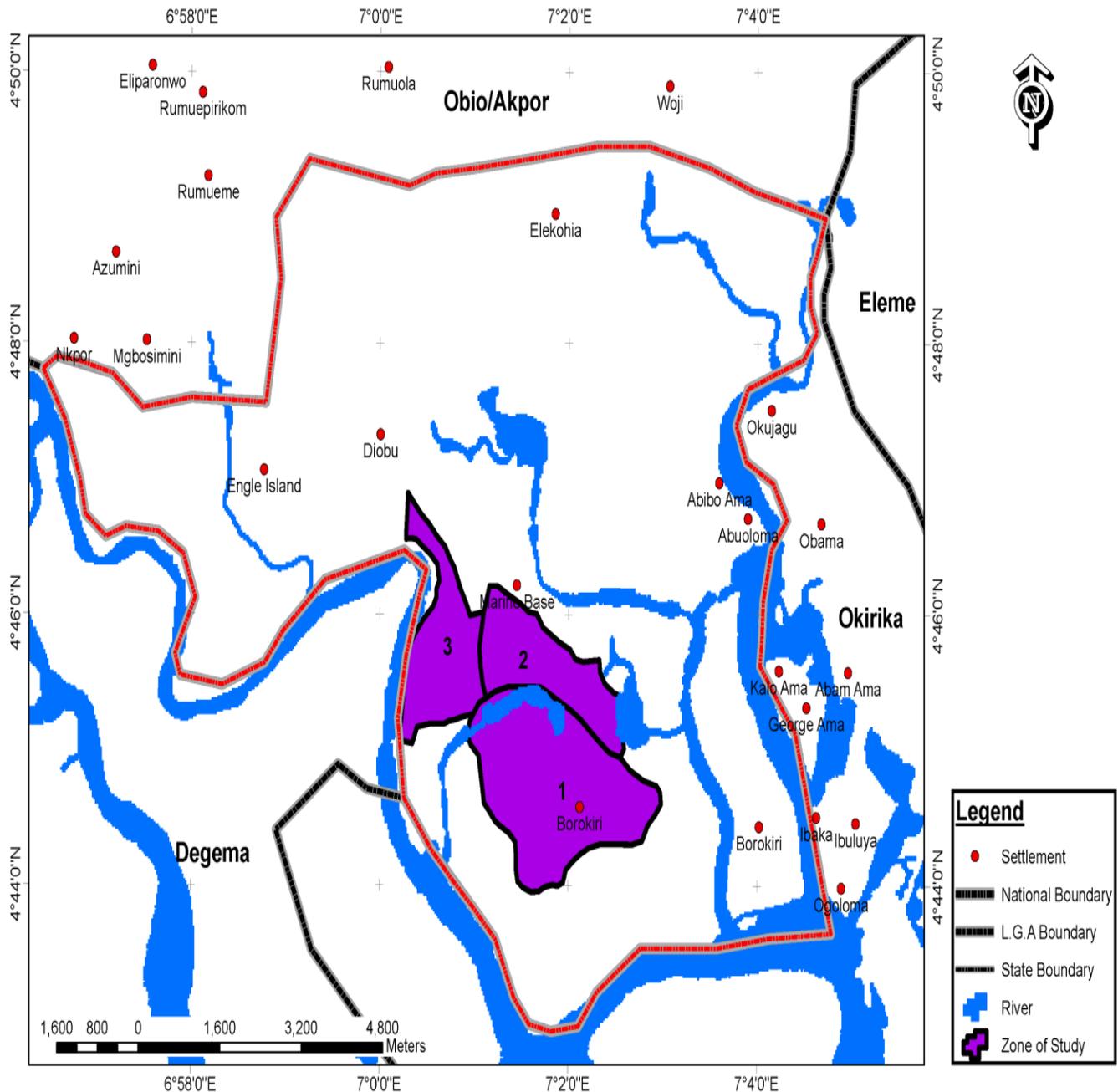
II. 2. STUDY LOCATION

Port Harcourt is one of the biggest cities and is financially viable as the focal point of Nigeria's oil and gas industry. It is the headquarters of Rivers State and the administrative seat of Port Harcourt City Local Government Area (PHALGA). Port Harcourt Situates on coordinate 4°49'27"N 7°2'1"E / 4.82417°N. It is located 52 kilometers (32 mi) southeast of Ahoada and around 40 kilometers (25 mi) northwest of Bori. It is boarded on the south by Okrika Local Government Area (LGA), on the east, by Eleme LGA, north by Obio-Akpor LGA and on the west

by Degema LGA. Port Harcourt has a moderately level geography of around 3.3m above sea level. It is blessed with oil and gas resources, sea ports and houses both local and multinational corporations. The presence of these resources is all contributory to the rapid growth of the city but not without some consequences such as uncoordinated growth with attendant implications on the city's quality of life.

The study covers three neighborhood s in Port Harcourt City Local Government Area namely: Main Town, Borokiri, and Dockyard Layout (see figure 1).

Figure 1: Study Neighborhood



Source: Rivers State Master plan of 1975

III. CONCEPTUAL FRAMEWORK/LITERATURE REVIEW

3.1 The Neighborhood Concept

The neighborhood concept was developed by Perry (1872 – 1944) and used to describe a populated area that supports a primary school with pupils' enrolment of between 1000 and 1200. A neighborhood was bounded by arterial road and other boundaries with an open space, school, community centre and local shops. In addition, there should be no thorough traffic within the neighborhood centre. This concept dominated scholar discourse during the industrial revolution. The neighborhood concept was developed as a response to degradation of the city surroundings because of excessive and heavy traffic movement through the city, insecurity to school – going children, distance of shopping and recreational facilities among others (Shambharkar, 2008). The idea of the concept was to create a safe and healthy physical environment in which children will have no traffic.

According to Perry,(1998) the neighborhood concept acts as a framework for urban planners attempting to design functional, self-contained and desirable neighbourhoods in the early 20th century in industrialising cities. The concept has however been adapted presently as a means of ordering and organising new residential communities in a way which satisfies contemporary "social, administrative and service requirements for satisfactory urban existence (Perry,1998)

3.2 The Concept of Livability and Quality of Life (QOL)

A livable city is one that addresses the issues of its residents for clean air and water, adequate housing, Safe Street, secure open spaces, employments and economic opportunities, and essential amenities like education, health care and sanitation. (Clark,2013). Other aspect of city livability is the degree to which citizens' participation in decision-making on matters meeting their well-being. Livability describes the ability of a living space (neighborhood, settlement) to support quality living to the residents. From the professional point of view, a livable space is expected to exhibit but not limited to the following: have a secure or safe public space; ensure an healthy environment; guarantee good job opportunities; ensure an integrated public transport system; foster accessible facilities for all; ensure greater transparency and good governance (devoid of political interferes corruption).

On the other hand, Quality of Life (QOL) refers to the outcome of conditions that perceived to exist and the degree to which they meet the desire and expectations of individuals (Massam,2002). QOL of life describes a multi-faceted concept that links both the physical, social, psychological and environmental dimensions of a person. urban quality of life refers to the urban planning whose objective is to realize the sustainability of the development with respect to an individual's quality of life. It is in this context that Centre for Health Promotion (2001) describes QOL to cover three main areas: Being (connecting with physical, psychological and spiritual) Belonging (connections to one's physical, social and community environment) and Becoming which describes the day to day activities that a person carries out to achieve goals, hopes, and aspirations with practical, leisure, and growth aspects.

The phenomenon of QOL is multi-faceted and complex rather than linear. Understanding the concept therefore requires an analysis of particular quality of space, including the relationships, the dynamics, and the reticular relationships that exist between the various dimensions of space. This is because quality of life does not refer to the quality of life in urban areas only but describes the quality of built environment in both urban and rural areas.

The issue of quality of life and liveability have attracted the attention of so many scholars. Kamp et al, (2013) sees livability as parts of the individual condition that in their broadest sense makes a place satisfying to live in. for them, a livable place should be especially regulated and by and large without irritation, pressing, uproar, hazard, air tainting, earth, squander, and other unwelcome intrusions. However, Myers, (1987) considers livability as "the community's quality of life which is constructed of the shared characteristics the residents experience in places and the subjective evaluations residents make of those conditions". This share some tangible characteristics which comprises accessibility of transport, public amenities, social facilities, opportunities and the impalpable components, for example, sense of place, sense of safety access to amenities, comfort, health, mobility, air quality, social network (Howley et. al. 2009;). These qualities cover the fundamentals of living and inclinations of the residents

McCrea et al (2005), examined different geographic levels of subjective urban quality of life and discovered that regional satisfaction was best predicted by evaluations of regional services (such as health and education) and the cost of living, while evaluations of environmental and urban growth problems were significant predictors of regional satisfaction for younger persons. Neighborhood satisfaction was best predicted by evaluations of social interactions, neighborhood crime and public facilities (parks, libraries), while housing satisfaction was predicted best by age of home and home ownership. Chor, and Wai (2006) also explored the relationship between the accessibility to prestigious schools and the value of housing properties in Singapore. The findings indicate that the accessibility to prestigious schools does affect residential property price, and it significantly explains the variation in housing prices in Singapore. However, these are not valued as highly as other attributes, such as neighborhood prestige and tenure of the property.

Song and Knaap (2004), analyzed the prices of single family houses when mixed land uses are included in neighborhoods in Washington County. They concluded that housing prices increase with their proximity to – or with increasing amount of – public parks or neighborhood commercial land uses.

IV. METHODOLOGY

The study adopted the quasi-experimental (Cook and Campbell, 1979) research design since there was no manipulation of any subjects of the study. Port Harcourt has 22 existing neighborhoods, three (3) neighborhoods (Borokiri, Reclamation (Dock yard) and Main town layouts) were selected randomly for study. To determine the sample size, total census of number of households was carried out and ascertained to be

41,272. Furthermore, the Taro Yamane sample size determination method was there after applied to determine the appropriate number of households (sample size) that should be studied at the 5% level of precision. In order to determine the number of questionnaires to be distributed in each of the sampled neighborhoods, the Neyman proportional allocation method was adopted so as to ensure that sample size is representative of the household population. A total number of 396 questionnaires were distributed and was considered adequate for this study.

To determine if there is any statistically significant relationship between the dependent variable (livability) and independent variables (residents occupation, income and educational status), the Multiple Classification Analysis (MCA) was used. The MCA statistics shows eta, eta² coefficient indicating how each independent variable is related to the dependent variable and a beta coefficient for each independent variable indicating its relative importance in the total variance explained.

The MCA technique is given by the equation:

$$Y_{ij\dots n} = \hat{Y} + a_i + b_j + \dots + e_{ij\dots n} \quad \dots\dots\dots(1)$$

$Y_{ij\dots n}$ = The score (on the dependent variable (i.e. Housing Productivity (HP) of individual who falls in category i of predictor A (AC), category /of predictor B (LAV), etc.

\hat{Y} = Grand mean on the dependent variable (HP)

a_i = The “effect” of membership in the ith category of predictor A (AC).

b_j = The “effect of membership in the jth category of predictor B (HP)

$e_{ij\dots n}$ = Error term

There exist diverse dimensions on which QOL can be measured the present study focused on three domains of QOL such as environmental dimension (measured in terms of conditions and availability of open space, youth friendliness, opportunity to play in the neighborhood and presence of parks); social dimension, (measured in terms crime rate); and physical dimension (measured in terms of affordability of housing, population density and nature of land use distribution)

V. RESULTS AND DISCUSSION

This section presents the results of the MCA analysis between our dependent and independent variables. Table 1 is the result of our MCA showing the relationship between neighborhood safety (dependent) and residents’ occupation, income and level of education (independent variables). The Eta² factor shows that there is significant relationship between our dependent and independent variables. The result shows that occupation (.174), monthly income (0.320), and level of education (0.187) have large and significant predictive effect on neighborhood safety. The joint explanation (R²) of the three independent variables (occupation, monthly income and level of education) on neighborhood safety is (.537). This implies that the level of explanation provided by occupation, income and level of education to the dependent variable (neighborhood safety) in the study area is 53%.

Table 1: Multivariate relationship between neighborhood safety and occupation, monthly income and educational status of residents

			Eta	Eta ²	Beta	R	R ²
Neighborhood Crime rate (Safety)	Occupation		.417	.174	.801	733	.537
	Monthly income		.566	.320	.901		
	Level of education		.432	.187	.640		

Source: Field Survey,(2018)

To ascertain if there is multivariate relation between neighborhood livability for housing and occupation, income and educational status of residents, a multiple classification analysis was also done as shown in table 2. The result (table 2) reveals that occupation, monthly income and education status collectively account for significant variation in perceived neighborhood livability for housing in the three (3) neighborhoods of Port Harcourt. The import of this development is that there is significant relationship between liveability for housing and the independent variables examined. The Eta² value shows that monthly income (1.220) and occupation of residents (1.02) correlates highly with affordability of accommodation respectively. Again, monthly income and occupation of residents also have large effect in terms of the level of explanation they provide for land use distribution in the

studied neighborhoods. The joint explanation (R²) provided by the independent variable (income, educational and occupational status of residents) to the dependent variable (land use distribution) shows that educational status, monthly income and occupation of residents is 0.829, indicating that 81% of the changes in the dependent variable is accounted for by the independent variables. For when the level of relationship between neighborhood population density and the independent variables income level of education and occupation was examined it is also revealed that there is bivariate relationship between them. The R² value of 0.693 was obtained implying that 69% variation in dependent variable is explained by the independent variable

Table 2: Neighborhood Livability for Housing using Occupation, Monthly Income and Level of Education (MCA)

		Eta	Eta ²	Beta (Adjusted)	R ²
Affordability of accommodation in the neighborhood	Level of education	.491	.241	.402	0.754
	Monthly income	.678	.460	1.220	
	Occupation	.699	.489	1.020	
Population density in the neighborhood	Level of education	.654	.428	.544	0.693
	Monthly income	.538	.289	.792	
	Occupation	.482	.232	.684	
Nature of landuse distribution in the neighborhood	Level of education	.122	.014	.264	0.810
	Monthly income	.829	.687	1.593	
	Occupation	.741	.549	1.079	

Source: Researcher’s Field Survey, (2018)

To further determine the relationship between neighborhoods liveability for open space and the resident’s socioeconomic characteristics, the MCA analysis was also carried out as shown in table 3. The result (table 3) shows that monthly income (eta² =1.334) and residents occupation (eta² =0.849) are the most important factors that correlate with open space in neighborhood . With respect to opportunities for families to play in neighborhood , monthly income (eta=1,449)

and occupation of residents (eta=1.381) also had a very high predictive powers. (See table 3). The joint explanation of income, occupation and educational status of residents to condition of open space in neighborhood is 0.628. For Level of youth friendliness in the neighbourhood, it is 0.839, Opportunities for families to play in neighborhood 0.826 and Parks that cater to youth in neighborhood 0.698 respectively.

Table 3: Predicting Perceived Neighborhood Livability for Open Space using Occupation, Monthly Income and Level of Education (Multiple Classification Analysis)

		Eta	Eta ²	Beta (Adjusted)	R ²
Rating the condition of the open space in neighborhood	Monthly income	.687	.472	1.334	0.628
	Occupation	.466	.217	.849	
	Level of education	.446	.199	.221	
Level of youth friendliness in neighborhood	Monthly income	.819	.671	.538	0.839
	Occupation	.789	.623	.678	
	Level of education	.620	.384	.411	
Opportunities for families to play in neighborhood	Monthly income	.606	.367	1.449	0.826
	Occupation	.532	.283	1.381	
	Level of education	.273	.075	.355	
Parks that cater for youth in neighborhood	Monthly income	.786	.618	1.242	0.698
	Occupation	.516	.266	.559	
	Education	.302	.091	.204	

Source: Researcher’s Field Survey, (2018)

VI. CONCLUSION AND RECOMMENDATION

Neighborhood livability is presented as a unique case of livability at large with strong ties to the notion of urbanity. Developed nations have managed to retain higher levels of livability by improving economic and health conditions and by adopting a more responsive approach to environmental issues. The livability concerns in most developing nations still revolve around the reduction of poverty, hunger, and disease. Such presence affects natural biodiversity and ecological stability by

modifying the natural landscape and emitting different kinds of wastes and pollutants to the environment. To improve the overall livability of the cities must minimize their impudence on the environment, which leads us to the reasonable assumption that the less cities we have, the more livability we can achieve. Such assumption may prevail if we ignore the social and psychological aspects of human life.

The advent of urbanity has prompted people to abandon their rural lives with established primary and secondary social circles and head to the cities to achieve greater economic and civic independence. Urbanity has offered humanity with another

kind of social and cultural affiliation that may have transcended the familial, clannish, and racial bonds. The economic and social opportunities offered by the city continue to entice people to move into urban areas and leave behind their pristine natural environments. Neighborhood livability and QOL focuses on the manner in which urban spaces work, the interface between public and private realms and their relationships with the natural environment, and the cultural values, including built and social heritage. Urban livability must consider urban morphology as an "incubator" of social and economic functions. Therefore, economic and physical development decisions must be coordinated to develop socially and culturally responsive environments.

This process provides a healthy environment that can emancipate the abilities of people and fulfill their need to become a part of sustainable social systems. Therefore, cities that strive to achieve livability and high QOL must create a governance model that supports the civic ecology of participatory democracy. Globalization has intensified economic competition among world cities in terms of attracting foreign investment as well as major sports and social events. The current ranking surveys have mobilized city governments to enhance the quality and scope of their public services with an emphasis on heightening the aesthetics of built environments and improving the lifestyle choices of their people. Although these measures can improve the standards of living, they do not necessarily result in long-term implications for the well-being of life-long residents.

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Effects of Occupational Stress on Employees: Gender Reaction and Coping Techniques

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Abstract- Nowadays organizations are expecting much more from their employees as a consequence of the industry evolution. Higher demands and requirements have impacted the well-being of employees increasing the levels of occupational stress. The purpose of this study was to examine gender differences in response to occupational stress and to investigate the use and effectiveness of coping strategies. An online survey was distributed containing demographic questions, instruments assessing physical and psychological symptoms along with questions inquiring physical activity, overall stress, and coping strategies. A total of 114 participants from various job levels (males = 46, females = 68) completed the survey. It was hypothesized that female employees would report significantly more psychological and physical symptoms than male employees under occupational stress. The results did not support the hypothesis indicating that no significant difference exists between gender and occupational stress. However, differences in the coping strategies used by females and males to reduce stress were found. Thus, knowing how each gender experience occupational stress and what coping strategies are used to decrease stress levels, organizations can have a better understanding of what methods and training to provide employees for the reduction of occupational stress. The findings serve as a contribution to the existing literature on question; yet, the authors suggest further examination on gender, occupational stress, and effectiveness of coping strategies. Limitation of the study are discussed.

Index Terms- gender, occupational stress, coping strategies, physical and psychological symptoms.

I. LITERATURE REVIEW

In the past decades, there has been constant changes in the nature of organizations. Factors such as integration of new technology, economic crisis, and new marketing strategies have forced companies to implement organizational changes to stay competitive and survive. Nevertheless, such continuous fluctuations create additional demands and challenges not only for organizations but for employees as well. Uncertainty about the ways change may affect the work of employees rises anxiety levels. Greubel and Kecklund (2010) suggested that different kinds of organizational changes play a negative part on health, work stress, sleep, sleepiness and recovery. According to Rivera-Torres, Araque-Padilla and Montero-Simo (2013) study on Job

Demands-Control and Support model and gender, environments with high work demands and low work control on the part of employees induce higher occupational stress levels; consequently, stress effects are greater on the health of individuals. Results from a survey of 300 general practitioners examining the relationship of quality of life, work demands, and psychological stress done by Vanagas and Bihari-Axelsson (2004) suggested that the combination of increasing job demands and psychological stress produces harmful consequences in the life quality of individuals. All the negative consequences that changes and demands have on the health of employees lead to occupational stress. Occupational stress was conceptualized by Galanakis, Stalikas, Kallia, Karagianni, and Karela (2009) as the incompatibility between the perceptions of demands imposed by the environment and the evaluation of personal resources available to accomplish those demands. Beehr and Newman (1978) defined occupational stress as factors of the job that force employees to deviate from normal functioning making the psychological and physical state to change.

To further investigate the adverse effects that occupational stress generates on employees, researchers have turned the focus to stress reaction by gender. A study reported that response to stress by women comes from perceiving an event as threat; in contrast, the reaction of men to stress follows the evaluation of the availability of resources for managing a stressful situation (Watson, Goh & Sawang, 2011). Based on the findings of Rivera-Torres et al. (2013), the Job Demands-Control and Support model showed that significant difference exists on how each gender reach levels of occupational stress. Intellectual and emotional demands produced high levels of occupational stress in women; whereas, time pressure and work were the most critical demands affecting men with occupational stress (Rivera-Torres et al., 2013). Other results have determined that women are more prone to suffer psychological strain, anger, and depression compared to men when working under similar circumstances (Liu, Spector, & Shi, 2008). In an empirical review done by Jick and Mitz (1985) on gender differences and work stress, various studies were analyzed indicating a tendency of females to report more psychological distress as opposed to males who experienced more physiological symptoms in response to stress. Stroud, Salovey, and Epel (2002) investigated the difference between men and women and the adrenocortical reaction to different occupational stressors. The conclusion was that cortisol levels increase based on the reaction by men to achievement stressors, and the reaction to social rejection by

women. Therefore, the findings revealed that women are more physiologically sensitive to interpersonal conflict than men. Moreover, a research conducted by Matud (2004) based on gender differences and coping techniques suggested that women experience higher somatic symptoms and psychological distress compared to men. Miller et al. (2000) studied the interaction of gender and culture in the experience of job stress by managers from four different countries. The study concluded there was not a difference in stressors experienced by male and females but that differences exist in the strains faced by gender, where men experienced better mental and physical health than women. Based on these studies, there are clearly contradictory findings in the literature of occupational stress and gender reaction.

On the other hand, there are other factors that may influence the stress levels experienced by each gender. The pressure that individuals experience to fulfill roles and responsibilities with family and work differs as well as the reaction to such aspects. Female and male differences might exist due to the diverse job positions at different organizational levels (Torkelson, Muhonen, & Peiro, 2007). Since females have a minority status in the workplace, additional stressors, such as low-salaries and work-family conflict, are experienced by women leading to increasing levels of stress (Devanna, 1987; Greenglass, 1993). Likewise, multiple roles imposed on females produce higher stress levels. Women have many roles that need to be fulfilled such as wives, mothers, daughters, and professionals. As concluded by Galanakis et al. (2009), females that are working, married, and have children experience higher stress levels compared to single or married men and women, or married couples without children. Though, when comparisons were made between female and male employees of the same age based on educational background and marital status, similar levels of stress were found among employees (Galanakis et al., 2009).

A different area that researchers have explored is how each gender manages occupational stress and the strategies used to lessen the effects of such constraints. Lowe and Bennet (2003) described coping as the process of reducing the negative effects that stressful situations bring to the life of an individual. Coping is also conceptualized as the usage of different methods in order to deal with the state of tension that stress brings (Anbazhagan & Rajan, 2013). Most of the literature on coping discusses two strategies: problem-focused and emotion-focused. Problem-focused technique minimizes stress by changing work habits or work environment that employees are in and resolving problems in a practical way; emotion-focused coping technique regulates emotions that stressors generate and help employees adjust to stress (Anbazhagan, & Rajan, 2013; Torkelson & Muhonen, 2004). Examples of emotion-focused techniques are social support, relaxation techniques, and health maintenance; whereas, some problem-focused techniques are time management, role clarification, delegation, and problem-solving (Anbazhagan & Rajan, 2013). Chang and Taylor (2013) conclusions showed that the combination of both coping strategies can benefit individuals since both techniques have shown to relieve stress; in addition, these strategies aid to sustain job performance levels and physical well-being. Another finding suggested that coping techniques used by females and males were strictly dependent on the type of stressor encountered (Torkelson et al., 2007). Yet,

findings by Torkelson and Muhonen (2004) study concluded that the problem-focused technique has no relationship with the reduction health symptoms compared with emotion-focused strategy of seeking emotional support which was associated with fewer health symptoms.

Several studies have reported that males use different coping techniques than females. According to Lowe and Bennet (2003) findings, employees use both problem-focused and emotional-focused coping strategies in the reduction of stress. Torkelson and Muhonen (2004) suggested that difference in the use of coping styles depended on the occupational level and gender. Employees who are at the same level and performing similar tasks tend to use problem-focused technique regardless of the gender; however, those who are at the non-managerial level, males tend to use problem-focused strategy more often than females and females use more emotion-focused techniques (Torkelson & Muhonen, 2004). Similarly, another study found that problem-focused technique tends to be use in upper positions; in contrast, emotion-focused technique is usually used by lower level positions (Narayanan, Menon, & Spector, 1999). Findings obtained in Matud (2004) study indicated that females use frequently emotion-focused coping technique since women experience more psychological distress than males. Nevertheless, ambiguity exists if gender differences really exist in the techniques implemented to reduce physical and psychological symptoms due to stress (Jick & Mitz, 1985).

The intent of this study was to extend the investigation of gender differences in response to occupational stress. In order to examine differences in participants, the effects of occupational stress were measured according to physical and psychological symptoms experienced by gender. Moreover, coping is defined in this study as a process of reducing stress by using two common strategies, problem-focused coping and emotion-focused coping. It was hypothesized that female employees will report significantly more psychological and physical symptoms than male employees under occupational stress. Furthermore, the data was analyzed to explore gender differences in the usefulness of coping strategies in the reduction of stress.

II. METHODOLOGY

Participants

For the purpose of the study, all individuals were required to be at least 18 years old and to be working at the time of participation. The 114 participants that responded the survey were from a convenient sample, which consisted of 68 (59.65%) females and 46 (49.35%) males. Most of respondents indicated that they were of Hispanic ethnicity 82.5%. There were 31 participants that opted to respond the Spanish version survey and 83 that proceed to complete the English version. In addition, 41.2% of participants described their current job level as professionals (28 females and 19 males); whereas, 6 males and 11 females indicated to be in entry level positions.

Materials

An occupational survey was created with two different language versions, English and Spanish. First, the survey included a demographic questionnaire, such as age and educational level, based on multiple choice and short answers format. In addition, the Physical Symptom Inventory based on

18-items with yes/no responses format was used to assess the physical symptoms experienced by employees in response to stress (Spector & Jex, 1998). Participants had to indicate whether they had a symptom in the past 30 days but did not see a doctor, they had a symptom and saw a doctor or they did not experience the symptom. The full version of the Job-Related Affective Well-being Scale was also used to assess the psychological symptoms experienced by individuals under occupational stress. The scale contains 30-items where responses are based on a five-point scale, 1= Never to 5 = Extremely often. Also, the survey included a short answer question format: how many days a week do you exercise?" to measure regularity of physical exercise, and a question based on a five-point scale 1= Normal to 5 = Very Severe asking the overall stress in the last 30 days. Last, a multiple choice question was formulated about which coping strategy participants use when confronting stressful situations at work. The possible answers were centered on two types of coping techniques, a) problem-focused, b) emotion-focused, c) combination of both, and d) none. The design of the question was intended to take participants that use one of the two strategies to answer and evaluate the level of effectiveness of the techniques based on a five-point scale from 1 = Strongly disagree to 5 = Strongly Agree.

Procedure

The survey was conducted through Google Forms, and it was written in English and Spanish. The Spanish translation was reviewed by a native Spanish speaker. Since the survey was internet-based, the administration was done by sending a recruitment message including the survey link through email and social media, Facebook and LinkedIn, to participants.

When participants received the link, first read the informed consent form. The form contains a description of participant's rights such as the purpose of the survey, the right to withdraw, the risks involved, and the contact information of researchers. It clearly states the survey is anonymous and that participation is absolutely voluntary without any penalties if participants discontinue the survey. Once participants agreed to participate, the time duration to complete the survey was supposed to be about 5-10 minutes. It is important to mention that there was no compensation for participation in the study.

III. RESULTS

In the analysis of descriptive statistics between gender and physical symptoms, females have a higher mean ($M = 4.90$) compare to the mean of males ($M = 4.13$) producing a difference of 0.77 points. A difference exists in the mean results of males ($M = 107.9$) and females ($M = 102.09$) by 5.82 points between gender and psychological symptoms.

In regards to the descriptive information of coping strategies, the question which strategy do you use when confronting stressful situations at work revealed that 50% of males preferred to use problem-focused coping strategy and 64.7% of females preferred to use a combination of problem and emotion-focused coping strategies.

Another factor analyzed was the stress level of participants. Male participants reported lower average of stress ($M = 2.57$) compared to female participants ($M = 2.78$) resulting

in a difference between the means of 0.21 points. However, the mean difference was not statistically significant to conclude a difference in stress levels between male and female employees.

Physical, Psychological, Coping Strategies Analysis

In order to test the physical symptoms experienced by female and male employees under occupational stress, a t-test statistical analysis was done. The pretest criteria was tested where normality, homogeneity of variance from the Levene test ($p .801$), and $n > 30$ were satisfied. Using a .05 alpha level ($\alpha = .05$) and confidence level of 95%, the p value of .468 ($p = .266$) suggested that there is no statistically significant difference. In conclusion, results indicated that there is no difference in the physical symptoms experienced by male and female employees under occupational stress.

To examine gender differences in experienced psychological symptoms, a t-test analysis was also used to analyze the variables. Normality, and n criteria was satisfied; however, the Levene test for homogeneity of variance did not satisfy the pretest criteria ($p = .021$). A p value of .132 ($p = .132$) was obtained with an alpha level of .05 ($\alpha = .05$) and 95% confidence level. Findings indicated that there is no statistically significant difference in psychological symptoms experience by both genders when facing job stress.

In order to investigate which coping strategy was the most used by participants, a chi-square test was performed. As depicted in Table 3, a 2×4 chi-square was done where classification of coping strategies was as follows: 1= Problem-focused, 2= emotion focused, 3= combination of both, 4= none. The chi-square p value obtained was .011 less than the used alpha level .05 ($\alpha = .05$) indicating that there is a statistically significant difference in responses across gender and the use coping strategies. The findings suggest problem-focused is most used by males, and combination of problem-focused and emotion-focused is most preferred by females. However, it should be noted that in the crosstabulation table, each cell does not contain an n of at least 5, meaning that the pretest criterion for a Chi-Square analysis was not satisfied.

Gender and Stress Level

The study also examined the stress levels of participants. To determine if there was a difference in stress level experienced by male and female employees under occupational stress, a t-test was run to analyze the data. The pretest criteria satisfied the assumptions to proceed with the t-test analysis. Using a .05 alpha level and 95% confidence level, the p value of .336 was obtained suggesting that there is no statistically significant difference. In conclusion, the finding indicated that there is no difference in stress levels experienced by male and female employees under occupational stress.

IV. DISCUSSION

The aim of this study was to examine the physical and psychological symptoms experienced by male and female employees under occupational stress. The findings indicated that no differences were found in the experience of physical and psychological symptoms by both genders suffering occupational stress; consequently, the initial hypothesis was not supported.

The interpretation of the results suggested that physical and psychological symptoms are encountered in a similar magnitude by male and female employees. Makhbul and Hasun (2011) study supports the findings that there is no difference in the experience of stress by both genders. The study revealed that support staff from Malaysia experienced and reacted similarly to their jobs and stressors regardless of the gender. While in Matud (2004) study, it was determined that a difference exists between genders where females experience higher somatic symptoms, psychological distress, frustrations, and conflicts. Miller et al. (2000) findings suggested that men and women working at a same level encounter the same stressors but women experience worst physical and mental health as a reaction to such stressors.

Furthermore, the authors wanted to explore the preferences of gender with respect to coping strategies use and the effectiveness of such techniques. Based on the results, male employees use more problem-focused coping techniques, whereas female employees use a combination of both (problem and emotion-focused). Other findings showed that problem-focused strategy is used by both genders when working at the same managerial level; in contrast, males in the non-managerial level tend to choose problem-focus coping strategy more than females (Torkelson & Muhonen, 2004). In the research of Matud (2004), interpretations indicated that women use more emotion-focused and avoidance technique than men. Nevertheless, it is unclear which coping technique is most effective in reducing the effects of stress (Jick & Mitz, 1985). The authors were aimed at investigating and clarifying which type of coping style was more effective to lessen the consequences of occupational stress but proper analysis was not possible to be performed.

Limitations

There are various limitations involved in the current study. First, the sample used in the research is a convenient sample. Second, the demographic question about the job level of participants, a few individuals chose the option "retired" or "unemployed". The study required participants to be actively working at least 30 days prior participating in the survey. The authors decided to include the data of retired or unemployed participants; even though, there is the possibility of response bias since the time period is unknown which such job levels have been held by the participants. Other limitation is that the assumption for the t-test analysis performed on gender and psychological symptoms variables was not met due to the probability obtained ($p = .021$) in the Levene test for homogeneity of variance. Likewise, when gender preferences of coping strategies were examined, the criterion $1 - n > 5$ for the chi-square test was not satisfied making the analysis less robust. Thus, it might be possible that the size of the sample affected the statistical testing. To conclude, the question for effectiveness for coping strategies could not be measured due to inadequate elaboration and structure of questions and answers. It was intended for participants to answer the effectiveness of the coping techniques based on the question answered in regards to the preference of coping strategies used. If participants answered the use a combination of both techniques or none, the survey finished with that question. Those individuals that answered preference for problem-focused or emotion-focused coping strategy jumped to the next question about effectiveness of the

chosen technique based on a five-point scale. By structuring the questions in that manner, the number of participants per group (females and males who evaluated the effectiveness of problem and emotion focused techniques) were negatively reduced in order to be able to run statistical tests and meet assumptions.

In conclusion, the aim of this study was to find differences in the psychological and physical symptoms experienced by female and male employees. Specifically, it was predicted that females will experience more psychological and physical symptoms than males caused by occupational stress. Results revealed that there are no gender differences with respect to the occupational stress outcome suggesting that both genders experience symptoms in a similar manner. The authors were able to examine gender preferences of coping techniques indicating that male employees use more problem-focused coping techniques; whereas, female employees use a combination of both (problem and emotion-focused). The results of this study serve as a contribution to the existing literature pertaining to occupational stress; yet, the authors suggest further examination on the topic. The literature is still unclear about which gender is more prone to experience higher distress under occupational stress due to the extensive organizational aspects where the variables can be studied. Effectiveness of coping techniques and the relationship of psychological and physical symptoms experienced by employees should also be considered for further analysis.

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Effect of Water Hammering Action on Performance of Hydraulic Ram Pump

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Abstract- The hydraulic ram pump is a simple durable pump that can be used to deliver water from one source to another. The pump has the following characteristics flow, drive that is how much water is available to run the pump; drive head is the drop from the water level in the drive tank to the pump; delivery flow is the amount of water flowing into the delivery tank while the delivery head is the height from the pump up to the delivery tank. The normal operation range of this pump is 0.5 to 10 litres/minute. The ram pumps are durable and either made from iron casting or welded steel pipe. The readily available local materials have been used to build the pump. No electricity or any power fuel is required to run the pump, therefore, it is less expensive to own and operate.

The results from the study have shown that the impulse valve frequencies have a major impact on the discharge of a hydraulic ram pump. When impulse valve frequency increased from 65 beats / minute to 76 beats per minute, it was found that the quantity of waste water increased 47.20% but the quantity of useful water decreased by 74.50 %.

Index Terms- Hydram; Efficiency; Head Ratio; Discharge of Waste Water; Discharge of Useful Water.

I. INTRODUCTION

The need for water has always been a basic motivation of mankind, which frequently had to be lifted from a lower height to a upper height. This ever increasing need of water ultimately resulted in the development of various pumping aids. The increasing need of water is always being closely associated with the demands of domestic water supply for rural populations, irrigation etc. which is a very vital input for development of mankind. With a view to meet above requirements, the following specific objectives have been taken up to test the performance of hydraulic ram pump.

1. To study the performance evaluation of Hydraulic Ram pump at different operating conditions.
2. To find out the efficiency of Hydraulic Ram pump.
3. To determine the characteristic curve of hydraulic ram pump.

II. OPERATIONAL PRINCIPLE

Hydraulic ram pump works on the principle of water hammering action. The water is caught by the spring catchment (or the stream catchment) and driven to the header tank by the feed pipe.

The spring or stream catchment is the first barrier to prevent organic matters to enter in the system and to reduce the efficiency of the system. The header tank allows a continuous flow to the drive pipe and the pump and it the last barrier to prevent sediments to enter in the pump. The drive pipe is made from galvanized iron (G.I.). It has to support the water hammer effect which is running continuously. The drive pipe is designed to conduct water as fast as possible to the pump and it must be straight. The Hydram is the most critical infrastructure of the system. The Hydram is attached to the pump basement. It has to absorb the shocks of the water hammer effect. The pump basement has to be carefully design because it is subject to the fatigue of the water hammer effect and is very difficult to maintain without stopping the pump from running. The delivery pipe conducts the water from the pump to the storage tank. The storage tank is used to hold water before it is delivered to communities.

III. EXPERIMENTATION

It includes the procedure for the performance evaluation of the hydraulic ram pump under different operations conditions. The experimental setup consists of a Hydraulic ram having a cylindrical air vessel connected to a small rectangular chamber through a non returning valve. A waste valve is also provided in the rectangular chamber to discharge the excessive water to the collecting tank. The chamber is connected to an elevated supply tank. A delivery pipe is connected to the foot of air chamber to deliver the water to collecting tank to measure the discharge delivered by the ram.

The hydraulic ram pump under test was first checked to have the leak proof suction line. The supply tank was filled with the clear water up to a top of the header tank and was maintained throughout the experiment. The hydraulic ram pump under test was then run at the normal conditions. While starting the pump in the beginning, the discharge valve was kept closed to develop the full head under no load conditions. The valve was then open gradually to prevent the sudden surge in the discharge line.

Once the operating conditions were established the actual test was performed. In order to conduct the test to find out the efficiency of hydraulic ram pump, the volume of waste water and the volume of useful water at different pressure head were recorded. There was no change in the water level of supply tank throughout the experiment.

While taking the observations to determine the efficiency of hydraulic ram pump, the discharge valve was set at the maximum opening and the observations at different pressure head were recorded. The same time, for a particular pressure head the observations were taken at different discharge rates also by regulating the discharge valve. The same process was repeated for the different pressure heads to get the observations of waste water flow rate and useful water flow rate of hydraulic ram pump.

These are the following governing equations for calculating amount of water pumped per day.

For discharge of waste water:

$$R = \frac{R_2 - R_1}{100} \quad \dots(1)$$

Where,

- R = rise of water level in measuring tank in time ($\Delta t = t_2 - t_1$), cm
- R_1 = initial level of water in measuring tank at time t_1 , cm
- R_2 = final level of water in measuring tank at time t_2 , cm

$$Q = \frac{R \times A}{\Delta t} \quad \dots(2)$$

Where,

- Q = discharge of waste water, $m^3/sec.$
- R = rise in water level of water measuring tank of waste water, m
- A = area of measuring tank (0.42m x 0.289m)
- Δt = time taken for R, sec

For discharge of useful water:

$$r = \frac{r_2 - r_1}{100} \quad \dots(3)$$

Where,

- r = rise of water level in time Δt ($\Delta t = t_2 - t_1$), cm
- r_1 = initial level of water in measuring tank at time t_1 , cm
- r_2 = final level of water in measuring tank at time t_2 , cm

$$q = \frac{A \times r}{\Delta t} \quad \dots(4)$$

Where,

- q = discharge of useful water, m^3/sec
- Δt = time taken for collecting useful water(r), sec

D' Aubuisson's efficiency

$$\eta_a = \frac{q h_d}{(Q+q) h_s} \times 100 \quad \dots(5)$$

Rankine's Efficiency

$$\eta_r = \frac{q(h_d - h_s)}{Q h_s} \times 100 \quad \dots(6)$$

Where,

- η_a = D' Aubuisson's efficiency of hydraulic ram pump, per cent (%)
- η_r = Rankine's efficiency of hydraulic ram, per cent (%)
- h_s = height of water in supply tank, m
- h_d = delivery head, m
- Q = discharge of waste water, m^3/s
- q = discharge of useful water lifted up, m^3/s

IV. RESULT AND ANALYSIS

After performing the test on hydraulic ram pump we got following results for different operating conditions. Waste water discharge increases and varies from $2.33 \times 10^{-4} m^3/sec.$ to $3.43 \times 10^{-4} m^3/sec$ with maximum value of $3.43 \times 10^{-4} m^3/sec$ at $3.52 kg/cm^2$ pressure and useful water discharge decreases from $0.263 \times 10^{-4} m^3/sec.$ to $0.046 \times 10^{-4} m^3/sec$ with maximum value of $0.263 \times 10^{-4} m^3/sec$ at $0.71 kg/cm^2$ of operating pressure.

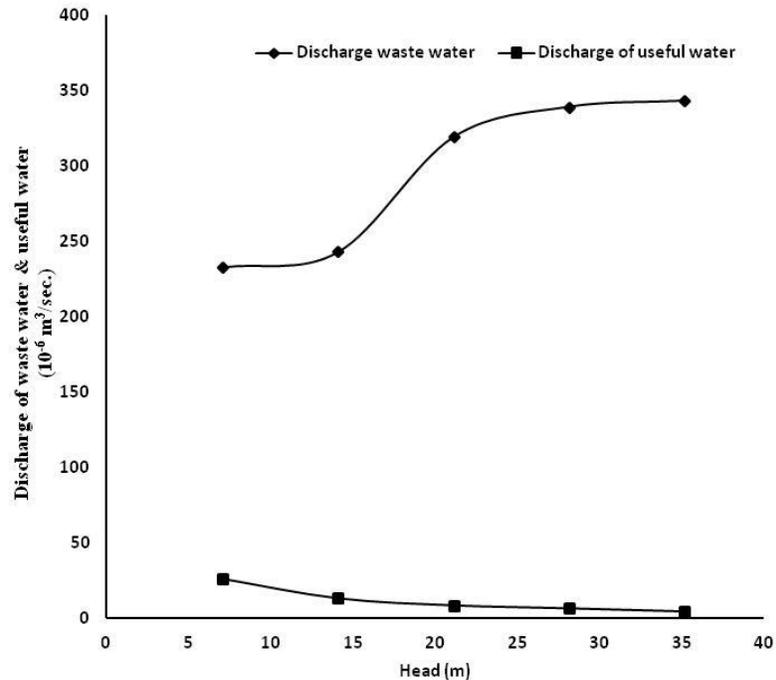


Fig: 1 Relationship between head and discharge

Hydraulic ram pump has a maximum efficiency of D' Aubuisson's efficiency and Rankine's efficiency 51.49% and 48.88% and a minimum efficiency of D' Aubuisson's efficiency and Rankine's efficiency 33.23% and 32.34% for a pressure range of 0.70 to 3.52 kg/cm^2 respectively. However, the highest efficiency was not obtained at highest discharge although the lowest efficiency was obtained at lowest discharge.

Characteristic curves of hydraulic ram working under conditions of constant waste valve lift, constant supply head and varying delivery head. With increase of delivery head the number of impulse frequency beats increases. Keeping the input unaltered, as the head increases the quantity of useful water per beat decreases. With increase in head the waste water per beat decreases slightly.

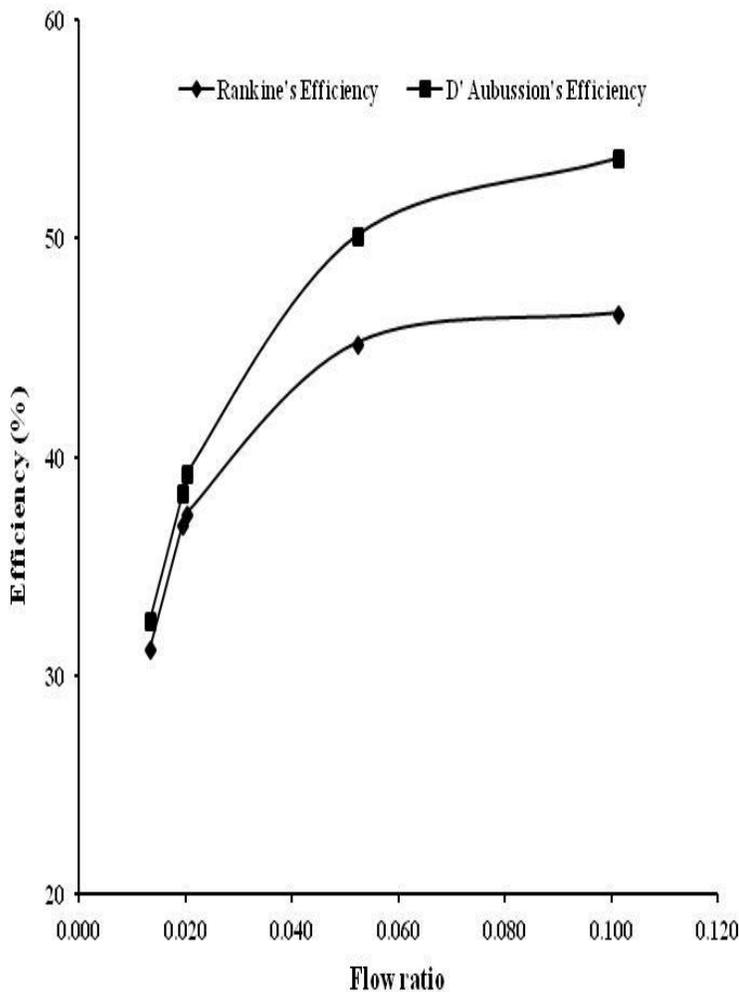


Figure 2: Relationship between flow ratio and efficiency

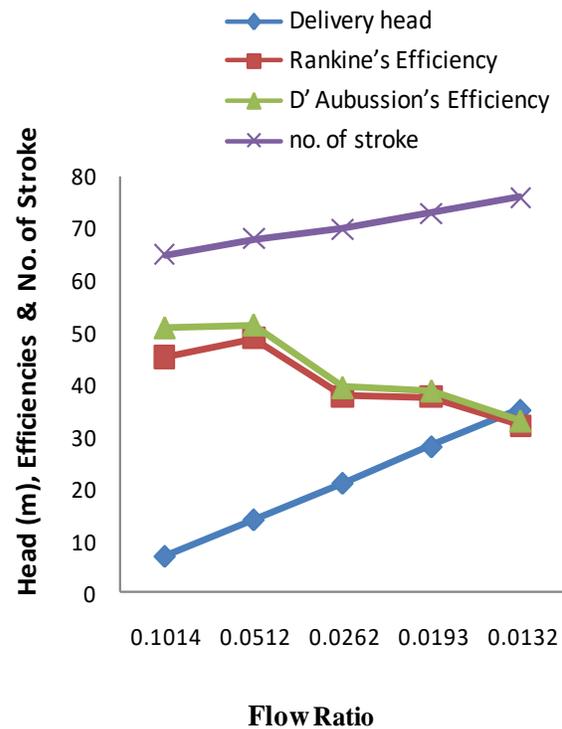


Figure 3: Characteristic curves of hydraulic ram pump

V. CONCLUSION

We concluded that hydraulic ram pump have a maximum efficiency of 51.49 % (D' Aubussion's efficiency) and a minimum of 32.00 % occurring at discharge of $0.134 \times 10^{-4} \text{ m}^3/\text{sec}$ and $0.046 \times 10^{-4} \text{ m}^3/\text{sec}$ respectively. However the pump has a maximum discharge of $0.263 \times 10^{-4} \text{ m}^3/\text{sec}$. The pump also has an optimum no. of strokes of 68 beats per minute. The results have also show that as the impulse valve frequency increase the discharge also increases up to an optimum point beyond which the discharges begin to decrease.

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The Strategy of Investment Decision Making Based on Fundamental Analysis

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Abstract:

The objective this study is to empirically test the fundamental analysis whether it can be used as a strategy in making investment decisions in the capital market. The method of this study is using secondary data. The analysis is done fundamentally and compares the intrinsic value through the Price Earning Ratio approach to market value on close price. The results of this study show that the condition of the sectoral company stock index is in the "overvalued" category based on fundamental analysis, because intrinsic value is lower than market value, that mean investors should not make transactions or "no buy" in 2018 year.

Index Terms: intrinsic, market value and price earnig ratio

I. INTRODUCTION

Shares are very closely related to business activities, by issuing shares of the company, it can become a long-term funding source. In addition, shares can also be used as an instrument to invest. Shares are a sign of participation or ownership of a person or entity in a company or limited liability company. Fahmi (2012) stated that stocks are one of the most sought after capital market instruments by investors, because they are able to provide attractive returns.

The number of retail investors entering the capital market has reached 838,000 new investors in 2017, the first month; 536,000 investors in 2016 and 432,000 investors in 2015, based on the Indonesian Stock Exchange records (<http://market.bisnis.com>). In addition the Indeks Harga Saham Gabungan (IHSG) in 2017 is assumed to grow by 5% - 10% for the Earning Per Share (EPS) ratio and by 18-19 times for the growth of the Price Earning Ratio (PER) or at 5,700 levels, worth 6,000 points, which translates being in a "moderate" position.

The existence of various changing conditions, investors must be able to consider and evaluate a stock, given the high risk involved in investing. Not all shares listed on the Stock Exchange can

provide maximum results when conducting transactions. Analysis needed to be done in minimizing existing risks before it is decided to be bought, sold or hold shares. One method that is often used to analyze the fairness of stock prices is fundamental analysis using the Price Earning Ratio (PER) approach.

Price earnings ratio (PER) is a comparison between stock prices and earnings per share (earnings pershare) of the company (Fahmi, 2012). This approach uses the value of earnings per share to estimate intrinsic value. According to Tandelilin (2010), the PER approach is also called a multiplier approach, investors will calculate the number of times (multiplier) the value of earnings reflected in the price of a stock. The higher the PER value, the smaller the profit per share and the lower the PER value, the greater the profit per share. This valuation with PER compares the intrinsic value with the stock price when close price so that the value of the stock position is obtained.

Stock valuation of PER approach is to make an analysis of stock prices by taking into account financial performance that is considered to affect the value of shares. Fairness of stock prices can be assessed by comparing the intrinsic value or the actual value of the stock price in the market so that the stock price can be known as overvalued, undervalued, or correctly valued.

The development of sectoral indices over the past 3 years can be considered quite good, except for Agriculture sector companies in the period of Week 4 of April 2017 which has less value compared to 2016, which is 1,864,249 to 1,839,381. This is also evidenced by the development of the index and market capitalization which experienced an increase in the JCI, over a period of 7 years, from the period of 2011 to 2017. However, it has a different performance within 1 day, 3 months, 6 months or 1 year. So that an analysis is needed to minimize the existing risks before it is decided to buy, sell or hold shares before making a stock transaction in the capital market.

In order for the investment decisions made by investors are not wrong, it is necessary to first evaluate the shares to be selected, then it can be determined whether the shares will provide a level of return that is in accordance with what is expected by investors. The general objective of this study is to know and test empirically that fundamental analysis can be used as a strategy in making investment decisions in the capital market.

II. LITERATURE

Fundamental analysis uses fundamental data, namely data originating from the company's finances, for example earnings, paid dividends, sales and so on, sourced from the company's financial statements and close price shares to calculate the intrinsic value of shares. This intrinsic value depends on the ability to generate profits (potential earnings).

According to Syamsuddin (2011), *Return on Equity* (ROE) is Earning After Tax divided by Stockholders Equity. Earning Per Share (EPS) is Earning Available for Common Stock divided by Number of Share of Common Stock Outstanding. Dividend per Share (DPS) is Dividend Paid divided by Number of Share of Common Stock Outstanding.

According to Tandelilin (2010), Dividend Payout Ratio (DPR) is Dividend per Share divided by Earning per Share. Price Earning Ratio (PER) is Market Price per Share divided by Earning per Share.

The use of fundamental analysis is to determine the level of corporate financial health and the level of dividend growth (dividend growth) (Baresa, Suzana, Sinisa and Zoran, 2013). The intrinsic value of the shares is compared with the stock market value in question to determine whether the stock market value has reflected the actual value or not (Eliza, 2013). Thus, investors can find out the condition of a stock, whether overvalued, undervalued or correctly valued so that a significant difference between intrinsic value to market prices can be known.

- a. If the intrinsic value is greater than the market price, then the stock is valued at too low (undervalued). $NI > \text{Market Prices}$
- b. If the intrinsic value is lower than the market price, then the stock is considered overvalued. $NI < \text{Market Price}$
- c. If the intrinsic value is the same as the market price, then the stock is valued at a fair price and is in a properly valued condition. $NI = \text{Market Price}$

Panda (2013) concluded that there are 2 models that are used to determine the comparison of fundamental values with market value in companies, namely Equity Free Cash Flow and Relative Valuation using the P / E ratio. The results of the study concluded that the Relative Evaluation method, using the P / E ratio is more accurate and practical than using the Equity Free Cash Flow model. Gottwald (2012), states that the P / E ratio is much better to be used to carry out a test, which is not only used to analyze fundamentally but also estimates the intrinsic value of a stock. The stock valuation techniques used are MizonRichard Test, Cox-Magnification Test and Davidson-MacKinnon Test. The results of this study explain.

Sareewiwatthan (2014) stated that the overall portfolio returns using a low PE, PEG and PERG ratio are better than the average Market Value. While in terms of statement, the use of PE ratios tend to be used. PE (Price Earning to Ratio) is a comparison between Price Earning and Earning Per Share. PEG is a comparison between Price Earning to Ratio (PE) and Earning Growth Rate (Annual Growth in Profit). PERG is a combination of PEG ratios multiplied by a Risk factor (R). Irawan and Wahidahwati (2013) concluded that selling shares was "overvalued" or bought "undervalued" shares.

III. METHODOLOGY

The method used in this study is a comparative method, which is used to find out about the difference between Intrinsic Value and Market Price variables by collecting data from financial statements and close prices in the period December 2015 to 2017. The design of this study was conducted using secondary data with data collection techniques carried out that is field research, through the site www.idx.co.id, and <https://finance.yahoo.com>; and library research (library research) for literature studies.

This type of research is quantitative research. The population of this study consisted of 6 sub-sectors of agriculture, 5 sub-sectors of mining, 9 sub-sectors of basic industry, 7 sub-sectors of various industries, 6 sub-sectors of consumer goods industry, 3 sub sectors of propety and real estate, 6 sub-sectors of infrastructure, 6 sub-sectors finance and 9 Trade sub-sectors, so that formulas can be obtained in investment decision-making strategies.

The analysis is done by analyzing financial ratios, determining the intrinsic value of shares with the Price Earning Ratio approach and assessing stock conditions by comparing Instructional Values and Market Prices. By knowing the dividend growth of each stock, the size of the fair value (intrinsic value) of the shares can be determined.

- a. Calculate the expected rate of dividend growth (g)

$$g = \text{ROE} \times \text{Retention Rate or Retained Earnings},$$

$$\text{Retentation Rate} = 1 - \text{DPR}.$$

The formula for calculating the expected dividend growth rate is $g = \text{ROE} \times (1 - \text{DPR})$

- b. Calculating expected EPS estimates (E_1)

$$E_1 = E_0 (1 + g), \text{ which } E_0 = \text{EPS in the previous period}$$

- c. Calculating the estimated estimated DPS (D_1)

$$D_1 = D_0 (1 + g), \text{ which } D_0 = \text{DPS in the previous period}$$

d. Calculating the expected rate of return (k)

$$k = D1/P_0 + g, \text{ which } P_0 = \text{Market Value in the previous period}$$

e. Calculating PER

$$\text{PER} = \frac{D_1 / E_1}{k - g}$$

f. Calculating intrinsic value of shares

$$\text{Intrinsic value} = \text{estimated EPS or } E_1 \times \text{PER}$$

It can be concluded that the market condition of a stock, whether it is in an "overvalued", "undervalued" or "correctly valued" condition on the sectoral index listed in the Indonesia Stock Exchange.

IV. RESULTS AND DISCUSSION

The results of this study are determining the comparison of market and intrinsic value on the sectoral index, from 2015 to 2017 period in Indonesia. This is done in order that the investment decisions can be made to assess whether or not it is feasible to invest in the company.

For the agricultural sector there are 22 companies, with a comparison between intrinsic value and market prices for 3 consecutive years (2015 - 2017) indicating the position of the stock in an overvalued condition.

For the mining sector there are 35 companies, of which in 2015 there were 4 companies that were in undervalued conditions, namely PT Indo Tambangraya Megah Tbk (ITMG); PT Bukit Asam Tbk (PBTA); PT Elnusa Tbk (ELSA), PT Timah Tbk (TINS.JK) and the remaining 31 companies in the sector are in overvalued conditions. In 2016 there was only 1 company that was in an undervalued condition, namely PT Bukit Asam Tbk (PBTA) and the remaining 34 companies were in an overvalued condition. In 2017, there were 2 companies that were in undervalued conditions, namely PT Samindo Resources Tbk (MYOH), PT Bukit Asam Tbk (PBTA) and the remaining 33 companies in the sector were in overvalued condition.

For various industries sectors there are 38 companies, where in 2015 there was only 1 company that was in an undervalued condition, namely PT Indospring Tbk (INDS) and the remaining 37 companies were in an overvalued condition. In 2016 and 2017 the entire sector company is in an overvalued condition.

For the basic and chemical industries sector there are 60 companies, where in 2015 there were 5 companies that were in undervalued conditions, namely PT Betonjaya Manunggal Tbk (BTON), PT Indal Aluminum Industry Tbk (INAI), PT Lionmesh Prima Tbk (LMSH), PT Malindo Feedmill Tbk (MAIN), PT Fajar Surya Wisesa Tbk (FASW) and the remaining 55 companies are in overvalued conditions. In 2016 and 2017 there was only 1 company that was in an undervalued condition, namely PT Indal Aluminum Industry Tbk (INAI) and the remaining 59 companies were in an overvalued condition.

For the goods and consumption industry sector there are 33 companies, where in 2015 there were 7 companies that were in undervalued conditions, namely PT Delta Djakarta Tbk (DLTA), PT Chitose International Tbk (CINT), PT Kedaung Indah Can Tbk (KICI), PT Langgeng Makmur Industri Tbk (LMPI), PT Martina Berto Tbk (MBTO), PT Indofarma (Persero) Tbk (INAF), PT Pyridam Farma Tbk (PYFA) and the remaining 26 companies are in the position of overvalued conditions. In 2016, there were 8 companies that were in undervalued conditions, namely PT Mayora Indah Tbk (MYOR), PT Chitose International Tbk (CINT), PT Kedaung Indah Can Tbk (KICI), PT Langgeng Makmur Industri Tbk (LMPI), PT Martina Berto Tbk (MBTO), PT Mustika Ratu Tbk (MRAT), PT Indofarma (Persero) Tbk (INAF), PT Pyridam Farma Tbk (PYFA) and the remaining 25 companies are in an overvalued position. While in 2017, it was the same as in 2016, there were 8 companies that were also undervalued, but the difference between PT Mayora Indah Tbk (MYOR) was no longer in an undervalued position but was replaced by PT Nippon Indosari Corpindo Tbk (ROTI).

Property, real estate and construction sectors have 49 companies, but in 2015 - 2017 the entire company is in an overvalued condition.

Infrastructure, Utility & Transportation sector there are 45 companies, where in 2015 there was 1 company that was in an undervalued position, namely PT Samudera Indonesia Tbk (SMDR), 1 company was in a correctly valued position, namely Baltia Air Lines, Inc. (BLTA) and the remaining 43 companies are in an overvalued position. In 2016, Baltia Air Lines, Inc. (BLTA) is also in a correctly valued position, PT Samudera Indonesia Tbk (SMDR) is in an undervalued position and added 1 more company that is in an undervalued position, namely PT Buana Lintas Lautan Tbk. (BULL), and the remaining 42 companies are in an overvalued position in that sector. Furthermore, in 2017 the conditions are the same as in 2015.

The finance sector has 72 companies where in 2015 there were 3 companies that were in undervalued conditions, namely PT Bank Bukopin Tbk (BBKP), PT Bank Rakyat Indonesia (Persero) Tbk (BBRI), PT BFI Finance Indonesia Tbk (BFIN) and the remaining 69 companies in an overvalued condition. In 2016, there was 1 company that was in an undervalued condition, namely PT BFI Finance Indonesia Tbk (BFIN). In 2017, the condition was also the same as in 2016 there was only 1 company that was in undervalued condition, namely PT Bank Rakyat Indonesia (Persero) Tbk (BBRI), and the remaining 71 companies were in an overvalued condition.

Trade, services and investment sectors have 105 companies, in 2015 there was 1 company that was undervalued, namely PT Tira Austenite Tbk (TIRA) and the remaining 104 companies were in an overvalued condition. This condition is the same in 2017. However, the company that was undervalued was PT Colorpak Indonesia Tbk (CLPI). But in 2016, all companies were overvalued. (Calculation data can be seen in the attachment)

Table 1. The Result of Fundamental Analysis for 9 Sector Index

Sectors Index	2015 year		2016 year		2017 year		Conclusion
	Market Value	Intrinsic Value	Market Value	Intrinsic Value	Market Value	Intrinsic Value	
Agriculture	1,432.84	1,291.42	1,629.68	1,466.68	1,372.32	742.39	Overvalued
Mining	756.22	715.53	1,296.01	1,208.21	1,656.63	1,539.76	Overvalued
Miscellaneous							
Industry	949.18	868.16	1,267.18	1,147.05	1,319.26	1,209.54	Overvalued
Basic Industry							
Chemical	4,492.73	4,043.77	1,224.33	1,104.73	1,577.97	1,455.72	Overvalued
Consumer Goods							
Industry	3,831.20	3,621.22	4,584.53	2,511.10	5,461.85	2,523.35	Overvalued
Property, Real Estate & Building							
Construction	1,489.63	1,343.62	1,682.92	1,513.85	1,755.24	1,594.87	Overvalued
Infrastructure, Utilities &							
Transportation	1,079.81	979.70	409.54	966.90	263.17	1,104.43	Overvalued
Finance	1,122.12	1,313.62	1,258.35	1,149.97	1,576.36	1,450.60	Undervalued
Trade, Service & Investment							
Investment	1,562.78	1,409.18	1,499.61	1,353.49	1,626.32	1,478.49	Overvalued

note: average account of market and intrinsic value

CONCLUSION

Based on the average calculation of fundamental analysis using the Price Earning Ratio (PER) approach, the decisions made by investors for 2018 to not invest in several companies or "not buy", because the condition of the stock in the index deposit is in the overvalued category. However the investor could invest in financial sector due to undervalued category.

But, if partially analyzed for each sectoral index there are several companies that are feasible to invest because the condition of the company's shares is in the category of undervalued or "sale", because intrinsic value is higher than the market value. There are also companies that are in correctly valued conditions in Infrastructure, Utility & Transportation sectors, meaning intrinsic value is equal to market value.

The assessment of investors to invest shares in the sectoral index companies should not only be viewed from the financial side. But, it is also reviewed from various factors and fields. Unstable economic conditions can trigger intrinsic value of the company that is low, but other factors can be analyzed to make stock investments, such as company performance, intellectual capital, and others. In order to make good investment decisions, it is not only fundamentally but technically it also needs to be done. It is better not only to the economic field which is the basis for conducting analysis but also, in the political and social field can be a comparison as a decision-making strategy

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Study on Knowledge, Attitude and Practice towards Cervical Cancer and Screening among Women in Butajira Town: A Cross Sectional Study.

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Abstract- Background: worldwide three quarters of cervical cancer cases occur in developing countries where programmes for screening and treatment are seriously deficient. Ethiopia has a population of 29.43 million women over the ages 15 years and older who are at risk of developing cervical cancer. About 4,732 cervical cancer deaths occur annually in Ethiopia.

Objective: To assess the Knowledge, Attitude and Practice towards Cervical Cancer and Screening among women in Butajira town.

Methods: A cross sectional study design was used to assess the Knowledge, Attitude and Practice towards Cervical Cancer and Screening among Butajira town women. A total of 821 samples were selected from the target population. The data entry was undertaken using Epidata version 3.1 software and exported to SPSS version 23 software for analysis and p-value < 0.05 was considered as statistically significant.

Result: Among a total of 821 women participated in study the results showed that 591(72%) had poor knowledge. Majority, 453(55.2%) of the respondents were positive attitude about cervical cancer and 15.1% only have ever been screened for premalignant cervical lesion screening. From logistic regression result variables like; women who can't read and write [$\overline{OR} = 2.052, 95\% CI 1.128 - 3.732$], Women with the age group 23-45 and 46-60 [$\overline{OR} = 1.899, 95\% CI, 1.099-3.281$] and [$\overline{OR} = 1.674, 95\% CI, 1.575-4.873$] and women in housewife work status [$\overline{OR} = 1.346, 95\% CI 1.535-2.129$] were found to be statistical significant associated factors with Knowledge towards Cervical Cancer and Screening.

Conclusion: The study has shown that there is a lack of knowledge on cervical cancer and screening for premalignant cervical lesion. There is also poor utilization of screening services available in the study area. The reason for poor practice was lack of knowledge and information. There is a need to promote cervical cancer screening among women by informing them on their susceptibility to cervical cancer and encouraging a belief that active and regular screening can detect cervical cancer.

Index Terms- Cervical Cancer, Knowledge, Attitude, Practice.

I. INTRODUCTION

Cervical cancer (cancer of the cervix; part of female reproductive organ) is a global health problem accounted as the fourth most common cancer in women, and the 7th overall with an estimated 528, 000 new cases and 266, 000 deaths in 2012 [1]. Eighty five percent of new cases and 87% of related deaths occur in developing and resource-poor countries like Ethiopia; affecting poor, vulnerable, and disenfranchised women at the prime of life. Over the past three decades, cervical cancer rates have fallen in most of the developed World largely as a result of screening and treatment programmes; in contrast rates in most developing countries have risen or remained unchanged more likely due to lack of effective prevention and early detection and treatment programmes, and the lack of equal access to such programmes. Without these interventions, cervical cancer is usually only detected when it is already at an advanced stage so that it is too late for effective treatment, and therefore mortality is high. Although other cofactors involved, the primary cause of cervical pre-cancer and cancer is persistent or chronic infection with one or more of the "high-risk" (or oncogenic) types of human papillomavirus (HPV) [2].

There are around 100 types of HPV, with different variations in their genetic and oncogenic potential [3]. The etiological role of HPV infection among women with cervical cancer is well-established, and there is growing evidence of its central role in other anogenital sites [4]. Ethiopia which has a population of 29.43 million women ages 15 years and older who are risk of HPV infection and subsequent development of cervical cancer; an estimated 7095 new case of cervical cancer are found with 4732 mortality each year [5].

In developing countries like Ethiopia, most of cervical cancer cases were detected at an advanced stages, when there is no hope of recovery, predominantly due to lack of awareness and information in the community about cervical cancer and absence of provision of screening and treatment services in the country especially in the rural/ resource poor settings, where majority of the victims are found [6].

Client access to screening and treatment services is essential to ensure the success of a cervical cancer prevention program; however, the mere availability of services is insufficient to guarantee their use. In addition, clients and community members must be aware of the problem of cervical

cancer, their potential risk of developing the illness, and the facilities where they can solicit screening services [7]. Providing accessible and affordable services and actively promoting them to the target population through well-designed, strategically targeted information and education efforts, can significantly increase the use of services and reduce cervical cancer incidence. Lack of awareness about the disease and its prevention, embarrassment or shame about having a pelvic exam, as well as fear of the screening procedure, fear of cancer, and common misconceptions, can negatively affect the use of cervical cancer prevention services [8].

“Knowledge, Attitudes, and Practices (KAP)” survey is a representative study of a specific population that aims to collect data on what is known, believed and done in relation to a particular topic. This study is aimed at assessing the knowledge, attitude, and practice of women in Butajira Town towards cervical cancer and screening so as to develop ways to improve the screening coverage and the effective follow-up of identified cases to reduce the incidence and mortality rates of cervical cancer in the town.

II. METHODS

Study Design

This is a cross sectional study which targeted women in Butajira town for assessment of their knowledge, attitudes and practice in relation to cervical cancer and screening service.

Study Population

According to the WHO guidelines, the target age group for Pap smear screening is women between 25-64 years. For the purpose of this study, women between the ages of 18-64 years were participated.

Study Area Description

This study was conducted in Butajira town. Therefore, Active resident women in the age group between 18-64 years are selected from Butajira town and they are interviewed. According to the National population and housing census carried out in 2007, the population of the town was 33,406.

Sample Size Determination

For this study the sample is determined by taking the proportion of women having knowledge about cervical cancer as 26.8% ($p = 0.26$), done in Gondar Town by (Getahun *et al*, 2013) [9]. With 95% confidence interval, and margin of error to be 3% ($d = 0.03$). Computing with the above formula gives a total sample size of 821. The sample size is determined by using single population proportion formula by considering the following assumptions:

Where:

n- The minimum sample size required

d- Margin of error

$Z_{\alpha/2}$ -Standard normal value at $(1-\alpha)$ 100% confidence level

$$n = \frac{Z^2 \times P(1-p)}{d^2} = \frac{1.96^2 \times 0.26 \times 0.74}{0.03^2} = 821$$

Sampling and Conduct of Survey

Single-stage sampling technique was utilized. Butajira Town has a total of five administrative areas. The number of households included in each administrative area was determined in proportion with the total number of households found in each administrative area. Then, a systematic random sampling method was applied to select the households. Trained investigators were conducted interviews and filed questionnaires. The interviewer informed the subjects that the information would be used for improvement of health care services and the anonymity of the respondent would be strictly maintained.

Research Instrument, Measurements and Data Collection

A standardized questionnaire was developed from questionnaires that had been used in previous studies and from various articles and books on information related to cervical cancer and its screening methods. The questions aimed to gather information regarding respondent's knowledge, attitude and practice towards cervical cancer and screening service. The questionnaire also designed to obtain relevant socio-demographic characteristics of the respondents.

A structured questionnaire was designed in local language (Amharic). Pre-testing was carried out on the target population for the purpose of validating the reliability of the instrument and familiarizing data collectors with the interview process.

Data Analysis

The hard copies of completed questionnaires were manually edited. Data were entered into EPI-DATA 3.1 and exported to SPSS version 23 for analysis. In statistics, descriptive statistics, chi-square test of association and binary logistic regression analysis was used. In the binary logistic regression analysis knowledge level was used as the dependent variable. Statistical significance level was determined as $p < 0.05$.

III. RESULTS

A total of 821 women aged 18 and above years were included in the study making the response rate 100%. The mean knowledge score was 1.42 (SD 2.321), the minimum knowledge score was 0 and maximum score was 7. Mean score of attitude was $26.07 \pm$ (SD 5.571), the minimum score was 9 and maximum score was 40. Descriptive and binary logistic regression methods are used to measure the effects of socio-demographic factor that affect the Knowledge, Attitude and Practice of women towards Cervical Cancer. The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 23.

Socio-Demographic Characteristics of Women in Butajira Town

The table below reveals that of 821 total respondents, 251(30.57%) was in the age range 23-45, the mean age was $30 \pm$ (SD 7.56) years, minimum and maximum age was 18 and 60 years. From the total respondents 553(67.36%) of women are currently married and 268(32.64%) of women are currently not married. Likewise most of the respondents are Gurage 541(66%) followed by Amhara 111(16%).

Results on educational level shows that majority of the participants reached primary level of education 259(31.55%) followed by Secondary level of education 180(21.92%). A small proportion 121(14.74%) had completed Technical /Vocational level (TVT) and above.

Most of the participants stayed at home 375(48.68%) followed by women who are Merchants 227(27.65%). A small proportion 63(7.67%) are daily laborer. Majority 426(51.89%) of the participant were Muslim followed by women who are follower of Ethiopian Orthodox 280(34.10%)

Table 1:-Socio-demographic characteristics of women in Butajira Town

		Count	Column N %
Age group of the respondent	18-22	120	14.62%
	23-45	673	81.97%
	46-60	28	3.41%
Marital Status	Currently not Married	268	32.64%
	Currently Married	553	67.36%
Ethnicity	Oromo	62	7.55%
	Amhara	111	13.52%
	Gurage	541	65.90%
	Others	107	13.03%
Religion	Orthodox	280	34.10%
	Muslim	426	51.89%
	Others	115	14.01%
Educational level	Can't read and write	128	15.59%
	Can read and write	133	16.20%
	Primary level	259	31.55%
	Secondary level	180	21.92%
	TVT and above	121	14.74%
work status	House Wife	375	45.68%
	Merchant	227	27.65%
	Daily laborer	63	7.67%
	Governmental employee	101	12.30%
	Others	55	6.70%
Monthly income	< 1400 Birr	518	63.09%
	≥ 1400 Birr	303	36.91%

Knowledge about Symptoms and Risk Factors of Cervical Cancer

Table 2 displays knowledge about symptom and risk factors of cervical cancer. Vaginal foul smelling discharge was the most known symptom by respondents accounted for 258(66%). Vaginal bleeding during sexual intercourse was mentioned by 218(56%) as the symptom of cervical cancer

followed by post-coital bleeding and pain during sexual intercourse respectively. Similarly on the knowledge about the risk factors for cervical cancer, 227(58%)respondents said early pregnancy(15yrs age and below)as a risk factor, followed by 194(50%) sex at an early age less than 15 years,179(46%) sexually transmitted infection and only 81(21%) respond acquiring HPV viruses as a risk factors

Table 2:-Percentage distribution of women Knowledge about symptoms and risk factors of cervical cancer

Symptoms of Cervical Cancer		Count	Column N %
Vaginal bleeding	No	173	44%
	Yes	218	56%
Vaginal foul smelling discharges	No	133	34%
	Yes	258	66%
Post-coital bleeding	No	231	59%
	Yes	160	41%
Pain during sex	No	234	60%
	Yes	157	40%
I don't know	No	331	85%
	Yes	60	15%

Risk factor for Cervical Cancer			
Having multiple sexual partners	No	231	59%
	Yes	160	41%
Sex at an early age less than 15 years	No	197	50%
	Yes	194	50%
Acquiring HPV virus	No	310	79%
	Yes	81	21%
Cigarette smoking	No	278	71%
	Yes	113	29%
Using birth control pills for a long time	No	275	70%
	Yes	116	30%
Early pregnancy(15yrs age and below)	No	164	42%
	Yes	227	58%
Sexually transmitted infection	No	212	54%
	Yes	179	46%
Repeated abortion	No	226	58%
	Yes	165	42%
Multiparty	No	273	70%
	Yes	118	30%
Excessive sex	No	246	63%
	Yes	145	37%
Lack of hygiene	No	202	52%
	Yes	189	48%
Heredity/family history	No	349	89%
	Yes	42	11%
I don't know	No	353	90%
	Yes	38	10%

The Table below shows cervical cancer prevention, treatment and screening options. Out of the total of 391 participants 254(65%) knew that cervical cancer is prevented by avoiding sexual intercourse at an early age less than 15yrs. 237(61%) participants knew that cervical cancer is prevented by avoiding multiple sexual partners, 224(57%) reported that avoid early pregnancy (at age of 15yrs and below), 184(47%) prevent STIs by safe sex and only 90(23%) knew that cervical cancer is prevented by through vaccination of HPV vaccine.

Regarding the treatment, 344(88%) participants knew that cervical cancer is curable and 47(12%) participants said cervical cancer cannot be cured. Of those, who responded that cervical cancer is treatable herbal therapy, surgery, specific drugs given by hospital (Chemotherapy) and radiotherapy were reported as treatment means by 16%, 35%, 84% and 34%, respectively. Only 29(8%) did not mention any type of treatment.

Respondents were asked about the cost of cervical cancer treatment 163(47%) responded that it is somewhat expensive, 131(38%) said it is very expensive and 50(15%), it is affordable price. Concerning how frequent one should be screened for cervical cancer, 183(56%) participants answered once a year, 58(18%) every three years and 29(9%) every five years. Similarly 213(65%) responded that women of above 25 years of age should be screened, while 85(26%) said that prostitutes and only 18(6%) answered elderly women should be screened.

Majority of the participant 131(40%) knew that visual inspection of acetic acid is used as one method of screening procedures of cervical cancer, 108(33%) Pap-smear and 61(19%) don't know any type of screening procedure

Table 3:- Knowledge about Prevention, Treatment and Screening modalities of Cervical Cancer.

		Count	Column N %
Avoid multiple sexual partners	No	154	39%
	Yes	237	61%
Avoid sex at an early age less than 15yrs	No	137	35%
	Yes	254	65%
No smoking/quit smoking	No	259	66%
	Yes	132	34%
Through vaccination of HPV vaccine	No	301	77%
	Yes	90	23%
Avoid early pregnancy(at age of 15yrs and below)	No	167	43%
	Yes	224	57%
Prevent STIs by safe sex	No	207	53%
	Yes	184	47%
I don't know	No	349	89%
	Yes	42	11%
Cancer of the cervix can be cured at earliest stages	No	47	12%
	Yes	344	88%
By using herbal remedies	No	290	84%
	Yes	54	16%
Surgery	No	224	65%
	Yes	120	35%
Specific drugs given by hospital(Chemotherapy)	No	55	16%
	Yes	289	84%
Radiotherapy	No	227	66%
	Yes	117	34%
I don't know	No	315	92%
	Yes	29	8%
Cost of treatment	It is affordable charge	50	15%
	It is somewhat expensive	163	47%
	It is very expensive	131	38%
Cervical cancer screening interval	Once every year	183	56%
	Once every three years	58	18%
	Once every five years	29	9%
	Others	57	17%
Who should screen	All women of 25 years and above	213	65%
	Prostitutes	85	26%
	Elderly women only	18	6%
	Others	11	3%
Visual inspection of acetic acid	No	196	60%
	Yes	131	40%
Pap smear	No	219	67%
	Yes	108	33%
Don't know	No	266	81%
	Yes	61	19%

Logistic Regression Analysis of Knowledge towards Cervical Cancer and Screening

Binary Logistic regression analysis was also performed to examine the relationship between Socio-demographic characteristics of participants and knowledge towards cervical cancer and screening. For the variable “educational status” the reference category is “women who can’t read and write”. Participants with primary education were about two times

[$OR = 2.052, 95\% CI 1.128 - 3.732$] more likely to be knowledgeable than women who can’t read and write.

For women with secondary education it is also twice [$OR = 2.384, 95\% CI 1.407 - 4.039$] more likely to have knowledge about cervical cancer compare to the reference category. The odds of women who have knowledge about cervical cancer is 68% [$OR = 1.683, 95\% CI 1.132 - 2.503$] higher for women who have diploma compared to the reference category.

For the variable age in group the reference category is “18-22 years”. Women with the age group 23-45 and 46-60 were found to have more knowledge about cervical cancer, with estimated odds ratio of 89% [$OR=1.899$, 95% CI, 1.099-3.281] and 67% [$OR=1.674$, 95% CI, 1.575-4.873] respectively than women whose age range between 18-22.

For the variable work status, the reference category is “housewife women”. The odds of women who are knowledgeable about cervical cancer is 34.6% higher

[$OR=1.346$, 95% CI 1.535-2.129] for women working as government employee as compared to those women who are not working. Similarly, women who are working as private/NGO employee is 1.994[1.711-5.593] times more knowledgeable than women who are housewife controlling other variables in the model

Table 4:- Binary logistic regression analysis of factors that affect knowledge towards cervical cancer screening

	B	S.E.	Wald	df	Sig.	Exp(B)=Odds Ratio	95% EXP(B) Lower	C.I.for Upper
Age group of the respondent			5.310	2	.030			
18-22(ref.)								
23-45	0.641	.279	5.280	1	.022	1.899	1.099	3.281
46-60	0.515	.545	.894	1	.044	1.674	1.575	4.873
Monthly income								
<1400birr(ref)								
>1400birr	0.214	.198	1.165	1	.002	1.239	1.840	2.828
Educational status of the respondent			26.105	6	.000			
Can't read and write(ref)								
Can read and write	0.782	.300	.298	1	.011	2.185	1.471	3.529
Primary level	0.719	.262	.041	1	.018	2.052	1.128	3.732
Secondary level	0.869	.269	10.435	1	.001	2.384	1.407	4.039
Technical and vocational	-.426	.629	.459	1	.498	.653	.190	2.241
Diploma	.521	.437	1.309	1	.010	1.683	1.132	2.503
Degree and above	.663	.513	1.671	1	.196	1.940	.710	5.297
Work status			3.536	5	.018			
House wife(ref)								
Merchant	-.018	.214	.007	1	.932	.982	.646	1.493
Daily laborer	.307	.309	.987	1	.320	1.359	.742	2.488
Gov't employee	.297	.352	.034	1	.001	1.346	1.535	2.129
Private/NGO employee	.690	.526	1.722	1	.009	1.994	1.711	5.593
Others	-.353	.507	.485	1	.486	.703	.260	1.897
Constant	-1.855	.351	27.945	1	.000	.156		

Attitude towards Cervical Cancer and Screening

As shown in the Table below 380(46.3%) perceived that they could have pre-cancer lesions and therefore could be susceptible to cervical cancer. Out of the total respondents 463(56.4%) disagree that Cervical Cancer is highly preventable and 231(28.1%) of the respondents agreed that carcinoma of the cervix causes death. Majority of the respondent 545(66.4%)

agreed that screening helps in the prevention of cervical cancer. Similarly, most of the respondent 519(63.2%) believe that screening causes no harm to the client. 379(46.2%) participants responded that cervical cancer screening is not expensive and 684 (83.3%) respondents volunteered to be screened if screening for cervical cancer is free

Table 5:- Attitude of respondents towards cervical cancer and screening.

	Disagree		Neither agree nor disagree		Agree		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Cervical Cancer is highly prevent	463	56.4%	114	13.9%	244	29.7%	821	100.0%

Cervical Cancer is leading cause of death	484	59.0%	106	12.9%	231	28.1%	821	100.0%
any women can acquire Cervical cancer	305	37.1%	136	16.6%	380	46.3%	821	100.0%
Cervical Cancer cannot transmitted	281	34.2%	151	18.4%	389	47.4%	821	100.0%
Screening helps prevention of Cervical Cancer	119	14.5%	157	19.1%	545	66.4%	821	100.0%
screening causes no harm to the client	145	17.7%	157	19.1%	519	63.2%	821	100.0%
Cervical Cancer screening is not expensive	309	37.6%	133	16.2%	379	46.2%	821	100.0%
if screening is free and causes no harm, will you screen	83	10.1%	54	6.6%	684	83.3%	821	100.0%

Note: Agree and strongly agree were combined together to form agree, disagree and strongly disagree into disagree, n=821

Cervical Cancer Screening Practice

The table below shows that the majority of respondents 697(84.9%) never had cervical cancer screening. The main reason for not intending to have cervical screening was poor knowledge about the test 452(64.8%), no health education programs to promote screening 394 (56.5%) and lack of information about cervical cancer in the city 303 (43.5%).

Similarly, 229(32.9%) participants also responded that they don't know of any screening site in the city. A small number of participants 126(18.1%), 143(20.5%), 163(23.4%) and 173(24.8%) responded that their partner would not allow them to go for screening, they felt that the screening procedure may be painful, they feel shy and they are afraid the screening test would reveal cervical cancer respectively.

Table 6:- Practice towards screening for Cervical Cancer and Reason for not having cervical cancer screening,

	No Count	Row N %	Yes Count	Row N %
Have you ever screened for Cervical cancer	697	84.9%	124	15.1%
<i>Reason for not having intention to use Cervical Cancer Screening</i>				
No screening site in the nearest health center	481	69.0%	216	31.0%
Limited information about cervical cancer in the city	394	56.5%	303	43.5%
Screening sites are too far from where i live	549	78.8%	148	21.2%
No health education programs to promote screening	303	43.5%	394	56.5%
Don't know what the test is all about	245	35.2%	452	64.8%
Not engaged in risky sexual behaviors	537	77.0%	160	23.0%
Against my beliefs and cultural values to go for screening	581	83.4%	116	16.6%
Partner would not allow me to go for screening	571	81.9%	126	18.1%
The screening procedure may be painful	554	79.5%	143	20.5%
I feel shy	534	76.6%	163	23.4%
Afraid of screening test would reveal cervical cancer	524	75.2%	173	24.8%
Don't know of any screening site	468	67.1%	229	32.9%
Others	590	84.6%	107	15.4%
Plan to have cervical cancer screening	194	27.8%	503	72.2%

IV. DISCUSSION

In this study, knowledge, attitude and practice towards cervical cancer and its screening were identified. The study found that women were not aware of cervical carcinoma and also screening for premalignant cervical lesions. The study showed that 47.6% of women had heard about cervical cancer which is less than the study conducted in Gonder town, northwest Ethiopia (78.7%) and higher than the finding in Tikur-Anbesa, Ethiopia (21.7%). This gap might be due to the difference in time period and nature of the population the studies conducted. In addition awareness creation interventions such as health education on cervical cancer and its screening in the community were very low [9, 10].

The level of knowledge was found to be low in this study; only 28% of respondents were knowledgeable about carcinoma of the cervix and screening. This finding was consistent with studies conducted in Tanzania (19.2%) and Cameroon (3.6%). Judging by the results of the level of knowledge of the participants, more awareness programs should be directed to the target group of women to provide them with information they need to know about cervical cancer so that they understand the purpose of the screening test [12, 13].

About 66% of the participants knew that Foul smelled vaginal discharge was the commonly mentioned symptom; this finding is higher than the finding in a study done in Gondar town North West of Ethiopia in 2010 [9], which was 35% of participants mentioned that vaginal discharge as symptom of cervical cancer.

Having early onset of sexual activity was the major risk factor reported for cervical cancer, followed by having sexually transmitted infection, having multiple sexual partners and multiparty. This finding is similar with the finding in a study conducted in Gabon [14], in which some of the risk factors which frequently cited by the study participants are abortion, sexually transmitted infection, smoking, multiple sexual partner. In contrast this finding is different from the finding in a study done in Ilala Municipality, Dares-Salaam where the most common mentioned risk factors were early marriage and multiparty [15]. The knowledge on risk factors is an important element in the prevention of cervical carcinoma. Knowing the risk factors can make someone avoid them and hence prevent herself from acquiring the disease. Knowledge on Risk factors was poor in this study and hence education on this important part with respect to prevention should be provided.

Most of the Respondents were also lack information about the link between HPV infection and cervical cancer. Of all the respondents in this study only 21% mentioned HPV as an important factor in causation of cervical carcinoma. This study higher than the finding of a cross-sectional survey conducted among college women in the University of Ghana that showed that 7.9% of study participants are aware of the link of HPV with cervical cancer [16]. This can affect prevention as it difficult for these women to go for screening if they don't know the link between HPV and cervical cancer

Concerning prevention of cervical cancer, over a half of the participants knew that cervical cancer is prevented by avoiding multiple sexual partners, avoiding early sexual intercourse, by avoiding causal sex and quitting smoking. Prevention and early

detection are keys to the reduction of incidence and progression of many chronic diseases including cancer. 88% of the respondents knew that cervical cancer can be prevented. This is higher than the study done in Gondar town North West of Ethiopia (63.9%) [9].

Women's knowledge of who should receive cervical cancer screening was good, 65% of the respondent in this study knew the age (according to WHO) at which one has to undergo screening. More than half of the respondents, who were aware of cervical carcinoma, knew that carcinoma of the cervix can be cured, majority of the participants mentioned VIA (40%) and 33% mentioned Pap smear. This is similar with the study conducted in Onitshh, South-East, Nigeria (2013) shows that cervical cancer screening (Pap smear) knowledge was 35.56% [17].

This study also reveal that the respondent's attitude on cervical cancer and screening. In general, more than half of the respondent had a positive attitude towards cervical cancer and screening. However, only 28.1% perceived it as a leading cause of death. 66.4% of the respondents agreed that screening is important in prevention of cervical carcinoma. Susceptibility perception was also a problem; we know that the perception of one's susceptibility to cervical cancer can affect screening behavior. A significant number of women (half of the respondents) expressed lack of personal susceptibility to cervical cancer and therefore believed it was unnecessary for them to have any screening done. A similar finding in a study done in Ghana showed that 48% of women expressed lack of susceptibility to cervical carcinoma [16]. Among all the respondents 83.3% of them agreed that they could avail themselves to screening if they were knowledgeable and if screening was free of charge and causes no harm. This means that if some barriers are eliminated many women could go for screening.

The practice of cervical cancer screening among participants of this study was very much low (15.1%); compared to studies done in South Africa (18%) [18] and consistent with the study done in Gondar town, Northwest Ethiopia showed that only 14.1% of all the respondents ever had a Pap smear screening test. The difference is because Pap smear is widely available as a screening tool in South Africa and there is also national Pap smear policy whereas in Ethiopia Pap test is available only in some health institutions.

Reason for not having intention to use Cervical Cancer Screening has been shown to exist in many countries. The greatest reason in this study was lack of knowledge about the screening tests and No health education programs to promote screening which was mentioned by 64.4% and 56.5% of respondent's respectively. The other reasons were limited information about cervical cancer in the city, not engaged in risky sexual behaviors, fear of pain, shyness and don't know of any screening site.

V. CONCLUSION

In Ethiopia, cervical cancer continues to be a major public health problem. This study revealed the lack of knowledge about cervical cancer and low rate of screening for premalignant cervical lesions. The general attitude, even though is showing

positivity, there are still women out there who have a more negative attitude towards cervical cancer and screening and these women needs to be targeted. There are also a certain percentage of women who have no idea at all about their level of susceptibility and risks to developing cervical cancer and with this attitude, they will never be able to participate in any screening or treatment programs unless they are well informed and educated accordingly. Women's reluctance to undergo cervical cancer screening appears to be based on lack of knowledge about the cervical cancer, the risk factors of cervical cancer and also lack of knowledge on the eligibility and availability of screening services. Education, communication and reassurance are required to overcome such resistances. Women's attitude was generally positive as most of them showed a positive attitude towards screening for premalignant cervical lesion. This attitude however did not improve practice and this could have been contributed by barriers that were lack of knowledge, thinking that screening is costly, and perception that the procedure is painful and other barriers as shown in the results.

LIST OF ABBREVIATIONS

Human Papillomavirus (HPV), Knowledge, Attitudes, and Practices (KAP), Technical /Vocational level (TVT),

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The Political-Economic Discourse Practice In The Media Industry Through Developing Headline About The 2014 Republic Of Indonesia Presidential Election Campaign On The Indonesian Media Newspaper

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ABSTRACT

This research is entitled the political-economic practice discourse in the media industry through developing headline about the 2014 Republic of Indonesia Presidential election campaign on the Media Indonesia newspaper. The purpose of this study is to dismantle the political-economic practice discourse in the media industry through developing headline about the 2014 Republic of Indonesia Presidential election campaign on the Media Indonesia newspaper. This study used a qualitative Content Analysis Method. The results of the study showed that the Media Indonesia newspaper was pro-capitalism wrapped in popular issues, where the news focused more on the structure of the media economy compared to the ideological content. In addition, the Media Indonesia organization is a subordination of the economic system of the owners of capital related to their respective political interests. The contents of the news contained exchange rates that forced market expansion for capital owners as policy makers and other businesses that were still within the corporate sphere with Media Indonesia. This is a monopolistic strategy in their business empires. Therefore, it can be ascertained that the independence of the media ideology lies in the strength of the economy. Media Professionalism Indonesia relies heavily on the interests of capital owners, then concentrates Media Indonesia tends to ignore the microeconomic sector. The tendency of Media Indonesia to serve the interests of political and economic power with political tactics is to place the public freely in accepting their existence.

Keywords: Discourse, political-economic, media, & campaign

1. INTRODUCTION

Every democratic process in the Presidential Election will always have efforts to gain public support from the public, especially those who have the right to vote. Democracy itself comes from the words *demos* and *kratos*. That is the pattern of governance originating from the people. It could also be that the government (President) was elected by the people's representatives. It means, the highest power is in the hands of the people. Democracy is developed to foster people's participation, not someone or group participation. The role of the people (read: public) is more valued because it plays an important role in making decisions in the public interest. Just say, in determining a Regional Head, Regent, Governor, and President as head of state in a democratic system must be chosen by the people (Irawan, 2018: 91).

The introduction of political figures as personal and institutional and / or political coalitions will be built along with the introduction of political ideas, to get acceptance in the eyes of the voter public. Through a democratic system, each individual has the same "one person" political rights, one vote "one weight" depends on the majority of the people who have the right to vote and come to the election by legally choosing the presidential candidate. The presidential candidate pair will fight over the same target, namely the voting community (Rahman, 2018: 167).

Participation is an important part of democracy, where Huntington & Nelson (1976: 3) put forward his views as follows: "By political participation we mean activity by private citizens designed to influence government decision-making." Based on this definition, political participation is interpreted as a private activity of citizens carried out to influence government decisions. Then Dahrendorf (2003) stated "Political participation affords citizens the opportunity to communicate information to government officials about their concerns and preferences and pressure on them to respond."

In the 2014 presidential election campaign which was reported in the Media Indonesia newspaper, it was certainly the result of construction from the press on the media. They also worked in the situation of advancing information technology so rapidly as an influential factor from the outside to the process and management issues of news from upstream to downstream that they could not avoid. All of that is based on the issue of transparency in the news management process in disclosing facts in the news to the public.

The advancement of information technology is a new civilization which means information. According to Muis, the flow of information from the outside will be more intense and increasingly difficult to filter. Because, the obstacles of space and time are getting thinner. Finally the world becomes more transparent, (Muis: 2000: 3). As the issue that has been and being carried out by the management of newspaper reporting is indicated by a tendency not to adhere to the principle of independence as an ideology that must be held firm by any media because the interests of the media owner influence the construction of the text in the news making process. The suspicion is getting stronger when we find out the owner of the newspaper as well as a politician or founder of a political party.

The relationship between journalists and politicians are based on the process of communication between these actors. Some communication processes occur in situations characterized by rather formal arrangements. These situations are planned, following certain fixed rules, appearing in the context of repeated events, which use standard language is common, and the situation has a more or less official character. (Philip and Carsten, 2013: 3).

The emergence of political communication as a special forum for the transmission political messages is a response to the needs from time to time because communication is no longer dominated by interpersonal communication and direct oral or face-to-face interaction but oriented to communication technology. (Ahmed and Ansari, 2012: 181)

Globalization in the field of information in the world of mass media cannot be separated from globalization in the economic field, which of course the development of information is highly dependent on the ability of the power in the capital class. Of course these conditions have an influence up to the world of mass media in Indonesia. Therefore, the phenomenon reported in the newspaper namely Media Indonesia tends to display information about the Presidential candidates with their respective reporting faces containing more positive and negative elements as an inevitable issue of reporting. On the one hand, the pressure of various interests that come from the investor (owner) media into the news management process is getting bigger. Whereas on the other hand, the demands of our national press system to preserve the function of the Pancasila press are also increasingly tight. In other words, there is a conflict between the demand to maintain the existence of the press and the demand to carry out the functions of a free and responsible press, in accordance with the Pancasila democracy, (Muis: 2000).

The ideology of the news in the mass media wrapped in the presidential election campaign agenda is part of social change that is increasingly fast and broader. The change in ideology is directly related to the influence of the process national development sharpened by the influence of globalization and this information age. In other situations, sometimes the content of information conveyed through the mass media to the public often contradicts the expectations of the public as a result of the pragmatic view mass media, which inevitably reality as such will affect the information development system in Indonesia. In Muis's view above, it emphasizes more on the behavior of the mass media that appear in two faces, where the state through the national press system requires the press to deliver the news must fulfill the applicable ethical values and press law. But on the other hand, the behavior of the press tends to adhere to the principle of freedom which is more nuanced to the interests of the intended media owner. This assumption can be seen clearly in the practice of reporting management in Media Indonesia newspapers.

Furthermore, in the perspective in analysis of the news text related to the 2014 presidential election campaign in Media Indonesia newspapers, which tend to be not independent, there are actually the most basic things, especially the issue of the press values of the Pancasila that are increasingly left behind the progress of information. There is a gap in news management that has occurred sharply in the newspaper's practice. Why is that? Basically the gap phenomenon occurs due to a conflict of interest involving the media working class (editorial team), newspaper owners who are also the founders of political parties / politicians who influence the management process of the 2014 presidential election campaign reports in Indonesia. This matter has caused various interpretations of the news in the newspaper. C.A. Van Peursen explained in the current era of globalization, the problem of communication ethics is increasingly dramatic. Human ethics and wisdom are increasingly left behind by the development of information and communication technology. The law of communication of mankind is also increasingly transformed into a phenomenon that has more harm than its reward. Because, the function of information and media commodities is increasingly more dominant than social functions, (Muis: 2000: 19).

In newspapers namely Media Indonesia newspapers, according to the authors, this is similar to what has been assumed by Subiakto and Ida, to be part of media politics and popular culture. Media and popular culture which are presented as capitalist commodities, ultimately build popular cultural narratives for politics in the country. Media or newspapers reverse passive audiences, the media become interactive participants who are no longer just spectators, but are part of the "story". Politics is no longer seen as a serious event and is related to the interests of the masses, including citizens. But politics becomes a "spectacle" and even used as a driver to increase the rating of programs on television stations and in other newspapers and the rubric brings benefits to the press, (Subiakto & Ida, 2015: 155).

Substantively the election of the President and Vice President will determine the values that will later be implemented in the government and politics of the country. The values developed through political ideas, the interests of the political parties will certainly be related to the control of state resources, not only members of the cabinet but also as the political direction of the nation for the next five years. It is hoped that every democratic process in the presidential election will always have efforts to gain public support from the public, especially those who have the right to vote. The introduction of political figures as personal and institutional and / or political coalitions will be built together with the introduction of political ideas or ideas, to get acceptance in the eyes of the voter public. According to Stuart Mill in Subiakto and Ida (2015: 5), democracy through direct elections (one person, one vote, one weight) depends on the votes of the majority who have the right to vote and come to the election by legally choosing the presidential candidate invite. The presidential candidate pair will fight over the same target, namely the voting community.

Media Indonesia newspapers that are members of the Metro Group led by Surya Paloh, known as Great Indonesia activists, are supporters of the Jokowi – JK presidential candidate. In its announcement, Media Indonesia always gave a prominence and established the Jokowi-JK presidential candidate, compared to the Prabowo-Hatta presidential candidate. Thus the loading of news on newspaper headlines is influenced by the political power of media owners. Each media will represent candidates according to the political orientation of the media owner. The news of Media Indonesia newspaper, which is part of the Metro Group led by Surya Paloh, is alleged to have been influenced by the media's political economy. Where Media Indonesia, which is part of the Metro Group led by Surya Paloh, is known as a Great Indonesia activist, is a supporter of the Jokowi – JK presidential candidate. In its announcement, Media Indonesia always established Jokowi's presidential candidate as a leader who was free from human rights violations, concrete programs and visionary.

Referring to this background, the researchers are interested in examining more deeply how the practice of political economy discourse on the media industry through the development of the headline 2014 Republic of Indonesia presidential election campaign on Media Indonesia newspaper. The purpose of this study is to dismantle the practice of political economy in the media industry through the development of headlines for the publication 2014 presidential election campaign of the Republic of Indonesia, in Media Indonesia newspapers. Then this research is expected to be able to provide theoretical benefits, namely providing development on new models (theories) about mass media economic political discourse, especially regarding political campaign reporting. Besides that, it can develop communication science especially in the research aspects of the content analysis of print mass media with Norman Fairclough's Critical Discourse Analysis approach, and can be used as a reference for subsequent research. The social benefit of this research is that it can provide important meaning for improving the quality of professionalism for media players, especially Media Indonesia newspapers in reporting political events to the public.

2. Literature Review

2.1 Discourse and Signs in Newspapers

Some relatively important definitions relating to discourse are as stated by Cook, discourse is the use of language in the context of communication, both verbally and in writing. Likewise the thing expressed by Halliday and Hasan that discourse is a semantic unity, and not a grammatical unit. Unity which is not because of its shape (morpheme, word, clause, or sentence). Connect Halliday and Hasan, there are two things that can be studied in connection with the unity of language proposed by the two scientists. First, abstract elements are used to teach language and to find out how the rules of language work. Second, the elements used to communicate. Other terms used in this study are more likely to use the concept put forward by Gee, which combines linguistic elements together with nonlinguistic elements to portray activities, views, and identities. (Badara, 2012: 17).

Furthermore, Hoeta Suhoed distinguishes the notion of discourse and text based on De Saussure's view that distinguishes langue and parole, according to him discourse is an abstract theoretical construct whose meaning is studied in relation to the context and situation of communication. What is meant by context is the element of language referred to by a speech. Thus, discourse is in the langue level, while the text is the realization of a discourse and is at the parole level. (Badara, 2012: 17).

In addition, the marginalization process as stated above, can be compared with the vocabulary used. This is in accordance with the basic argument as stated by Roger Fowler. He explained that certain linguistic choices of words, sentences, propositions, carry certain ideological values. The word is seen not as something neutral, but brings certain ideological implications. (Badara, 2012: 7). According to Berger, for the sake of the speaker (communicator) the sign functions: (a) to awaken (sense) the listener to something he stated to then think about it, (b) to express his feeling (feeling) or attitude towards an object, (c) to notify (Covey) the attitude of the speaker to the audience, and (d) to show the purpose or outcome desired by the speaker or writer, both consciously and unconsciously. (Badara, 2012: 13).

For the benefit of the listener (communication), the sign functions: (a) shows (centering) the center of attention, (b) characterizes, (c) makes him aware of the problem (relizing), (d) gives positive valuting or negative, (e) influencing (Influencing) the audience to maintain or change the status quo, (f) to control an activity or function, and (g) to achieve a purposing goal to be achieved using these words. As for finding an ideology sign it is necessary to know the context in which the sign is located and according to the culture of the user. Because, a sign can change its meaning according to the context. Both sentence, time, place and culture context. A symbol will change its meaning even in a context (time) or place) that is relatively the same but in a different context of culture (civilization). (Badara, 2012: 14).

2.2 Views on Critical Discourse Analysis

From linguistic history, humans by means of signs, can communicate with each other. Many things can be communicated in this world. (Sobur, 2003: 15). According to Badara (2012: 29), Critical Discourse Analysis (CDA) investigates how the use of the language of existing social groups fight each other and submit their own versions. Some characteristics of Critical Discourse Analysis summarized by Eriyanto are as follows: a) Actions. Discourse is understood as an action, discourse is associated as a form of interaction. Discourse is not placed as in closed and internal spaces. Discourse is seen as something that aims, whether to influence, argue, persuade, refute, react, etc., b) Context. Critical Discourse Analysis considers the context of discourse, such as setting, situation, events, and conditions. Discourse in this case is produced, understood, and analyzed in a particular context. c) History. Placing discourse in a particular social context means that discourse is produced in certain contexts and cannot be understood without including the accompanying context. d) Power. In the critical discourse analysis also considered the power element in the analysis. Every discourse that appears, in the form of text, conversation or whatever, is not seen as something natural, natural, and neutral but is

a form of power struggle. The concept of power is one of the keys to the relationship between discourse and society, d) Ideology. Ideology has two contradictory meanings. Positive, ideology is perceived as a worldview that states the value of certain social groups to defend and advance their interests.

In Fairclough's view, discourse is a social practice and divides discourse analysis into three dimensions, namely text, discourse practice, and social practice. (a). Text is related to linguistics, for example by looking at vocabulary, semantics, and order of sentences, as well as coherence and cohesiveness, and how they form a definition. (b). Discourse practice is a dimension related to the process of producing and consuming text; for example, work patterns, work charts, and routines when producing news. (c). Social practice, dimensions related to context outside the text; for example the context of the situation or context of the media in relation to society or a particular political culture, (Badara, 2012: 26).

2.3 Political Discourse and Representation in Mass Media

Political discourse, according to Syaifuddin, is as communication of ideas about politics, both oral and written, which are official and orderly for the purpose of power (hegemony). In this sentence it implies things that affirm the meaning of "political discourse": First, all regular writings such as political news, political articles and political editorial are structured systematically and logically, which has unity and integration / red thread (coherence) in the editorial or sentence. (Badara, 2012: 75). Political discourse is communication in a complex process, in which it involves / is related to the thoughts and attitudes of citizens and interests, organizational groups, election activities, and lobbying as answers to how to obtain, process and maintain power (hegemony) for the maker of the political discourse. Here it means, communication involving political messages is as "political discourse", political discourse is essentially a political reality constructed by the creator / media to influence political audiences with the aim of political imaging, hegemony and accumulation of interests. (Badara, 2012: 76).

In connection with the 2014 presidential election campaign, both the Media Indonesia and Seputar Indonesia newspapers used representational practices in constructing the reality of the campaign. Campaign issues are social reality, each newspaper will framing the social reality in accordance with the interests of the media. According to Fiske in Eriyanto (2008: 114), when doing representation it cannot be avoided the possibility of using ideology, (Eriyanto, 2008: 114). That is, in reporting the campaign is adjusted with the orientation of the media's interests to the candidates it supports. The political world of media involvement has become the center of attention by many parties because it turns out that media companies also participate in politics. The mass media without exception is TV, magazines, radio, and newspapers often do not want to miss the political process in a country. The mass media is an important instrument in campaigning for candidates for formal political leaders, including communicating various political programs of candidates. Mass media can be relied upon enough to bring certain messages from candidates who get a place in a media.

2.4 Critical Theory

Some of the premise that has been the trigger for the birth of Critical Theory. First, the birth of critical theory came from the Frankfurt School of Germany. Second, the discovery and rapid development in the field of communication technology, especially newspaper technology, radio, television technology is one of the factors that trigger the birth of critical theory. Third, the debate about the role and effects of the mass media between the Frankfurt (Germany) School and the Chicago School (United States) is another problem that has encouraged the development of critical theory. The problem contested by the Frankfurt School in the research of mass communication in the Chicago School (United States) is the question of "marxistic economic determinism" and "empirical positivism". Four, Habit in empirical positivism research that denies freedom of value and narrows social reality. From these four premises, what emerges is what the Frankfurt (German) School group calls the "Critical Theory".

By referring to the typical character of critical theory, criticizing ideology in the process of changing society in a system, for example, criticism must be done comprehensively and holistically with all the advantages and disadvantages inherent in the system if, for example, there is a process of human slavery, a life that not independent of their social reality, there is injustice and irrationality in humans. Critical theory aims to open up the slavery process, liberate humans, create a life of justice and rationality. That is, the creation of a better and more balanced human life for their needs. (Eriyanto, 2008: 56).

2.5 The Theory of Media Political Economy

The third basic theory that is used as an analysis for this research object is in the discussion of the results of the research in the next chapter, which is the Media Political Economic Theory. The political economy of the media is actually a battle of how economic and political aspects have influenced the production and reproduction of culture as a commodity of mass media. This approach looks more at how the conception of materialism is distributed and circulated in the practice of implementing cultural production. As the view of Babe also writes that the roots of media political economy stems from views and conceptions born of experts in cultural studies, such as Theodore, Adorno, Richar Hogart, Raymond William, and E.P. Thompson. These people introduced the theory of cultural materialism. The efforts of adherents of critical theory to explain that culture or culture are the results of production and reproduction that are caused or become consensus of economic logic. Culture has become a commodity produced by the particular interests of the maker for the benefit of obtaining financial benefits. (Eriyanto, 2008: 160-161). This is actually the main reason why newspapers, Media Indonesia newspapers discredit each other and claim social truth about each of the presidential candidates in the 2014 presidential election through reporting in the newspaper.

In addition, the content of the media is the accumulation of influences from various factors that influence the decision-making process for related parties in the editorial room. These factors can come from, among others: First, the individual / media worker itself such as the media manager's professional background, gender, age, or religion, in terms of professionalism of the media manager, educational background or tendency of journalist orientation to political parties . Second, the media routines that take place every day and become standard procedures for media managers such as the mechanism and process of determining / making news, the form of delegation of tasks, etc. Third, organizational structure factors where foreign components in a media organization may have their own interests such as editorial, marketing, advertising, circulation, general, and so on that have different goals, targets, strategies, and philosophies own organization. Fourth, environmental factors outside the media such as news sources, external parties such as the government and the business environment. Fifth, ideological factors used by individuals / media owners to see the reality and how they deal with it.

3. Methodology

This study uses a qualitative Content Analysis Method. While the analytical approach is the Norman Fairclough version of Critical Discourse Analysis. Therefore, this research is in the realm of the critical paradigm. The critical philosophical assumption is that seeing reality is based on competition for power, identity, history and ideology. Thus the presidential election campaign is a battle of discourse of each candidate. Through mass media representation appears to establish the ideological discourse that will be built. Representation in the mass media, especially in newspapers, is inseparable from the influence of history, political economy, media and ideology. For this reason, understanding social reality requires a theoretical framework, but not to be deducted, but rather to gather concepts in explaining the phenomenon of media coverage written in Media Indonesia newspaper headlines and Seputar Indonesia in the 2014 presidential election campaign. used the Political Economy of Media theory, and representation, while Norman Fairclough's critical discourse analysis was used for discourse analysis.

Starting from the critical approach, in the stage of interpretation "dialogue" is carried out between the results of the analysis and the theoretical framework so that a new understanding of the phenomenon is obtained. In this stage, inductive thinking is used, concepts in theory are used to analyze factual units while moving in a more abstract direction in the form of generalizations and eventually become theories through the process of conceptual formation and theory formation (grounded theorizing).), Neuman in Hamad (2004: 46) In the study of critical discourse analysis, in addition to the use of critical tradition perspectives, critical paradigms and also some critical theories adapted to the research themes needed to become analysis blades in dissecting / analyzing text texts and the results of in-depth interviews (dept interview). In addition to the intended theories, in this study the analysis of Norman Fairclough's version of Critical Discourse Analysis was used as an analytical approach or model.

The subject of this study is the headline of political campaign news, namely Media Indonesia newspaper as many as 6 news owners / actors (editors) as well as representations of media readers. While the object of research is political ideology and economics reporting on the news headlines of the 2014 Indonesian Presidential election campaign published during the campaign period of the intended Presidential Candidate. By taking experience from what Syaifuddin said in his research, the data collection techniques that will be used in this study are as follows: Text Analysis, Depth-interview, Library study and documentation, and Observation. Then Fairclough's data analysis technique understands Critical Discourse Analysis (CDA) related to research on tension between two assumptions about the use of language, that language composes and is socially structured by Titscher, Mayer, Wodak, & Vetter. (Titscher, et al. 2009: 242). The assumption is based on Halliday's "systemic functional linguistic theory," that each text has an "ideational" function through representation of the experience of representation and representation of this world. In addition, the text produces social interactions between participation in discourse, and thus also displays interpersonal functions. Finally, the text also has a textual function, that the text brings together separate components into a whole and combines them with situational contexts (Fairclough, 1995 p. 61).

The validity technique of the data in this study is the intertextuality technique. The results of this analysis are in the form of meanings, representations, and the influence of media political forces in the 2014 presidential election campaign. In drawing conclusions, researchers use interactive models as stated by Miles and Hiberman (2004). The analysis process flows from the initial stage to the final stage. Components of data analysis (which includes data reduction, data presentation and conclusion) are interactively interconnected during and after data collection. The researcher will draw conclusions by staying open and skeptical. As long as the research takes place, any conclusions that are set will continue to be verified until truly valid and solid conclusions are obtained.

4. Discussion

This discussion will reveal more about Media Indonesia newspaper's political economy discourse in the reporting of the 2014 Republic of Indonesia Presidential Election Campaign. From the Media Indonesia newspaper, the researcher assumes three reports relating to political economy discourse. Furthermore, in the sub-section of this discussion, researchers will divide the three reports into two major themes. For more information on the political economy discourse in the headlines of the news of Media Indonesia newspapers, the researchers will present it in Table 18 below.

Table 18

POLITICAL ECONOMIC DISCOURSE SK. MEDIA INDONESIA

DATE./TITTLE	HL – MEDIA INDONESIA	DISCOURSE
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Headline		
05 June 2014 excite the world's efforts (1)	The Jokowi-JK pair received support from businessmen (KADIN and Apindo) and academics.	The Jokowi-JK Pair Policy received support from the business community / KADIN
16 June 2014 Jokowi is More Concrete (7)	The media considers Jokowi's maritime-based program because removing price differences is more concrete than Prabowo's. Text construction also shows support from KADIN towards Jokowi's policies.	
22 June 2014 Jokowi-JK Ready to Protect Maritime Affairs (11)	The Jokowi-JK pair stressed the importance of protecting citizens, maritime natural resources, domestic products and regional and international security.	Protection of business actors, maritime natural resources, and domestic products, as well as regional and international security guarantees

The study of media political economy on several news titles in the table above wants to show how economic interests are always overshadowed or occur in a political battle setting. Conversely, political battles occur in the interest of gaining power to regulate economic resources. In this interest, capital owners are involved through the operationalization of tangible mass communication media institutions to achieve their goals. Owners of capital affiliated to certain political forces tend to construct reports that favor the groups they support and marginalize groups considered as opponents.

The tendency of media alignments mainly occurs because of the working mechanism of the media structure in producing a discourse. This relates to the editorial work process where planning, selection, editing and improvement occur until the news is ready to air. Media in the view of McNair (2011) not only conveys the messages of political organizations to the public, but also changes them through various processes of reporting and interpretation. (McNair, 2015: 65).

On the news on June 5, 2014 entitled "Jokowi Breaks the Business World", and June 16, 2014 entitled "Jokowi is more Concret", the text construction was aimed at directing public opinion that the Jokowi-JK couple's policies received support from the business community namely KADIN and APINDO and academics. KADIN (Indonesian Chamber of Commerce and Industry) is an Indonesian entrepreneurial organization engaged in the economy. This organization was established on September 24, 1968 and is regulated in Law Number 1 of 1987 concerning the Chamber of Commerce and Industry. The law stipulates that all Indonesian businessmen in the field of state business, cooperative business and private businesses jointly form the Chamber of Commerce and Industry in the context of realizing a strong and highly competitive Indonesian business world.

Whereas APINDO (Indonesian Employers' Association) was established on January 31, 1952. This association was formed in line with the increasing issues in the field of labor and industrial relations, employers considered the importance of a forum that was able to become a forum for communication and exchange of ideas to resolve various problems arising in the field of industrial relations and labor. The interests of the government and employers. In a wider scope, the forum can voice the aspirations of employers to governments and other organizations, both at home and abroad, which are related to the world of industrial relations and labor. ([Http://apindo.or.id](http://apindo.or.id)).

The practice of Media Indonesia newspaper discourse by displaying KADIN and APINDO in text construction, besides being part of journalistic techniques, but more than that has a close connection with the media political economy. As the discourse analysis of Theo Van Leeuwen (Rachmadi, p. 6), which focuses on: first, the exclusion process; second, the process of inclusion. In the headline text construction above, what is done by the Media Indonesia newspaper is the inclusion process, namely a discourse strategy that constructs a group or each particular party is included in the news text into a representation. While in Fairclough's discourse analysis, the representation of the headline discourse practice above shows how events, people, groups, situations, circumstances, or whatever is displayed and described in the text, implies a reciprocal relationship between discourse and social structure.

In reviewing the news that presented the chairman of Chamber Commerce and Industry as well as the President Commissioner of PT Panasonic Gobel Indonesia (PGI), Rachmat Gobel and Chair of APINDO Sofjan Wanandi, it could be seen that <http://dx.doi.org/10.29322/IJSRP.8.12.2018.p8456> www.ijsrp.org

there were relations between the Media Indonesia newspaper, the Kadin Chair and the APINDO Chair, even with Joko's vice presidential vice presidential candidate Widodo - Jusuf Kalla, who is both from a business background. Later, after the election of Joko Widodo - Jusuf Kalla, Rachmat Gobel was elected as Minister of Trade. Rachmat Gobel is currently a member of the Nasdem Party honor council and legislative candidate for the Gorontalo electoral district.

While Sofjan Wanandi, when the 2014 Presidential Election with APINDO supported Jokowi-JK. After the pair he supported was elected president-vice president, Sofjan, who is also the owner of the Gemala Group (now Santini Group), entered the Jokowi-JK cabinet to become the Vice President's expert team. In addition to Sofjan, an APINDO member who later entered the cabinet was Franky Sibarani, who was the Head of the Investment Coordinating Board (BKPM).

In contrast, in addition to the allocation of power to non-party political groups (in this case KADIN and APINDO) in government, for the Media Group business conglomerates, especially capital owners, the economic benefits obtained are in the form of advertisements by entrepreneurs who are members of both organizations. Some that can be mentioned here are Sugianto Kusuma and Robert Budi Hartono who are members of the APINDO Advisory Council. (<http://apindo.or.id/id/about/struktur-organisasi>). Sugianto Kusuma or familiarly called Aguan is the founder of Agung Sedayu Group, one of the largest property developers in Indonesia whose advertisements often adorn glass screens. (<https://news.detik.com/berita/d-3179405/profil-aguan-bos-agung-sedayu-group-yang-dicegah-kpk-ke-luar-negeri>). While Robert Budi Hartono is the owner of the Djarum cigarette company and owner of Polytron. (<https://properti.kompas.com/read/2017/12/05/171034021/ini-sepuluh-raja-properti-terkaya-indonesia>.)

The advantages in terms of ad revenue as described above, allow the Media Group, especially the newspaper Media Indonesia to run a media business as an industry and at the same time a tool for the ideological battle of capital owners through the practice of daily news discourse. This advantage was also conveyed by Elman in an interview with the Researcher about the importance of advertising in financing media operations. Quoting Elman's statement, "Especially today, advertisements and editors must be together. No, maybe we don't have a salary. Where is the salary (if) from the ad not there? How do advertising promotions want the newspaper not to sell? Through the statement, Elman stressed the importance of collaboration between the editorial section and the advertising section to produce the performance of newspaper publications that attracted readers' interest. This opinion was reinforced by Gaudensius who emphasized the importance of cooperation between sections in Media Indonesia. Gaudensius stated, "Between the parts shoulder to shoulder so that. Editors also help friends in advertisements to open opportunities with policy makers. But Gaudensius also emphasized that the fire in the newsroom cannot be intervened by the business / advertisement section. He mentioned the need for cooperation between the editorial section and the business section to maintain the sustainability of the company. In its conclusions about the mechanism of the media industry's work in the Media Indonesia newspaper, Gaudensius stressed that there could be no idealism if the company was not healthy.

The description of reality and the dynamics of politics and economics above shows the reciprocal relationship between discourse and social structure as mentioned earlier. Both institutions, namely KADIN and APINDO were identified as public organizations, namely non-party organizations with political objectives; by occupying institutional political power, in government or representative councils, which enables the implementation of desired policies (McNair. 2015: 5-6). For example, on the June 5, 2014 headline, Media Indonesia newspaper constructed a text about KADIN's hope for Jokowi-JK to make a mental revolution to cut the high-cost economy. Likewise the construction of the text regarding the recognition of the Chairman of the Indonesian Employers Association (Apindo) Sofjan Wanandi that Jokowi not only simplified everything, but also made it very simple.

On the contrary, Media discourse is carried out by Media Indonesia with an exclusion process for institutions or institutions that support Prabowo. For example, support by the Mainstay Farmers and Fishermen Group (KTNA) and the Indonesian Farmers Association (HKTI). In the practice of this discourse, the Media Indonesia newspaper deliberately ignores institutions or institutions that are considered to be political opponents. This kind of media work practice shows a form of cruel market mechanism because it makes certain media dominate the public discourse and others are marginalized. The presence of KADIN and APINDO in the Media Indonesia discourse as an organization that is closely related to economic activities, as well as being seen as non-party organizations that have political goals reinforce McNair's (2011) view that the media not only provide knowledge (cognitive), but also organize and arranging political reality, sorting out more or less important events according to their existence or absence on the media agenda. (McNair. 2015: 71).

On June 22, 2014, Jokowi-JK was ready to protect the maritime country, the conclusion of the news was that the Jokowi-JK couple stressed the importance of protecting citizens, maritime natural resources, domestic products and regional and international security. Regarding maritime natural resources, Agrimedia Bulletin states that there are seven economic spectrums that have the potential to contribute to the maritime sector to Indonesia's national GDP. The seven marine economic spectrums include fisheries, maritime tourism, sea transportation, offshore mineral energy resources, marine industry, marine building and marine services. The potential for marine economic value is estimated to reach a minimum of 8.22 trillion dollars per year. (<https://www.researchgate.net>). Through the construction of the news, the Media Indonesia newspaper carries out a communication function that connects political power in the contestation of the 2014 Presidential Election with economic resources that include production, distribution and consumption in the maritime sector. The fruit picked by Media Indonesia newspaper is of course in the form of economic benefits obtained by the owners of capital.

The researcher noted that the Media Group, a conglomerate that covers the Media Indonesia newspaper, has planned to build a resort in Sabang since 2015 to develop marine tourism with the concept of eco-tourism in the western tip of Indonesia. The Media Group claims to have received direct requests from the central government and regional governments. The development is likely to hold China Sonangol Media Investment, a joint venture between Media Group and China Sonangol Land. China Sonangol Land and

Sonangol EP are under the umbrella of the Sonangol Group which has been in partnership with the Media Group since 2009 in the Cepu Block. Since 2014, Sonangol EP wants to become an oil supplier to Indonesia. Surya Paloh himself admitted to whispering to President Joko Widodo that Pertamina would cooperate with Sonangol EP. (<http://industri.kontan.co.id>). In addition, Media Group also obtained investment cooperation with China Sonangol Land to build the 303 meter Indonesia Building 1 with a value of Rp 8 trillion. Inauguration of the building located on Jalan MH. Thamrin was carried out by President Joko Widodo on May 23, 2015. (<https://finance.detik.com>).

The economic facts above illustrate the power relations between the media and the stakeholders who are symbiotic mutualism. These facts also affirm that in the process of making news on a particular event about power there are special considerations by the media in giving emphasis and scale of priority by placing the "interests" of both parties (the interests of the media and stakeholders) as something important especially concerning various aspects such as the issue of sources of production, consumption, and distribution as sources of news that can benefit both parties.

When considering the political economy perspective from the aspects of commodification, structuration and spatialization, it seems clear that Media Indonesia chose events by presenting news that was considered to be liked by the groups of readers. This means that reporting related to the political field, especially regarding the Presidential Election has a high selling value, as evidenced by the intense presentation of this political news as a headline. While the practice of structuring is evident in the dynamics in the editorial room. Particularly in Media Indonesia, it seems that the structure of the role in influencing the presentation of the news is so clear that what is placed in the headlines of the Presidential Election is a single discourse that tends to be positive for the Jokowi-JK pair. Explanations from informants in the Media Indonesia newspaper showed how the editors had taken the same position and were socialized to the journalists. Spatial aspects such as the adoption of innovation in the form of sophisticated technological tools in the media industry driven by the Media Indonesia newspaper, since its inception in 1970, have developed into a media conglomerate. This business group has Media Indonesia, Lampung Post, Borneonews, Prioritas tabloid, and MetroTV television stations. In fact it has penetrated into various other industrial fields.

From the discussion it can be concluded while the political economy of Media Indonesia newspapers is viewed from a theoretical perspective. From the point of view of Media Political Economic Theory, that from the aspect of structuration, the owners of capital conduct a variety of owner's ideologies in the news content that is disseminated to the readers. The newspaper also focuses on the structure of the media economy compared to ideological content. This media organization as a subordination of a very large media corporation / economic system of capital owners related to their political interests.

The Media Indonesia newspaper also uses monopolistic strategies to develop the capital's business empire. Therefore, the independence of the ideology of the media lies precisely in economic and political power. Political economic interests This newspaper has influenced the values of democracy which are increasingly retreating in the practice of the state. The political and economic practice of the Media Indonesia newspaper affiliated with the Nasdem party has become a significant factor affecting media operations. While readers as viewers / consumers / become easy targets as well as commodities in the media industry. This Media Indonesia newspaper practices the values of materialism that are distributed and circulated in the production practices of new cultures into the concurrency of economic logic for the benefit of the owners of capital to gain financial gain and political power. The political economy interests of the capital owners of the newspaper have actually spawned disagreements among readers because they narrow the space for public discourse, representation, distortion and imbalance between society, the market and the country's political system.

From the criteria of critical political economy analysis, it can be affirmed that; a). Media Indonesia newspapers can be classified in the class of capitalist bureaucrats and dominating groups. b). The Media Indonesia newspaper is part of the dominant class among the classes in the community that conducts the fight. c). Professional Media Indonesia newspapers form an illusion of autonomy that is socialized into norms - nonna dominant cultures.

From the commodification aspect, the Media Indonesia newspaper has made the 2014 presidential election campaign event in the news a commodity / merchandise to accumulate economic and political value benefits by capital owners as a way of maintaining target audiences as well as advertisers who have become customers, as well as increasing the amount larger sales people / circulation so that they can survive and make massive expansion in order to control economic resources on a large scale. From the spatial aspect, the political economy of Media Indonesia newspaper has also commodified information technology by building online, TV, corporate media and the size of media business bodies as an effective means of overcoming barriers to distance and time with readers. From the perspective of professionalism at the level of the political economy of the media, the main focus of the Media Indonesia newspaper is to serve the needs of capital owners in providing a platform for a variety of different views. Institutional autonomy and journalist professionalism are not the best guarantee for proper supervision of political power.

5. Conclusion

Regarding the political-economic of the Media Indonesia newspaper on the headline of 2014 presidential and vice presidential campaign reports, it can be concluded that the newspaper Media Indonesia is pro-capitalism wrapped in popular issues. The Media Indonesia newspaper focuses on the structure of the media economy compared to the ideological content. In addition, the Media Indonesia organization is a subordination of the economic system of the owners of capital related to their respective political interests. The contents of the news contained exchange rates that forced market expansion for capital owners as policy makers and other businesses that were still within the corporate sphere with Media Indonesia. This is a monopolistic strategy in their business empires. Therefore, it can be ascertained that the independence of the media ideology lies in the strength of the economy. Media Professionalism Indonesia relies heavily on the interests of capital owners, then concentrates Media Indonesia tends to ignore the

microeconomic sector. The tendency of Media Indonesia to serve the interests of political and economic power with political tactics is to place the public freely in accepting their existence.

Based on the two conclusions above, the writer can provide several recommendations (suggestions), namely that Media Indonesia consistently adheres to and is responsible in accordance with the spirit of the National Press Law and the Journalistic Code of Ethics. Media Indonesia also should avoid hypocritical attitudes and stay away from hypocrisy towards the public (audience) and run media business management professionally, rationally and proportionally, not through capitalistic business management. This mass media must strengthen the role in providing education / literacy to the community. Media Indonesia owners are expected to be able to stay away from an anomalous attitude in manipulating nationalism symbols to their particular readers, and to the general Indonesian community. The media owner (owner) should prioritize humanitarian interests as a form of dedication to the nation, both to employees and the wider community

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Burst TENS: An Immediate Alternative Therapy to Reduce Systolic Blood Pressure Temporarily in Hypertensives.

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Abstract- Hypertension is a major risk factor for cardiovascular morbidity and mortality. It is paramount that the resting blood pressure is within normal limits for safe prescription of exercise. Burst TENS on peripheral vascular resistance implies a sympathetic inhibition which results in peripheral vasodilatation which results in lower blood pressure. Sixty patients of either gender of 30-65 years diagnosed as essential hypertension were recruited for the study. The patients in experimental group received Burst TENS and in control group received Sham TENS for 30 minutes. Pre - post blood pressure measurements were noted in both the groups and compared for statistical significance. The exercise blood pressure response to six minute walk test was studied with and without TENS. A statistically significant reduction ($p < 0.05$) was obtained in Systolic, Diastolic blood pressure and in Mean arterial pressure in the experimental group while there was no significant change in the control group for both immediate as well as the exercise response. Thus the immediate effect of Burst TENS shows a significant reduction in Blood Pressure in hypertensive individuals and can be safely used adjunct to drug therapy to lower the abnormal exaggerated blood pressure response to exercise in hypertensive patients.

Index Terms- Burst TENS, Exercise, Hypertensive, Six minute walk test

I. INTRODUCTION

Hypertension is well documented as a major risk factor for cardiovascular morbidity and mortality. It is an important public health challenge in both economically developed and developing countries.[1] For every 20 mmHg systolic or 10 mmHg diastolic increase in BP, the mortality is doubled for both ischemic heart disease and stroke.[2] A 2mm Hg lowering of systolic BP reduces death from stroke by 6% and heart disease by 4%. According to the VII Joint National Committee guidelines for hypertension, lifestyle modifications such as exercise, weight loss and salt and dietary restriction play important role in blood pressure management. A single session of dynamic exercise can evoke an exaggerated hypertensive response and may be accompanied by some limitation in exercise tolerance in certain hypertensive subjects. The Framingham Heart Study reported that patients with an exaggerated blood pressure response had a 10% greater left ventricular mass than those who did not [3], hence the response to exercise in hypertensive patients may be a more useful end point to assess

the efficacy of antihypertensive therapy than is resting blood pressure.

For safe prescription of exercise it is important that resting blood pressure is within normal limits. Less widely prescribed but increasingly popular is the complementary and alternative medicine antihypertensive therapies. The current modality Transcutaneous Electrical Nerve Stimulation (TENS) is primarily used for pain relief [4]. Studies of effect of Burst TENS on peripheral vascular resistance imply a sympathetic inhibition which causes peripheral vasodilatation and thus increase blood flow and lower blood pressure[5]. Jacobson et al suggested that TENS may have additional blood pressure lowering properties in hypertensive patients who do not respond properly to pharmacological treatment[6]. The effect of TENS on blood pressure is a field of growing interest. Our study aimed at evaluating the immediate effect of TENS on resting BP and exercise BP in hypertensive individuals.

II. METHODOLOGY:

It was a prospective randomized controlled intervention approved by institutional ethics committee of tertiary care hospital. Sixty patients of either gender in the age group of 30-65 years diagnosed as essential hypertension were recruited. Patients with autoimmune, hormonal, neurological respiratory, cardiovascular disorders or with secondary hypertension were excluded from the study. Patients unable to understand, psychologically disturbed and having difficulty in walking or any musculoskeletal disorder which would interfere with ambulation were also excluded. Patients were randomly allocated via lottery method into experimental or control group. The patients in experimental group received Burst TENS and in Control group received Sham TENS.

In order to study immediate short term effect, heart rate and blood pressure was recorded, pre and post Burst TENS and Sham TENS application in experimental and control group respectively. The next day at the same time, to study exercise related BP response, Six minute walk test (6MWT) was used as an exercise stressor. It was performed according to ATS guidelines 2002 with standardized instructions. Blood pressure change with 6MWT was recorded with and without Burst TENS or Sham TENS application as assigned upto 30 mins of recovery following 6MWT.

Baseline parameters were recorded with patient sitting comfortably on chair with arm rest for ten minutes and with feet

supported. They were advised not to drink coffee or smoke cigarette thirty minutes before having their blood pressure measurement. At the first assessment BP was measured on both arms to check any variance between the arms. The possibility of raised BP in response to the assessment itself (white coat hypertension) was considered and ruled out. Two readings were taken at least 2 min apart and average was found.

Burst TENS was applied to experimental group for 30 minutes with the patient positioned comfortably on a chair with arms supported on table. The Burst TENS frequency of 2/100 Hz was used, with pulse duration of 0.2ms; mild perceptible intensity ranging from 2-20 mA. Carbon electrodes were fixed at two acupuncture points: - LI 4 and LI 11 (Figure1).

LI 4- Hegu point- It is on the dorsum of the hand, between the first and second metacarpal bones on the radial side of the midpoint of the second metacarpal bone. LI 11- Quchi point- Located in the elbow in the depression at the lateral end of the transverse cubital crease and the lateral epicondyle of the humerus.

Sham TENS was applied in the similar manner. The battery was designed to show the flickering of light with no output for Sham TENS. The participants were informed that there may be no perception of current. Participants could see the output light flashing but no current was transmitted to the acupoint throughout the 30 minutes.

III. Results:

Data was analyzed using SPSS 16 with a 'p' value < 0.05 for statistically significant. Data was normally distributed. Total 96 patients were screened and 60 included as per selection criteria and randomly allocated in each group. Both the groups were comparable for baseline characteristics of age, Body mass index, systolic and diastolic blood pressure and pulse rate. By applying student's unpaired 't' test it was seen that there is no significant difference between baseline mean values of Burst TENS group and Sham TENS group. Paired t test was used for within group comparison and unpaired t test was used for inter group comparison.

In Experimental group (Table 1) an immediate reduction of SBP was observed from mean 140.80 to 130.13 mmHg, (reduction by 10.67 mm Hg) which was statistically significant [$p < 0.05$]. A statistically significant reduction was obtained in DBP reduction from mean 92.13 to 83.47 mmHg and in mean arterial pressure from 108.36 to 99.02 mmHg. In control group there was no significant change in SBP or DBP from the baseline values.

On comparing the mean change in BP parameters (Table 2) there was a clinically and statistically significant reduction in blood pressure parameters in Burst TENS group compared to Sham TENS.

Paired 't' test was used to compare the change in blood pressure parameters following 6 MWT Before and after Burst TENS (Table 3) in experimental group and control group. There was a statistically significant ($p < 0.05$) reduction in exercise blood pressure response to 6MWT in Burst TENS after application, however there was no statistically significant ($p > 0.05$) difference obtained in control group. On comparing the mean change in parameters between both the groups there was a statistically significant difference in the exercise blood pressure response. The control group showed a greater rise in BP

compared to experimental group (Table 4). The pressures were observed to remain elevated even after 30 mins of recovery in control TENS group. Unpaired 't' test was applied to compare parameters post 30 minutes recovery time following 6 MWT after burst TENS and Sham TENS application. Significant reduction in parameters was found in Burst TENS group as compared to Sham TENS group ($p < 0.05$)

IV. Discussion:

Hypertension is a major risk factor for coronary artery disease and stroke, which are highest causes of mortality [7,8]. Blood pressure changes during exercise and recovery period are analogous with blood pressure responsiveness to daily physical stress conditions. The aim of the present study was to find the short term effect of Burst TENS at rest and on post exercise blood pressure in hypertensive subjects. In the present study 60 hypertensive subjects were randomly divided into Burst TENS (experimental) and Sham TENS (control) group. The control group was given sham TENS in order to take care of psychological aspect of application of treatment with device and effect of rest if any.

The results of this study showed that there was a clinically and statistically significant reduction in parameters ($p < 0.05$) after application of Burst TENS (experimental group) whereas there was no significant reduction in parameters ($p > 0.05$) in Sham TENS (control group). A 2 mm Hg lowering of systolic BP reduces death from stroke by 6% and heart disease by 4%, in our study we obtained a mean reduction of 10.67 mm Hg in SBP and 8.67 mm Hg in DBP.

The anticipation of exercise activates the sympathetic nervous system. As exercise begins there is further increase in sympathetic tone, reduction in vagal tone and increased circulating catecholamine levels. This leads to proportionate increase in heart rate and systolic blood pressure whereas the diastolic blood pressure remains unchanged or decreases as a result of vasodilatation and decreasing total peripheral resistance in normal persons [9]. An exaggerated increase in systolic blood pressure at submaximal exercise increased mortality in hypertensive patients. The relative risk for death from cardiovascular disease increased with the elevation in systolic blood pressure during exercise [10,11].

The end-organ effects of hypertension are progressive, and resting blood pressure may not accurately indicate the underlying state of the disease. Blood Pressure response to 6MWT (a submaximal test) demonstrated a typical exercise stressor response. In experimental group after Burst TENS application it showed a statistically significant reduction in both systolic and diastolic blood pressure increase as compared to Sham TENS. The mean rise obtained in Burst TENS group following 6 MWT for SBP was 23.67 mmHg and DBP was mean 1.27 mmHg compared to 35.67 mmHg, DBP was mean 10.07 mmHg in sham TENS group. Thus it is seen that the abnormal elevation in blood pressure following exercise is prevented due to application of Burst TENS. Hence the complication and risks arising due to exaggerated blood pressure response are prevented.

Also the blood pressure remained maintained post 30 minutes following 6 MWT after burst TENS application in experimental group. The results showed that there was significant difference 30 mins of 6 MWT in experimental group as compared to control

group ($p < 0.05$) after Burst TENS the SBP mean was 130.13 mmHg, DBP mean was 83.47 mmHg, whereas in control group the SBP mean was 141.33 mmHg, DBP mean was 91.93 mmHg. This carry over effect of Burst TENS has a great clinical value since it aids in the safe prescription of exercise and helps prevent any cardiovascular injury during and post exercise.

In the early phases of hypertension, calculated total peripheral resistance is normal at rest but does not decrease during exercise because of a reduced vasodilatory capacity. When fixed hypertension develops, peripheral resistance increases. These responses of peripheral vascular function can be explained by a hyper-reactivity of sympathetic nerves and an increased vascular response to adrenergic stimulation or by a thickening of the arteriolar wall that alters its ability to respond to vasoconstrictor stimuli [12].

For decades, acupuncture and electro needling treatments have been used, predominately in the Eastern countries, in the management of patients with compromised cardiovascular and digestive functions. Similarly, neuromuscular electrical stimulation is commonly employed in Western countries to modulate pain, augment muscle strength and enhance blood flow in patients with peripheral vascular disease. Many rehabilitation specialists believe that electrical stimulation of acupuncture points with surface electrodes can elicit the same physiological and therapeutic effects as those produced by acupuncture and electro needling techniques. Electrical stimulation of acupuncture points with surface electrodes is a relatively new and non-invasive treatment with potential clinical application in the management of patients with vascular disease.

Acupuncture treatments using low levels of electrical stimulation can lower elevations in blood pressure by as much as 50 percent, researchers at the Susan Samueli Center for Integrative Medicine at UC Irvine have found. Overall, the researchers found that a 30-minute treatment reduced blood pressure rates in these test rats by 25 mmHg - with the effect lasting almost two hours. Acupuncture is invasive and therefore carries some risk of injury. Application of transcutaneous electrical nerve stimulation, a non-invasive modality, over specific acupoints (Acu-TENS) is believed to elicit similar responses to manual acupuncture in pain relief.

Transcutaneous electrical nerve stimulation (TENS) is typically used for alteration of pain perception. Several investigators, however, have reported that TENS can affect the peripheral vascular system⁵. Burst-mode TENS stimulates peripheral nerve fibers using relatively high carrier frequencies (80–100 pps), modulated burst frequencies (2–5 bps), and intensities above or below the motor threshold⁵. This pattern of external stimulation more closely mimics physiologic sympathetic nerve activity than continuous-mode high- or low-frequency stimulation does [5].

TENS produces a reduction in BP which may be associated with vasodilatation. They suggested that an opioid-serotonergic mechanism or VIP (vasoactive intestinal polypeptide) as possible neurotransmitters involved in TENS induced vasodilatation [13]. The reduction in blood pressure due to burst TENS may be caused by the central inhibition of the sympathetic activity¹⁴. In rats, the post stimulatory inhibition of sympathetic activity and cardiovascular depression was reversed by naloxone, a specific

opioid receptor antagonist; suggesting that an endorphinergic mechanism is involved in the inhibitory effect. This is supported by the finding of a marked increase in opioid peptide content in human CSF after TENS for 30 mins [14].

In a study done by F Jacobsson, et al found reduction in mean systolic blood pressure by 6.3 mm Hg ($P < 0.05$) and the mean diastolic blood pressure decreased by 3.7 mm Hg ($P > 0.05$) after 4 weeks of application of burst TENS TENS at 2 acupoints (Hegu LI 4, Quchi LI 11) on both forearms for 30 minutes twice daily during 4 weeks. Thus they concluded that continuous TENS may have additional blood pressure lowering properties in hypertensive patients who do not respond properly to pharmacological treatment. The effect of TENS may also have a prolonged effect⁶.

John Zhang, Derek Ngb, Amy Saub (2008) concluded that electrical stimulation of acupuncture points reduced systolic blood pressure but not the diastolic blood pressure in the current subject population with normal and elevated blood pressure. Used the acupuncture points LI 4 and LI 11 for blood pressure for 30 minutes each session, twice a week for 5 weeks.

The stimulation of acupuncture points triggers the release of opioid chemicals in the brain that reduce excitatory responses in the cardiovascular system. This decreases the heart's activity and its need for oxygen, which in turn can lower blood pressure, and promotes healing for a number of cardiac ailments, such as myocardial ischemia (insufficient blood flow to the heart) and hypertension [15].

In this study the effects of Burst TENS on blood pressure by stimulating certain acupuncture points and meridians in hypertensive subjects was seen. Selected acu-points LI 4 and LI 11 are based on the published study of Zhou et al for 2 reasons. First, these 2 points were important in the traditional Chinese medicine and were most commonly used for varying conditions including hypertension. Second, these 2 points were on the upper arm so it is very easy for researchers to access and apply treatments¹⁵. This approach was supported by the study of Jacobsson et al using the same Hans unit treating 2 points on the forearm showed significant reduction in blood pressure [15].

TENS produced a reduction in BP which may be associated with vasodilatation. It is suggested that an opioid-serotonergic mechanism or VIP (vasoactive intestinal polypeptide) as possible neurotransmitters involved in TENS induced vasodilatation.

The effect of low frequency TENS on hemodynamic and metabolic changes in the heart was seen and stated that an increase in peripheral microcirculation results from sympathetic inhibition after the application of low frequency TENS.

The reduction in blood pressure due to Burst TENS may be caused by the central inhibition of the sympathetic activity. In a study, done by Sanderson et al to assess the effect of TENS or a variety of standard tests of autonomic cardiovascular reflexes concluded that TENS appeared to have a mild inhibitory effect on reflexes which are mediated predominantly by the sympathetic nervous system [16].

Kaada et al investigated the effect of low freq TENS on hemodynamic and metabolic changes in the heart and stated that an increase in peripheral micro circular results from sympathoinhibition after the application of low frequency TENS [14].

Burst-mode stimulation was chosen in order to mimic the naturally occurring, burst-like pattern of action potentials in sympathetic nerves. The pattern of external stimulation more closely mimics physiologic sympathetic nerve activity than continuous mode stimulation does. Vasodilatation would be more likely to occur with burst-mode than with constant-frequency TENS because arterial smooth muscle is more responsive to irregular, low-frequency bursts of stimulation. The muscle pump, accumulation of local metabolic vasodilator substances and flow induced vasodilatation produced by local release of reflexing factors derived from the endothelium are potential mechanisms for the vasodilatation in response to the TENS[5].

Also Blood pressure response to exercise after Burst TENS application in the experimental group was significantly lower

V. CONCLUSION

The results of this study shows that there was immediate statistical and clinically significant reduction in Blood pressure after the application of Burst TENS. Hence patients with exaggerated response of Blood Pressure with exercise can be benefitted with application of burst TENS.

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than in the control group thus it proves that Burst TENS application helps to reduce the exaggerated Blood pressure response to exercise . Thus Burst TENS can help to reduce the exaggerated blood pressure response to exercise and aid in prescription of safe exercise and prevent further cardiovascular injury.

Impaired exercise tolerance in hypertensive patients defined by functional exercise testing can be used to assess new drugs for hypertension treatment, adequacy of exercise blood pressure control, and the search for appropriate therapy for diastolic dysfunction in relation to

Burst TENS can be safely used adjunct to drug therapy to lower the abnormal exaggerated blood pressure response to exercise in hypertensive patients.

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Figure 1. Placement of TENS Electrodes

Table No. 1 Comparison of Blood pressure variables pre and post Burst and Sham TENS

Variables	Burst TENS				Sham TENS			
	Pre	Post	“t”	“p”	pre	Post	“t”	“p”
SBP	140.80±8.54	130.13±8.74	13.56	*0.000	141.67+9.09	141.27+9.60	1.795	0.083
DBP	92.13±4.20	83.47±4.17	12.87	*0.000	92.40+4.31	91.93+4.99	1.651	0.109
MAP	108.36±5.52	99.02±5.41	11.33	*0.000	108.8222+5.78	108.3778+6.38	1.000	0.326
PR	84.33±4.39	79.27±3.54	13.83	*0.000	84.33+4.39	84.27+4.47	1.720	0.096

SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; MAP: Mean arterial Pressure PR: pulse Rate. * Significant

Table No.2: Comparison of mean change in blood pressure and heart rate variables from baseline after Burst and sham TENS

Parameters	Mean ± SD		‘t’ value	‘p’ value	Result
	Burst TENS	Sham TENS			
SBP	10.67±4.31	0.40 ±1.22	12.55	p<0.05	Significant
DBP	8.67±3.68	0.47±1.54	11.39	p<0.05	Significant
MAP	9.37±3.69	0.43±1.35	12.62	p<0.05	Significant
PR	5.07 ±2.44	0.07±0.36	11.18	p<0.05	Significant

Table No.3: Mean difference of Pre-Post change in Variables of 6 MWT with burst and Sham TENS .

Variables	Pre Burst	Post Burst	‘t’ value	‘p’ value	Pre Sham	Post sham	‘t’ value	‘p’ value
SBP	35.67±3.48	23.67±5.99	11.47	P<0.05	35.33±4.080	35.67±4.205	-1.720	P>0.05

DBP	9.47±2.51	1.27±3.08	10.19	P<0.05	9.60±2.127	10.07±3.129	-1.651	p>0.05
MAP	18.33±2.10	8.77±3.03	13.58	P<0.05	18.20±2.203	18.60±2.699	-1.934	p>0.05
PR	36.63±6.18	21.30±8.78	11.20	P<0.05	36.20±4.909	36.00±4.00	0.291	p>0.05

Tourism site Conservation Knowledge of College Student as Social Media User in Malang East Java Indonesia

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Abstract

Indonesia categorized as a mega biodiversity country, with 25% of the species in the world. Because of that, awareness about conservation is urgent, especially for youngster as the next country hope. Lately Social Media has become a trend among youngster. They use it every time and everywhere. Some studies in Indonesia mostly still view social media as marketing advice. In fact, social media also plays an important role in regulating the perceptions of the people who come to the ecotourism site both from the content or the ease of access. Practically, from this research could determine how far student knowledge about Conservation. And it can be used for make an engagement strategy to improve knowledge about conservation. This research is descriptive type with quantitative approaches, with research locations in Malang. Research is done using online questionnaire with Google Form. The results are, Instagram is the most used social media by students in Malang. And for Knowledge about conservation, 81,3% student care about conservation, 94,4% know that tourism site conservation is must, and 81,9% involved in that tourism site conservation.

Keyword : Conservation, College Student, Social Media ,Tourism site,

I. INTRODUCTION

Indonesia is one of a country with a highest diversity of flora and fauna. Indonesia categorized as a mega biodiversity country, with 25% of the species in the world [1]. With abundant resources, need good management so it can be utilized maximally and for a long time sustainably. According to Indonesian Fundamental Law Number 32. Year 2009 about Natural resource and Environmental management, paragraph 1 verse 9, Natural resource composed of Biological resource and non-biological resource that make an ecosystem [2]. One of the uses of natural resources is in the tourism sector. Tourism is a variety of tourist activities, which are supported by facilities and provided by the community, entrepreneurs, government, and local government [2].

Tourism itself, has a big impact for economical side, Culture and Social, and also environmental side. For Economical side, will increasing income for anyone that involved, including local people around tourism site. For social side, tourism could increase working field especially for people around, for culture tourism will help to conserve local wisdom. And also tourism will have affected for Environmental conservation awareness [3].

Social Media, consisting by three parts, there are infrastructure, information, and tools used to produce and spread media content. Content in social media can be personal messages, news, ideas, and many more. Later, the role as producer and consumer of media content can be individuals, organizations, or even industries [4]. 2015 in Indonesia, from 255 million populations, 88.1 million were Internet users and 79 million of these internet users were active as social media users [5]. Most of the studies in Indonesia

mostly still view social media as marketing advice, although some have started using Social Media as an educational medium. Previous research in China said that social media also acts as a driver in social movements in society [6].

This study conducted in Malang, because Malang has been known to be educational city since the Colonialism era. In Malang, there are currently more than 88 colleges [7]. From the number of students themselves, it is estimated that there are more than 350 thousand students, with estimated New Students for UB in 2017/2018, around 10,000 students [8]. Aim from this research to understand social media that college student in Malang Prefer to use, and also how far they knowledge about conservation in tourism site.

II. MATERIAL AND METHODS

This study is descriptive type with quantitative approaches. This study conducted in Malang, because Malang has been known to be a city of education since the Colonialism era. In Malang, there are currently more than 88 colleges [7]. For the number of students themselves, it is estimated that there are more than 350 thousand students, with estimated New Students for UB in 2017/2018, around 10,000 students [8].

So with a high amount and diverse student population, assumed it can provide a clearer picture how far conservation at tourism site knowledge from the college student. The study was conducted for one month, starting from May 17, 2018 to June 17, 2018.

A. Data Collection

Data collection is done using Online Questionnaire via google form. The questionnaire itself is an indirect data retrieval technique. The questionnaire contained a list of questions that later have to be answered or responded by the respondents. Respondents have freedom to give answers according to their perceptions [9]. Research starting May 17 2018 to June 17, 2018. Questionnaire spread using Whatsapp media, Instagram, and there are also those taken directly.

B. Data Analysis

Recorded data from the questionnaire, later collected and then it calculated with Microsoft excel for later displayed as diagram for next step result analyse,

III. RESULT AND DISCUSSION

From data recorded from 138 respondents were students in Malang, with ages ranging from 19 to 30 years. Then for the most widely used social media platform by student, 79.2% of respondents use the Instagram Social Media Platform, then Facebook 8.3% and the rest are other Social Media. With 56.6% of respondents using social media more than two hours per day.

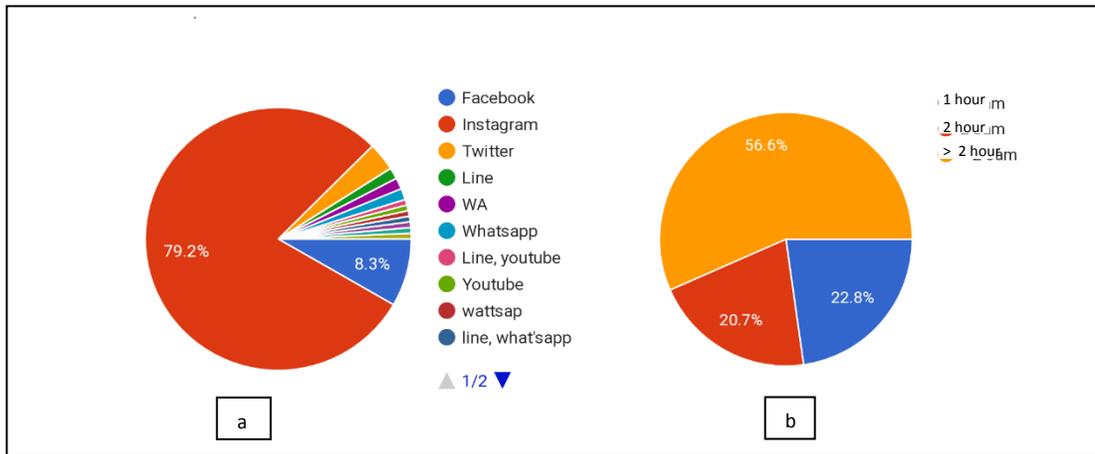


Fig 1. (a) Most Preferred Social Media by Student (b) Time spent using Social Media per day

The data obtained is accordance with the research that has been done before, the reason young people use Instagram as preferred social media because young people in the period to find they personal identity. And of course with Instagram they got spcae to express themselves because Instagram gives space to express the narcissistic nature that they have in order to look cool [10].

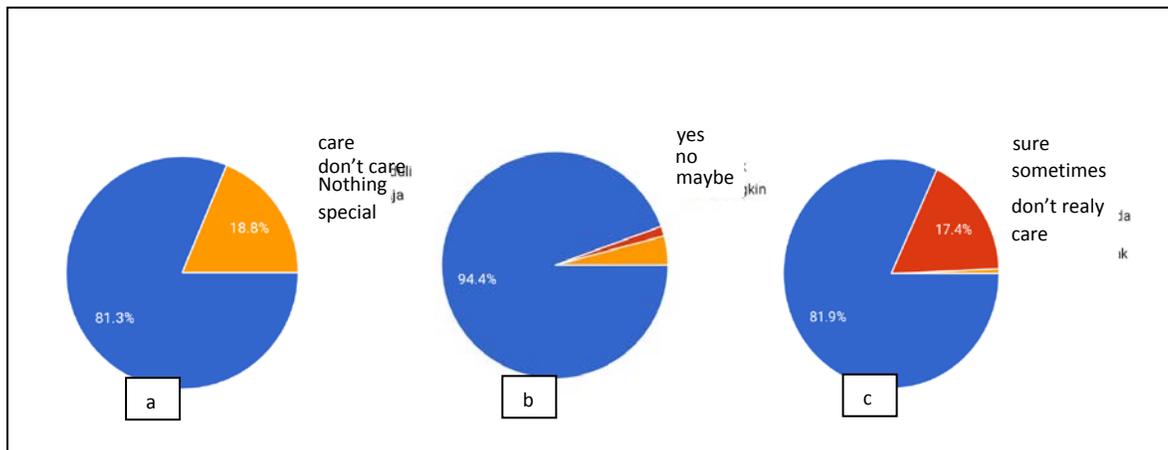


Fig 2. (a) Awareness about Conservation, (b) Knowledge about Conservation in tourism site, (c) Involvement in conservation at tourism site

From the data obtained, respondents concerns about conservation at tourism site are, 81.3% of respondents were concerned with conservation, and 94.4% knew that in tourist attractions also needed to be conserved. Then the involvement of respondents in protecting the environment 81.9% of respondents participate in maintaining cleanliness and 17.4% sometimes do it.

Tourism activity at certain areas does have positive and negative impacts. The positive impact is, there can increase income which can later be used for conservation and also additional costs to educate other tourists. The negative impact of the presence of tourists, can cause pollution both on land (garbage), or air pollution (transportation emissions), deforestation for the opening of tourist <http://dx.doi.org/10.29322/IJSRP.8.12.2018.p8458>

attractions, which later can disrupt diversity there [11]. With a high enough awareness according to the data obtained, we can be sure the negative impact of pollution that arises because the presence of visitors can be minimized.

IV. CONCLUSION

This research reveal that Instagram became most popular Social Media that used by College Student in Malang. For Spending time of social media usually more than 2 hour. And for Knowledge about conservation, 81,3% student care about conservation, 94,4% know that tourism site conservation is must, and 81,9% involved in that tourism site conservation.

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Using Archived Comments on Learning Videos as a Resource for Question Answering

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Abstract

In video-based tutoring systems, users can ask the questions and receive the answers from the system and aim at facilitating a learner in video-based learning. i.e., while watching a tutorial video, the users can enter a question (or some keywords) and retrieve potential helpful comments from the Q/A threads of Khan Academy tutorial videos using the textual overlap between the query and possible answers. It helps to find comments answer regarding tutoring systems. Moreover, this system itself is related to tutoring systems. It can be used to query Khan Academy comments according to some given keywords.

Keywords: Tutoring Systems, Q/A Systems, Python, Web development Tools: JavaScript

1. Introduction

Nowadays people can learn several concepts from the web-based learning platform. Online learning is the prevalent way of learning but when a learner wants to know the video topics discussion follow comments by other learners. For instances, when a user/learner wants to know about the video comments on the topic which has been written by existing users or learners. He/she might know other peoples discussion about the topics. This paper, the approach to developing tutorial components based on video targeted comments. It takes some sophisticated knowledge-based content technology to store structured and unstructured information.

The ultimate objective is text mining perception is to collect the useful information. Our goal is to retrieve question to answer pairs for videos as well as automatically. The availability of active discussions in this site provides plentiful opportunities for knowledge summarisation for searching a query and retrieve the relevant answers.

In this paper, we have presented an approach to web-based learning purposes to implement learning experience to build by some videos and text.

Web-based learning meant to used several videos, and it includes various features for education, practicing, progress and teaching tools (Sampson et al., 2014). TREC-8 was the first large-scale evaluation of domain-independent question answering systems (Voorhees and Tice, 2000).

In this work focuses on extracting comments on the selected online video learning. Content analysis techniques used to derive the structured and describe the conceptual relations (Daems et al., 2014). In this paper, to provide the user's comments on e-learning video. Our approach could be retrieved a similar question and answer pairs.

In this work, use the freely available resource of the question and answer sets to define intelligent tutoring systems(Khan Academy) which perceive the user's corresponding questions and answers. Data consists are set of question and answer threads so that we know data retrieve and extraction, text processing, and network analysis.

2. Related works and background

The EU Juxtalearn project (Daems et al., 2014) developed the science concepts to the create and share the videos to specify the targeted knowledge. These are the relevant concepts of the domain. Used the content analysis techniques to extract the learner's idea to declare in textual artifacts. The result of the analysis perceived student concepts and other ontology techniques suggest as "problems of understanding" and "misconceptions" (Daems et al., 2014). These are evaluated to find the automated analysis of the textual artifacts.

The ongoing web-based learning systems provide the user comments that hold to understand the video concepts. This system is capable of interacting with the tutoring components and users. We search the query into a set of categories regarding the domain concepts (Daems et al., 2014). Ontology is the concepts of domain and relationship that exists among the domain ontology.

2.1 Intelligent Tutoring System (ITS)

So far, a limited amount of research has been done on web-based learning compared to the intelligent tutoring systems. In our thesis, Intelligent tutoring system has been used for interact directly to combine the students and tutors. Any other analytical techniques for existing interfaces can also be applied. The intelligent tutoring systems have been used to prepare learners into before-mentioned different domains. We have used intelligent tutoring systems to expand the variety of instructional functions such as subjects domain, and students can handle the system response.

The domain model to solve the complicated problems where the student can practice and have new discussions. For tutoring model, distinctive ways of learning on a particular topic. Different domain reused by the learner.

Intelligent tutoring systems used artificial intelligence techniques to supports "Learning by doing ("H. Ulrich Hoppe") with computer-based systems, specifically help to learners problem understanding the mixed-initiative approach which can ask questions.

2.2 Text Mining

Text mining applies in the various learning process. It takes some complex knowledge-based content technology to store structured and unstructured information. The ultimate objective is text mining perception is to collect the useful information. To develop the text mining initiated by text documents (e.g. book in a library). But now text mining development moved to extract the textual information using natural language processing techniques is the comprehensive techniques are then used to extract relevant information. Text mining techniques, which can develop and enhance (Miner, Elder IV, and Hill, 2012) the artificial intelligence.

Text mining is used for knowledge corpus, extract the text information, classifying, clustering to meaningful understand (Gottipati, Lo, and Jiang, 2011). In the automatic extract, the text document of information (Krallinger and Valencia, 2005) to improve the database annotations with the knowledge base.

Text mining that can form text collections including retrieving and classified to combined user queries, extensive analysis to obtain specific topics, these are called text mining. Text mining tools used to develop the unknown training dataset from specified resources (Gupta and Lehal, 2009).

Text mining can represent by compliant ways of information management, analysis, and interpretation. Thus text mining can develop the fists of data mining to the ability to deal with textual materials. The purpose of text mining a field of various data mining (Navathe and Ramez, 2000) to find the model from the corpus. In text analysis, design the structured and semi-structured full-text documents.

2.3 N-Gram Language Model

This model could predict also assign to the likelihood of an entire sentence. N-gram model is the contiguous sequence of n words from given a set of sample text to estimate the probability (Jurafsky and Martin, 2009) and (Chen and Goodman, 1999).

Our approach to solving the predicting a word from the previous word in a sample of text. In particular, we consider n-gram models based on the set of words. We also discuss several analytical concepts for specifying words to categories based on the frequency in section 2.6 of their co-occurrence with other words (Brown et al., 1992).

The performance of a language model component is evaluated by the perplexity, which measures both the task complexity and the adequacy of the language model. Once the acoustic and language models are determined from a training corpus, the recognition process consists of maximizing the product which is performed through the search techniques.

The probability of each word does not depend on all the previous words in the sentence, but only on the N-1 previous ones. Therefore, the N-gram probability assigned to a sequence of words W is:

$$P(W) = \prod_{x=1}^m P(w_x | w_1^{x-1})$$

Where $W = w_1 \dots w_m$, and w_{k-1} represents the string w_k . we discuss the language model which can predict the probabilities of sentences and sequences of words using the following cases:

N-gram is a sequence of N words like "could you explain what is Programming Language?"

Bi-gram is a two-word sequence of words like "could you"

Tri-gram is a three-word sequence of words like "could you explain" or "you explain what." Estimate the predict of words or seeking words (Brown et al., 1992) based on the previous words according to a sample text using n-gram model. We'd expect to

find the pair of words. Isolated words (Bahl, Jelinek, and Mercer, 1990) are being distinct purposes of syntactic analysis in the previous words w_{k-1} .

We are using some NLP techniques like Tokenization, stemming, stopwords.

2.4 Term frequency - Inverse document frequency(TF- IDF)

Term frequency - Inverse document frequency (TF-IDF) is the weight of a term implies that how important is for a document in a collection or corpus. We have used TF-IDF to determine the term depends on relevance score of the whole or (in part) documents of each query term that appears in that document.

As TF- IDF has used several times for this thesis, the general idea of TF- IDF is described in this section. TF-IDF of a term t in a document d is calculated as follows:

$$TF - IDF_{t,d} = termFreq_{t,d} \times inDocFreq_t$$

Here $termFreq_{t,d}$ is the term frequency of a term t for the document d and $inDocFreq_t$ is the inverse document frequency of the term t .

Term frequency component implies a term appears in a number of times in the document. Inverse document frequency component signifies the overall weighted of a term in a given document.

How many times a term appears in a document is the $t f$ value of a term in the document. The document d and term t of term frequency is followed by:

$$termFreq_{t,d} = \frac{\text{The term frequency appears in document } d}{\text{Estimate the terms in the corpus}}$$

Inverse document frequency(idf) defines how importance does the term appear in all documents. We have applied a python medium-scales named Scikit-learn (Pedregosa et al., 2011) to calculate TF-IDF where $inDocFreq_t$ is calculated the following equation.

$$inDocFreq_t = 1 + \log\left(\frac{numDoc}{(1 + docFreq_{(d,t)})}\right)$$

Where $numDoc$ is the number of documents in the corpus and $docFreq_{(d,t)}$ is the document frequency which contains the term belongs to the documents.

If a term t appears the length of document d , higher weight or shorter length of the field, we normalized the field length as follows...

$$normDoc_{(nd)} = \frac{1}{\sqrt{lenTerms_t}}$$

While $normDoc_{(nd)}$ efficient for searching a query in the index.

Term frequency, Inverse document frequency, and normalized documents both are stored index time within a document regards of fundamental semantic (Blei, Ng, and Jordan, 2003) concepts.

2.5 Vector Space Model

Vector Space Model (VSM), text document representation such as provide automated information to the user (Salton, Wong, and Yang, 1975), store accurate and facilitate for designing the search engines, each number in the vector is the weight of a term as calculated among term frequency/inverse document frequency. Vector-based methods for performing query retrieval produces the high-quality search results (Ramos, 2003). We have used VSM to extract the query against the multi-term documents. It seems that vector representation both query and documentation.

VSM is the most significant and plotted algorithm that processes the user-defined query become such common and uncommon terms. We assume that common terms are very low weighted while different terms are relatively high weighted.

3. Design Approach

This approach to developing tutorial component is based on video targeted comments. Here, we pay more attention to extract comments on the selected online video learning. In our research, we analyzed to use each of the approaches to comments collections. Figure 3.1 presents the overall prototype architecture of finding the answer to the question.

Our aim to explore the approach to extract the comments that apply to general users. We are dealing with comments similar to question and answer. We make use of recently archived dataset obtained from the learning website (Khan Academy) comments to extract the relevant question and answer. We have shown that web-based learning comments of data are useful at finding the information known by providing information that frequently occurs with the query terms in the context. Q/A systems that have been applied to data collections before, and it entirely relies on the question and answer of the tutoring videos.

Our design approaches focus on the analytical tools of the system architecture on heuristics. Some parts of our design work are more constrained by presentment than others. Video-based learning platforms such as Khan Academy are of great value for informal learning on demand. Users can browse an extensive collection of videos and video-based learning courses in various domains to acquire specific knowledge in a self-directed manner. In addition to the videos and courses, Khan Academy supports knowledge exchange among the users. Each video has a question and answer thread where users can ask questions that are answered by the community.

From this, an extensive collection of questions and corresponding answers has emerged over time such that it is likely that for a given question in a specific area there exist several documents that have already been answered in the Q/A threads of Khan Academy videos. Since Q/A pairs are always linked to a single video, it is difficult to retrieve potential answers to questions across different videos.

Thus, the basic idea of this thesis is to use the vast corpus of question-answer pairs as a knowledge base to retrieve relevant answers given a user-defined question. To do this, a given free text question has to be matched to the existing questions in the database based on similarity measures. The solution should be integrated into a web platform users can use to find answers and related learning videos by providing a specific question.

This approach to developing a tutorial component is based on video targeted comments. Here, we pay more attention to extract comments on the selected online video learning. In our research, we analyzed to use each of the approaches to comments collections. Figure 3.1 presents the overall prototype architecture of finding the answer to the question.

4. Implementation

To implement extract and retrieve the documents from specific web-based learning data configured through elasticsearch REST APIs and also to evaluate the results of retrieving relevant documents we have used python as a programming language. Besides the built-in library of Python, we have used several third-party modules. They are: sklearn scikit-learn: ("Scikit-learn: Machine learning in Python" 2018), numpy(NumPy 2018), scipy (SciPy.org 2018), spacy (spaCy - Industrial-strength Natural Language Processing in Python 2018) and stopwords a widely used Python library named NLTK (Bird and Loper, 2004) library. The source code of our implementation and manually annotated datasets are available online.

The process starts with searching library namely Elasticsearch customize the searching techniques. In web-based learning like Khan Academy, people trend to comments on video lecture. We extract the comments using web crawling. Elasticsearch has several analyzers but we used the "standard analyzer " in English with a broad variety of built-in-analyzers which divides the text into terms. It removes the most punctuation, lowercases terms, supports to remove the stop words, and stemming.

Elasticsearch allows us to customize the analyzer process. We configured the built-in analyzers. We customized the stopwords removal list from the query with lowercased. Get tokens from a provided text. In our settings, the method provided uni-gram tokens. We also provide remove stopwords from the query. After that, we get a list of the query by removing one token for each time.

5. Evaluation and Results

For Evaluation, firstly, we took the 500 video comments from Khan Academy and pre-processed to only questions shown in figure 5.1. We made the 100 manual queries, described in section 5.2 by reading through the documents and two different raters annotated the relevant documents.

We have calculated the inter-rater reliability for making the data Ground truth data (GTD) that measures the Cohen's Kappa value. We represent the descriptive statistics histogram to show the relevant items frequency. Finally, we calculated the Precision, Recall, and F1-score based on the ground truth data (GTD) and averaged all of the query results.

We compared our particular approaches using the Khan Academy archived comments. In this collection, there are several video topic comments data, and it was pre-processed into 500 question pairs, but human-generated question annotations are available

for comparing to automated annotations. To develop the process, we are using archived video comments for the next evaluation to match concepts in the desired response.

The fundamental theory is to take all queries from a user and consider all questions in that session. Then calculate the precision, recall, and f1-score based on the inter-rater-reliability method and find the average score of all the queries.

5.1 Manual annotation

For manual annotation, we had assigned aspects to each query with relevant documents. We collected the human-generated query annotations with relevant documents. For the final evaluation, we have considered 100 annotated query set from two different raters.

In this thesis paper, the name of these five video comments are referred to as Computer Programming(Clarifying with Comments), Computer programming intro to HTML/CSS: Making Web Pages, Physics One-Dimensional Motion, Velocity/ Speed, Reading Pictographs comments. In the manual annotation, we have made 100 manual queries, reading through the documents and two different raters annotated the relevant documents.

Figure 5.3 represents the statistics of a histogram of the number of queries against the number of relevant documents based on human judgment.

According to our observation of documents, we have seen, particular topics were discussed in several questions. We have split each manually annotated question, generated an ID and assigned topics to each question. A topic is a group of the question and answers pairs or phrases that indicate what the question is talking about.

For example, consider the following queries collected from the dataset of Khan Academy comments: "What does parabola mean?" This query represents the topic parabola. We created an order that will help an annotator to put the relevant documents in the dataset. Figure- 5.2 shows the manual relevant query annotation of five particular topics.

5.2 Measure Cohen's Kappa

Cohen's Kappa measurement is used to determine the measure of agreement between two raters which is the number of agreement scores/ total scores. For calculating Cohen's Kappa value, we considered the 100 relevant annotated query from two different raters and took the common annotation ID's. At first, we merged the human annotated documents and then, common all ID's and measured Cohen's Kappa value.

In our thesis evaluation, we have considered the value range to be

- 0.5 - 1.00 = agreement equivalent to chance alone.
- 0.1 - 0.20 = slight agreement.
- 0.21 - 0.40 = fair agreement.
- 0.41 - 0.60 = moderate agreement.
- 0.61 - 0.80 = substantial agreement.
- 0.81 - 0.99 = near perfect agreement.
- 1.00 = perfect agreement.

We are representing the statistical histogram of Cohen's kappa value against the number of manual queries in figure 5.4 and the number of relevant documents based on the human judgment. In our inter-rater reliability (IRR) measures, we considered ≥ 0.5 Cohen's Kappa agreement of each query values. We calculated the Precision, Recall, and F1-score of each query if Cohen's kappa agreement value is ≥ 0.5 .

We took the common two raters annotated relevant queries and measured the Cohen's Kappa value for ground truth (major agreement) data. A document is considered to be relevant when all raters judged it as relevant. Then calculated the precision, recall and, f1-score for agreed values.

We evaluated the different background set by firstly performing the agreement data and considered the manually annotated dataset. Secondly, we perform the precision, recall, and f1-score of each query based on the agreement data. In the third configuration, we performed the average performance of the systems by combining the single searching query. We also performed the stopwords removal and domain-specific words.

This section contains the result of evaluation and it manifests the effectiveness of our method. Standard stopwords list and after modification, we get the different accuracy of the system. For any decision to be made by the system performance, we'll show the effect of some results.

For evaluation, we considered 100 manual queries, but we show a sample of 10 query results. We don't show all of the query results in this write-up.

We have single search results versus combined search results. Standard stopwords list result versus domain specific list words result. We get the different effect of evaluation results.

Results of our agreement data measured by Cohen's Kappa in table 5.1 shows the values we get from the manually annotated relevant query described in section 5.2 by two different raters. As a result of this, we represent only 10 sample queries result.

To handle the ground truth (GT) data for agreement, we manually reported the number of relevant data for a sample of 100 queries. For precision, recall, and f1-score values, we considered the Cohen's Kappa values whose agreement values are more than 0.5. After the agreement, we got 84 major agreement queries which values are more than 0.5. Table 5.2 and 5.3 shows the effects of precision and recall values respectively.

We merely take the precision and recall of each query based on our agreement data. If we miss some relevant document, in that situation precision might be 100 percent, but recall might not be good.

The raters contributed a total of 100 queries. Each query was informational; it seems to evaluate the performance of the systems. The Cohen's Kappa measures the percentage of foresight that equals to any one of the ground truth data. The f1-score measures the average overlap between the prediction and ground truth agreement. Then it is closer to the smaller number as compared to the more significant amount shown in table 5.4 for each query.

We evaluated the reliability of our query set by comparing it to the manually annotated documents based on the inter-rater reliability. We assessed the quality of our system performance based on the mean precision, recall and f1-score.

The average value for a single query shown in table 5.6 is calculated by taking the mean of the precision, recall, and f1-score. The mean precision value for a single query is calculated by taking the mean of the precision score after retrieving the manual document. Table 5.5 contains the overall average performance of the quality of combining query search results.

The final thesis work must be the focus on the value, the search value can be the proper evaluation. We evaluated the distinctive values of queries. We use the standard stopwords removal list to evaluate the results. Either it could improve the result or we have to make a certain decision about how can we improve the system performance. Our focus is on domain-specific concepts. For precision value, we get the sound result to use domain-specific words than the standard stopwords list like what, why, relate, where. But recall value isn't better.

We compare the result of standards stopwords list and with domain-specific words shown in table 5.7 and 5.8. If we miss some relevant documents in that situation precision might be 100 percent, but recall might not be accurate. We didn't consider the rewrite methodology because we applied English analyzer on "question" index for pre-configuration for Elasticsearch. Analyzer provides the n-gram model.

The overall result of all the manual datasets is shown in table 5.9. From the overall consequence shown in table 5.9, it could be noted that the system accuracy from the single searching result performs worst while combined searching result performs the best.

6. Summary

In our research, we aimed to determine to find useful textual information and analyze the domain and signal concepts while learning one or more topics. In this thesis paper, we develop a tutorial component to extract the video targeted comments from the online discussion. To approach the extraction of the implicit question and answer comments. We use the Khan Academy online discussion comments to compute the similarities degree.

In this thesis paper, we have described extracting comments on online video questions and answers data and then generating the review of the label for each question and answer pair.

We have used the default elasticsearch string-distance algorithm measure entirely as the distance function. To make a sentence vector for a sentence from its words, we have estimated removing stop words from the sentence. In the evaluation section, we have found, perform the average value of the relevant data. We have considered a set of re-phrases as labels of combination words. We have been initialized by determining the set of essential uni-gram terms from the documents. To find important terms that we have considered the following methods.

In our first method, the text of the documents has been tokenized into unigram terms. Then stop-words from terms have been removed, and we have implemented stemming to every remaining term. After applying to stem to terms, similarly, we have been represented the syntactically related words. Then the TF-IDF weighting scheme has been weighted in each term. where TF has been calculated based on given the term appear in the document and IDF has been determined from the term appear in all documents in the collection. IDF value of a term has remained the same in common terms which contribute to the relevance of words, as they appear in most documents.

In the second approach, documents of the texts we also been tokenized into uni-gram terms. Similarly, to handle related terms using the stemming While calculating the IDF value of a term, we have taken similar words. We have calculated similar words, each word has the same IDF value. To calculate the TF value of the term, we have replaced all words in a term-document with the one that has appeared the higher the weight in the document.

In the third, we have used to domain concepts to extract keywords from a document. Top-weighted terms have been considered as important terms. Besides uni-gram terms those were extracted using the several approaches, we have used noun phrases have been extracted from the document. If every word in a noun phrase appeared in top terms, the noun phrase has been estimated as a higher weight of the documents and the noun phrase including words have been removed from candidate label a set of question. Stop words have not been considered before splitting a noun phrase. In first and third methods, we applied to stem to each word of a noun phrase.

For the evaluation, we have used fraction relevant results evaluation for using archived comments. Precision-recall is the criteria for relevant evaluation where the relevant and irrelevant of each sentence from the document. To evaluate the result, how well the search is satisfied, we have matched set of the generated question with the set of all documents. The effect of each method measures the retrieval results. F1-score is the measure of a test's accuracy in weighted of precision-recall. In every case, all of our evaluation methods have exceeded the average the retrieval of relevant answers.

According to the result of table 5.9, domain-specific words return the best result whereas stopwords return the less performance instead of measuring words which are the combination of the different patterns. Table 5.9 shows the overall system performance with several techniques.

6.1 Future work

One of the limitations of our approach in both documents and query is using pre-trained NLP using NLTK (Bird and Loper, 2004) model. We have used the pre-trained model. The model provides outstanding results due to its optimization. However, every word in our corpus is not happened to appear in the pre-trained NLTK model. With the method, many essential words might not be in considerations. In our approach there are synonyms words doesn't work. To address this issue, in the future work, We can train and optimize the NLTK model with a large number of video comments. The several sources of data might also be filled to train the NLTK model to get a better outcome.

To our knowledge, there is a more standard or well-established method to evaluate information extraction. We have shown a way to evaluate our query with the pre-annotated relevant query. As our evaluation process is not a standard one, the technique could have some side effects. Manual evaluation of query could be a recovering.

List of Figures

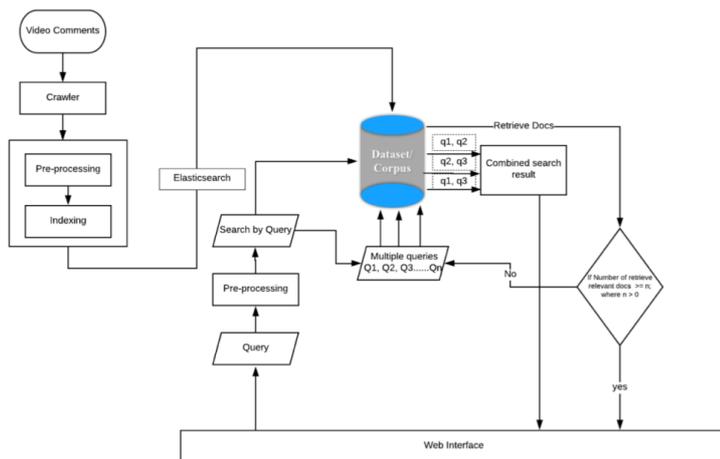


FIGURE 3.1: Overall prototype architecture of finding the answer to question

List of tables

Query	Cohen's Kappa Value
Difference between speed and velocity	0.711
What is parabola mean	0.798
Where comes from a pictograph	0.549
Is Displacement different from Distance	0.821
Does mean the Atomic weight is an average weight of all the atoms in the world	0.625
What is the difference between velocity and displacement	0.799
How can carbon an isotope stable state	1.0
How to know electron in atoms	0.664
Why human feel to acceleration and deceleration	0.666
Does the work is a scalar in physics and consider the work as a scalar or a vector	1.0

TABLE 5.1: Results of our agreement data measured by Cohen's Kappa

Query	Recall
Difference between speed and velocity	0.2
What is parabola mean	0.75
Where comes from a pictograph	0.4
Is Displacement different from Distance	0.858
Does mean the Atomic weight is an average weight of all the atoms in the world	0.5
What is the difference between velocity and displacement	0.5
How can carbon an isotope stable state	0.5
How to know electron in atoms	0.667
Why human feel to acceleration and deceleration	1.0
Does the work is a scalar in physics and consider the work as a scalar or a vector	0.5

TABLE 5.3: The recall value of each query

Query	Precision
Difference between speed and velocity	0.333
What is parabola mean	1.0
Where comes from a pictograph	0.2
Is Displacement different from Distance	0.75
Does mean the Atomic weight is an average weight of all the atoms in the world	0.3333
What is the difference between velocity and displacement	1.0
How can carbon an isotope stable state	1.0
How to know electron in atoms	0.5
Why human feel to acceleration and deceleration	1.0
Does the work is a scalar in physics and consider the work as a scalar or a vector	1.0

TABLE 5.2: The precision value of each query

Query	F1-score
Difference between speed and velocity	0.25
What is parabola mean	0.667
Where comes from a pictograph	0.267
Is Displacement different from Distance	0.799
Does mean the Atomic weight is an average weight of all the atoms in the world	0.4
What is the difference between velocity and displacement	0.5
How can carbon an isotope stable state	0.667
How to know electron in atoms	0.571
Why human feel to acceleration and deceleration	1.0
Does the work is a scalar in physics and consider the work as a scalar or a vector	0.667

TABLE 5.4: The f1-score of each query

Mean Precision	0.776
Mean Recall	0.681
Mean F1-score	0.685

TABLE 5.5: The combined search results

Mean Precision	0.604
Mean Recall	0.514
Mean F1-score	0.521

TABLE 5.6: Search results with single query

Mean Precision	0.721
Mean Recall	0.709
Mean F1-score	0.682

TABLE 5.7: Result of standard stopwords remove list

Mean Precision	0.774
Mean Recall	0.674
Mean F1-score	0.679

TABLE 5.8: Result of domain-specific words

Measure	Combine	Single	Stopwords removal	Domain-specific
Mean precision	0.776	0.604	0.721	0.774
Mean recall	0.681	0.514	0.709	0.674
Mean f1-score	0.685	0.521	0.682	0.679

TABLE 5.9: Overall result of precision, recall, and f1-score using different methods

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Fishing Activities of Trawlers and Gillnets in Kien Giang Province, Vietnam

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Abstract- The study on the fishing activities of trawlers and gillnets was conducted from May to October 2018 in Kien Giang province. The results showed that the trawlers and gillnets had highest number of fishing boats and yields. Trawlers and gillnets have been operated whole year round. The main fishing season of trawlers was from October to coming April and from April to August for the gillnets. The fishing capacity of trawling boats (47.8±24.6 HP) was much larger than that of gillnets boats (26.6±11.4 HP). The fishing yield and ratio of trash fish in the final product of trawlers were 39.4±15.9 tons/year and 22.83%, respectively and they were also higher than those of gillnets (26.6±11.4 tons/year; 16.8%). Profit of trawlers (338±114 million VND) was significantly higher than that of gillnets (143±73 million VND), however, rate of return of trawlers (0.66 times) was lower than that of gillnets (0.73 times). For the sustainable development of trawlers and gillnets, the development and management of fisheries resources should be promoted, and training fishermen to use appropriated fishing equipment should be enhanced to increase their fishing efficiency.

Index Terms- Advantages and disadvantages, finance, gillnet, Kien Giang, trawler

I. INTRODUCTION

Vietnam has a long coast line which is favorable for the development of fishing activities. Total aquatic production in 2017 reached 7.2 million tons, of which capture production accounted for 3.39 million tons. Export turnover of the fishery reached about 8.32 billion USD (Center for Informatics and Statistics, 2017). Kien Giang is a coastal province in the Mekong Delta, Vietnam with highest fishery production of 533,300 tons in 2016, and accounting for 39.4% of the fishing production in the Mekong Delta (GSO, 2017). Trawlers and gillnets are two most important fishing activities in Kien Giang province. Gillnets accounted for 33.5% and trawl net accounted for 31.9% of the total number of fishing boats in Kien Giang.

Fisheries exploitation in Kien Giang in recent years have encountered challenges e.g. reduction of fisheries resources,

increase in the input cost of many materials and fuels, violations in fishing activities thus affecting the fisheries activities. However, up to now, there has been no research on fishing activities in coastal of Kien Giang province, focusing in trawlers and gillnets, dominated fishing activities in the region. Therefore, the aims of the study are to investigate the current status and challenges of the fishing activities of trawlers and gillnets in Kien Giang province in the Mekong Delta, Vietnam in order to propose appropriate solutions to enhance the effectiveness of these fishing types.

II. METHODS

The study was conducted from May to October 2018 by interview fishermen in coastal provinces of Kien Giang province. A total of 137 fishing households was face to face interviewed. Fishermen involved in gillnets (84 households) and trawl nets (53 households) were randomly selected from the list provided by provincial agriculture and rural development.

The semi-structured questionnaire was piloted in five households in each group of fishing type including technical information e.g. gear structure, loading capacity of the vessel, labor force, fishing grounds, fishing seasons and fishing production. Cost information included fixed costs, variable costs and gross income were also collected for calculation of profit, rate of return. The advantages and disadvantages of the fishing types were also interviewed.

Results are expressed in descriptive statistics e.g. frequency of occurrence, mean value, and standard deviation. Statistical independent sample T-test was applied to compare the differences in technical and financial indicators with a significance level of 95%.

III. RESULTS AND DISCUSSION

3.1 Technical aspects of fishing activities in Kien Giang province

3.1.1 General information of fishing activities

Kien Giang is a coastal province in the Mekong Delta, owning a large fishing ground in the Gulf of Thailand, which has

been enabled the fishing industry to develop. The number of fishing vessels increased from 2008 to 2016. The total number of fishing boats with a capacity of more than 90 horsepower (HP) increased year by year. This proves that offshore fishing vessels in Kien Giang province are increasingly being developed to reduce the pressure on coastal fishing, affecting fisheries

resources. Kien Giang had the largest number of fishing vessels (10,555 boats), accounting for 44.4% of the total number of fishing vessels in the Mekong Delta and the highest fishing production in the Mekong Delta (335,300 tons, accounting for 41.0%).

Table 1: Number of vessels and fishing production in period 2008-2016

Contents	Year				
	2008	2010	2012	2014	2016
Number of fishing vessels (boats)	8.665	11.300	11.732	10.211	10.555
Offshore fishing vessels (>90 HP) (boats)	2.052	3.090	3.320	3.950	4.196
Fishing production (tons/year)	253.000	252.700	277.600	299.100	335.300

Fishing activities in Kien Giang mainly gillnets (33.5%) and trawlers (31.8%). Gillnets fishing boats with capacity of less than 90 HP (3167 boats) were dominated whereas and the number of fishing boats over 90 HP was 431. Although in recent years, trawling vessels with a capacity of over 90 HP accounted for 4,196 boat but vessels with a capacity of less than 90 HP still dominated with 55.4% total vessels. Therefore, to strengthen the fishing industry in Kien Giang province, it is necessary to promote more offshore fishing vessels through national support program and encourage fisherman operate with bigger boat during fishing.

3.1.1 General information of fishing households

The average age of fishermen in trawling and gillnets were 43.2 years old and 38.3 years old, respectively. At this age, fishermen had a lot of experience in the field of fishery. The average age of fishermen in trawling was 14.0 years and gillnets was 8.0 years. However, the level of education of the fishermen was very low. In the trawling fishing, up to 35.8% of fishermen was illiterate and 43.4% of primary school while fishermen in the gillnets had primary school of 32.1% and secondary education of

65.5%. This level of education become challenges for fishermen to acquire technical advances, e.g. acquiring maritime knowledge for offshore fishing, knowledge of using fish detectors for more efficient exploitation and knowledge on quality management of harvested products.

The numbers of workers on the trawling boat (3.26 persons) and the gillnet boat (3.27 persons) were not statistically significant difference ($P>0.05$). The number of employees on board was limited due to the small size of the fishing vessel (20-90 HP) and mainly inshore fishing. However, trawling and gillnets fishing have created jobs for their families. In addition, these two fishing types provided jobs for the local people. According to the survey, the trawling fishing needs to hire 55% of the labor force and gillnet hired 44% of the labor force on board. However, due to high production costs, unstable weather, inefficient exploitation, unstable and low incomes, many of the fishing workers have been finding other jobs with higher incomes. Therefore, hiring labor for fishing has been facing many difficulties.

Table 2: Number of fishing vessels in Kien Giang province, Vietnam

Contents	Power groups of fishing boats			Total boats	Ratio (%)
	< 20 HP	20 - 90 HP	≥ 90 HP		
Gillnets	1,524	1,643	431	3,598	33.5
Trawling	3	134	3288	3,425	31.8
Squid fishing	735	653	57	1,445	13.4
Purse seine nets	0	5	314	319	3.0
Longlines	93	128	69	290	2.7

General Statistics Office (2011 and 2017)

Table 3: Information on the age and fishing experience of the captains

Contents	Trawlers (n=54)	Gillnets (n=84)
Age (years)	43.2±10.7 ^a	38.3±8.3 ^b
Fishing experience (years)	14.0±8.6 ^a	8.0±5.7 ^b

Values of the same row with different letters were significantly different ($p < 0.05$)

Table 4: Information on the age and education level of the captains

Education levels	Trawlers		Gillnets	
	n	Ratio (%)	n	Ratio (%)
Illiteracy	19	35.8	2	2.4
Primary education	23	43.4	27	32.1
Secondary education	8	15.1	55	65.5
High school education	3	5.7	0	0

Table 5: Labor force (persons) in fishing boats

Contents	Trawlers (n=53)		Gillnets (n=84)	
	Average	Ratio (%)	Average	Ratio (%)
The number of labors from family member	1.47±0.80 ^a	45	1.82±0.70 ^b	56
The number of hired labors/employees	1.79±1.13 ^a	55	1.45±1.00 ^b	44
Total number of labors on fishing boats	3.26±1.02 ^a	100	3.27±1.03 ^a	100

Values of the same row with different letters were significantly different ($p < 0.05$)

Table 6: Reason for choosing fishing activities

Reasons	Trawlers		Gillnets	
	n	Ratio (%)	n	Ratio (%)
Hereditary family	27	31.0	50	31.7
Stable incomes	27	31.0	24	15.2
Experience in fishing	22	25.4	35	22.1
Living near the sea (fishing ground)	11	12.6	39	24.7
No land for cultivation	-	-	10	6.3
Total	87	100	158	100

Table 7: Loading capacity and power of the fishing vessels

Contents	Trawlers (n=53)	Gillnets (n=84)
Loading capacity (tons)	8.5±4.7 ^a	3.7±1.6 ^b

Power (HP)	47.8±24.6 ^a	26.6±11.4 ^b
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Values of the same row with different letters were significantly different ($p < 0.05$)

Table 8: Length and mesh size of fishing gears

	Trawlers (n=53)	Gillnets (n=84)
Smallest mesh size (mm)	16.1±2.8 ^a	86.6±5.0 ^b
-	Length of the net (m)	16,583±9,338
-	Height of the net (m)	0.91±0.12

Values of the same row with different letters were significantly different ($p < 0.05$)

The reasons for selection of trawling and gillnet fishing are hereditary family, stable incomes, fishing experience and livelihoods of coastal people. Moreover, people in this area had experience in fishing and living near the sea so it is convenient for joining fishing activities. The above reasons have facilitated the development of fishing industry in Kien Giang province. However, it is necessary to support fishermen to exploit effectively, in the manner of protection the fisheries resources for long-term and sustainable exploitation.

3.1.2 Fishing vessels and fishing gears

The loading capacity of the trawling boat in Kien Giang province was 8.5 tons with 47.8 HP which was smaller than the average loading capacity and boat power of the trawling boat in the Mekong Delta from the survey of Long (2014), 8.92 tons and 51.5 HP, respectively. Fishing vessels with smaller loading and HP leading to exploitation activities as close to inshore as possible. Gillnets boats had loading capacity of 3.6 tons and 26.6 HP. They were also smaller than the result from survey in the Mekong Delta, with average loading capacity of 6,11 tons and 39.9 HP (Long, 2014). Thus, gillnet ships in Kien Giang province was impossible to exploit offshore due to small loading capacity and HP. This will put pressure on near-shore fishing, affecting the protection and conservation of fisheries resources.

The trawling nets in Kien Giang province have an average net mesh size of cod end was 16.1 mm. According to the Ministry of Fisheries (2006), the minimum net mesh size for a trawl net was 28 mm. Thus, the trawling net in Kien Giang province slightly violated this provision. On the other hand, small mesh sizes will lead to great impact on fisheries resources in the fishing ground. Therefore, it is necessary to propagate and strictly management the mesh size according to the regulations of the trawling net. The gillnet had a length of 16,583 m, height of 0.91

m and a large mesh size (86.6 mm). The mesh size was not violated the regulations of the Ministry of Fisheries (2006).

3.1.3 Fishing grounds and fishing seasons

Fishing ground of fishermen in Kien Giang are the sea areas from Gulf of Thailand. Fishery resource was estimated of 478,689 tons and an exploitable capacity of 425,952 tons (Son, 2005). Fisheries activities could be taken place in the whole year, except bad weather.

The number of fishing trips per year was more or less dependent on the duration of a trip, which is long or short. The results showed that the number of fishing trips in one month of trawling were lower than in the gillnets ($p < 0.05$). The duration of a trawling trip was 10.45 days and 1.50 days for the gillnet. Compared to the results of the survey in the Mekong Delta, the duration of a trip was 6.11 days for trawlers and 1.24 days for gillnets (Long, 2014). Trawlers and gillnets in Kien Giang province operated at a longer time because many service boats have been available to collect, transfer fishery products and provide input material (food, energy, ice) to fishing vessels during operation. The duration of a trip of gillnets was shorter than trawler because the gillnet boat size was smaller than that of trawling boat.

Fishing time of trawlers and gillnets was only 8.92 to 9.14 months per year. This result is similar to the results of Chi and Long (2018). The average fishing times in the East Sea of trawlers and gillnets were 8.52 months and 8.93 months per year. The fishing season of trawlers and gillnets in Kien Giang province was not similar. Trawlers had higher yields from October to April of the following year, while gillnets were from April to August. According to this result, trawlers can be converted into gillnets at the lower yield period in order to increase fishing production.

3.1.4 Fishing yield

The yield of the trawlers was higher than that of the gillnets and the difference was statistically significant ($P < 0.05$). The average yield of batch of trawlers (48.74 kg) was higher than the gillnet (16.93 kg). Similarly, the trawler fishing production per year was 39.4 tons and it was also significantly higher than that of the gillnets (3.06 tons/year) ($P < 0.05$). Calculation per 1 HP of trawlers (883 kg/year) was significantly higher than that of gillnets (120 kg/year) ($p < 0.05$). Compared with the results from Thuong *et al.* (2014), the yields of trawlers and gillnets in Bac Lieu province were 33.9 tons/year and 1.3 tons/year, respectively. This proves that trawling and gillnets in Kien Giang are more efficient. However, according to fishermen, the production of these two fishing types have decreased

continuously in the last 5 years. Therefore, in order to enhance the efficiency of these two fishing types, it is necessary to strengthen the management policies to mitigate the impacts of these two activities on aquatic resources, contributing to the sustainable development of the areas. Although trawlers had higher yield than gillnets, catching all fish species and sizes of fish without selection, trawlers had higher rate of trash fish (22.83%). The gillnets only caught fish in the appropriated size of their mesh size, trash fish proportion (16.8%) was lower than that of trawlers ($P < 0.05$).

Table 9: Fishing activities of trawler and gillnets

Contents	Trawlers (=53)	Gillnets (n=84)
Time of fishing batch (hours)	3.36±0.55 ^a	4.15±3.99 ^b
The number of fishing batch in a day (batch)	3.15±0.63 ^a	1.00±0.00 ^b
The period in a fishing trip (days)	10.45±2.51 ^a	1.50±0.61 ^b
Number of fishing trip in a month (trips)	10.75±3.05 ^a	18.45±4.92 ^b
Number of fishing month in a year (months)	8.92±1.67 ^a	9.14±1.41 ^b

Values of the same row with different letters were significantly different ($p < 0.05$)

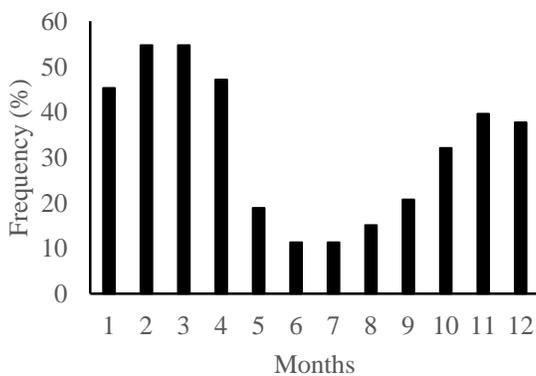


Figure 1: Fishing season of the trawlers

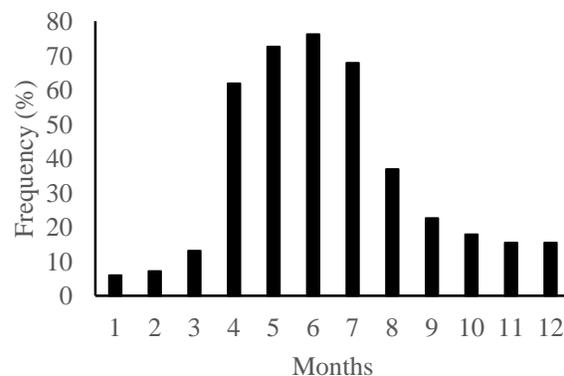


Figure 1: Fishing season of the gillnets

Table 10: Fishing production of trawlers and gillnets

Contents	Trawlers (n=53)	Gillnets (n=84)
Yield (kg/batch)	48.74±8.46 ^a	16.93±8.35 ^b
Production (tons/year)	39.4±15.9 ^a	3.06±2.23 ^b
Productivity (kg/HP/year)	883±186 ^a	120±83 ^b
Ratio of trash-fish (%)	22.83±8.57 ^a	16.8±3.9 ^b

Values of the same row with different letters were significantly different ($p < 0.05$)

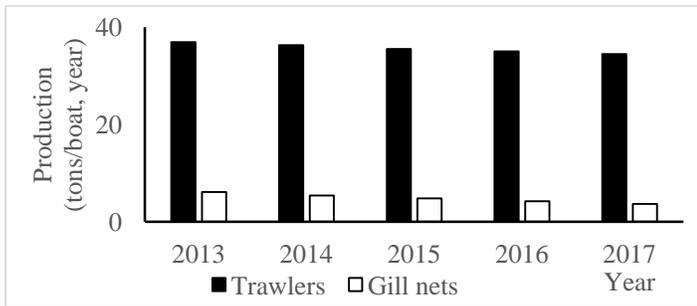


Figure 3: Fishing production of trawlers and gillnets for the period 2013 -2017

3.2 Financial aspects of fishing activities

3.2.1 Costs of fishing activities

The results show that the average investment for a trawling boat was 300 million VND, of which ship hulls accounted for 73.31%, 15.26% for engines and 7.22% for fishing gear. While the investment for a gillnet vessel was 179 million VND, of which hulls accounted for 54.49%, 10.36% for engines and 23.50% for fishing gear. As analyzed above, the trawlers in Kien Giang were larger scale in fishing activities, so the investment cost for a trawl boat was higher than the gillnet boat ($P < 0.05$). The cost of the hull of the two occupations was high. Next, trawling vessels had a large proportion cost for engine

(15.26%), while gillnets hold a large proportion cost for fishing gear (23.50%). This is because the trawlers need a large power to pull the net. For gillnets, it was not necessary to have large engine as trawlers. Therefore, the cost of the machine in the gillnets was small, it required more input for fishing gear.

The variable cost of trawlers was 515 million VND/year, mainly fuel costs (43.94%) and labor costs (36.56%). For gillnet vessels, the variable cost was lower than that of trawlers (154 million VND/year) ($P < 0.05$). The highest cost was for fuel (40.75%) and labor cost (38.50%). Both occupations had high fuel and labor costs. The increase fuel prices and the scarcity of labor force may effect on fishing activities efficiency.

Table 11: Fixed cost and depreciation of fishing types

Contents	Trawlers (n=53)		Gillnets (n=84)	
	Average	Ratio (%)	Average	Ratio (%)
Fixed cost (million VND)	300±254 ^a	100	179±79 ^b	100
Cost of hull (million VND)	220±109	73.31	104±50	54.49
Cost of engine (million VND)	45.7±14.6	15.26	19.7±10.6	10.36
Cost of fishing gear (million VND)	21.7±8.8	7.22	44.7±21.4	23.50
Other cost (million VND)	12.6±5.4	4.21	10.9±4.11	5.73
Depreciation cost (million VND/trip)	31.39±11.77 ^a		39.34±16.94 ^b	

Values of the same row with different letters were significantly different ($p < 0.05$)

Table 12: Variable cost structure of fishing types

Contents	Trawlers (n=53)		Gillnets (n=84)	
	Average	Ratio (%)	Average	Ratio (%)
Variable cost (million VND/year)	515±186 ^a	100	154±59 ^b	100
Fuel (million VND/year)	226±34	43.94	62.76±14.31	40.75
Oil (million VND/year)	16.64±5.15	3.23	3.07±1.37	1.99
Food (million VND/year)	46.55±11.54	9.05	20.56±7.65	13.35
Ice (million VND/year)	10.74±4.12	2.09	1.63±1.24	1.06
Labor cost (million VND/year)	188±89	36.56	59.29±17.04	38.50
Maintenance costs (million VND/year)	17.13±3.50	3.33	5.66±1.42	3.67
Other cost (million VND/year)	9.23±2.15	1.79	1.04±0.13	0.67

Values of the same row with different letters were significantly different ($p < 0.05$)

3.2.3 Financial analysis of the fishing types

The gross income of trawlers was 887 million VND/year and the profit was 336 million VND/year. The rate of return was 0.66 times higher than that of the trawlers in Soc Trang province (0.51 times; Long and Phuong, 2010).

For the gillnets, the average annual revenue was 336 million VND/ year and profit was 143 million VND/ year. The rate of return of the gillnets was 0.73 times which was much higher than the gillnets fishing in Soc Trang province (0.46 times; Long, 2012). The average cost of trawlers (VND 549 million/year) was higher than the total cost of gillnets (VND 193 million/year) and it was statistically significant difference (P

<0.05). Similarly, net return of trawlers (VND 338 million/year) was also significantly higher than that of gillnets (VND 143 million/year) (P <0.05). On the other hand, net return per HP of trawlers (7.44 million VND/HP/year) was also significantly higher than that of gillnets (5.59 million VND/HP/year) (P <0.05). The gillnets fishing was more efficient than the trawlers because the rate of return of gillnets (0.73 times) was higher than that of the trawlers (0.66 times) (P <0.05).

The survey results show that the fishing products were mainly sold to whole sale traders, 96.94% in the trawlers and 90.48% in the gillnets. It is agreed to results of Ven (2012) showing that most of the harvested products were sold to whole sale traders (81.6%), only 4% was sold to the processing factory, the remaining was sold to sea-going ships (9.7%) and retail (4.7%). This showed that fishermen chose to sell to whole sale traders because traders had the ability to buy all products of fishermen in a short time, so it is convenient for fishermen to prepare for the next fishing trip. However, the whole sale traders were the one who decided the trading prices leading to the profit was highly depended on the price proposed by traders.

3.3 Advantages and disadvantages

According to fishermen, during operation of trawling and gillnets in Kien Giang province, they could work independently due to long time experience and traditional career. The second

advantage was that the exploitation remained effectively and brought stable income to fishermen. Another advantage was about natural conditions that fishermen living near fishing grounds and it became convenient for fishing. All of these advantages provided the trawlers and gillnets in Kien Giang province grew with larger numbers of vessels and production.

Beside advantages, trawlers and gillnets in Kien Giang province also faced with many difficulties. The biggest problem was that other fishing vessels have competed with fishing grounds, affecting fishing production and fisheries resources. Inclement weather affects fishing season resulted in unstable output, effected to the income of fishermen. The second difficulty was declining of fisheries production. The trawlers (86.0%) and gillnet households (96.40%) said that fishing production decreased in recent 5 years. Besides, losing net and lack of capital for operation were also problems for many fishermen.

In order to facilitate the development of these two fishing types, it should be able to (i) promote management and control to prevent fishing vessels from fishing outside the fishing grounds, (ii) enhance management of fishery resources e.g. reduction coastal fishing boats, increase the inspection of mesh size, banning fishing in the breeding season, and (iii) train fishermen on how to use modern fishing equipment for example, fish finder to enhance the fishing activities efficiency, even in bad weather conditions.

Table 13: Financial analysis of fishing types

Contents	Trawlers (n=53)	Gillnets (n=84)
Gross income (million VND/trip)	887±286 ^a	336±157 ^b
Total cost (million VND/trip)	549±191 ^a	193±68 ^b
Net return (million VND/year)	338±114 ^a	143±73 ^b
Net return (million VND/HP/year)	7,44±2,10 ^a	5,59±2,37 ^b
Rate of return (times)	0,66±0,37 ^a	0,73±0,47 ^b

Values of the same row with different letters were significantly different (p <0.05)

Table 14 Consumption patterns of fishing products

Contents	Ratios (%)	
	Trawlers (n=53)	Gillnets (n=84)
Retailer	2.81	-
Wholesale to trader	96.94	90.48
Family consumption	0.26	9.52

Table 15: Advantages of trawlers and gillnets

Advantages	Trawlers		Gillnets	
	n	Ratio (%)	n	Ratio (%)

Experience in fishing	42	53.85	67	49.26
Stable incomes	22	28.21	39	28.68
Living near the sea (fishing ground)	14	17.95	12	8.82
Stable output of fishing products		-	18	13.24
Total	78	100	136	100

Table 16: Fishing products and profits compared to previous 5 years

Contents	Trawlers (%)			Gillnets (%)		
	Increase	Un-change	reduction	Increase	Un-change	reduction
Fishing production compared to previous 5 years	0.0	14.0	86.0	0.0	3.6	96.4
Profits compared to previous 5 years	20.0	58.0	22.0	35.7	46.4	17.9

Table 17: Difficulties of trawlers and gillnets

Difficulties	Trawlers		Gillnets	
	n	Ratio (%)	n	Ratio (%)
Fishing vessels compete	24	31.17	31	20.67
Inclement weather	15	19.48	41	27.33
Declining production	15	19.48	22	14.67
Cost of production increased	10	12.99	9	6.00
Labor shortage	8	10.39	14	9.33
Net loss		-	12	8.00
Lack of capital		-	21	14.00
Total	77	100	150	100

Values of the same row with different letters were significantly different ($p < 0.05$).

IV. CONCLUSION

Kien Giang has the strongest fisheries exploitation in the Mekong Delta. In particular, trawlers and gillnets had the highest number of ships and production. The trawlers and gillnets could be operated all year round, but trawlers had high yields from October to April, while the gillnets was from April to August. Trawling boats were bigger than gillnet vessels. The yield and net return of the trawlers were higher than that of the gillnets, but the rate of return of the gillnets was much higher than that of the trawler because of the lower input cost of gillnets. In general, both gillnets and trawlers in Kien Giang province have been operated effectively.

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Seroprevalence of Cytomegalovirus among Women of Reproductive Age Attending Selected Hospitals in Zaria Metropolis, Kaduna State, Nigeria.

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Abstract

Background to the Study: Human cytomegalovirus (HCMV) is a member of herpesvirus family. It is the most genetically complex viral pathogen of humans and now the commonest congenital form of infective neurological handicap recognized by the institute of medicine as the leading priority for the developed world in congenital infection. HCMV infection among women of reproductive age especially those that are pregnant can lead to congenital abnormalities and is often associated with serious complications such as microcephaly, mental retardation, deafness and spastic paralysis. This study was done to determine the seroprevalence rate of HCMV infection and its associated risk factors among women of reproductive age in three selected hospitals in Zaria metropolis, Kaduna State. The Cross-sectional study was conducted on 300 consenting women of reproductive age. A structured questionnaire was administered to obtain some demographic data and possible risk factors associated with the infection. The presence of HCMV IgG and IgM specific antibodies were examined in the patients' serum samples using Enzyme Linked Immunosorbent Assay (ELISA) technique. Statistical package for social science (SPSS version 23) was employed to test for the associated risk factors for the infection using the Chi-square test. The result of analysis obtained revealed an overall prevalence of 94.7% (284/300) and 23.9% (88/300) for HCMV IgG and IgM antibodies respectively. The participants' age, nature of occupation, marital status, sexual activities such as-multiple sexual partners and engaging in unprotected sex, were found to be significantly associated with CMV infection among the study population.

Keywords: Cytomegalovirus (CMV), Enzyme Linked Immunosorbent Assay Immunoglobulin G (IgG), Immunoglobulin M (IgM), Risk factors.

INTRODUCTION

Cytomegalovirus (CMV) is a DNA virus that belongs to the viral family known as Herpesviridae or herpesviruses. The species that infect human is typically abbreviated as human cytomegalovirus (HCMV), alternatively known as Human herpes virus5 (HHV-5). Within Herpesviridae, HCMV belongs to the Betaherpesvirinae subfamily, which also includes cytomegaloviruses from other mammals (koichi *et al.*, 2007). It is an enveloped virus, a potential killer or a lifelong silent killer (Hodinka, and Friedman, 2005). CMV infections are common and are usually asymptomatic however, clinically significant infections are encountered frequently in pregnant women, neonates and immune-compromised patients (Brook *et al.*, 2007). HCMV is an important cause of morbidity and mortality among immunosuppressed patients. It is known for producing large cells with nuclear and cytoplasmic inclusions and infects around 40% of the world population (Ryan and Ray, 2004; Offermann and Rosenthal, 2008).

Human cytomegalovirus (HCMV) or human herpes virus 5 is one of the major causes of congenital infections (Munro *et al.*, 2005; Kenneson and Cannon, 2007; Dollard *et al.*, 2007; Cannon, 2009; Sotoodeh *et al.*, 2010). Its clinical manifestations range from asymptomatic forms (90% of cases) to severe fetal damage, and in rare cases, death due to miscarriage. Furthermore, 10 to 15% of the children who are asymptomatic at birth may develop late sequelae, especially hearing defects, after a period of months or even years (Massimo *et al.*, 2009).

HCMV can be transmitted via infected saliva, sexual contact, placental transfer, breast feeding, blood transfusion and solid-organ transplantation (Bowden, 1991). Latency following a primary infection may be punctuated by periodic reactivations that give rise to recurrent infections, and *in utero* transmission may occur during either primary or recurrent infections. Although the mechanisms and the pathogenesis of intrauterine transmission and severe fetal infection in the presence of preexisting maternal immunity are unknown, an analysis of CMV strain-specific antibody responses revealed an association between intrauterine transmission of CMV and reinfection with new or different virus strains in seroimmune women (Boppana *et al.*, 2001), but it is likely that most recurrent infections are due to reinfection.

The risk of congenital infection is much higher during primary infection (Fowler and Boppana, 2006). It has been reported that the risk of fetal damage is greater if the primary infection occurs during the first trimester of pregnancy (Adler and Marshall, 2007).

CMV is a slow replicating virus from the herpes family, infecting only as many as 1% of all neonates in developed countries, but demonstrating up to 90% IgG-positivity in developing countries (Cannon *et al.*, 2010). As well as increasing with age, CMV seroprevalence may also depend on sexual activity and occupation, particularly occupations involving close contacts with children in a community setting. In the case of parents, contact with the urine or saliva of their children is a major source of infection (Adler, 1991).

Materials and Methods

3.1 Study area and population

This study was conducted in Zaria metropolis, Kaduna state, Nigeria. Kaduna state lies between latitude 09⁰ 2'N and 11⁰ 23' N and longitude the 06⁰ 15 'E and 08⁰ 60'E and shares boundaries with Katsina, Kano and Zamfara states to the north, Plateau and Bauchi State to the east, Nasarawa State and Federal Capital Territory to the south and Niger to the west. The state consist of 23 Local Government Areas and is divided in to three senatorial districts.

3.2 Study Population

The study population comprised of women of reproductive age attending selected hospitals in Zaria metropolis Kaduna State. The hospitals were Major Ibrahim B. Abdullahi Memorial Hospital (MIAMH) Sabon-gari Zaria, Hajia Gambo Sawaba Hospital (HGSH), Zaria and University Health Services A.B U Zaria.

3.3 Inclusion Criteria

This will include all women of reproductive age attending the selected hospitals within the study period and gave their consent to the study.

3.4 Exclusion Criteria

Women below reproductive age, women that have reach menopause age and women of reproductive age who did not consent to the interview were not involved in this study.

3.5 Ethical Approval and Consent

Ethical approval to carry out this research work was obtained from the Ministry of Health, Kaduna State and the ethical committee of various hospitals involved. The purpose and procedure of the study was explained to all participants and their consent was sort.

3.6 Data Collection

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Questionnaires having information on socio-demographic factors such as age, marital status, as well as risk factors such as level of education, occupation, geographic location, history of blood transfusion and other risk factors that may be associated with cytomegalovirus were recorded.

3.7 Sample Collection

About 5ml of venous blood was collected from each patient aseptically by venipuncture and dispensed into sterile labeled anticoagulant free containers, followed by centrifugation at 2500rpm for 5 minutes to separate the serum for the detection of CMV specific antibodies; Immunoglobulin M and Immunoglobulin G. The sera samples were then transferred into sterile properly labeled screw capped vials and stored at -20°C until required for analysis.

3.8 Laboratory Diagnosis

Enzyme-linked immunosorbent Assay (Diagnostic Automation, inc., Calabasa USA) technique was used to assess the presence of CMV IgG and IgM in sera samples obtained from the participants in the study.

3.9 Statistical analysis

Data and results obtained from this study were analyzed using the statistical package for social sciences (SPSS version 21). Chi-square analysis was done to determine the level of association between variables and CMV infection at 95% confidence interval (CI) and P-values that are less than 0.05 were considered to be statistically significant.

Results

A total of Three hundred (300) blood samples were collected from consenting patients (women of reproductive age) attending three different hospitals within Zaria metropolis. One hundred (100) samples were collected from each of the hospitals enrolled in this study namely; University health services of Ahmadu Bello University Zaria (UHS), Hajia Gambo Sawaba General Hospital (HGSH) and Major Ibrahim B. Abdullahi. All samples collected were tested for the presence of Cytomegalovirus (CMV) IgM and IgG antibodies. A total of 88 (29.3%) and 284 (94.7%) patients were positive for CMV-IgM and IgG respectively (Figure 1).

Presented on (Table 1) is the analysis of data showing the level association between the prevalence of CMV-infection and some demographic characteristics among women of reproductive age. All participants enrolled in this study were grouped according to their age, of which 53, 154, 66, and 27 of the patients fall within the age-group 11-20, 21-30, 31-40 and 41-50 respectively. The analysis of result according to age showed that patients within age group 21-30 had the highest prevalence of 39.0% (60/154) for CMV-IgM and the highest sero-prevalence of 96.7% (64/66) for CMV-IgG was recorded among those within age group 31-40, while the least prevalence of 14.8% (4/27) and 86.7% (46/53) was observed among patients within age-group 41-50 and 11-20 for CMV-IgM and IgG respectively. There was a significant association between age and CMV-IgM ($p=0.008$), however, CMV-IgG reflects no significant association among the age groups. The subjects were grouped into four major categories based on their marital status response; 158 responded to be married, 109 were single, 6 were divorced and 15 were widow, however, 12 (out of the patients) gave no response. The analysis of result based on marital status, showed that, the highest prevalence of 66.7% (4/6) for CMV-IgM was recorded among the divorced patients, while the highest prevalence of 100% for CMV-IgG sero-positivity was recorded among the divorced (6/6) and the widow (15/15). However, only CMV-IgM had a significant association with the patients' marital status ($p=0.038$). Analysis of data obtained in this research according to highest level of patients' education attained, the result showed that Cytomegalovirus IgM sero-positivity was highest among women with secondary school level of education with a percentage prevalence of 36.6% (30/82), while the highest sero-positivity for CMV-IgG was recorded among those with tertiary level of education with percentage prevalence of 97.5% (117/120). There was no significant association between prevalence of CMV infection with respect to patients' educational status. In relation to Occupation, the patients were grouped into six (6) different categories based on their occupation; 43 were Civil servant, 3 were artisan, 48 were trader, 6 were farmers, 39 were unemployed, 129 were student and 32 gave no response. The highest prevalence of 66.7% (2/3) of CMV-IgM antibody was observed among patients that were artisan while the highest prevalence of 100.0% for CMV-IgG antibody was observed among those that were artisan and farmer. The difference observed was significant for CMV-IgM ($p<0.05$).

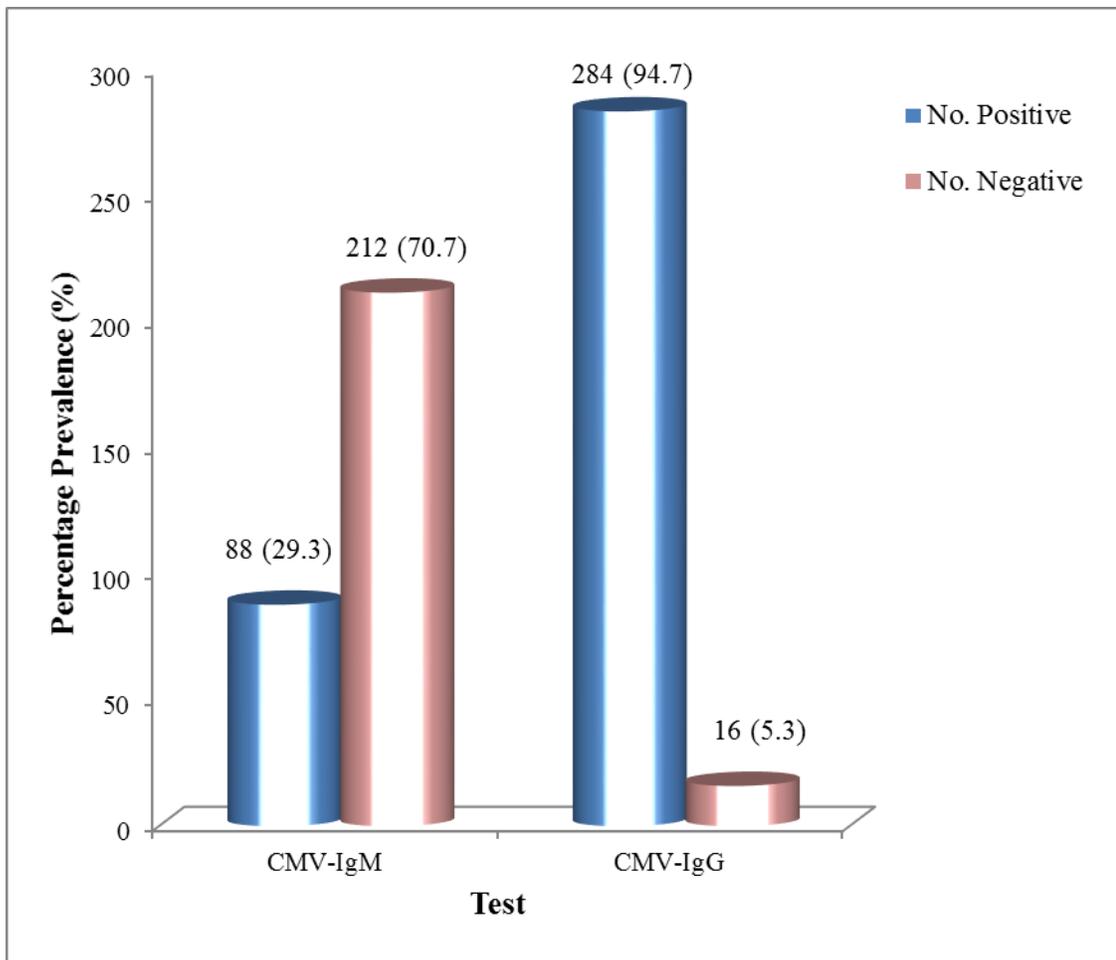


Figure 1: Overall Prevalence of CMV-IgM and IgG antibodies among the study population

Key: CMV= Cytomegalovirus, IgM= Immunoglobulin M, IgG= Immunoglobulin G, No=Number, %= Percentage.

Table 1: Association between Demographic Characteristics and CMV Infection among Women of Reproductive Age

Variables	Number Examined	CMV-IgM			CMV-IgG		
		Positive n (%)	χ^2	P- value	Positive n (%)	χ^2	P- value
Age (Years)							
11-20	53	8(15.1)	13.318	0.008*	46(86.7)	3.782	0.436
21-30	154	60(39.0)			148(96.1)		

31-40	66	16(24.2)			64(96.7)		
41-50	27	4(14.8)			26(96.3)		
Marital status							
Married	158	53(33.5)			150(52.7)		
Single	109	20(18.3)	12.359	0.038*	103(94.5)	4.265	0.371
Divorced	6	4(66.7)			6(100)		
Widow	15	7(46.7)			15(100)		
No response	12	4(33.3)			10(3.5)		
Educational Status							
Primary	29	8(27.6)			27(93.1)		
Secondary	82	30(36.6)			77(93.9)	7.709	0.103
Tertiary	120	26(21.7)	6.578	0.160	117(97.5)		
Informal	36	13(36.1)			31(86.1)		
No response	33	11(33.3)			32(97.0)		
Occupation							
Civil servant	43	12(27.9)			42(97.7)		
Artisan	3	2(66.7)	18.574	0.045*	3(100)	7.135	0.319
Trader	48	19(39.6)			46(95.8)		
Farmer	6	2(33.3)			6(100)		
Unemployed	39	16(41.0)			34(87.2)		
Student	129	28(21.7)			124(96.1)		
No response	32	9(28.1)			29(81.3)		
Total	300	88(29.3)			284 (94.7)		

Key: χ^2 =Chi-square, %= prevalence *=Significant association exist as $p<0.05$, n = number

History of sexual activity (as regards; number of sexual partners, participating in unprotected sex), pregnancy and number of children among the women enrolled in this study were also considered as a possible risk factor for CMV infection (Table 2).

Based on number of sexual partners, sixty (60) out of the 300 women enrolled in this study declined being sexually active. The highest prevalence of 50.0% (10/20) for CMV-IgM was recorded among those who admitted to having multiple sexual partners while the lowest prevalence of 22.9% (40/175) was recorded among those who had one sexual partner. For CMV-IgG those who had just one sexual partner recorded the highest prevalence of 96.0% (168/175) while the least prevalence was recorded among those who had multiple sexual partners. However, the result of analysis based on this factor, showed only CMV-IgM to be statistically significant with number of sexual partners as a risk factor for CMV infection ($\chi^2=13.489$, $p=0.004$).

Further analysis to examine involvement of subjects in unprotected sex as a risk factor for CMV infection among the remaining 240 women who admitted to be sexually active revealed that, those who admitted to, participating in unprotected sex had a higher prevalence of 35.9% (33/92) and 98.9% (91/92) compared to 19.6% (29/148) and 93.2% (138/148) for CMV-IgM and IgG respectively among those who had protected sex. The differences observed were found to be statistically significant for both CMV-IgM and IgG ($p>0.05$).

Based on pregnancy status, only eighty-six 86 out of the 300 women in this study were pregnant. Analysis of result showed a higher prevalence of 41.9% (36/86) and 97.7% (84/86) for CMV-IgM and CMV-IgG respectively among the pregnant women as against 24.3% (52/214) and 93.5% (200/214) among the non-pregnant women. However, pregnancy as a risk factor was found to significantly associated with CMV-IgM alone ($p<0.05$).

Analysis of result based on number of children shows that there was no significant difference between CMV-infection and number of children ($p>0.05$). The highest prevalence for CMV-IgM sero-positivity of 100% (1/1) was recorded among those who had seven or more children; however prevalence of 100% was recorded for CMV-IgG among those who had three or more children.

Data obtained in this study were also analysed to examine the level of association between CMV and HIV infection. Out of 300 subjects enrolled in this study, 11 were positive for HIV infection. Higher prevalence of 45.5% (5/11) was recorded for CMV-IgM among those who were positive for HIV infection. However, those who were negative for HIV infection recorded a higher percentage prevalence of 95.2% (275/289) for CMV-IgG. The difference observed were not statistically significant ($p>0.05$).

The presence of other sexually transmitted diseases was also examined as a possible risk factor for CMV-infection. The result of analysis showed that those that had sexually transmitted disease recorded a lower prevalence of 13.6% and 15.8% as compared to 78.4% and 75.7% for CMV-IgM and IgG respectively, among those who did not have. The association between CMV-IgM and CMV-IgG antibodies and sexually transmitted disease was not statistically significant ($p>0.05$).

Analysis of prevalence obtained based on blood transfusion in this study showed that there was no significant association between transfusion and CMV-infection ($p>0.05$). However, higher prevalence of 30.8% (12/39) was recorded among women who had previously undergone transfusion for CMV-IgM, whereas, those who have never been transfused, recorded a higher prevalence of 95.4% (249/261) for CMV-IgG.

Table 2: Association between CMV Infection and Some Risk Factors among Women of Reproductive Age

Risk Factors	No Tested	CMV-IgM			CMV-IgG		
		Positive n (%)	χ^2	P- value	Positive n (%)	χ^2	P- value
No of sexual partners							
None	60	26(43.3)			55(91.7)		
One	175	40(22.9)	13.489	0.004*	168(96.0)	2.619	0.454
Two	45	12(26.7)			43(95.6)		
Multiple	20	10(50.0)			18(90.0)		
Unprotected Sex							
Yes	92	33(35.9)			91(98.9)		
No	148	29(19.6)	7.843	0.005*	138(93.2)	4.170	0.041*
Sub Total	240	62(25.8)			229(95.4)		
Pregnant							
Yes	86	36(41.9)			84(97.7)		
No	214	52(24.3)	9.127	0.003*	200(93.5)	2.160	0.142
Number of children							
None	257	76(29.6)			243(94.6)		
1-2	22	8(36.4)	0.439	0.932	20(90.9)	1.673	0.643
3-4	17	2(11.8)			17 (100.0)		
5-6	3	1(33.3)			3(100.0)		
≥ 7	1	1(100)			1(100.0)		

Total	300	88(29.3)	284 (94.7)
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Key: χ^2 =Chi-square, %= prevalence *=Significant association exist as $p<0.05$, n= number

Table 3: Association between CMV Infection with respect to HIV and STD Status.

Risk Factors	No Tested	CMV-IgM			CMV-IgG		
		Positive n (%)	χ^2	P- value	Positive n (%)	χ^2	P- value
HIV STATUS							
Positive	11	5(45.5)			9(81.8)		
Negative	289	83(28.7)	1.432	0.231	275(95.2)	3.734	0.053
STD							
Yes	46	12(13.6)			45(15.8)		
No	230	69(78.4)	0.284	0.868	215(75.7)	2.905	0.234
No response	24	7(8.0)			24(8.5)		
Blood Transfusion							
Yes	39	12(30.8)			35(89.7)		
No	261	73(29.1)	0.045	0.851	249(95.4)	2.152	0.142
Total	300	88(29.3)			284 (94.7)		

Key: χ^2 =Chi-square, %= prevalence *=Significant association exist as $p<0.05$

Discussion

Findings in this study revealed that the prevalence of HCMV in women of reproductive age in Zaria metropolis, Kaduna state is high. An overall prevalence of 94.7% was observed for CMV-IgG antibodies while 29.3% was recorded for CMV-IgM antibodies representing those that had acute infection of CMV among the study population. The lower prevalence of 29.3% for IgM antibodies observed in this study is possibly due to the fact that majority of the women must have recovered from primary infection with the loss of CMV IgM antibodies by the time they reach the reproductive age (Griffiths *et al.*, 2001, Fowler *et al.*, 2003). However, according to Khairi *et al.* (2013), CMV-IgG antibodies on the other hand, remain in the body of an individual for life after previous infection and protects considerably against subsequent infection. Hence, the detection of CMV-IgG in this study indicates that the women had previously been infected with CMV and negative results of CMV-IgG test means that the women have not been infected with the virus.

When compared to other findings within Nigeria; the prevalence of 94.7% recorded in this study was similar to 94.8% previously reported by Yero *et al.* (2014) in Kaduna State and slightly lower than 97.2% reported in Lagos by Ahmad *et al.* (2011) and 98.7% reported in Sokoto State by Akinbami *et al.* (2011). Similar seroprevalence had also been reported within the continent of African; Kafi *et al.* (2009) reported a prevalence 95% in Sudan and a prevalence of 96% was reported by EL- Nawawy *et al.* (1996) in Egypt. However, the result of this study were higher than 46.8% reported by picone *et al.* (2009) in France and that of Sharas *et al.* who reported a prevalence of 60% in the United State in 2006. The high CMV-IgG seroprevalence observed in this study was seen to be similar to that reported in other developing countries, whereas, it was higher than those reported in the developed countries. This may be attributed to the depreciating socioeconomic status, low standard of education, poor hygienic practices among these women and inadequate health care facilities which may play important roles in increasing the rate of CMV transmission in developing countries (Staras *et al.*, 1994; Yero *et al.*, 2014).

The prevalence rate of CMV IgM sero-positivity (29.3%) recorded among the women in this study was far higher than 1.7% reported in Korea by Seo *et al.* (2009), 2.5% reported by Hamdan *et al.* (2011) in Western Sudan, 7.2% in Malaysia by Saraswathy *et al.* (2011) and 13% in Poland by Gaj *et al.* (2012).

Analysis of prevalence of CMV infection with respect to age revealed no specific pattern, however, there was a significant association between the age group and prevalence of CMV-IgM antibodies ($\chi^2=13.318$, $p=0.008$), with the highest prevalence of 39.0% being recorded among women within the age group 21-30 years. The rise in CMV-IgM sero-positivity within this age group may not be unconnected to the increase in sexual activity due to realization of sexual maturity leading to high level of sexual promiscuity, hence increase in transmission rate of the infection (Griffthis *et al.*, 2011). Whereas, the lowest prevalence of 14.8% recorded among those within age group 40-50 years. May likely be attributed to the waning nature of CMV-IgM as majority of the women previously exposed to the infection must have recovered from primary infection over time (Saidu *et al.*, 2015).

Seroprevalence of CMV infection based on marital status among the women revealed a significant association for CMV-IgM antibodies. The peak of prevalence was recorded within the divorced women group. The reason for high prevalence in these group of women might be due to the fact that they are more exposed to new infection due to multiple sexual partners. This is in agreement with the report of Tremlog *et al.* (2009), who reported sexual exploitation as a factor for transmission of CMV infection.

In this study, the distribution of seroprevalence of CMV infection among women of reproductive age by educational status showed no significant association. Although, women with secondary school education had the highest prevalence for CMV IgM antibodies. This might be as a result of the fact that those women in these groups are more exposed sexually than those in primary schools. This result contradict the earlier report of Yero *et al.* (2014) who reported that seroprevalence rate of CMV decrease with increase in level of education.

Analysis of CMV infection based on occupation shows that there was significant association in relation to occupation by CMV IgM antibodies. The highest prevalence of CMV was observed among patients that were artisan for both IgG and IgM antibodies this may be as a result of the nature of their work which involve frequent contact with different people which could possibly lead to high transmission rate of CMV infection among these subjects. This does not agree with previous study of Bate *et al.* (2010).

The result of analysis of those women who engage on unprotected sex show significance association with CMV IgM and IgG antibodies with highest prevalence in those women who engaged in unprotected sex. Number of sexual partners were also significant for IgM with highest prevalence in those women who had multiple sexual partners. A greater number of sexual partner did increase risk of transmission of CMV. Increased sexual exposure identifies those who engaged in more or perhaps riskier behaviour or selects individual who are exposed to different partner pool are at high risk of transmitting CMV infection (Ray, 1997).

Pregnancy was found to be significantly associated with CMV infection with higher prevalence for both IgG and IgM antibodies among the pregnant women than those women that are not pregnant. This report contradicts the report of Yero *et al.* (2014), who observed no significant association between pregnancy and CMV infection. The reason for high prevalence of CMV infection among the pregnant women in Zaria metropolis may be as a result of the fact that pregnancy has been reported as a stressor on women and could lead to primary exposure or cause reactivation of the virus from its latent state. This agrees with the report of Biswas *et al.* (2011). Hence the high prevalence of CMV infection among pregnant women implies that there might be a corresponding high incidence of congenital CMV infection among infants born in the area (Mussi – Pinhata *et al.*, 2009).

This study revealed no significant association between number of children and CMV prevalence among the women tested for both CMV IgG and IgM. It was observed that women with seven or more children had the highest CMV IgM sero prevalence while 100% of CMV IgG seroprevalence was recorded among those women who had three or more children. This might be as a result of the women acquisition of the infection from their young children as this agrees with the report of Adler (2004), who reported the exposure to young children as a factor for transmission of CMV infection.

HIV tested and HIV status, were also found not significantly associated with CMV prevalence in this study, however those that are HIV positive had the highest prevalence for IgM antibodies while those tested negative had the highest prevalence by IgG antibodies. The highest prevalence for CMV IgM antibodies among those women that are HIV positive might be as a result of their state of immunosuppression and thus may increase the risk of acquiring new infection.

History of sexually transmitted disease was also not found significant for both IgG and IgM antibodies. Having unprotected sex increase the rate of transmission of CMV, although those that has the history of STD had the highest prevalence for IgG antibodies but lowest prevalence for IgM compare to those that has the history of STD.

Further analysis to evaluate risk factors that are associated with CMV infection in this study revealed no significant association with participants' history of blood transfusion. This disagrees with the findings of Matos *et al.* (2010), who reported blood transfusion as a risk factor for transmission of CMV infection. The reason for the disagreement here could be as a result of the disproportionate size of women who were transfused to those who were not transfused. However, highest prevalence rate was recorded among women who had previously undergone transfusion for CMV-IgM, whereas, a higher prevalence rate for CMV-IgG was recorded among those who had never been transfused (Matos *et al.*, 2010).

Conclusion

In conclusion, this study showed that CMV infection is widespread among women of reproductive age in Zaria metropolis with prevalence of 94.7% and at 29.3% for CMV IgG and IgM antibodies respectively. The high prevalence was attributable to age, nature of occupation, marital status, participating in unprotected sex and multiple number of sexual partners. It is recommended that attempts to control the transmission of CMV infection through the risk factors implicated in this study should be adopted.

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Drivers of poverty in Sub-Saharan Africa: Policy implications for achieving Agenda 2030 for Sustainable Development

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Abstract- Following their independence, Sub-Sahara African (SSA) countries started with high hopes for rapid economic growth, eradication of poverty and socio-economic transformation that will culminate into high quality of life of their population. However, poverty is increasingly assuming an African face. Sub-Saharan Africa accounts for 75% of the world's poor people. Fifty-four percent of the population in SSA is multi-dimensionally poor. The overall objective of the paper is analyzing the main drivers of poverty and policy implications for achieving sustainable development goals by 2030. The main drivers of poverty in Sub-Saharan Africa are (i) Lack of broad-based growth. (ii) High income inequalities (iii) rapid population growth. (iv) Lack of capabilities and deprivation of basic necessities for large segments of the population. (v) High external debt burden and debt services. (vi) Low productivity of rural population. (vi) Political instability, conflicts and bad governance.

In order to end poverty and hunger in SSA, the following interventions are suggested: (i) Expand policy space of governments to properly manage their economic development process and building their productive capacities. (ii) Address the causes of income/wealth inequality through effective fiscal and monetary policies to increase access of the poor to public services and employment opportunities. (iii) Prioritize sustainable development goals to match their national capabilities and resources in order to achieve most of sustainable development goals by 2030. (iv) Increase public investment in human resource development to expand the capabilities of the poor (v) Increase public investment for the transformation of the agricultural system from low productivity to high productivity and ensure the benefits of transformation reaches the poor. (vi) Commitment and implementation of democratic system of governance based on the principle of social justice to maintain peace and stability. (vii) Strengthening and expanding family planning to reduce fertility rates and accelerate demographic transition (vii). External debt cancellation and access to markets of developed countries for exports of SSA to enable the countries to finance their development programs that will enable them to achieve most of the 17 sustainable development goals by 2030.

Index Terms-Sub-Saharan Africa, Poverty, Multidimensional poverty index, Developmental state, Sustainable Development goals.

1. Introduction

Following their independence, Sub-Sahara African (SSA) countries started with high hopes for rapid economic growth, eradication of poverty and socio-economic transformation that will culminate into high quality of life of their population (Go et al. 2007:252).

Sub-Saharan African governments attempted to enhance their countries' economic growth through state-led investments and import substitution industrialization strategies. However, the era of 'big government' in which public projects and public enterprises expanded enormously remained unsuccessful (Heidhues and Obare, 2011:2). In the 1980s, Sub-Saharan African countries faced fundamental problems: low economic growth, low levels of savings and low investments, high levels of unemployment, persistent deficit in their balance of payments and a general decline in their incomes and increasing incidence of poverty (Heidhues and Obare, 2011:2).

As response to their macroeconomic crises, Sub-Saharan African countries' governments changed their policies and development strategies in favor of free market and free trade, with minimal state under the rubric of structural adjustment programs (SAPs.) to enhance efficiency and competitiveness of their economies and, subsequently enhance their economic growth (WB, 1994). However, market-oriented reforms have led to a greater inequality and increase in the number of poor people (GDEI, 2000:4). Poverty is increasingly assuming an African face. Sub-Saharan Africa accounts for 75% of the world's poor people (SDSN, 2012:5). Thus policies of eradication of poverty and promotion of shared prosperity needs to be strengthened in order to make economic growth inclusive in line with Agenda 2030 for Sustainable Development (AfDB, 2016:57).

2. Problem statement

Poverty is a major development challenge in SSA countries. It is strongly linked to lack of income, productive resources and human capabilities as well as lack of participation in decision making of individuals or households in their social, economic and political life (UN, 1995; UN, 2001). Fifty-four percent of the population in SSA is multi-dimensionally poor (AfDB, OCED and UNDP, 2017:6). The majority of the population in SSA countries lives in rural areas and earns their livelihoods primarily from subsistence agriculture (Gollin, 2009:2). However, rising rural populations has resulted into reduced farm sizes which put more pressure on the farm land. Smallholder farmers are responding by continuously cropping their fields every year, without crop rotation or investments in land improvement (AGRA, 2016:75). Such unsustainable farming practices of small holders while worsening land degradation have contributed to their low crop yields. As a result, a large portion of poor people are concentrated in rural areas (KIT, 2005:9). Despite the abundant natural and human resources in SSA countries, they still suffer from widespread and persistent poverty due to lack of productive employment opportunities, several interlinked factors, including low productivity in agriculture, low human capabilities, bad governance, income inequality and conflicts (ODI, 2009:7; Go et al. 2007:35; Kabuya, 2015:2; WB, 2015; ILO, 2003:8). Since 2000, poverty eradication has become at the center of development agenda, both globally and nationally. Augmenting the millennium development goals, in September 2015, the UN adopted Agenda 2030 for Sustainable Development which contains 17 goals (UN, 2015:6). The Agenda 2030 which is supported by all member states is a transformative vision and framework that will guide development policies in all countries. One of the sustainable development goals is elimination of poverty by 2030 (UNCTAD, 2015:6). Achieving sustainable development goals such as eradicating extreme poverty is formidable challenge for Sub-Saharan African countries as many of the countries have to overcome their multiple and interwoven challenges, including, low savings and investments rates, weak economic growth, political instability, high unemployment and external debt burden (Adeyemi, and Raheem, 2009:162). These factors are interrelated, and success in one area may reinforce the others. Breaking the vicious circle of poverty in sub-Saharan Africa would thus require building an effective state which can mobilize both domestic and foreign resources in order to enhance public and private investments to achieve inclusive sustained economic growth that would eliminate poverty in line with the Agenda 2030 for sustainable development.

3. Objective of the study

Sustained economic growth and poverty reduction in Sub-Sahara African countries would require development of their productive capacities in such a way that the working-age of their population becomes fully and productively employed (ECA, 2015:76). National productive capacities in SSA countries can be developed through the interrelated processes of capital accumulation, human resource development and technological progress, strengthening competitiveness of their exports in the world markets (ECA, 2015:76). Successful economic development in other parts of the world have been accompanied by structural transformation, a process in which the bulk of economic activities shift from low-productivity to high-productivity sectors (AGRA, 2016:65). In the successful countries, labor moved from less productive traditional sectors into modern high productive sectors such as manufacturing and services, which resulted into sustained economic growth, improvement in living standards, and poverty reduction of the populations (AGRA, 2016:65). Building a critical mass of viable and competitive productive capacity in agriculture, manufacturing and services sectors is essential if SSA countries are to sustain inclusive and equitable growth that will have substantial impact on poverty reduction. The sources of growth also matter because for substantial poverty reduction, new jobs need to be created in the labour-intensive sectors. To these ends, SSA countries would be required to mobilize their domestic resources that would enable them to save and invest 25% or above of their GDP to sustain 7% -8% growth rates, which most analysts consider have a high impact on reducing poverty (UNCTAD, 2011; ECA, 1999). The extent to which the levels of savings can enhance investments, and hence growth rates, largely depend on the capacities of financial intermediation in channeling domestic savings into productive investments (Abebe and Quaicoe, 2014:3). Poverty eradication through increased investments which create employment, particularly employment for the SSA youth has to be a priority in the policy agenda of the countries (ILO, 2007:13).

Rural areas in SSA countries constitute 75 per cent of the poor, who are desperately seeking ways to improve their living conditions (KIT, 2005:5). This is mainly because agricultural productivity in SSA has lagged far behind the progress made in Asia and Latin America (WB, 2007:19). That is why agriculture is still the centerpiece of development in SSA countries for their rapid economic growth, poverty reduction, and food security (WB, 2007, p.39). In order to increase agricultural productivity and to foster broad-based economic growth, more investments would be required. Poverty in SSA countries is predominantly multidimensional because of deprivation of individuals of certain basic necessities and capabilities and that it has to be addressed from a broader dimension. In line with this perspective, governments can substantially reduce the level of poverty by (a) increasing investment in productive employment and entrepreneurship development; (b) improving governance and resolve conflicts; (c) address the causes of income or wealth inequality through appropriate fiscal and monetary policies (d) increase investment in human capital formation; (f) increase investment in research and development (f) spurring agricultural and rural development through more public and private investments; (g) diversifying exports, while pursuing regional integration; and (h) reducing aid dependency and external debt burden through mobilizing more domestic resources (UNU-WIDER) 2016:14).

Thus, understanding the various drivers, scale and depth of poverty that exist in many Sub-Saharan African countries is very important in order to implement inclusive and pro-poor growth policies in line with Agenda 2030 for sustainable development. The overall objective of the paper is analyzing the main drivers of poverty in SSA. The specific objectives are:

- Analyze the nature and magnitude of poverty ;
- Analyze the main causes of poverty in the region;
- Analyze the main challenges in overcoming poverty and enhancing inclusive pro-poor economic growth ; and
- Recommend policy measures which would promote inclusive growth and poverty reduction in Sub-Sahara Africa.

In line with the problem statement and overall objective of the study, this paper aims to address the following questions: (i) Have economic growth rates in SSA substantially reduced poverty? (ii) What are the main drivers of poverty in Sub-Saharan Africa? (iii) What policy measures would be required to deliver sustainable and broad-based economic growth that would reduce poverty in SSA countries?

4. Methodology

The study dwells on extensive literature review to gather secondary data from various sources including research reports, publications of academic institutions, relevant documents of international organizations and national policy documents relevant textbooks as well as the internet. The secondary data are contextualized and analyzed to suit the objectives of the study. Following sections 1-4, (introduction, problem statement, objectives and methodology), Section 5 deals with conceptual framework: perspectives on poverty. Section 6 is the main body of the paper; it deals with the empirical analysis on the drivers of poverty in SSA. Section 7 is an extension of the previous sections and focuses on discussion and policy implications.

5. Conceptual Framework: perspectives on poverty in developing countries

Development has several objectives, including building of productive capacity, promotion of equal opportunities for the population and elimination of poverty. Poverty is primarily an ethical concept. Essentially, to think about poverty means to identify individual economic and social situations which are judged unfair and unjust in a given society (CECI, 2001:3). The search for a fair society is in fact a search for some form of equity among the members of a society for “material things” or access to resources and opportunities (CECI, 2001:3). Poverty is thus caused by lack of resources, opportunities and capabilities of certain segments of a given society in a country. Thus, the solutions to remedy poverty is inclusive sustained economic growth, fair distribution of wealth, equal opportunities and a focus on building human capacity of all members of a society (Manjoro, 2012:30).

Conceptually it is essential to understand different perspectives on the causes of poverty and effective methods of eradicating it. According to the neoclassical school the main cause of poverty, within a market-based competitive economic system is unequal initial endowments of talents, skills and capital (NIESR, 2014 p.22). The neoclassical school underpins that under free market economy, everyone would be better-off as producer or consumer in any society (Wolff and Resnick, 2012:15). The neoclassicals view is that factors that fuel poverty are individual deficiencies in decision making. Poor individuals are to be blamed for being poor because with harder work and better choices and decisions they could have avoided their poverty (Bradshaw, 2006:17). The neoclassical economists propose no explicit policy interventions by governments to overcome high incidence of poverty observed in many developing countries. The individual deficiency theory of poverty and a do-nothing policy is not well received in the academics and policy making circles because the market is not perfect and doesn't guarantee equal opportunities. The policy implication is that government interventions are expected to provide equal opportunities for all and, subsequently eliminate poverty through inclusive and sustained economic growth.

In the early post independence, the growth-oriented development strategy in SSA countries resulted in into high income inequality and incidence of poverty. In the 1970's, a focus on basic needs was advocated by the basic needs school (CECI, 2001:22). A person is judged to be poor because of the inability to meet his /her basic needs: food, clothing, shelter, basic education and health care (CECI, 2001:22). These elements do not often “trickle down” to the largest segment of a society or the poor (GDEI, 2000:4). The basic needs approach implies inadequacy of the market to meet the basic needs of the people and that governments have central roles in meeting basic needs of the population and in alleviating poverty through employment creation and increasing their access to public services (UNDP,1996:56).

Although governments of SSA countries have been exerting efforts to promote economic growth and alleviate income poverty, high incidence of poverty is still prevailing in most of the countries. Since 1990, there has been a shift in emphasis on human development. The Human development Index (HDI is constructed based on three core elements which have equal weights: longevity, knowledge and decent living standards. The UNDP has developed a score on human development index which varies between zero (lowest human development) and one (highest human development) (UNDP, 1990:12). In 2016, human development index of SSA countries was 0.523 compared to the world, which was 0.717 (UNDP, 2016:201). Thus based on the HDI SSA countries are ranked in the low human development. The implication is that the SSA countries still have to build their human development through increased investments in their social sectors, particularly education and health care.

The capability perspective provides a wider perspective in which people can be enriched or impoverished (Hick, 2012:11). Based on Amartya Sen's capability approach, poverty is viewed as the deprivation of certain basic capabilities and that poverty is increasingly recognized as multi dimensional, which includes economic and non economic dimensions (Sen, 1999: 75). From a capability

perspective, poverty is viewed as the deprivation of people of certain basic necessities such as food, shelter, basic education, health care as well as lack of employment opportunities and lack of participation in the economic, social and political life of their respective societies (Sen, 1999: 75). In situations where some individuals or households lack access to resources or are denied of opportunities, they become poor. The market forces are not capable of correcting the situation and that the poor tend to remain poor. When people are deprived of several necessities such as health care services, education, potable water, sanitation, they become multidimensionally poor (OPHI, 2016:3; Addae-Korankyep, 2014: 2). Thus, SSA governments' must ensure equal opportunities and ensure equitable distribution of the national wealth in their respective countries in order to eliminate multidimensional poverty.

In September 2015, the United Nations adopted the 2030 Agenda for Sustainable Development. The 2030 Agenda contains 17 goals. Two of the 17 goals are related to poverty. These are: Goal 1 End poverty in all its forms everywhere; Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture which are expected to be achieved by 2030 (UN, 2015:6). Sustainable Development does not only depend on the value attached to the economic variables but also on the extent to which social inclusion and social cohesion are integrated into policy formulation and implementation. Today, there is clear recognition that poverty occurs within and is affected by the political, economic, social, cultural and environmental, national and global factors (UNDP, 2010:104).

From an inclusive growth and poverty reduction perspective, the fundamental preconditions for poverty eradication/reduction are building human capacity and ensuring a pattern of growth and structural change that generates productive employment, improves earnings of majority of the population. The prospects for poverty eradication and social justice, however, cannot be ensured by the market forces and that effective states that are both developmental and redistributive would be required. Countries that have successfully reduced poverty had purposeful, growth-oriented and welfare-enhancing policies (UNRISD, 2010:222). Without developmental state approach to development and poverty elimination, successful industrialization, structural transformation and building of productive capabilities of the poor will be difficult in SSA.

Moreover, SSA countries do not seem to substantially reduce poverty without realizing inclusive sustained economic growth which avoids their further marginalization in the global economy in the 21st century (Edigheji, 2005:12). Experience of Southeast Asia countries that have been successful in reducing their poverty indicates that the countries used effective industrial and agricultural policies that enhance their economic growths while facilitating employment-centered structural transformations (Warr, 2000:143). Similar kinds of interventions appropriate to SSA countries' situations can be used to transform the structure of their economies, strengthen linkages between their industry and agriculture, while creating productive employment opportunities for the poor (UNRISD, 2010:46). Structural transformation underlines the importance of an export-oriented development strategy that enhance sustained economic growth and export diversification based on domestic resources without creating high dependence on external financing that leads to indebtedness (ADB, 2003). To these ends, SSA countries need developmental states which give top priority for the building of their productive capacities (Leftwich, 2000). The building of productive capacities involves three basic processes: (i) accumulation of physical, human and organizational capital, (ii) technological progress and (iii) structural transformation (UNCTAD, 2004:79). It is through structural transformation and the development of their productive capacities that the SSA countries will be able to rely increasingly on their domestic resources mobilization to finance their economic growth, to reduce aid dependency and to attract private capital inflows of a type that enhance their development process (UNCTAD, 2006). The developmental state approach by expanding their policy space would enable the SSA countries to achieve the expected positive benefits of trade liberalization in terms of sustained economic growth, employment creation, poverty reduction, structural transformation and export diversification (UNCTAD, 2004:79). Development of productive capacities would particularly be important for the SSA countries during the next 14 years because they are at a critical moment of implementation of the sustainable development goals.

6. Empirical findings

6.1 Lack of broad-based growth /Lack of pro-poor growth

Raising people out of poverty requires sustained and inclusive economic growth which require large investments in productive employment creation, industrial expansion, including promotion of investments in small, micro and medium enterprises and in the modernization of agricultural production.

As shown in Table 1, in a sample of SSA countries, Botswana, Kenya, Mozambique and Tanzania relatively showed better growth performances, while Algeria, Chad, South Africa, and Eritrea showed low performances in their growth rates during 2007-2016 periods. However, the average growth rates of real GDP for most of the countries were far below 7 per cent required to have a great impact on poverty reduction. The average growth rates in SSA decreased from 6.1% in 2007 to 2.2% in 2016. Declining patterns of growth rates were also observed in the sample countries, including Botswana, South Africa, Uganda, Mozambique and Nigeria. Reflecting their sluggish economic growth rates. During the period 2005-2014, the poor population were 54.7% of the population in Mozambique, 37.5% of the population in Cameroon; 75.3% of the population in Madagascar while in Nigeria and South Africa the poor constituted 46% and 53.8% of their populations respectively (UNDP, 2016:218-219). Thus, economic growth rates in most SSA countries were non-transformative and pro-poor. With current trends of their economic growth rates, SSA countries are unlikely to escape from their high incidences of poverty (Gordon, Sachs and Woo, 2005:6). Thus high domestic savings and

investments would be required to create productive employment opportunities. It is not only higher growth rate, but also shared higher economic growth and high employment in order to reduce poverty substantially in SSA countries (WB, 2007:33).

Table 1: Real GDP growth rates for selected SS African countries 2007-2016 (percentage)

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Algeria	3.4	2.4	1.6	3.6	2.9	3.4	2.8	3.8	3.8	3.5
Botswana	8.3	6.2	-7.7	8.6	6	4.5	11.3	4.1	-1.7	2.9
Cameroon	3.3	2.9	1.9	3.3	4.1	4.6	5.6	5.9	5.8	3.2
Chad	4.8	2.8	-2	15	6.3	12.5	-5.9	3.4	4.4	-3.4
Eritrea	1.4	-9.8	3.9	2.2	8.7	7	3.1	5	4.8	3.8
Ghana	4.3	9.1	4.8	7.9	14	9.3	7.3	4	3.9	4
Kenya	6.9	0.2	3.3	8.4	6.1	4.6	5.7	5.3	5.6	6
Madagascar	6.2	7.1	-4	0.3	1.5	3	2.3	3.3	3.1	4
Mozambique	7.4	6.9	6.4	6.7	7.1	7.2	7.1	7.4	6.6	3.3
Nigeria	6.4	6.3	6.9	7.8	4.9	4.3	5.4	6.3	2.7	-1.5
Rwanda	7.6	11.2	6.3	7.3	7.8	8.8	4.7	7.6	8.9	5.9
South Africa	5.4	3.2	-1.5	3	3.3	2.2	2.5	1.7	1.3	0.3
Tanzania	8.5	5.6	5.4	6.4	7.9	5.1	7.3	7	7	7.2
Togo	2.1	2.4	3.4	4	4.8	4.8	4	5.9	5.5	6
Uganda	8.1	10.4	6.9	8.2	5.9	3.2	4.7	4.9	5.4	4.8
Africa	6.1	5.3	3.4	5.7	2.9	6.2	3.9	3.7	3.4	2.2

Source: ECA, AfDB and AU, 2017: 51, Table 2.2

6.2 high income inequalities

The high incidence of poverty in SSA countries is not only due to the low income per capita but also due to the high income inequality (AfDB, 2016:22. Empirical studies indicate that a one percentage change in income inequality would translate into 0.78% increase in poverty levels in Africa (AfDB, 2013:16). Income distribution can be measured by: (i) Gini coefficient. The theoretical range of the Gini coefficient is from 0 (perfect equality) to 100 (perfect inequality (Todaro and Smith, 2012, p.209). (ii) Quintile ratio- a ratio of the average income of the richest 20 percent of the population to the average income of the poorest 20 percent of the population and (iii) Palma ratio- a ratio of the share of income of the richest 10 percent of the population to the share of income of the poorest 40 percent of the population (UNDP, 2016:206-209) 3. Table 2 shows the distribution of income in selected SSA countries. The distribution of income in Norway and China are used as references. With respect to quintile ratio, South Africa has the highest value (27.9) compared to Norway (3.9) and China (9.2) during the period 2000-2015.

Table 2: Income distribution in selected African countries, 2000-2015

Country	Quintile ratio	Palma ratio	Gini Coefficient (0-100)
	2000-2015	2000-2015	2000-2015
Norway	3.8	0.9	25.9
China	9.2	2.1	42.2
Botswana	22.9	5.8	60.5
Gabon	8.4	2.1	42.2
South Africa	27.9	7.1	63.4
Namibia	20.3	5.8	61
Angola	8.9	2.2	42.7
Cameroon	11.4	2.7	46.5
Sudan	6.2	1.4	35.4
Lesotho	20.5	4.3	54.2
Malawi	9.6	2.6	46.1
Congo Democratic Republic	8.7	2.1	42.1
Zimbabwe	8.5	2.2	43.2
Zambia	16.5	4.3	55.6

Source: UNDP, 2016: 206-209, table 3

Most SSA countries have higher quintal ratios, indicating that the shares of income of the richest 20 percent of the population are more than six times the shares of income of the poorest 20 percent of the population. With respect to Gini coefficient, income inequality is highest in Botswana with a value of 60.5, compared to Norway (25.9) and China (42) during the period 2000-2015. With the exception of Sudan, the countries have higher Gini coefficient, reflecting high income inequality. The Palma ratio also reflects the high Gini Coefficient for the sample SSA countries: South Africa (7.1), Botswana (5.8), Namibia (5.8), Lesotho (4.3) and Zambia (4.3) during the period 2000-2015. In terms of income inequality, SSA is one of the most unequal regions in the world. The average Gini coefficient is 47.4 and the poorest 20% of the population earn only 5.3% of total income (ODI, 2009:14). The high level of inequality in SSA countries is the result of complex interactions of their history, politics, resource endowments, market forces, and government policies. The existence of high incidence of poverty with economic growth rates also suggest that growth in SSA countries has been due to modern-sector enrichment growth where economic growth has been benefitting certain groups of people in the modern sector, while the traditional agricultural sector was experiencing little or no growth.

The persistence of economic inequality, that is, unequal distribution of assets such as land, unequal access to education, health and lack of high paying employment opportunity perpetuate poverty in SSA. The policy implications are that SSA countries can reduce poverty using their fiscal and monetary policies. Progressive taxation on property, income and profit; public investment on education, vocational and entrepreneurial training, access to basic health services; provision of cheap credit to promote micro and small enterprises will expand employment opportunities and will have direct or indirect positive impacts on the return of the most important asset of the poor, their labor.

6.3 High fertility rates /rapid population growth

Most SSA countries have higher fertility rates compared to other regions. Of the 22 countries in the world with relatively high levels of fertility rates, 20 are found in Africa (United Nations, 2017:12). Table 2 shows that fertility rates in SSA are highest, 5.1 births per woman compared to 2.2 births in Latin America, 1.8 births in East Asia and Pacific during the period 2010-2015. The high fertility rate is partly due to the high demand of poor households for children to meet the high labor demand in a predominantly labor-intensive subsistence agricultural production system. Poor households also desire to have a large number of children to protect themselves against poverty in times of old age (AFDB, 2004:34; SDSN, 2012:5). A reflection of high fertility rate in SSA is also observed in the highest dependency ratio which is 79.9 per 100 people for young age compared to 28.5 and 38.7 for East Asia and Pacific and Latin American and the Caribbean respectively (ECA, 2017:14).

Table 3: Total fertility of SSA countries, 2010-2015

Region	Total fertility Birth per woman 2010-2015	Dependency ratio per 100 people ages (15-64), 2015	
		Young age (0-14)	Old age (65 and older)
Sub-Saharan Africa	5.1	79.8	5.7
East Asia and the Pacific	1.8	28.5	11.8
Latin America and the Caribbean	2.2	38.7	11.3
Organization for Economic Co-operation and Development	1.8	27.7	24.8
World	2.5	39.7	24.8

Source: UNDP, 2016:239, Table 7

The consequences of high fertility and high dependency ratios are reduced per capita incomes, reduced investment in education and health of children, reduced consumption, low savings, increased incidence of poverty as well as low governments' per capita investments in infrastructure and social services (AfDB, 2004:34; SDSN, 2012:5). The population of sub-Saharan Africa is still rapidly increasing, demonstrating an early stage of demographic transition compared to most other regions of the world. The population of Africa grew at an average rate of 2.6 per cent per year during the period 1990-2015, more than twice the world average (ECA, 2017:14). The population of Africa is also expected to reach 2.2 billion people by 2050 (International Institute for Environment and Development, 2014:8). The policy implications are that enhancing development, access to reproductive health services, effective information and expanded education will help to bring behavioral changes and enhance demographic transitions which will culminate into low birth rates and low death rates (Merrick, 2002:6). Decline in fertility rates, in turn, will increase investments of households in the health and education of their children. At the national level, low population growth will increase public savings and public investments that would stimulate inclusive economic growth which has high impact on poverty reduction.

6.4 Lack of capabilities and deprivation of basic necessities for large segments of populations

People who lack capabilities or who are denied access to basic services and necessities are likely to remain multidimensionally poor. Multidimensional poverty index (MPI) is an international measure of acute poverty. It measures the nature and magnitude of overlapping deprivations in three dimensions: (i) Education which has two indicators (years of schooling and child school attendance). (ii) Health which has two indicators (child mortality and nutrition). (iii) Standard of living which has six indicators (electricity, improved sanitation, safe drinking water, flooring, cooking fuel and assets) (OPHI, 2016:3). Each person's deprivation profile across the three equally weighted dimensions and the ten indicators are considered in calculating MPI. A person is identified as multidimensionally poor if he/she is deprived in at least one third or more of the ten (weighted) indicators. The value of MPI ranges between 0 (no deprivation) to 100 (perfect deprivation). The intensity of poverty is measured by the number of deprivations a person experiences across the ten indicators. Intensity of the deprivation varies between zero (no deprivations) to 100% (perfect deprivation). The contribution of deprivation to multidimensional poverty index is attributed to deprivations in each of the three dimensions of poverty (education, health and standard of living (UNDP, 2016:219).

Table 4 shows that population in multidimensional poverty for selected SSA countries which have data. The value of MPI is highest in Burkina Faso (50.8%) and lowest in Swaziland (11.3%). In Burkina Faso, 82.8% of the population is categorized as multidimensional poor based on headcount; in Zimbabwe, 28.9% of the population is considered multidimensional poor based on headcount in 2010. The intensity of deprivation remained high for all the countries, the highest being in Burkina Faso (61.3%) and lowest deprivation was in Swaziland (43.5%). The major contributing factor of deprivation is attributed to standard of living, constituting 54.9% in Tanzania, the highest value in the sample countries and 8.5% in Burkina Faso. The deprivations affecting the highest share of MPI poor people in SSA are cooking fuel, electricity and sanitation (OPHI, 2016:1).

Table 4: Multidimensional poverty for selected African Countries, selected years 2009-2015

Country	Multidimensional Poverty index		Population in multidimensional poverty		Contribution of deprivation in dimension to overall poverty %		
	Year of survey	Index value	head count %	Intensity of deprivation %	Education	Health	standards Living
Benin	2012	0.343	64.2	53.3	33.1	24.8	42.1
Burkina Faso	2010	0.508	82.8	61.3	39.0	22.5	38.5
Cameroon	2011	0.260	48.2	54.1	24.5	31.3	44.2
Ghana	2014	0.147	32.4	45.4	27.2	31.5	41.2
Gambia	2013	0.289	57.2	50.5	32.9	30.9	36.2
Lesotho	2009	0.227	49.5	45.9	14.8	33.8	51.4
Rwanda	2015	0.253	53.9	47.0	28.6	18.4	53.0
Swaziland	2010	0.113	25.9	43.5	13.7	41.0	45.3
Tanzania	2010	0.335	66.4	50.4	16.9	28.2	54.9
Zambia	2014	0.264	54.4	48.6	17.9	29.8	52.3
Zimbabwe	2014	0.128	28.9	44.1	10.8	34.5	54.8

Source: UNDP, 2016:218-219, Table 6

Knowing the extent of deprivation and poverty is crucial for designing appropriate policies for poverty elimination through sustained inclusive growth. As underdeveloped human capital is a key determinant of the low returns to the most abundant asset of the poor, their labor, increased investments in health and education and in employment creation, particularly through promotion of microenterprises will serve as important paths out of poverty (AfDB, 2004., p.16).

6.5 External debt burden and debt services

Since their independence, most Africa countries have faced shortage of domestic savings. Thus, the countries used foreign savings through foreign borrowing with the objective to augment the stock of their capital and build up their productive capacities and kick-start their economic growth which will have high impact on their poverty reduction, and subsequently to pay their external debts (AERC, 1990:15; Swaray, 2005:132). However external debt burden has become a major development challenge of SSA governments because it has undermined their investment capabilities in their respective countries. One measurement of external debt burden is debt-GDP ratio-which measures a country's capacity to repay its debt and is an indicator of its creditworthiness. Another indicator of debt burden is debt service ratio which measures the percentage of export revenue used for external debt repayment and the magnitude indicates the extent of debt payment burden of a country. As shown in Table 5, the debt-to-GDP ratio varied across

the SSA countries reflecting the differences in the sizes of their GDP and magnitudes of their external debts. In 2016, external debt as percentage of GDP in Mozambique was 111.3%, the highest in the group, while the value for Benin was 19.1%, the lowest in the sample countries. High debt /GDP ratios suggest low debt payment capacities of the countries.

The external debt service of the SSA countries increased from 8.8% in 2011 to 12% in 2014. In 2016, the highest external debt service was in Kenya (28%), while the lowest was in Benin (3.5%). The external debt services in all the sample countries showed an increasing trend, making the debt service more challenging in future. In the SSA countries for which debt-service ratios exceeded the threshold level such as 25 percent of the exports of goods and services, the debt burden becomes a significant obstacle to development efforts (AERC, 1990:27). In SSA, the debt service takes up a large part of scarce budgetary resources that could be directed to productive investment in different sectors and that external debt service is crowding out public investments (Onovwoakpoma . 2013:143). Sub-Saharan Africa, pays \$10 billion every year for interest on debt accumulated. That is about 4 times as much money as the countries in the region spend on healthcare and education (Easterly, 2002:1).

The debt burden to a certain extent is the result of domestic macroeconomic policy mistakes exacerbated by structural weaknesses in their economies, particularly a narrow and technologically backward production base and heavy dependence on the exportation of a narrow range of primary products. The external factors reflect an increasingly hostile international economic environment characterized by low and falling primary commodity prices, declining terms of trade, soaring global interest rates, rising protectionism in the industrialized countries and dwindling capital flows into African countries (AERC, 1999:8). As a result, SSA countries have been facing mounting current account and balance-of-payments deficits, and an escalating external debt stock, while poverty continued to deepen (AERC, 1999:8).

Table5: External debt, debt services for selected SSA African countries, 2011-2016

Country	External Debt outstanding (%GDP)						Debt services (%exports)					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Angola	19.5	18.8	23.6	27.4	34.8	51.1	2.7	3	3.5	6.1	10.6	14
Benin	15.8	15.9	17.4	18.8	20.1	19.1	3.3	3.5	3.1	2.3	3.2	3.5
Chad	20.7	20.5	21.9	27.2	24.6	23.3	2.2	3.2	4	15.7	9.6	16.5
Eritrea	45.8	35.8	29.1	25.8	23.2	23.9	33.5	13.1	8.3	8.3	6.8	6.1
Ghana	25.1	26	31	42.8	46.7	57.1	3.2	3.9	4.7	7	8.7	18.7
Kenya	31.8	28.5	29.2	36.4	38	38.3	50.3	43.3	55.1	63.4	21.1	28
Mozambique	72.8	69.3	83	89.7	113	111.3	16.4	11.9	12.9	12.1	14.8	19.9
Rwanda	15.7	14.2	20.6	22.2	26.9	34.2	2.4	10.2	19.1	5.5	7	14.8
Sudan	59.2	63.4	67.5	56.9	52.1	47.4	2.8	6.6	2.8	3.6	10	5.2
Zimbabwe	68.8	66.4	68.4	71.5	77.8	84.2	12.2	17.9	17.3	21.7	26	27
Africa	18.5	18.6	19.5	20.9	24.6	24.7	8.8	10.3	9.1	10.4	10.9	12

Source: ECA, AFDB and AU, 2017, p.62 Table 4.1

To date, the debt problem facing many African countries has constituted a serious obstacle to their development efforts and economic growth, while deepening the vicious circle of poverty, (SESRTCIC, 2002:33). When seen from Agenda 2030 for Sustainable Development, a major concern is that high levels of external indebtedness will continue to reduce the capacity of SSA countries to invest in building their productive capacities, particularly the productive capacities of the poor. The policy implications is that external debt cancellation and access of SSA Africa countries' exports to the market of the developed countries will increase their investments in education, health care, employment creation that will have large impacts on poverty reduction.

6.6 Low productivity of rural population

Majority of Sub-Saharan Africa's population live in rural areas where poverty and deprivation are most severe. Seventy –five percent of the extreme poor in Africa live in rural areas (WTO, 2015, p.26). Family farms make up the majority of agricultural producers in SSA and they produce 98 percent of food crops (AGRA, 2016:95). Rural poverty, low agricultural productivity and natural resource degradation are interrelated problems in many SSA countries. Around 65 percent of arable land in SSA countries is already degraded, costing farmers about US \$68 million of lost income annually (AGRA, 2016:75). This loss is estimated to affect over 180 million people, mostly smallholder farmers (AGRA, 2016:75).

The degradation of land and inadequate investments in agriculture has resulted into low crop yields in most SSA countries. As shown in Table 6, the yields per hectare in South Africa remained above 4000 kg, while those of Eritrea, Mozambique, Namibia and Zimbabwe remained below 1000 kg. The variations in yields have been due to differences in climate, fertility of soils, and intensity in

the use of modern farm inputs. Low agricultural productivity is attributed largely to inadequate rural infrastructure and agricultural services, low levels of education of farmers; under-investment in agricultural research, low application of fertilizer, slow adoption of high yielding crop varieties, lack of access to small-scale irrigation, lack of credit and limited opportunities for trade in international markets for the agricultural products (AfDB, 2004:16). Moreover, increased population pressure has precipitated natural resource degradation as farmers who are unable to intensify their production continue to expand their farm lands by cultivating marginal land areas.

Table 6: Cereal yield (Kg per hectare) in selected African countries, 2008-2014

Country	2008	2009	2010	2011	2012	2013	2014
Burkina Faso	1,040	1,002	1,063	995	1,203	1,157	1,226
Cameroon	1,678	1,765	1,669	1,681	1,597	1,652	1,623
Central African Republic	947	948	1,447	1,522	1,684	1,716	1,649
Eritrea	252	500	536	578	608	602	626
Gabon	1,603	1,658	1,687	1,698	1,685	1,691	1,686
Kenya	1,418	1,243	1,710	1,515	1,745	1,662	1,628
Mozambique	763	884	1,028	1,041	630	670	703
Namibia	496	365	436	389	551	351	421
South Africa	4,062	4,413	4,143	4,024	3,689	3,725	4,320
Tanzania	1,334	1,110	1,648	1,390	1,315	1,418	1,660
Zambia	2,180	2,066	2,534	2,731	2,689	2,532	2,755
Zimbabwe	309	424	743	794	806	724	789

Source: AGRA, 2016:270-271

At the current patterns of crop yields and population growth, poverty is likely to remain a predominantly rural phenomenon for the coming decades in most Sub Saharan Africa (Ravallion et al., 2007:5). This is mainly because governments have been focusing on agricultural market liberalization, while reducing their fiscal policy space. As a result, there has been significant reduction of public investment in the agricultural sector (Dorward et al, 2004: 1). Moreover, while liberalizing their economies extreme public spending cuts have contributed to the deterioration of infrastructure, including roads, water supply, irrigation facilities and have undermined crop productivity of the rural population (UN/DESA 2011:30). Table 7 shows that that SSA governments' expenditures as total government expenditure have remained below 10 per cent, lesser than the agreed target of allocating 10% of the national budget in each country to agriculture to reach an annual average growth rate of 6% in agricultural production by 2015 (African Union, 2003:1). However with very low domestic savings and low rates of investments, there is little in SSA African countries' current dynamics that ensure an escape from their rural poverty (Gordon, Sachs and Woo, 2005:6). The policy implication is increase public investments in modern farm inputs, including public investment in rural infrastructure for the provision of energy, water and sanitation, transportation and communications, fertilizer, high quality seed varies, irrigation infrastructure in order to foster farmers' productivity and incomes of the rural population that would eventually eradicate rural poverty in line with the sustainable development goals.

Table 7: Government agricultural expenditure as% age of total government expenditure for selected SSA African countries, 2008-2014

country	2008	2009	2010	2011	2012	2013	2014
Angola	2.8	2.3	2	1.6	1.3	1	1.1
Botswana	2.9	2.4	3.4	2.7	2.9	2.1	2.1
Cote d'Ivoire	2.3	2.7	3	3.3	5.9	5	5.3
Gambia	6.4	6	5.9	9.6	3.7	3.5	3.3
Kenya	3.2	3.9	4.1	4.3	4.1	3.4	2.7
Rwanda	4.4	3.1	3	6.9	7.4	7.6	9.1
Sudan	4.5	3.5	3.9	3.4	2.9	2.5	2.2
Uganda	5	4.6	4.8	3.7	3.4	4.6	4.5
Zambia	12.5	9.3	11.4	6.1	5.9	6.3	9.4
Zimbabwe	44.7	12.5	15	14.5	4.9	5.5	9.5

Source: AGRA, 2016:286-287

6.7 Political instability, conflicts and bad governance

According to Messer et al, (1998) conflicts are linked to grievance arising from the mix of resource scarcity with social inequality and human rights abuses and from perceptions of unfairness in the distribution of resources. Lack of democratic governance and absence of social justice are also driving forces of conflicts in many SSA countries. That is why conflict is a driver of poverty in many parts of Africa: Southern Africa, the Horn of Africa, Sudan and Chad, Eastern Africa, and the Western Sahara (University for Peace, 2011:24; Go et al. 2007:32). In 2006, Africa, with 13% of the global population, had over 40% of the world's violent conflicts; eleven countries were affected directly (Ploughshares, 2007). Over 28 years, 1970-97, conflict-related losses to agricultural production in Sub-Saharan Africa amounted to a total of some \$52billion. This represented some 30 per cent of the agricultural output of the affected countries during conflict years (Cramer, 1999:6-7). Conflicts affect negatively the welfare of people by channeling public spending away from productive activities, undermining their economic life, devastating physical, social and human capital and by strengthening the push factor which lead to the outmigration of skilled labor (Go et al. 200:25; Addae-Korankyep, 2014:152). Conflicts in SSA countries while undercutting economic development and deepening economic deprivation lead to further escalation of conflict, making states unable to deliver public goods, or increase in productive investments that create more employment (University for Peace, 2011:66). Lack of productive investments, in turn, result into high incidence of multidimensional poverty. - Sustainable goal 16 underscores promotion of peaceful and inclusive societies (UN, 2015:6). In line with this, the policy implications is that democratic governance structures and social justice, and popular participation which put people at the center of development will help SSA countries to build peace and to sustain inclusive economic growth to achieve most important development goal: national harmony and socio-economic development that would eventually eradicate poverty. To these end, development policies in SSA countries should aim at building peace in ways that foster human-centered, inclusive development in which all members of the society are both agents and beneficiaries of their development.

Discussions and conclusions

This paper deals with the main drivers of poverty in Sub-Saharan African countries and the policy implications for eradication of poverty and achievement of Agenda 2030 for Sustainable Development. Following their independence, African countries started with high hopes for rapid growth and development, eradication of poverty and socio-economic transformation that will culminate into high quality of life of their population. However, poverty continued to be one of the major development challenges in SSA. Fifty-four percent of the population in SSA is multi-dimensionally poor.

The high incidence poverty in SSA countries is the result of the failure of development outcomes over several decades because African governments are not able create productive employment and sustain inclusive economic growth. Sub-Saharan African countries have been suffering from widespread and persistent poverty due to several interlinked factors: (i) lack of broad-based or pro-poor economic growth. (ii) High income inequalities mainly because economic growth rates were the result of modern-sector enrichment where growth is limited to certain groups of people in the modern sector while incidence of poverty continued to increase, particularly in rural areas. (iii) High fertility rates which contribute to high incidence of poverty through reduced households per capita investment in the health and education of their children as well as low public investments in infrastructure and other social sectors (iv) lack of capabilities and deprivation of basic necessities, lack of productive employment opportunities, lack of access to basic health care and education of large segments of African people (v) high external debt burden and debt services which have been taking large part of scarce budgetary resources. As a result external debt service has been crowding out public investments in health care and education (vi) Low productivity of rural population due low investment in modern farm inputs and rural infrastructure (viii) Political instability, conflicts and bad governance which breed corruption, implementation of inappropriate development strategies and policies and low quality institutional structures have resulted in failure of development while fueling conflicts and deepening poverty. Conflicts in many SSA countries affect negatively welfare of people by channeling public spending away from productive activities, undermining their economic life, devastating physical, social, and human capital and by strengthening the push factor which lead to the outmigration of skilled labor. Conflict of different scales is one of the driving force of poverty in SSA because the magnitude of poverty increases when population are displaced, livelihoods lost and safety nets break down. Sub-Saharan African countries thus need to build systems of good governance which are effective and accountable to their people and simultaneously address areas of concern such as health, education, agriculture, infrastructure, corruption and land tenure.

From an inclusive growth and poverty reduction perspective, Sub-Saharan African countries need to make several strategic choices in their development strategies and policies: an outward-oriented strategy of export-led growth, based on labour-intensive manufacturing; agricultural and rural development, with encouragement of new technologies; investment in physical infrastructure and human capital; efficient institutions that provide the right set of incentives to farmers and entrepreneurs; and social policies that promote health, education, and social capital, as well as safety nets to protect the poor people. These will help SSA to overcome their multiple and interwoven challenges, including, low investment and economic growth, political instability, high unemployment, external debt burden and poverty. These factors are interrelated, and success in one area will reinforce the others. Breaking the vicious circle of poverty in sub-Saharan Africa would thus require building an effective state which can mobilize both domestic and foreign resources that would enhance public and private investments to achieve inclusive sustained economic growth and eliminate

poverty in line with the Agendas 2030 for sustainable development. As poverty in SSA countries is multidimensional by its nature, it requires active involvement of the governments in several areas. In line with this, the following measures are suggested:

i. Expand policy space of governments to properly manage their economic development process

SSA would be required to expand their policy spaces and undertake proactive complementary policies for building their productive capacities to achieve the expected positive benefits of trade liberalization in terms of sustained inclusive economic growth, structural transformation, export diversification, strengthening financing capabilities and poverty eradication that meet the sustainable development goal 1 by 2030.

ii. Address the causes of income/wealth inequality through effective fiscal and monetary policies. Fiscal policies affect poverty and inequality through progressive taxation, equitable land distribution, and well-targeted public spending on education, vocational and entrepreneurial training, and basic health services that benefit more to the poor. Similarly, monetary policies such as provision of cheap credit to the poor will expand their employment opportunities.

iii. Prioritize sustainable development goals to match national capabilities and resources - SSA countries would be required to prioritize the sustainable development goals and, select a few sustainable development goals depending on their own circumstances. This is because they lack resources and are unable to meet the investment needs for the 17 sustainable development goals. The selected sustainable goals need to be synchronized with their respective national development plans and poverty reduction targets. This approach will help the SSA countries to estimate their domestic financing needs for the selected sustainable development goals as well as their resource gaps that could be met by mobilizing foreign resources.

iv. Increase public investment in human resource development to expand their capabilities of people that would enable them to get productive employment and lead dignified life.

v. Increase public investment for the transformation of the agricultural system from low productivity to high productivity

Increasing and sustaining agricultural productivity in SSA will require large public investments in agricultural research and development, irrigation facilities and other farm inputs such as new varieties of seeds, fertilizer and pesticides, marketing, warehouse and extension services to have great impact on poverty reduction.

vi. Commitment and implementation of democratic system of governance based on the principle of social justice to maintain peace and stability

Implementing democratic governance structures and social justice, and popular participation which put people at the center of development will help sub-Saharan African countries build peace and to sustain inclusive economic growth to achieve most important development goal: build a just society to ensure national harmony and socio-economic development that would eventually eradicate poverty. To these end, development policies in SSA countries should aim at realizing social justice while building peace in ways that foster human-centered, inclusive development in which all members of the society become both agents and beneficiaries of their development.

vii. Strengthening and expanding family planning to reduce fertility rates -rapid growth rates of population in SSA countries is a major driver of poverty. Thus, investments in family planning and provision of accessible and effective family planning will reduce fertility rates, household sizes and subsequently increase investment that would reduce poverty.

viii. External debt cancellation and access to markets of developed countries for exports of SSA. The prospects of economic growth and achievement of many of the sustainable development goals in SSA will be influenced considerably by progress in international debt relief efforts and access of SSA exports to markets of the developed countries. Debt cancellation and access of African exports to developed countries' markets will enable SSA countries to finance their development programs that will enable them achieve most of the 17 sustainable development goals by 2030.

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The Socioeconomics Impact and Environmental challenges of the South Sudan Breweries Limited on the Population of Janduro Area

Case study: Janduro Area in The Republic of South Sudan – Juba

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Abstract: The industrialization can be traced back almost 5,000 years ago to Mesopotamian writings describing daily rations of beer and bread to workers. Before the rise of modern breweries, the production of beer took place at home and was the domain of women as baking and brewing were seen as women's work (Schlimm J, 2005). Breweries as production facilities reserved for making beer did not emerge until monasteries and other Christian institutions started producing beer not only for their own consumption, but also for sale. The industrialization of brewing shifted the responsibility of making beer to men. The oldest, but still functioning brewery in the world is believed to be in German state, owned by Weihenstephan, brewery in the city of Freising, Bavaria. It's history goes back to 1040 AD this was disputed by the nearby Weltenbug Abdey brewery whose history could be traced back to its beer brewing tradition to at least 1050 AD, the Zatec brewery in the Czech Republic (Schlimm J.2005). According to the book of the economic impact of Brewery Tripe value strategy consulting The Hague, February 2008 it was said that: The model was developed for this study combines the distribution of Brewery's revenues over its various financial stakeholders (e.g. suppliers, employees, government, dividends etc.) with an input-output description of the national economy. The Socio Economic Impacts of the industrial sector is one of the most fundamental issues that is affecting most of the population, especially in the undeveloped countries and those whom lives in particular area with the company. It is the global responsibility of every individual, government, non-governments organizations and private sectors to find out some alternative procedures that would improve the standard of living and their economics all over, without posing serious environmental and socio-economic problems. In the Republic of South Sudan especially Juba, Janduro area in Rejaf Payam during the visit and interview are found the most serious issues facing local communities are not fully aware about the health effects and environmental impacts which can be cause by the company during life time of project, other things like air pollution of burning solid wastes, odour smell, emission of gases in rainy season the individuals respondents which agreed (100%) in the area widely especially during night the all area have smell, even makes communities unable to sleep well. The main potential odour sources from vapours from wort boiling, wastewater treatment, storage and handling of co- and by-products, oil

storage, ventilation of beer cellars and packaging lines, and stack emission from the boiler house. The main reasons for odour nuisances from location toward neighboring areas, no vapour condensing from wort boiling, Mal-operation of heat recovery system for the wort boiling, storage of by-product during summer periods, and content of sulphate in wastewater, which will cause malodors if the Wastewater becomes anaerobic. The respondents are (76%) said that the noise pollution in the area widely especially during night from heavy mechanizes which are used in the processes and you cannot sleeps well at night. So other respondents who disagreed are (24%). Indeed, the socioeconomic impacts individuals other than the drinker can be affected, for example, by traffic accidents or an increased risk of violence or HIV infection. Drinking outside the home can mean less time spent at home. After all these problems local communities, stakeholders and government they are still emphasized about the improvement in the area in terms of job opportunities, facilities and services to the local communities from the company, but Few numbers of the local population are working in SSBL. Moreover, the establishment of the company in the area has disrupted other social and economic activities previously existing in the area. The researcher also found that the establishment of the company didn't follow the usual procedures of human health, safety, and environmental issues (for examples, Environmental Impacts Assessment, Environmental Management, Strategy Impacts Assessment, Environment Assessment, Planning and Projects Management, etc.).The EIA for SSBL was not done under the supervision of South Sudan Government as an overall environmental authority in the country. The researcher, therefore strongly recommended environmental auditing for SSBL. Meanwhile SSBL should take urgently action to remove the dumping manufacturing wastes, control solids wastes and wastewater which are flowing into mainstream passed through the area direct into River Nile. The local population should be involved in all aspects (planning, construction, employment) of establishment of new industries or any new projects in any location, for the government of South Sudan has to enact laws for alcohol consumption in the country specially for drivers of different types of vehicles and educate people through awareness of impacts of alcohol consumption to their health and lifestyles and social impact.

Key Words: Environmental Problem, Pollution, Republic of South Sudan, Juba- Janduro Area, Socioeconomic Impacts issues and Problem.

1.0. INTRODUCTION

1.1. Introduction:

The industrialization can be traced back almost 5,000 years ago to Mesopotamian writings describing daily rations of beer and bread to workers. Before the rise of modern breweries, the production of beer took place at home and was the domain of women as baking and brewing were seen as women's work (Schlimm J, 2005). Breweries as production facilities reserved for making beer did not emerge until monasteries and other Christian institutions started producing beer not only for their own consumption, but also for sale. The industrialization of brewing shifted the responsibility of making beer to men. The oldest, but still functioning brewery in the world is believed to be in German state, owned by Weihenstephan, brewery in the city of Freising, Bavaria. It's history goes back to 1040 AD this was disputed by the nearby Weltenbug Abdey brewery whose history could be traced back to its beer brewing tradition to at least 1050 AD, the Zatec brewery in the Czech Republic (Schlimm J.2005). According to the book of the economic impact of Brewery Tripe value strategy consulting The Hague, February 2008 it was said that: The model was developed for this study combines the distribution of Brewery's revenues over its various financial stakeholders (e.g. suppliers, employees, government, dividends etc.) with an input-output description of the national economy. Provides a schematic overview of the modeling approach. Input-output analysis considers inter-industry relations in an economy by depicting how the output of one industry goes to another industry where it serves as an input; it makes industries dependent on one another, both as customer of outputs and as supplier of inputs.

The Republic of South Sudan became the world's newest nation and Africa's 54th country on July 9th, 2011, following a peaceful secession from the Sudan through a referendum in January 2011. As a new nation, it has the dual challenge of dealing with the legacy of more than 50 years of conflict and continued instability, along with huge development needs. Formal institutions are being built from a very low base and the capacity of government to formulate policy and implement programs is limited, but growing. While the White Nile River flows through the entire length of South Sudan, it is a landlocked country that falls almost entirely (96 per cent) within the Nile River Basin in East-Central Africa. However, South Sudan country is surrounded with many countries as it is located in the South of the Republic of Sudan, Ethiopia in the East, Kenya in the Southeast, Uganda in the South, Congo in the South West, and in the Northwest of the country is the Central African Republic. South Sudan as a region it has ten states (central Equatoria, Eastern Equatoria, Western Equatoria, Upper Nile state, Unity State, Jonglei State, Western Bahr El Gazal, Northern Bahr el Gazal, Warab state, and Lake State). It occupies an area of 658,842 km². The country is covered by extensive grasslands, wetlands and tropical forests. Its natural assets include significant agricultural, mineral, timber and energy resources. The climate is mostly hot and dry, with seasonal rains that allow for two or three harvests a year in the county's green belt. Apart from oil, however, its natural resources are largely unexploited and only 4.5 per cent of its potential arable land is cultivated. Which has 64 different ethnic groups inhabit South Sudan. With fewer than 13 people per square kilometer, population density in the country is one of the lowest in sub-Saharan Africa. Livelihoods in the northern dry areas are dominated by seasonal agriculture, pastoralism, fishing and hunting. Livelihood opportunities vary in the low woodland savannahs in the country's center. South Sudan is endowed with a natural environment rich in biological resources. These include a large variety of ecosystems, a vast array of globally important species of flora and fauna and an unknown lode of genetic diversity. It is the home to the Sudd wetland, one of the world's largest tropical wetlands, and to one of the greatest circular migrations of wildlife on the planet. Most of the population lives close to the natural environment, directly depending on forests and woodlands for fuel and food products, local soils in which to grow their crops, pastures for their livestock and nearby water sources for household needs. These ecosystem goods and services constitute the foundation of South Sudan's socioeconomic development.

A 2008 census showed that the population of South Sudan was 8,260,490. However, this figure is hotly disputed because the census was conducted by the Sudanese Government of the time and is (believed by many to have been manipulated for political reasons). As the distribution of wealth between Sudan and South Sudan at the point of independence was determined in part by their relative populations, the government in Khartoum had an incentive to manipulate the figures. Additional criticisms of the 2008 Sudan population census were that it excluded the South Sudanese diaspora, that poor weather and communication conditions had prevented some people from being surveyed, and that the Sudanese Government had refused to share the raw population data from the census with the Government of South Sudan. It is estimated that around 11% of South Sudanese people were not surveyed, which, if correct, would mean that the population of South Sudan in 2008 was around 9.28 million people. The South Sudan population in 2011 was considerably higher - perhaps as much as 10-12 million. Today, the population in 2018 is estimated to be 12.92 million (<http://sudanwatch.blogspot.com/2009/05/population-of-south-sudan-826-million.html>).

The South Sudan Breweries Limited is located at Janduro area, east of Eye Radio FM in Juba and is the biggest company in South Sudan. According to the manager of the company, was established on 08.11.2006 and in the middle of May, 2008 it started production of beers using water from the Nile. The first production of this company is known as White Bull and water from the River Nile is being treated using three big tanks: water is pumped from the Nile River and stored in the first tank which uses sand filter to clean the water from the solid wastes and other wastes. After the first treatment the water is passed to the next tank which treats water by using charcoal to absorb the unwanted wastes, organisms and other materials from the water. At the last stage the water is passed to the last

tank for disinfection by adding the chlorine, and the water becomes clean and useful to the company and other services such as production, drinking, washing and irrigation of trees inside the company, in order to make the area to look beautiful. The company also supplies the treated water to community in that area and the areas nearby brewery. Use this water for drinking, domestic uses and other purposes in that area. Other services provided by the company in the area are job opportunities to local communities and provision of the Towns in the country with sodas, beers, mineral water and then the payment of taxes to the government which facilitates the delivery of services. In the case of the protection of the communities in the area, from the environmental pollution or impacts of the company (SSBL) most community members in the area said that there is no any environmental protection in the area, while the Director of Human Resources Department in (SSBL) said they have instated state of art, gas recovery plants and waste water treatment plants (Field survey July.2018). SSBL is one of contributing entity to the country's economic and its one of its kind to be establish in the country. Just like any other entities, SSBL didn't consider undertaking environmental impact assessment to cater for environmental needs despite the fact that it contributes to the social welfare of the people through job creation, however not all the populace do benefit from this project. It's on this context the researcher is trying to assess the social economic impact of the local community.

1.3. Objectives of the Research:

- i. To investigate the effects of the SSBL on the local communities in the study area.
- ii. To examine the role of the SSBL in provision of job opportunities to the Local Population of the Area.
- iii. To examine the role of the SSBL in services provision to local population.
- iv. To investigate the health, environment challenges and social problem associated with the SSBL pollution.

1.4. The Study Area:

1.4.1. Location:

This research was conducted in Juba Town in Janduro Residential area Block Five, Rejaf Payam- Central Equatoria State (CES). Juba is the capital of Central Equatoria and became the interim seat and the capital of the government of South Sudan. Juba is one of the fastest-growing cities in the world, and is developing very rapidly after the signing of CPA. Juba's diverse community is made up of approximately 250,000 residents that according to the survey Department, form all Juba is located in CES it is altitude is 458m and between latitude of 4°-6°N of the Equator and longitude of 30° - 32° E of Greenwich Meridian. The town mostly lies at the Western bank of River Nile (White Nile), also called as Bahr-El Jebel and located along the River Nile and it has heterogeneous communities. Although the area of the study is within Juba town it can take 40 minutes by using public transportation as Janduro is located in west of Juba Town (www.googlemap.com) Source: **These two pictures show the location of the study area Janduro capture by Google earth map:**



Plate 1. Show the location of SSBL in Google Earth Map



Plate 2. Show the location of SSBL in Google Earth Map and surrounding by residential areas

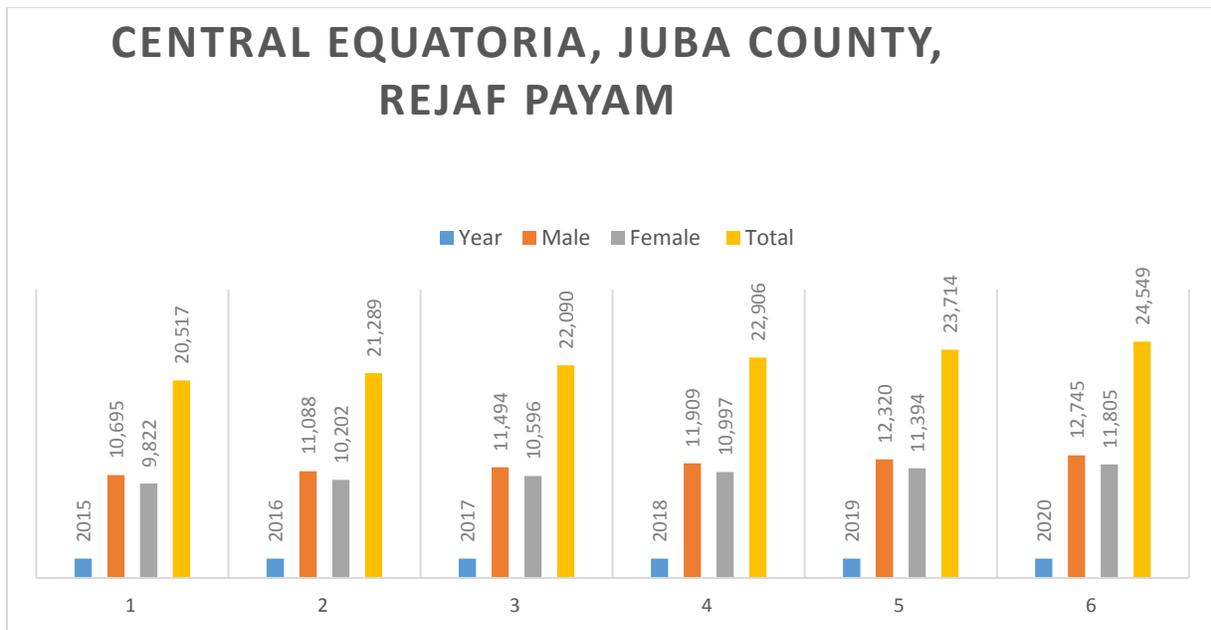


Figure 1: Population Projections for South Sudan by Payam from 2015 – 2020 (National Bureau of Statistics, April, 2015)

Source: South Sudan National Bureau of Statistics (web).

Handing Over Note: Rejaf Payam unit was created in May 1996 vide decree NO 5/99 issue by former Wali of BJS (Rdt) Col Henry Jada Zakaria. The area of Rejaf by within Bahr El Jebel locality. Rejaf’s diverse community is made up of approximately 120,000 residents that according to the survey Department, formally occupy over 60,000 plots of land in greater Rejaf East. Its inhabitants of Bari tribe.

1.4.2. Geographical position

Rejaf Payam lies in South of Juba Town and is extending from Juba to Kujo at distance of about 35 Miles and from Pojulu to Kuda River at distance of about 55 Miles at North-South and West-East transacts respectively. The HQs Office still in Juba but it will be moved to Gumbo area where already the actual Head Quarters will be built in Rejaf.

1.4.2.1 Climate of the area:-

The climate of Rejaf Payam as a part of Central Equatorial State (CES) yearly weather comprises of rainy season and dry season which is the general climatic characteristics of the area. The rainy season’s starts early at month of April and ends in October the rainy season take seven months and dry season starts from the month of November and comes to an end in month of March. The sun shines throughout the year; even the rainy season has high temperatures, strong wind which result to a dust storm and pollutes the environment of the area. When the South Sudan became independents there has been increase in number of the populations, day after day and occupied many places shanty towns. This could have caused changes in the climate of the area and the establishment of South Sudan Breweries Limited (SSBL) could have caused changes in some climatic factors, due to the pollution from the factory.

1.4.2.2. Temperature:-

The average temperature of Rejaf Payam is the same with the temperature of Juba town because it was closed to Juba town and both of them are in the Central Equatorial State, so the temperature of the area is 27.5° C or (83° F) and the a range of the month temperature is 4.5°c, the warmest average maximum temperature is 38°C or (99°F) in months of January, February, and March, the coolest average minimum temperature is 20° or around (68°F) in months of January, November and December .

1.4.2.3. Rainfall (precipitation):-

The rainfall in the area of the study which is Rejaf Payam is on average 997mm (39.3 in) annually or 83mm (3.3 in) each month. On the balance there are 104 days annually on which greater than 0.1mm (0.0004 in) of precipitation (rain, sleet, snow, hail) occur or days on an average month. The month with driest weather is January the balance 3mm (0.1 in) of rain, sleet, hail or snow falls across one day. While the month with wettest weather is May when on balance 159mm (6.3 in) of rain, hail or across 13 days.

1.4.2.4. Humidity:

The relative humidity of the study area an average/ year is recorded as 45.9% of humidity and on a monthly basis it ranges from 24% in January and February to 63% in August. There are hours of Sunshine range between 5.9 hours per day in July and 9.5 hours per day in January, on balance there are 2788 sunshine hours annually and approximately 7.6 hours of sunshine for each day. (www.climatemaps.com, 2012).

1.5. Soil:

The soil in the area of the study is the same with the soil of Juba town, the soil of Janduro area is characterized of sandy soil, loamy soil, clay soil or rocky soils and the area are sloped up, and down like mountain, the loss of the soil is very high due to very high rate of erosion. The sandy soils consist of large sized particles leaving relatively large pores between them and allows a rapid water movement when the soil is filled with water. The capillary rise in sandy soil is very limited as few small sized pores are available. Loamy soils generally have the following characteristics.

- a. Part of the water does not infiltrate into soil and it is lost by surface runoff of water.
- b. Part is drained to the sub-soil (on sandy and soil and especially on sandy and soil and especially on soil consisting of stones only).
- c. Part of the water evaporates from loam soil consisting of small particles leaving many sized pores between them. Clay soil consists of less than 40% of sand and more than 40% of clay particles.

1.6. Population of the area:

The original population or communities in the area of the study are Bari- which lives in Rejaf Payam. According to the South Sudan center for census, statistics and evaluation the population of the Rejaf Payam. According to households interviewed in Janduro area block five it has been found out that in 50 households interviewed about there were 579 persons and the average household size is 7 persons per households. This means there is high/low population number in that area. The numbers of Males 26% and female 31% respecting of the total population number of households interviewed. While the numbers of children are (43% of total population of households interviewed) in different ages and gender.

1.7. Government Institutions at Rejaf Payam:

The numbers of the schools in the Rejaf Payam are 17 Basic schools, government schools are eight, private schools are eight and one private secondary school and three numbers of church which are registered and muqes for Islamic people according to department of education office in Rejaf Payam. In other area they used to teach under the trees like that in the area of the study, and 12 churches, 3 small muqes for the Islamic people in the area and faculty of police for teaching and training in Rejaf west. Always according to survey in area and according to department of public health office they were said that they have 3 health centers in Rejaf Payam one in Rejaf East, one in Gombo, one in lalogo Western Rejaf. Also according to Janduro block five has the area of the study has to teach under the trees in the first classes of primary levels then take them to those schools in Juba town to learn more, but now there was

school built organization in the area that in case of the returning those came from Khartoum and that school near to the SSBL at Eastern side, so there are 2 churches in the study area and small market. According to Mr. Lado Malash.

1.8. Economic Activities in the Area:

The economics activities in the area are Firewood collection Small bundle, Big bundle, Charcoal-burning Stone breaking or breaking of rocks from the mountains, (One truck load is equivalent to approximately seven tones or one to two, weeks of labour depending on the number of workers.), Making bricks, Smearing houses, Washing clothes, Washing dishes, Charcoal retail, (bags bought from charcoal-burners and sold at markets) Food retail Tea-making and baking, Agricultural activities in small farmers and Vegetables, Alcohol brewing and motor bikes (Boda boda).

2. Research and Elaborations

2.1. Introduction

The purpose of literature review is to compare the findings of other researchers and see the problems they faced during data collection and their deviations. The data for the review was collected from various books, journals, internet, NGOs reports, and interview with Payam officials and residents of Rejaf Payam.

2.1.1 Socioeconomics:

Socioeconomics or **socio-economic** or **social economics** is an umbrella term with different usages. 'Social economics' may refer broadly to the "use of economics in the study of society." More narrowly, contemporary practice considers behavioral interactions of individuals and groups through social capital and social "markets" and the formation of social norms. In the latter, it studies the relation of economics to social values. A distinct supplemental usage describes social economics as "a discipline studying the reciprocal relationship between economic science on the one hand and social philosophy, ethics, and human dignity on the other" toward social reconstruction and improvement or as also emphasizing multidisciplinary methods from such fields as sociology, history, and political science In many cases, socio economists focus on the social impact of some sort of economic change. Such changes might include a closing factory, market manipulation, the signing of international trade treaties, etc. Such social effects can be wide-ranging in size, anywhere from local effects on a small community to changes to an entire society. These may affect patterns of consumption, the distribution of incomes and wealth, the way in which people behave (both in terms of purchase decisions and the way in which they choose to spend their time), and the overall quality of life. The goal of socioeconomic study is generally to bring about socioeconomic development, usually in terms of improvements in metrics such as GDP, life expectancy, literacy, levels of employment, etc. Although harder to measure, changes in less-tangible factors are also considered, such as personal dignity, freedom of association, personal safety and freedom from fear of physical harm, and the extent of participation in civil society. (Pokrovskii and Vladimir P; 2011).

2.1.2 Brewery:-

Brewery is a dedicated building for the making of beer, though beer can be made at home, and has been for much of beer's history. A company that makes beer is called either a brewery or a brewing company. The diversity of size in breweries is matched by the diversity of processes, degrees of automation, and kinds of beer produced in breweries. A brewery is typically divided into distinct sections, with each section reserved for one part of the brewing process. Suhlimm. J (2005).

2.2. Industrialization of the brewery:

Before the rise of the industrialization of breweries, the production of beer took place at home and was the domain of women, as baking and brewing were seen as "women's work". Breweries, as production facilities reserved for making beer, did not emerge until monasteries and other Christian institutions started producing beer not only for their own consumption but also to use as payment. This industrialization of brewing shifted the responsibility of making beer to men. Early breweries were almost always built on multiple stories, with equipment on higher floors used earlier in the production process, so that gravity could assist with the transfer of product from one stage to the next the modern brewery: (April 2012). This layout often is preserved in breweries today, but mechanical pumps allow more flexibility in brewery design. Early breweries typically used large copper vats in the brew house, and fermentation and packaging took place in lined wooden containers. Such breweries were common until the Industrial Revolution, when better materials became available, and scientific advances led to a better understanding of the brewing process the modern brewery: (April 2012). Breweries today are made predominantly of stainless steel, although vessels often have a decorative copper cladding for a nostalgic look. Stainless steel has many favorable characteristics that make it a well-suited material for brewing equipment. It imparts no flavor in beer, it reacts with very few chemicals, which means almost any cleaning solution can be used on it (concentrated chlorine "bleach" being a notable exception) and it is very sturdy. Sturdiness is important, as most tanks in the brewery have positive pressure applied to them as a matter of course, and it is not unusual that a vacuum will be formed incidentally during cleaning. Heating in the brew house usually is achieved through pressurized steam, although direct-fire systems are not unusual in small breweries. Likewise, cooling in other areas of the brewery is typically done by cooling jackets on tanks, which allow the brewer to control precisely the temperature on each tank individually, although whole-room cooling is also common. Today, modern brewing plants perform myriad analyses on their beers for quality control purposes. Shipments of ingredients are analyzed to correct for variations. Samples are pulled at almost every step and tested for [oxygen] content, unwanted microbial infections, and other beer-aging compounds. A representative sample of the finished product often is stored for months for comparison, when complaints are received. The modern brewery: (April 2012)

2.3. Types of brewing companies:

Brewing companies range widely in the volume and variety of beer produced, ranging from small breweries, such as Ringwood Brewery, to massive multinational conglomerates, like SABMiller in London or Anheuser-Busch InBev, that produce hundreds of millions of barrels annually. The biggest brewer in the world is the Belgian company Anheuser-Busch InBev. Some commonly used descriptions of breweries are (The modern brewery: (April 2012).

- i. **Microbrewery**—A late-20th-century name for a small brewery. The term started to be replaced with craft brewer at the start of the 21st century.
- ii. **Farmhouse brewery**—A farmhouse brewery, or farm brewery, is a brewery that primarily brews its beer on a farm. Crops grown on the farm, such as barley, wheat, and/or hops, are usually used in the beers brewed. A farmhouse brewery is similar in concept to a vineyard which grows its own grapes and uses them to make wine.
- iii. **Brewpub**—A brewery whose beer is brewed primarily on the same site from which it is sold to the public, such as a pub or restaurant. If the amount of beer that a brewpub distributes off-site exceeds 75%, it may also be described as a craft or microbrewery.
- iv. **Contract brewing company or contract brewery**—A business that hires another brewery to produce its beer. The contract brewing company generally handles all of the beer's marketing, sales, and distribution, while leaving the brewing and packaging to the producer-brewery (which confusingly is also sometimes referred to as a contract brewer).

- v. **Regional brewery**—An established term for a brewery that supplies beer in a fixed geographical location
- vi. **Craft brewer**—A term that is replacing microbrewery. A craft brewery is a brewery that does not use adjuncts and/or is considered to make craft beer.
- vii. **Macro brewery or Mega brewery**—Terms for a large brewery, which sometimes carry a negative connotation (The modern brewery: (April 2012).

A brew master, or formerly **braumeister**, is a person who is in charge of the production of beer. The major breweries employ engineers with a Chemistry/Biotechnology background. There are organizations that assist the development of brewing, such as the Seibel Institute of Technology in the USA and the Institute of Brewing and Distilling in the UK (The modern brewery: (April 2012).

2.4. The requirements for establishments of breweries:

2.4.1. Requirement and guidelines of funding agencies

According to Parta- Environmental and Social Impact assessment –in October 2008(Africa Resources it was said: ARL has elected to abide by the Equator Principles. The Equator Principles are a set of guidelines, developed by private financial institutions, for managing environmental and social issues related to project financing. These principles are aligned with the requirements of the International Finance Corporation (IFC), which has established a set of Performance Standards that govern environmental considerations of project financing. The IFC's Performance Standards have therefore been used as the yardstick against which to measure compliance with the Equator Principles. The Equator Principles are devised to promote environmental stewardship and responsible development in the context of project financing. Projects are categorized based on the magnitude of the potential social or environmental impacts and risks of that project, in accordance with World Bank Group classification criteria. These categories are:

Category A: Projects with potential significant adverse social or environmental impacts that are diverse, irreversible or unprecedented;

Category B: Projects with limited adverse social or environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures;

Category C: Projects with minimal or no social or environmental impacts. Mining projects, by their extractive nature, tend to fall into Categories A or B, being high or medium risk. For Category A and B projects, the borrower must conduct a social and environmental assessment (i.e. this ESIA) to determine the social and environmental impacts and risks of the project, and to propose relevant and appropriate mitigation and management measures in respect of the project. The ESIA must establish the project's overall compliance with, or justified deviation from, the applicable standards and guidelines. To satisfy the requirements of the performance standards, ARL must prepare an action plan that addresses the relevant findings and draws on the conclusions of the ESIA. The action plan should describe and priorities the actions needed to implement mitigation measures, corrective actions and monitoring measures necessary to manage the impacts and risks identified in the ESIA. Furthermore, ARL must establish and maintain a social and environmental management system that addresses the management of the action plan. Communities that could be affected by a project must be consulted in a structured and culturally appropriate manner to ensure their free, prior and informed consultation. Their informed participation must be facilitated as a means to establish whether a project has adequately incorporated the concerns of affected communities. To accomplish this, the assessment documentation and action plan must be made available by ARL to the public for a reasonable minimum period, in the relevant local language. The borrower must also take account of and document the process and the results of the consultation. To ensure consultation continues throughout construction and operation of the project, ARL must establish a grievance mechanism as part of its management system. The IFC applies the Performance Standards (PS) to

manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in its member countries eligible for financing. Performance Standards cover the following topics:

- ✚ PS1: Social and environmental assessment and management systems
- ✚ PS2: Labour and working conditions
- ✚ PS3: Pollution prevention and abatement
- ✚ PS4: Community health, safety and security
- ✚ PS5: Land acquisition and involuntary resettlement
- ✚ PS6: Biodiversity conservation and sustainable natural resource management
- ✚ PS7: Cultural heritage

2.4.1.1 Social and Environmental Assessment and Management Systems

Aims at managing social and environmental performance throughout the life of a project. An effective social and environmental management system is a dynamic, continuous process initiated by management and involving communication between the client, its workers, and the local communities directly affected by the project. The objectives of the standard are summarized as:

- ✚ To identify and assess social and environmental impacts;
- ✚ to avoid, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment;
- ✚ To ensure that affected communities are engaged; and
- ✚ To promote improved social and environment performance through the effective use of Management systems.

Covers social and environmental management systems, social and environmental assessment, management programs, organizational capacity, training, community engagement, and monitoring and reporting.

2.4.1.2 Labour and Working Conditions

Aims to establish maintain and improve the worker-management relationship that promotes the fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws. This standard also aims to protect the workforce by addressing child labour and forced labour and promoting safe and healthy working conditions, and to protect and promote the health of workers. Covers human resources policy, working relationships, working conditions and terms of employment, workers organizations, nondiscrimination and equal opportunity, retrenchment and grievance mechanisms. Under Protecting the Work Force" it covers child labour and forced labour. Occupational health and safety, non-employee workers and supply chain are also discussed.

2.4.1.3 Pollution Prevention and Abatement

Outlines a project approach to pollution prevention and abatement in line with internationally disseminated technologies and practices. The objective is to minimize adverse impacts on human health and the environment, and to reduce the emissions that contribute to climate change. Covers pollution prevention, resource conservation, energy efficiency, wastes, hazardous materials, emergency preparedness and response, technical guidance, ambient considerations, greenhouse gas emissions, pesticide use and management.

2.4.1.4 Community Health, Safety and Security

Addresses the proponent's responsibility to avoid or minimize the risks and impacts to community health, safety and security that may arise from project activities. The objective is to minimize risks and impacts on the health and safety of the local community, and to ensure the safeguarding of personnel and property. Covers community health and safety requirements, infrastructure and equipment safety, hazardous materials safety, environmental and natural resources issues, community exposure to diseases, and emergency preparedness and response.

2.4.1.5 Land Acquisition and Involuntary Resettlement

Involuntary resettlement refers to both physical displacement (relocation or loss of shelter) and economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project related land acquisition. Resettlement is considered involuntary when affected individuals or communities do not have the right to refuse land acquisition that result in displacement. The objective can be summarized as:

- ✓ To minimize involuntary resettlement;
- ✓ To mitigate adverse social and economic impacts;
- ✓ To improve or restore the livelihoods of displaced persons;
- ✓ To improve living conditions among displaced persons.

Covers project design, compensation and benefits for displaced persons, consultation, grievance mechanisms, resettlement planning and implementation, displacement (physical and economic), private sector responsibilities under government managed resettlement.

2.4.1.6 Diversity Conservation and Sustainable Natural Resource Management

Address how clients can avoid or mitigate threats to biodiversity arising from their operations as well as sustainably manage renewable natural resources. The objective is to protect and conserve biodiversity and to promote sustainable management and use of natural resources. Covers protection and conservation of biodiversity, habitat (modified, natural and critical), legally protected areas, invasive alien species, management and use of renewable natural resources, natural and plantation forests, and freshwater and marine systems.

2.4.1.7 Cultural Heritage

The aim is to protect irreplaceable cultural heritage and to guide proponents on protecting cultural heritage in the course of their business operations. Cultural heritage refers to tangible forms of cultural heritage, such as property and sites having archaeological, paleontological, historical, cultural, artistic, religious and unique natural value. Intangible forms of culture, such as cultural knowledge, innovations and practices of communities embodying traditional lifestyles, are also included. The covers protection of cultural heritage in project design and execution, internationally recognized practices, chance find procedures, consultation, removal of cultural heritage, critical cultural heritage, and the project's use of cultural heritage.

2.5 Socioeconomic impacts of the brewery:

2.5.1 Modeling approach

According to the book of the economic impact of Brewery Tripe value strategy consulting The Hague, February 2008 it was said that: The model that was developed for this study combines the distribution of Brewery's revenues over its various financial stakeholders (e.g. suppliers, employees, government, dividends etc.) with an input-output description of the national economy. Provides a

schematic overview of the modeling approach. Input-output analysis considers inter-industry relations in an economy by depicting how the output of one industry goes to another industry where it serves as an input; it makes industries dependent on one another, both as customer of outputs and as supplier of inputs.

2.5.2 Social Accounting Matrix

The key ingredient of the model is the so-called Social Accounting Matrix (SAM). The SAM represents the flows of all economic transactions that take place within the national economy. It is a statistical and static representation of the economic structure of the country and must reflect fairly recent data. All sectors or stakeholders (industry sectors, households, governments etc.) are both buyers and sellers. Final consumption induces production which leads to money transfers between the various sectors which subsequently generates incomes for households, governments (taxes) and profits (dividends and savings). After that, the final beer consumption can be traced in money terms throughout the economy. In doing so, the total economic effect related to the presence of Athenian Brewery are subdivided into three effects:

1. Direct value chain effects: Value added generated and jobs provided by Brewery, its direct suppliers (i.e. recipients of cash coming from Brewery) and the wholesale and retail trade associated with selling Brewery products (also known as direct and first-round effects);
2. Indirect effects: Value added generated and jobs provided by companies further away in the Brewery value chain, i.e. the suppliers of Brewery's suppliers and wholesale and retail trade partners (also known as second-round effects);
3. Induced effects: effects due to the increased expenditures of households due to increasing incomes generated by the direct value chain and indirect effects (also known as third-round effects).

2.5.3 Household income and government taxes

The Brewery's value added consists of three components: household labour income (salaries), taxes paid to the government and company profits and household savings. Each of these components is made up of direct, indirect and induced effects, as was described in Section 2. As is shown in Exhibit 3, Brewery's presence generates EUR 1,492 mln in value added in the national economy (or EUR 1,046 mln when conservatively not including induced effects). Of this, EUR 642 mln (43%) is related to the direct value chain of Brewery and EUR 8505 mln (57%) of indirect and induced effects. Total tax income generated by Athenian Brewery is EUR 467 mln, which represents 1.05% of the total national tax revenues. 72% of these taxes (EUR 336 mln) are generated by Brewery's direct value chain (i.e. excise duties, value-added tax and corporate taxes), corresponding to 0.75% of Greece's tax revenues.

2.5.4 Employment generation

Employment figures for 16 sectors were obtained from the National Statistical Service of Greece. By combining these with the output per sector from the SAM, the employment intensity (number of jobs per EUR 1,000 of output) can be determined. Using the model results of industrial output (corresponding with the "transfers" quadrant in Exhibit 1) and the employment intensities per sector, the employment generated by Athenian Brewery, both in the direct value chain as well as in the broader economy can be computed. The results are shown in Exhibit 4. As can be seen, Athenian Brewery provides employment directly for 1,274 people. Direct suppliers provide another 2,859 jobs and wholesale and retail trade partners provide 30,689 jobs. In the entire value chain (from farmers supplying Barley until small retailers selling the final product) 34,822 jobs are provided. This brings the value chain employment multiplier to 276, i.e. for every job directly provided by Athenian Brewery, a total of 27 jobs exist in the value chain. Because companies in the Athenian Brewery value chain also provide indirect employment and the additional spending of households provides induced employment, the total amount of jobs that are sustained by Athenian Brewery's presence is almost 55 thousand. This implies

an overall employment multiplier of 43. In 2006, on average 4.45 mln people held jobs and the jobs sustained by Athenian Brewery constitute 1.2% of that. Exhibit 5 shows a more detailed breakdown of the jobs generated in the entire Greek economy. For every sector the number of jobs generated by the Athenian Brewery direct value chain, indirectly by suppliers further away in the value chain and the jobs induced by households spending part of their incomes.

2.5.5 Scenario analyses

One of the objectives of the economic impact model is to enable management to analyze the broader socio-economic impact of its decisions. This section describes two scenarios that have been analyzed using the model. The first scenario is an increase of local content in Athenian Brewery's products and the second is the comparison of the impact associated with locally-manufactured products with imported products.

a) Increasing local content

Currently, Athenian Brewery procures a little over EUR 0.65 mln of Barley from within Greece. For 2008 it is projected that this amount will increase to EUR 3.70 mln¹⁰. A scenario has been analyzed in which the total expenditure to farmers increases by EUR 3.05 mln and the imported Barley reduces by the same amount. Exhibit 6 shows the impact on value added. As can be seen, the increase of locally-produced Barley by EUR 3.05 mln results in an increase of value added of EUR 3.39 mln. Because the agricultural sector is a net recipient of subsidies¹¹ (which are accounted for as negative taxes in the model) the positive impact on household labour income and profits & savings is partly offset by lower tax income. The increase of locally-produced Barley purchases generates 209 jobs in the Greek economy. Obviously, the majority of these jobs (172) are in the agricultural sector and are directly related to the Athenian Brewery value chain (164). But because the Barley needs to be processed and transported and the increase of household labour income induces additional demand in the economy there are some indirect and induced effects as well.

b) Brewery as an importer of foreign-produced goods

Athenian Brewery's revenues come from products that are manufactured locally. As was shown already in Section 4.1, local production has a positive economic impact. In order to quantify the impact of Athenian Brewery's local production, a scenario has been constructed in which Athenian Brewery transforms into an importer of foreign-produced products. The characteristics of this scenario are:

1. Total Brewery revenues and profits remain unchanged;
2. Costs of producing locally is identical to producing abroad;
3. A reduction of local spending by EUR 98 mln¹²;
4. A reduction of the workforce of Athenian Brewery of 753 people (-60%) and a reduction of personal income tax payments (withheld by Athenian Brewery) of EUR 6 mln (-55%).

The reduction in value added by EUR 149 mln associated with this scenario. This corresponds to 10% of the total value added indicated in Exhibit 3. This reduction manifests itself most prominently in the lower household labour income (EUR 84 mln or 14% of the current household labor income in Exhibit 3). With a reduction of EUR 25 mln (5% of the EUR 467 mln indicated in Exhibit 3), tax income is least affected since excise duties and value added tax (the largest components) would still be levied. Exhibit 9 depicts the effect of importing all products from abroad on employment. The total job loss associated with this scenario would be 4,232. Relative to the 54,817 jobs mentioned in Exhibit 4, this is a reduction of 7.8%. Although this fraction looks quite small, it must be remembered that most of the jobs are associated with wholesale and retail trade and that these would not be significantly affected. In the more upstream part of the value chain, the relative effects would be significantly larger.

2.7. Challenges faced in implementing EIA mitigation measures in the Republic of South Sudan:

As part of this study, the interviewees were requested to give the challenges encountered while implementing mitigation measures and all the 10 interviewees (100%) cited the high financial costs involved. For example because of the high financial costs involved in implementing mitigation measures, environmental officers were not employed, no routine 86. Environmental audits and no effluent treatment plants are in place. However, these developers/managers were not aware that it is their responsibility to meet the costs of pollution control and prevention from their industries. Sadler et al (2002) explain that, impact mitigation is consistent with the Polluter Pays Principle (PPP), which places a responsibility to proponents to internalize the full environmental costs of development proposals. The full polluter pays principle which is principle 16 of the Rio declaration states that; "National authorities should Endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment".

The reason as to why majority of the developers and managers of industrial projects complained of high financial costs associated with implementation of mitigation measures, could be probably because EIA practitioners did not include the economic analysis of the mitigation measures in the EIA reports. A standard EIA report should have the cost-benefit analysis of the recommended mitigation measures, such that developers are aware of the costs involved in undertaking their projects before implementation. This is supported by the view that economic analysis is normally conducted as part of the project feasibility study and should contain the following elements that are integrated into the overall economic analysis of the project, i.e. costs and benefits of environmental impacts, costs, benefits and cost-effectiveness of mitigation measures and discussion of impacts that have not been expressed in monetary values and in quantitative terms. ([http://www.adb.org/Documents/ Guidelines/Environmental Assessment/Content Format Environmental_Assessment.pdf](http://www.adb.org/Documents/Guidelines/Environmental%20Assessment/Content%20Format%20Environmental_Assessment.pdf)). It could therefore have been better for EIA reports to have this section of economic analysis to help developers understand that impact mitigation and management is part of the project lifecycle. All the other challenges encountered such as employing environmental officers, internal audit and monitoring etc. centered on the costs involved in their implementation. Political interference was also highlighted by NEMA's Environmental Audits and Monitoring Officer as one of the challenges to the implementation of mitigation measures. Lack of adequate resources to implement the enforcement mechanism for the implementation of mitigation measures was also highlighted by NEMA as one of the biggest challenges. Without adequate resources therefore, implementation of mitigation measures may not be possible.

3.0. Material and Methods

3.1. Data Collection:-

The study review of the Socioeconomics Impact of the South Sudan Breweries limited on Population of Janduro area was developed through analysis of secondary source data. These sources include reviewed materials present in the journal, books, national presentations, supplemented by non-peer reviewed literature from a wide range of other sources, including international and non-governmental organizations, and some commercial organizations. These sources were collected through comprehensive and extensive literature search using academic reference databases including Web of Knowledge, Science Direct and Google scholar (including databases such as aquatic science, conference papers index for life, Environment and Aquatic science, GeoRef, International Bibliography of the Social Science, Oceanic Abstracts) were all used to identify relevant literature and articles in the news line from the country. This review involved obtaining data from the past and present studies, and current literature including field visit to Janduro area, questionnaire to communities in total 50 questionnaires were administered to 50 households randomly selected in the study area. Then the results were tabulates and interpret with the excel charts, and discussed and face to face interview with government official from different ministries. The study relied on secondary data, and the data were analyzed using descriptive

methods to obtain logical deduction and sequential presentation of facts from the data obtained that gave a precise picture of the subject matter. This below show hierarchical horizontally of data collection up to results.



4.0. Results and Discussion:

4.1. First results from the visit and face to face interviews:

This information were obtained from government official in the Ministry of Environment in the Republic of South Sudan Juba, Ministry of Commerce, Industrial and Investment in South Sudan Juba, and Human Resources Department in SSBL during the visit and face to face interview with the interviewers.

i. The Republic of Sudan before the independence of South Sudan:

According to the book of Sudan-post-Conflict Environmental Assessment United Nations Environment programmer first published in June 2007 by the United Nation Environmental Programmed is said that Industry and the Environment to Assessment activities the Sudan's industrial sector is currently undergoing rapid change and expansion. Historically limited to utilities and small-scale food processing,

ii. Overview of Industry related Environmental issues:

Industry related environmental issues can be divided into those applicable to all industries issues are:

- a) Absence of environmental considerations in the development of new project.
- b) Poor environmental performance at operating sites. UNEP site are inspections revealed chronic serious environmental problems at the majority of industrial facilities visited. The issues noted ranged from air emissions and water pollution to hazardous and solid waste disposal, there was no correlation with scale: large facilities had the same performance as smaller ones, if not worse. Air and liquid discharges directly into water courses at several sites.

iii. Industrial sector environmental governance:

General industrial facilities the industry is subject to national and level environmental legislation , but the enforcement of existing laws is limited and difficult, at the national level , Sudanese industry is governed by the Environmental framework Act of 2001 .in cases it is also regulation, the need to obtain and renew operating licenses issues by state governments. While there is no specific national level statute addressing the environmental impacts of industry, individual operating permits may have provisions regarding air emissions or effluents the most direct form of environmental governance observed by UNEP during assessment was at the state level, where local complaints of large scale air and water pollution had led to action by state governor and a form of state level environmental council. In two cases reviewed (a cement factory and a tannery), the action was successful: the cement factory was upgraded and the tannery was shut down, in one other case, the facility (a lubricant plant) was resisting control.

iv. Ministry of Commerce, Industrial and Investment in South Sudan-Juba

Most of the major industries/factories were started in South Sudan since 1980s during former Sudan under the government of Sudan. Among these are two major industrial known as:-

- Anzera Agro complex – it includes the part for textiles production
- White brewery factory in Wau – it produce main products of beer to satisfy the need of the consumers.

There were also minor factories during those days like there were Wau fruits and vegetables canning factories it produced mango juices, okra can so as to satisfied needs for the surrounding populations within the town and other minor town of South Sudan. Beside these above factories, there were other factories such as Tonj, Kenaf factories which produce wooly sacks containers. Also we have Yirol oil leaf – it main products are: Oil, Groundnut oil, and Lulu oil. These were all industrial development in South Sudan since 1980s, but their operations and activities were stop by the serious war erupted in South Sudan. Following the above establishment there were proposals projects of:-

1. Mangala sugar gain project
2. Maluth sugar gain project

These two projects were not implemented and may IEA was done for they are big projects. Soon after signing of CPA in 2005, most of the industries started too emerged into South Sudan and establishment began during negotiation time in 2002 - 2008. There were no laws for establishment of industries, factories and companies until now, but the government of South Sudan (GOSS) tries to set some regulations which regard all established industries, factories and companies to register under the ministry of justice. Soon after the signing of CPA 2005 and after independence of the Republic of South Sudan most industries and companies established in Juba registered under ministry of legal affair and they must have registration certification. According to the ministry of industry national government there were competitions in companies' registrations because some of the companies \industries are now operating without consultation to national legal affairs for registrations, but latter find registered under the state government of Central Equatoria. Therefore, there is no serious inspection; companies may appear operating in surprise of national legal affair and ministry of industry and investment. Then illegal operations in a sense from two governments national and the state that it may register from other side. (SEA) Strategy Environmental Assessment in South Sudan they do not know about it.

4.2. Result from the questionnaire and shows in the below charts:

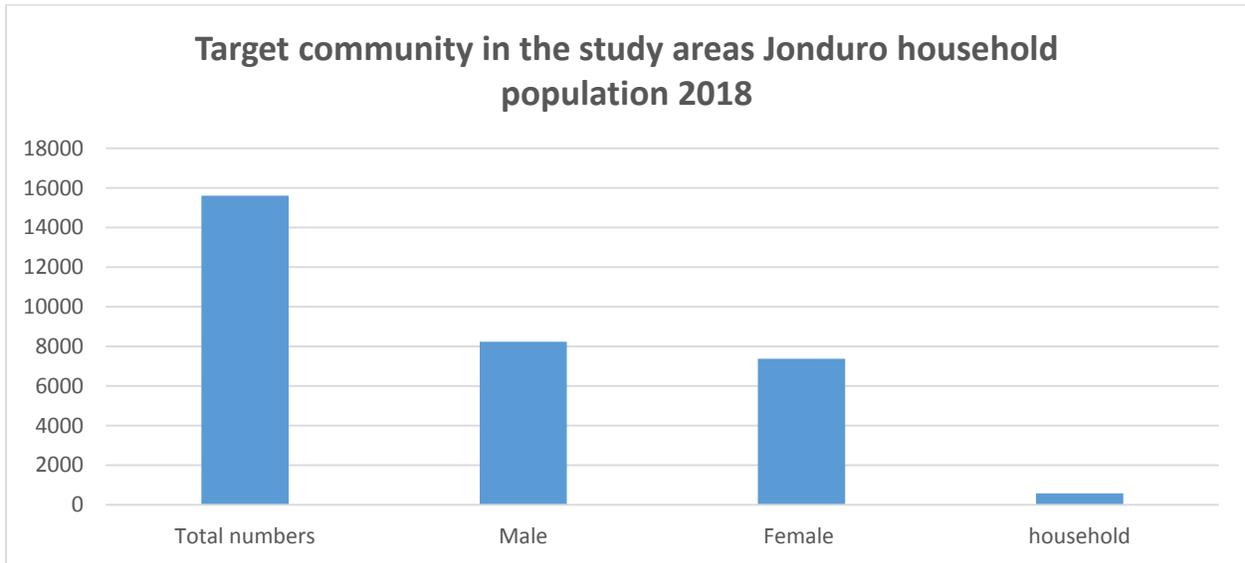


Figure 2: The total of 50 questionnaires were administered to 50 households randomly from total houses numbers 579 selected in the study area (Male are 8232, Female are 7372, and total resident numbers in the target area are 15,604).

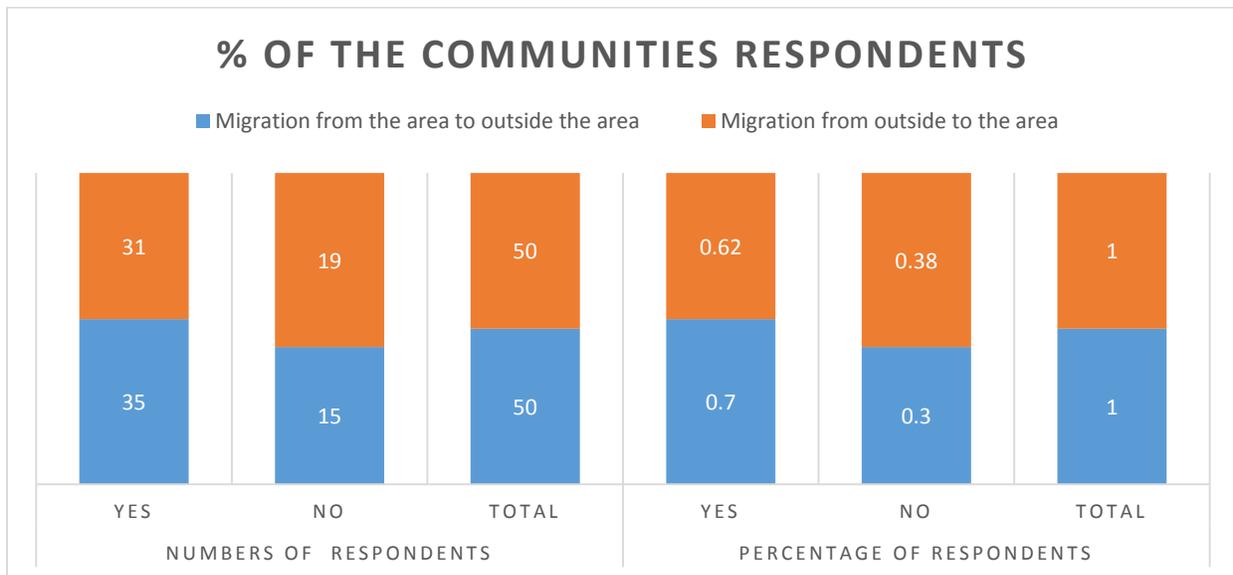


Figure 3: Number and percentage of respondents interviewed on the population composition of the local community in the study area.

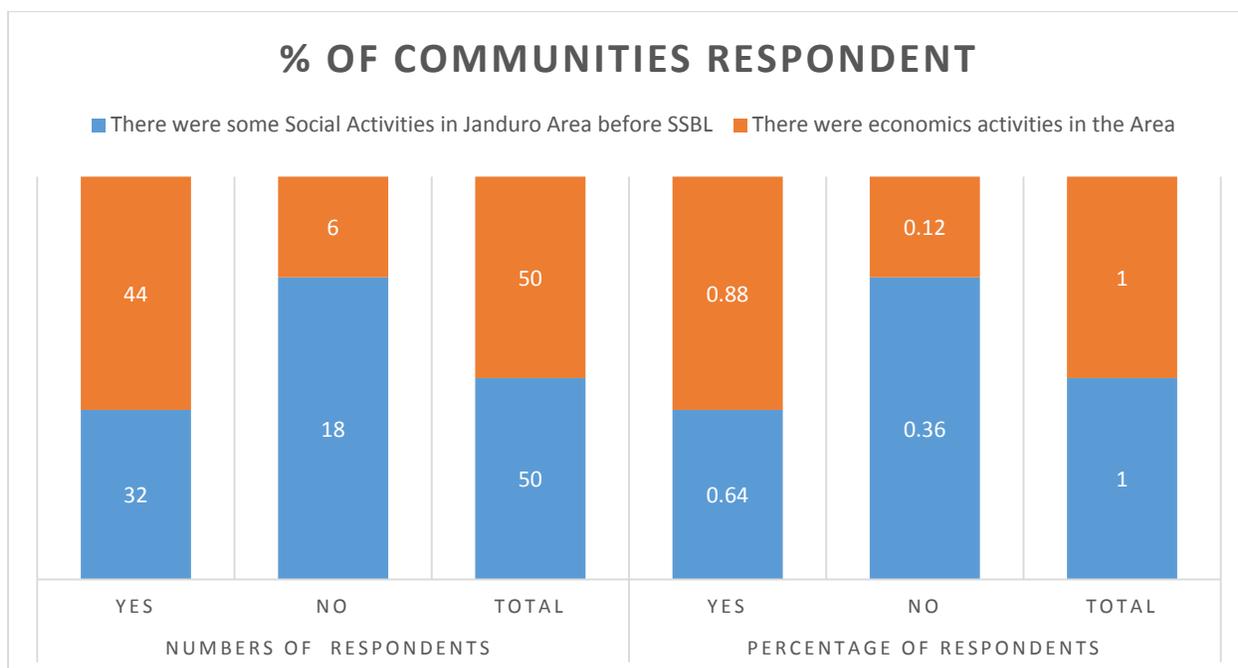


Figure 4: Number and Percentage of respondents interviewed on whether there were some Socio-economic activities in the Area before establishment of SSBL.

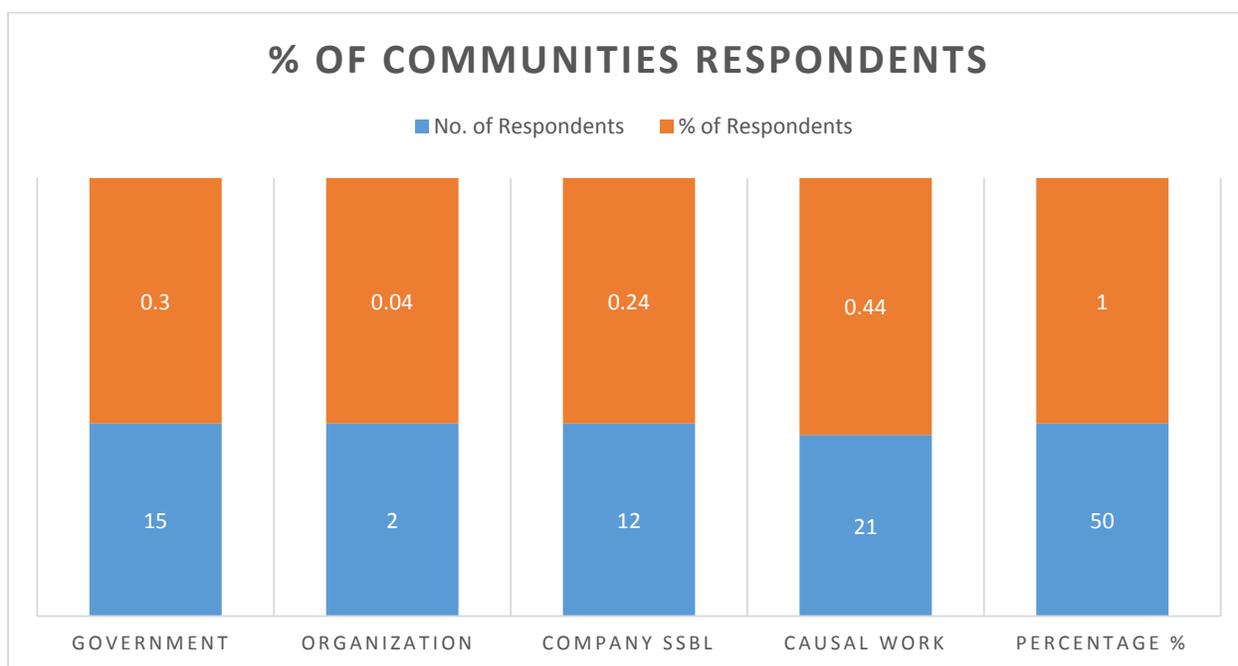


Figure 5: The types of jobs or work where people of Study Area work in.

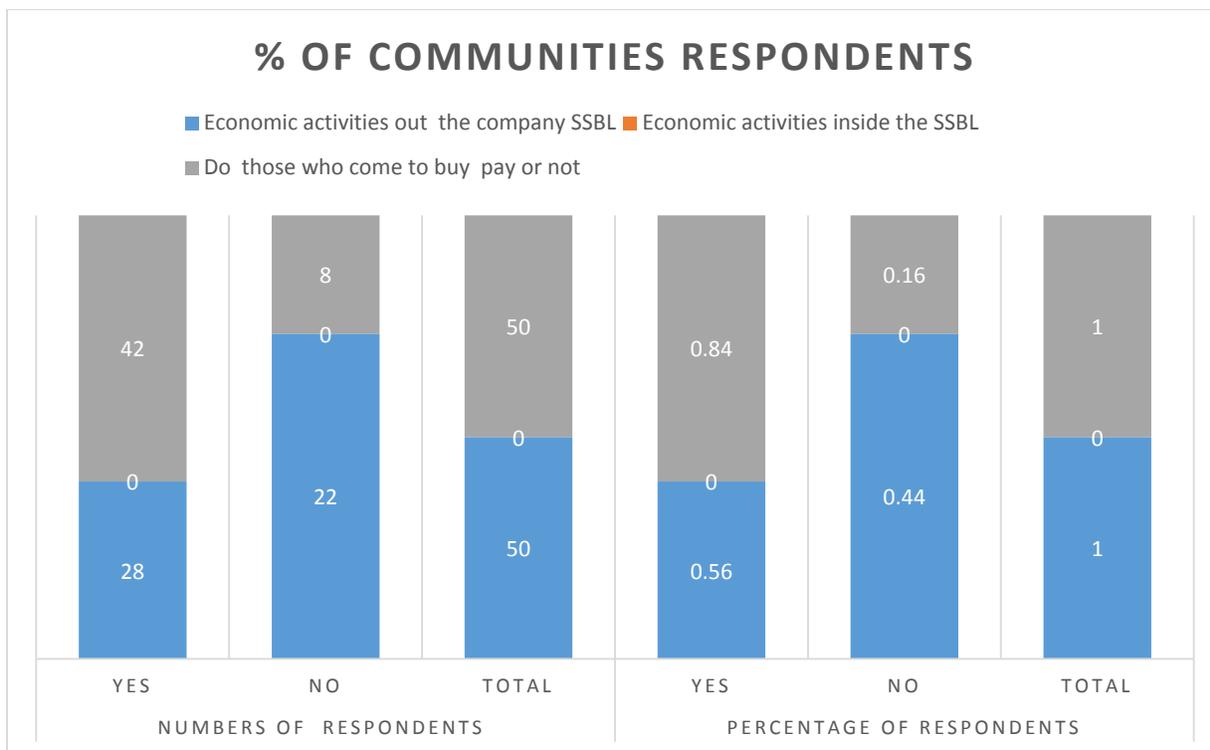


Figure 6: The existing economics activities inside and around Company.

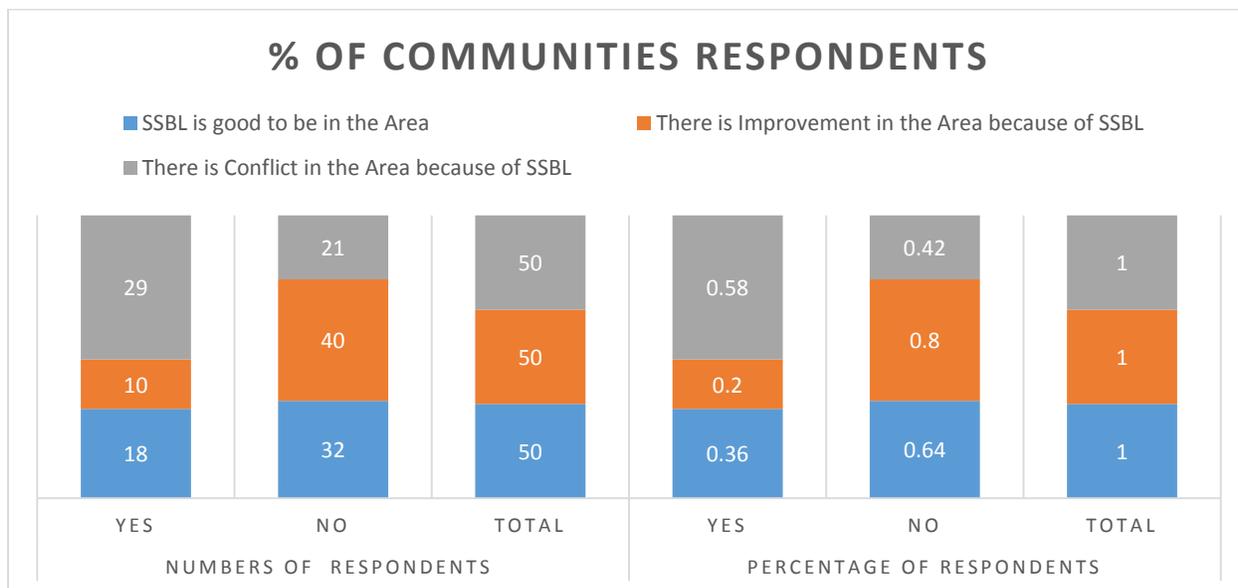


Figure 7: Number and Percentage of respondents interviewed on whether the establishment of SSBL in the Area is good or not.

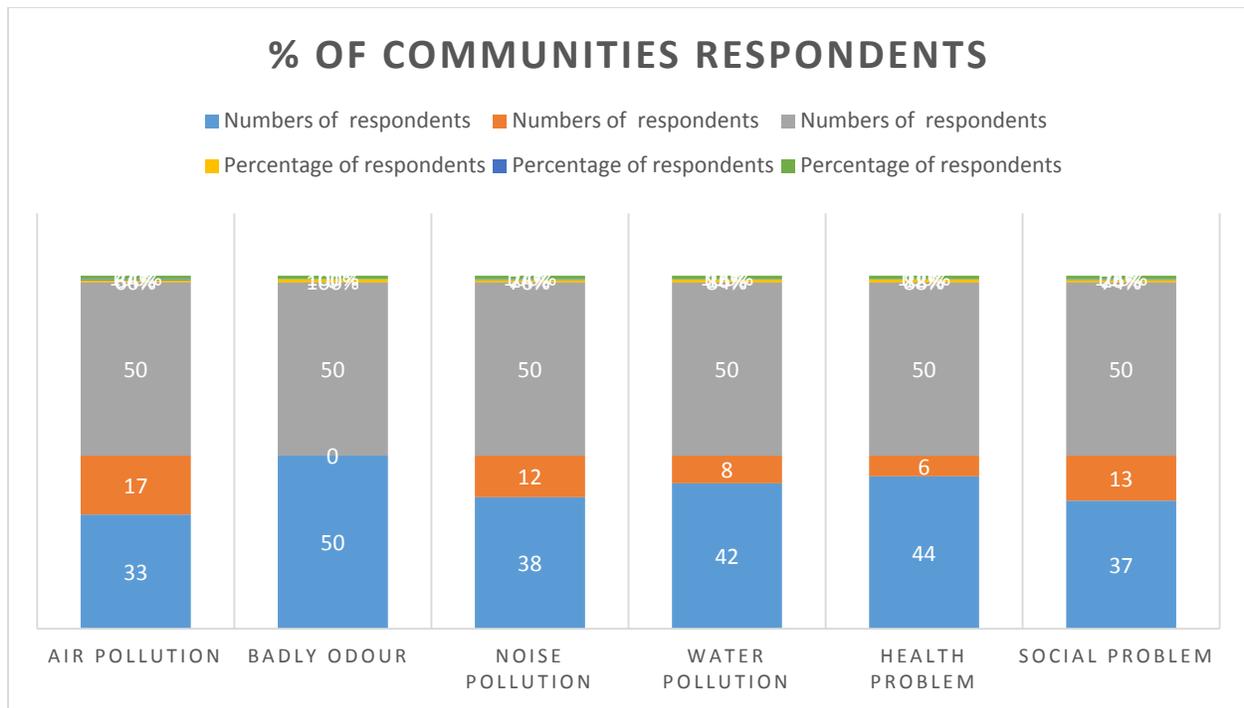


Figure 8: To investigate the health and social problem associated with the SSBL in the area of the study. The second parts of the discussion are the environmental problems or the impacts or effects on the individual communities in the area and around the company and those environmental impacts of the SSBL Company on the individual communities.

4.3.1. The Impacts of SSBL project on the Population Composition of the Local Community in the Study Area in and out:

It has been found out that in 50 houses interviewed the average household size is 7 persons per households. This means there is high/low population number in that area. The numbers of male, compared to the numbers of female, representing 26% and 31% respectively of the total population number of households interviewed while the children represents (43%) of total population of households interviewed in different ages and gender. The dominant native population is Baria tribe or communities. About 70% of the respondents interviewed agreed that there have been migration of some original communities to other areas because of establishment of SSBL in the place from where they earn their livelihood The place was a small forest and they used it for different activities like, the cultivation, cutting trees for fire woods, charcoal, and wood for building and rocks mining. Those people migrated because the company (SSBL) took the land and cut down all the trees, removed the rocks and stopped communities from obtaining their benefits from that land. While population migrated because of the planning survey in other reasons for the migration includes demarcation of the land by CES, land authority. About 30% of respondents interviewed said no impacts of the SSBL on the composition of the local communities because they are new in the area. They came after SSBL has been established. Some people came from the outside the Area to look for jobs in the company. Others live in the area and are doing some business activities around the area represents about (62%)of respondents, therefore those who said there are no people coming from outside the area of the study are about 38% of respondents refer to (figure 3).

4.3.2. Socio-economic activities in Jonduro area before establishment of SSBL:

Out of the 50 households' interview, about 64% agreed that they have experienced the impacts brought about by SSBL project on the social activities and traditions existing in the area. Accordingly, customs such as occasional gathering as groups or families and communal work by the tribes in Jonduro has been disrupted since the establishment of SSBL in the area. The community members who are working in the SSBL and other activities are too busy for such gathering, while compounded by the demarcation activities, many families are living isolated from each other. So the numbers of respondents who agree they experience impacts of company on social activities of local community are (64%) of respondents. while the discussion about the economics activities, over (88%) of respondents interviewed said that the major economics activities in the area are the small scale cultivation to provide food for local communities, others bring the produce to the market as source of income to them, there are people who used to collect firewood and made charcoal in that place of company because the place used to be a small forest they cut wood to take them to market as source of the income for them, others are doing smallest business in the area like tea making in small shops and market. At the present moment most community are (breaking rocks) mining rocks which are sold to be used in different types of building and construction in Juba Town. The economics activities in the area are Firewood collection Small bundle, Big bundle, Charcoal-burning Stone breaking or breaking of rocks from the mountains, (One truck load is equivalent to approximately seven tones or one to two , weeks of labour depending on the number of workers.), Making bricks, Smearing houses, Washing clothes, Washing dishes, Charcoal retail, (bags bought from charcoal-burners and sold at markets) Food retail Tea-making and baking, Agricultural activities in small farmers and Vegetables, Alcohol brewing and motor pikes (Boda boda). Some of those people work as blocks in the area and Juba Town. Other respondents who said no economics activities in the area before establishment of SSBL are (12%) because they were not in the area before but they came after the establishment of the company in the area. This refers to (figure 4).

4.3.3. Types of jobs or works where people of Study Area are uses to work in Juba:

The numbers of respondents who are working in different jobs said they are (58%) in general, but in detail the numbers of respondents working in the government are (30%), those who are working in the organization are (04%) respondents, while for the respondents working in the company of SSBL are (24%) respondents, also the respondents those who are not working but causal jobs in the area or around in Juba Town are (42%) respondents, so the all results are 100% percentage. About (24%) respondents of who are working in the SSBL Company. Therefore this means that there are problems of jobs in the area, the company didn't help them to find the employment, those who are the students in different levels in different schools are around 30 students and other doing smallest business in the area like making tea in small shops and market, the most communities are (breaking rocks) mining rocks to be used in the building in the area in place of sand and in other different type of building, some of those people work as blocks in the area and Juba town. (This refers to figure 5).

4.3.4. Services and infrastructures in the Study Area after the establishment of SSBL:

The numbers of the respondents said that there are local economics activities around the SSBL but not inside are (56%) and those who said No are (44 %) in the area. While the numbers of respondents over (84%) said yes for payment and while respondents who said No are (16%) for payment of money when those came to buy things. Concerning the services in the area, only water is provided by SSBL, and the government is provided schools under trees in the area and help the communities to learn almost all the people agreed with that (figure 6). So when the owners of the South Sudan Breweries Limited (SSBL) company discussed the issues of the establishment of the company and the purposes and goals of that company in the South Sudan or in Juba town especially in Janduro area block five, they both local leadership and the owners of SSBL then came out with some conditions. The conditions of the establishment of SSBL Company in area were agreed upon by the parties are:

- a) To provide opportunities of the employment to the local communities over (75%)
- b) To provide some facilities in the area and town
- c) To provide for them health care center or clinic in the area.
- d) To help them in case of building schools for their kids.
- e) To supply for them clean water and electricity in the area.
- f) To help them in making roads infrastructures of roads in the area.

The roles of the industry to local communities are providing the opportunities of job employment to our local communities and help the communities in other services in the area like above mention because any company in every place help in the improvement of the area in different ways and makes area to develop, change the behaviour of the population and bring new skills to those communities, but according to the director of human resources in the company SSBL he said that the biggest role for them is the provision of employment and then the payment of taxes to the government which facilitates the delivery of services. There has been no compensation of the local communities for their land taken by SSBL as agreed before. The company owners use to pay money of land to leaders and according to the director of the department of the human resources he said that yes there is, a number of way both to the authorities and local development committee.

4.3.5. The establishment of SSBL in the Area is good or bad in the area:

The Brewery is providing water for drinking, household work and other purpose in that area. And other services provided by the company in the area are provision of job employment to local communities and provide for the country and town sodas, beers, mineral water to help the economics of the country in different levels of business and then the payment of taxes to the government which facilitates the delivery of services. In the case of the protection the communities in the area, around from the environmental problems or impacts or effects of the company (SSBL) to the population in the area, the most communities in the area said that no any environmental protection to them in the area and according to the director of the human resources department he has said they have installed gas recovery plants and waste water treatment plants. The majority of the local population is not in support of SSBL being in the area (64%) of the respondents. However about (36%) said it is good for SSBL to be established in the area because SSBL provide clean drinking water and job opportunities. According to the interview with the director of the department of the human resources in the company he was clear that over 479 persons are from local communities and 29 persons are Experts. According to those who do not support the establishment of the company in area, a lot of the problems occurs in the area because of the company, the company didn't help in providing facilities to the area according to the agreement made before the establishment of the company with the local leadership and owners of the company to providing health care center or clinic to the area, to providing schools to local communities, providing them with electricity, supply clean water and infrastructure or construction of roads in the area and other service in the area and people of the local to be benefits from the company by provide them opportunities of job like they made with the leaders to give local communities over 75% in the case of work. This refers to (figure 7).

4.3.6. Environmental and Health Impacts of SSBL on Local communities of the Study Area:

The second parts of the discussion are the environmental problems or the impacts on the communities in the area and around the company and the major public concern about breweries has traditionally been about wastewater pollution from untreated discharges. Locally, the odor and the noise from the operation have caused public concern.

- a. The Air pollution in the area and around the company.
- b. The Odor or Smell pollution in the area and around because of the production and other wastes from the company.

- c. The Noise pollution in the area during the process and production in the company.
- d. Health problems or the health effects on communities in the area because of company.
- e. Socio-economic impacts of the brewery company in the area on the individual.

According to figure 8: the individual respondents interviewed, about (66%) said that there is air pollution in the area widely spread especially during night the smoke come up or the emission of gases is clearly and in winter seasons you will see it and feel it in the different ways those air pollution from the processes and production of beers in the brewery. While other respondents who disagreed are (34%). The resource utilization is an issue which should be seen from a sustainable development perspective, scarcity of water resources, combustion of fossil fuels, utilization of raw materials, emission of ozone depletion chemicals, CO₂, etc. Compared to other types of industries the utilization of resources is the most characteristic environmental impact from breweries and dust mainly from handling malt and adjuncts. The raw material intake and transport mainly generate dust. In addition, dust could be generated by the supply and handling of filtration aids such as kieselguhr. However, as the dust emission from these systems normally is limited by the integration of cyclones and bag filters, the emission is very restricted.

According to figure 8: the individual respondents which agreed are (100%) said that the odour (smell) pollution in the area widely especially during night the all area have smell, emission of gases in rainy season is smell even makes those whom are living there unable to sleep well. The main potential odour sources from vapours from wort boiling, wastewater treatment, storage and handling of co- and by-products, oil storage, ventilation of beer cellars and packaging lines, and stack emission from the boiler house. The main reasons for odour nuisances from location toward neighboring areas, no vapour condensing from wort boiling, Mal-operation of heat recovery system for the wort boiling, storage of by-product during summer periods, and content of sulphate in wastewater, which will cause malodors if the Wastewater becomes anaerobic.

According to figure 8: the respondents are (76%) said that the noise pollution in the area widely especially during night from heavy mechanizes which are used in the processes and you cannot sleeps well at night. So other respondents who disagreed are (24%). The noise emission from a brewery can be divided into transport noise and noise from stationary sources. Transport noise mainly comes from the distribution trucks and forklifts. From stationary equipment it is mainly noise from condensers and cooling towers that can be heard outside the brewery.

The main sources of noises are: transports within the brewery both with Lorries and forklifts, condensers and cooling towers for the utility plants, raw material transport within the brewery, and ventilation fans.

The main reasons for large noise nuisances are: location toward neighboring area, poor maintenance of outdoor equipment, and activities during night time. The environmental impact of noise emitted by the brewery should be assessed by a study of the specific emission sources. It shall be noted that noise within the brewery is also an OH&S concern in the utility areas (compressors) and in packaging areas (glass bottles). Especially when using old equipment.

According to figure 5.the individual respondents over (84%) said that the water pollution in the area widely especially passing from the company to stream through the area moving to the river Nile and some of those water there are stopped in the different place in the area with the bad smell causing some health problems because gives the insects good environment for breeding. Therefore some of individual respondents who disagreed are (16%). Water will leave the brewery as beer, as a part of by-products (brewers' grains and excess yeast), wastewater or as steam and Vapours. In areas with cold water, the water consumption is normally lower than in areas with high temperatures.

- **The largest water consuming processes are:** Mashing and sparging, cleaning of packaging material (e.g. bottle washing), pasteurization (tunnel), rinsing and cleaning of process equipment (CIP), cleaning of floors, soap lubrication of conveyors in the packaging area, vacuum pump for filler, flushing of filler, and Keg washing
- **The main reasons for high water consumption are:** High consumption of water for bottle washer, overflow in the hot water system, pasteurizers out of balance, cleaning of process equipment, water used for cooling of tunnel pasteurizer in an open system, high water consumption for vacuum pump in packaging area, low efficiency of equipment and plants, closed loop cooling system is not working satisfactorily, leaking valves, running taps and hoses, and no (or insufficient) resource management system

The wastewater discharge will be equal to the water supply subtracted the produced beer, evaporated water in brew house and utility plants, and the water present in the by-products and solid waste. Organic material mainly enters the brewery in the form of raw materials such as malt and adjuncts. In addition organic material may enter the brewery as “other input sources” consisting of cleaning additives, lubricants for conveyors and residual products in the bottles. Organic materials will mainly leave the brewery as beer, by-products and wastewater. In order to reduce the organic content of the wastewater focus must be put on the loss of intermediate products and beer and on collection of by-products. The traditional characterization of brewery wastewater is the content of organic material, which is often measured as either COD or BOD.

According to figure 8. The individual respondents which agreed over (88%) said that the health problem occurs is related to all different types of pollution in the area widely spread especially from the water passing through company to the area moving to the river Nile. While other individual respondents who disagreed are (12%).

It is well established that drinking can severely impair the individual’s functioning in various social roles. Alcohol misuse is associated with many negative consequences both for the drinker’s partner as well as the children. Maternal alcohol consumption during pregnancy can result in fetal alcohol syndrome in children, and parental drinking is correlated with child abuse and impacts a child’s environment in many social, Drinking can impair performance as a parent, as a spouse or partner, and as a contributor to household functioning. There are also other aspects of drinking which may impair functioning as a family member. In many societies, drinking may be carried out primarily outside the family and the home. In this circumstance, time spent while drinking often competes with the time needed to carry on family life. Drinking also costs money and can impact upon resources particularly of a poor family, leaving other family members destitute. Also, it is worth noting that specific intoxicated events can also have lasting consequences, through home accidents and family violence, suggests that adverse child health effects of alcohol use are primarily through two distal determinants (indirect effects) - forgone household disposable income and caretakers' time for childcare. Diversion of scant economic resources for alcohol use that could have otherwise been used for seeking health care, may lead to self-care or delay in seeking health care. The other potential ways by which alcohol use can reduce the household income are through morbidity associated with the drinking habit among the consuming individuals, resulting in increase in medical expenditures and loss of income due to lost wages, and, sometimes, resulting in the premature death of sole wage earners in a household Implicit in the habitual drinker's potential impact on family life is the fact that the drinking and its consequences can result in substantial mental health problems of family women members The effects of men's drinking on other members of the family is often particularly on their roles as mothers or wives of drinkers. The risks include violence, HIV infection, and an increased burden in their role of economic providers. In a paper that looked at alcohol and Alcohol-related problems facing women in Lesotho, it was noted that as in many other developing countries, the cultural position of women in Lesotho facilitates a vicious circle in which women are at one time brewers of alcohol, then sellers, and then become excessive consumers due to the problems created by their drinking husbands.

4.3.7. Social and economic problems are linked to alcohol:

Alcohol consumption can have adverse social and economic effects on the individual drinker, the drinker's immediate environment and society as a whole. Indeed, individuals other than the drinker can be affected, for example, by traffic accidents or violence. It has an impact on society as a whole in terms of resources required for criminal justice, health care and other social institutions. Drinking outside the home can mean less time spent at home. The financial costs of alcohol purchase and medical treatment, as well as lost wages can leave other family members destitute. When men drink it often primarily affects their mothers or partners who may need to contribute more to the income of the household and who run an increased risk of violence or HIV infection. The economic consequences of alcohol consumption can be severe, particularly for the poor. Apart from money spent on drinks, heavy drinkers may suffer other economic problems such as lower wages and lost employment opportunities, increased medical and legal expenses, and decreased eligibility for loans. Alcohol plays a role in a substantial number of domestic violence incidents, especially in the case of abusing husbands. Often both the offender and the victim have been drinking. The relationship between alcohol and domestic violence is complex and the precise role of alcohol remains unclear. Heavy drinking has been strongly linked to violence between partners and to a lesser extent to violence towards others, possibly because proximity increases the opportunities for violence. For instance, in South Sudan, 64% of the women and men who recently experienced domestic violence according survey and the questionnaire results that their partner had consumed alcohol, and there is a need to better understand the possible role of alcohol intoxication or dependence in the processes through which incidents escalate into violence. There is little doubt that alcohol consumption has many social consequences, but more quantifiable data is needed to enable meaningful comparisons between countries.

4.3.8. Social and economic costs:

Cover the negative economic impacts of alcohol consumption on the material welfare of the society as a whole. They comprise both direct costs - the value of goods and services delivered to address the harmful effects of alcohol, and indirect costs - the value of personal productive services that are not delivered as a consequence of drinking. Estimating the costs of the impact of alcohol on the material welfare of society is often difficult and requires estimates of the social costs of treatment, prevention, research, law enforcement, lost productivity and some measure of years and quality of life lost.

5.0. Conclusions and Recommendations:

5.1. Conclusion:

The Socio Economic Impacts of the industrial sector is one of the most fundamental issues that are affecting most of the people especially in the developing countries. The socio economists usually focus on the social impact of some sort of economic and social change caused about by the establishment of the industries. Such social effects can be wide-ranging in size, anywhere from local effects on a small community to changes to an entire society. This study was carried out on the socio-economic impacts of SSBL on the population of Janduro Residential Area in Rejaf Payam Central Equatoria State. Other things those population complaining a lots are about health problems from air pollution from burning solid wastes, the individuals respondents which agreed are (100%) said that the odour (smell) pollution in the area widely especially during night the all area have smell, emission of gases in rainy season is smell even makes those whom are living there unable to sleep well. The main potential odour sources from vapours from wort boiling, wastewater treatment, storage and handling of co- and by-products, oil storage, ventilation of beer cellars and packaging lines, and stack emission from the boiler house. The main reasons for odour nuisances from location toward neighboring areas, no vapour

condensing from wort boiling, Mal-operation of heat recovery system for the wort boiling, storage of by-product during summer periods, and content of sulphate in wastewater, which will cause malodors if the Wastewater becomes anaerobic. The respondents are (76%) said that the noise pollution in the area widely especially during night from heavy mechanizes which are used in the processes and you cannot sleeps well at night. So other respondents who disagreed are (24%). The noise emission from a brewery can be divided into transport noise and noise from stationary sources. Transport noise mainly comes from the distribution trucks and forklifts. From stationary equipment it is mainly noise from condensers and cooling towers that can be heard outside the brewery. While wastewater running every day from company throughout small stream passing by area to White Nile River which increase diseases in the area and the water pollution into the river. Meanwhile, the socioeconomic impacts of the brewery company in the area on the individual. For example alcohol consumption can have adverse social and economic effects on the individual drinker, the drinker's immediate environment and society as a whole. Indeed, individuals other than the drinker can be affected, for example, by traffic accidents or violence. It has an impact on society as a whole in terms of resources required for criminal justice, health care and other social institutions. Drinking outside the home can mean less time spent at home. When men drink it often primarily affects their mothers or partners who may need to contribute more to the income of the household and who run an increased risk of violence or HIV infection. The economic consequences of alcohol consumption can be severe, particularly for the poor. The relationship between alcohol and domestic violence is complex and the precise role of alcohol remains unclear. Heavy drinking has been strongly linked to violence between partners and to a lesser extent to violence towards others, possibly because proximity increases the opportunities for violence. For instance, in our country Republic of South Sudan, according to survey result 64% of the women and men who recently experienced domestic violence and because of that many children are complain about their parents of consumed alcohol, and there is a need to better understands of possible role of alcohol intoxication or dependence in the processes through which incident escalate into violence. So with all these problems local communities, stakeholders and government they are still emphasized about the improvement in the area in terms of providing job opportunities, facilities and services to the local communities from the company. Few numbers of the local population are working in SSBL. Moreover, the establishment of the company in the area has disrupted other social and economic activities previously existing in the area. The researcher also found that the establishment of the company didn't follow the usual procedures of human health, safety, and environmental issues (for examples, Environmental Impacts Assessment, Environmental Management, Strategy Impacts Assessment, Environment Assessment, Planning and Projects Management, etc.).The EIA for SSBL was not done under the supervision of South Sudan Government as an overall environmental authority in the country. The researcher, therefore strongly recommended environmental auditing for SSBL.

5.2. Recommendations:

Based on the findings of this study, the researcher recommended the following to be taken into consideration.

1. The researcher strongly recommended environmental auditing for SSBL and any company Most locate far from the residential area.
2. Increase the awareness by educating all from the grassroots up to top levels within government, stakeholders, communities and students on risk of environmental pollution and its impacts on human being health.
3. The enactment of Environment Law to regulate environment protection and management in South Sudan. The Act should be comprehensive covering the environment assessment (EA) process. Before Implementing any project for which an EIA is required, the developer must submit to the authority a Project Brief which, must include: Description of the project; location; purpose and scope of the project; potential impacts on the environment: and any such matter that the authority may in writing require from the developer.

4. That Environment Impact Assessment Studies Required under the Act must be Conducted or prepared respectively by individual experts or a firm of experts authorized in that behalf by the Authority.
5. The local population should be involved in all aspects (planning, construction, employment) of establishment of new industries. This will contribute to adding new skill for the local community in the area and training them to improve and evolve of the local communities in the area.
6. Every company have to provide opportunities of the employment to the local communities and provide facilities and others services in the area to local communities (e.g. Health Care Centre, Schools, Good roads, water and electricity in the area) based on the agreement reached between company owners and the local population.
7. The SSBL have to look for another way of management different types of solid waste rather than dumping them around the residential area which cause a lots of problems in the area such dusts, odor, noise, stream pollution ... etc.
8. The Government of South Sudan has to enact law for alcohol consumption in the country especially for drivers.
9. Cooperation between Government from national, local and environmental organization then communities to protects the human being and ecosystems.
10. Knowing the environment and what causes the problems, pollution, pollutants, effects or impacts and how to control, reduce or minimize, recycling and reuse it by understanding all these issues we will live wonderful life in this earth or world. Pollution it don't have broader so we are supposed to rethink concerning our activities (The words said: treat environment the way you like the environment to want treat you).

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Acronyms/Abbreviations

ATIA: African Trade Insurance Agency

CES: Central Equatoria State

CPA: Comprehensive Peace Agreement

EIA: Environmental Impact Assessment: Comprehensive analytical effort designed to anticipate

Environmental impacts of major projects having the potential to have significant, diverse and irreversible impacts on the natural environment and on humans dependent on that environment

EIS: Environmental Impact Statement: Comprehensive analytical effort designed to anticipate environmental impacts of major national activities affecting the global commons outside of the jurisdiction of any nation.

EMP: Environmental Management and Monitoring Plan: Systematic program designed to prevent, mitigate and monitor anticipated environmental and related human impacts of prospective and ongoing activities. Sometimes called an Environmental Action Plan (EAP)

ER: Environmental Review

ERA: Environmental Risk Assessment: An instrument for estimating the probability of harm

Occurring from the presence of dangerous conditions or materials at an installation. Risk represents the likelihood and significance of a potential hazard being realized.

EAP: Environmental Action Plan: An instrument, which provides details of the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental impacts or to reduce them to acceptable levels.

Included are the actions needed to implement them.

ISO: International Organization for Standardization.

RSS: Republic of South Sudan

SSBL: South Sudan Breweries Limited

SEA: Strategic Environmental Assessment (in South Sudan)

SPSS: Statistical Package for Social Scientists.

UNEP: United Nations Environments Programmes.

UNCED: United Nations Conference on Sustainable Development

Evidences pictures below are Shown Some Environmental Pollutions and Health Problems Facing the Population in Janduro Area and how the company of SSBL has made communities in the area and in Juba Town to Suffer from effects of pollution and some environmental impacts.

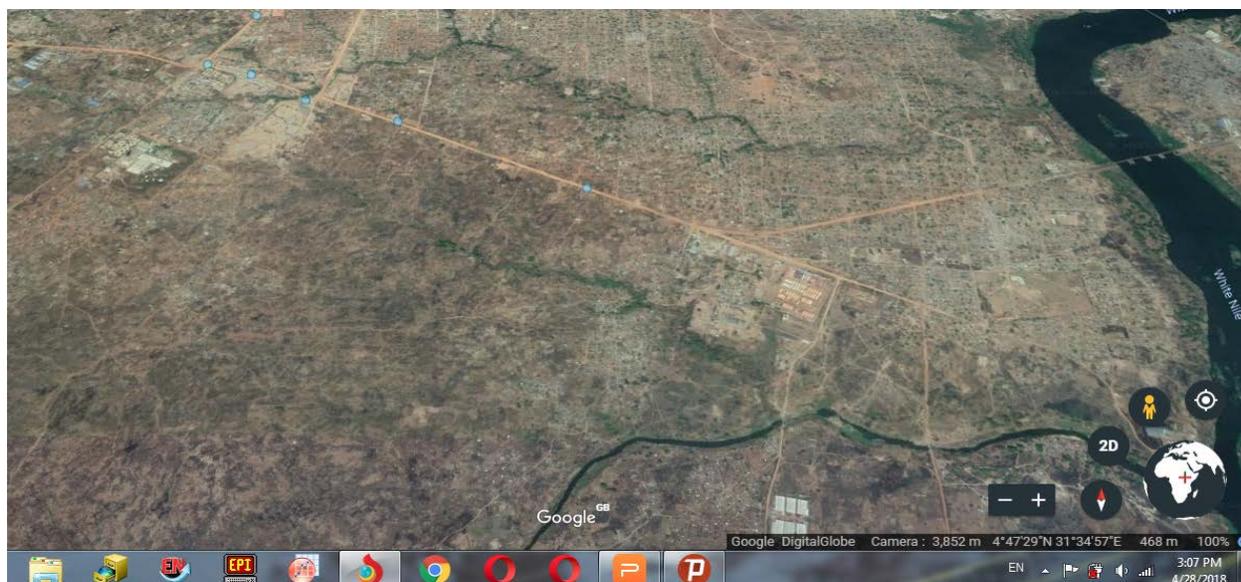


Plate 1. Shows the distance of SSBL from Nile River and small stream moving wastewater into the River



Plate 2. Shows the wastewater running through the residential area relate to increase of bleeding of insects in the area and water pollution in the River



Plate 3. Shows the burning of wastes which can increase of air pollution and health problem to local communities



Plate 4. Shows the Random dumping of different types of solids waste within the area at behind the SSBL



Plate 5. Show the random dumping of solid waste from ram material after production processes within the residential or at northern east site of SSBL



Plate 6. Show the random dumping of solid waste from ram material after production processes within the residential area of Janduro and Juba town at the north site.

Research and Professional Education in Emergency Medical Services

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Abstract

Emergency Medical Services (EMS) is a critical component in the delivery of quality healthcare services. Being the first line of professionals to respond and evacuate patients to hospitals, paramedics play a major role in influencing the short term and long term health outcomes the clients with traumatic injuries. In this case, there is need to continuously empower paramedics them with up to date skills and knowledge, to enhance their competence in the profession, through continuous professional education and research in emergency medical services. However, lack of adequate repository of knowledge such as books and scholarly research studies in the field is a major hindrance. This study sought to examine the trend in EMS research, by investigating the scholarly research studies published in the filed in the last 10 years. An electronic search was conducted in the various databases to monitor the number of published scholarly research articles in 13 countries across the world. The study found that although there has been a gradual increase in the number of published research studies during the period of review, the number is so far below the required standards. This indicates low interest in continuous professional development of EMS through research, a situation that hinders delivery of improved services in the field.

Keywords: EMS research, paramedic education.

Background

Emergency Medical Service (EMS) is one of the critical components of healthcare system, which is normally involved in the rescue, stabilization and transportation of trauma patients to medical institutions for treatment [5]. The demand for EMS in both developing and developed countries has been on an increasing trend, due to ever increasing incidences of automobile accidents, violence and disasters. United States has 850,000 emergency medical services providers actively involved in providing pre hospital care services to about 20,000 emergencies that occur annually in the country [1]. However, professional development of paramedics to enhance their ability to deliver improved quality pre-hospital services has emerged as a major area deserving attention from all stakeholders.

Being a paramedic with all levels of academic background are infrequently to spend a lot of time in researching and writing for the EMS industry, generally, paramedics are depending on routine Continuing Medical Education (CME) and recertification as their regular professional learning. As a matter of fact, many advances in professional education are intimately connected to the research for solutions to practical problems [6]. Such research is use-inspired, if executed as part of a systematic and strategic program of inquiry, it can support new understandings at the most fundamental and basic scientific level, this applied to paramedic as well.

EMS related research encompasses out-of-hospital based emergency cases, in the recent years; there has been a growing contribution to the literature by

paramedics to counter the considerable lack of field data available to support specific interventions or practices. Taking United States as example, federal government agencies annually contribute research funding to pre-hospital EMS [7, 8], such as the National Institutes of Health (NIH), the Agency for Healthcare Research and Quality (AHRQ), the National Highway Traffic Safety Administration (NHTSA), the Health Resources and Services Administration (HRSA), and the Centers for Disease Control and Prevention (CDC), they all have various programs in place to support for the EMS field. However, comparing to some Asian cities, including Hong Kong, Macau, Taiwan and etc., the research foundation to support EMS or related studies is actually less well developed. Consequently, EMS has for years performed without scientific support for many of its actions [9, 10].

Education through research in EMS is somehow limited by a variety of factors, including a lack of investigators being considered to concentrate their work on this area of research that restrict the number of sharing of related information, on the other hand, lack of funding directed specifically to support EMS research also a contributing factor. Despite some paramedics are willing to develop research interest, it is a fact that they currently receive little or no formal training in research methodologies, biostatistics, or informed consent and are not experienced in how to perform a critical reading of the literature [11]. Only a small number of EMS personnel have become accomplished as researchers by taking formal training and advanced degrees that were not part of their initial training in ambulance service [12, 13].

Promoting continuous learning and research has been identified as one of the key approaches of enhancing competence in EMS and healthcare system at large [3]. This realization has been brought about by need to have the entire healthcare system

adapt and adequately address the emerging trends and demands of healthcare services in the 21st century.

These include the need to improve the quality and outcomes of patient care, providing universal and affordable healthcare and application of emerging medical technologies [3].

Empirical research evidence indicates that continuous learning and professional development among paramedics empowers them with skills that enhance recovery outcomes of emergency patients and in generation of new knowledge crucial to advancement of the profession [1, 2]. A research study by Guy and Brachet [2] found that paramedics that trained on the use of pre-hospital Advanced Life Support (ALS) reported a decline in the seriousness of injuries and mortality of trauma patients within 24 hours. Moreover, ALS intervention was found to enhance recovery from multiple traumatic injuries [2]. Evidence based research studies on delivery of EMS services in remote areas have also indicated an improvement in survival rates for trauma patients after administration of on scene interventions in Ireland [3] and prediction in occurrence rate for pre-hospital cardiac arrest in Hong Kong [4]. All of these studies underline the research importance of continuous professional development of paramedics. A study investigating the effects of continuous professional development on paramedics indicated found that the learners reported significant benefits, including gaining new knowledge and updating their skills and introducing new evidence based practices into the profession. However, there is shortage of research on various aspects of EMS, including evidence based studies investigating the efficacy of out of hospital interventions and management for patients with trauma injuries in addition to promoting paramedics welfare as crucial stakeholders in the healthcare sector.

The lack of adequate scientific literature and research on various aspects of EMS and low motivation of paramedics to engage in lifelong learning and continuous professional development is a major issue of concern in the healthcare system¹. Various experiential studies investigating published research

on continuous professional development of paramedics across the world have found extremely low numbers². The trend is a considerable impediment to achieving quality healthcare services and in improving professional development of paramedics. Various research studies have investigated the impediments to research and continuous learning in EMS. Some of the impeding factors are associated with the working environment and lack of engagement among the existing paramedics.

EMS work environment is characterized by high levels of stress, concerns about personal safety, irregular working hours, rigorous training, limited professional mobility and poor compensation [2, 5]. Paramedics are exposed to various occupational hazards, which includes contact with body fluids from disaster scenes, risk of falling objects and exposure to violence [2]. A combination of these factors makes EMS one of the careers with lowest staff retention rates. The challenging working environment has over the years been attributed to playing a significant role in undermining establishment of a learning culture in the EMS [1].

This research study sought to investigate the number of scholarly research studies published in paramedics and EMS.

Methodology

To investigate research development in paramedics and emergency services an extensive electronic search was conducted in various research databases across the world. The search sought to establish the number of scholarly studies in paramedics and emergency medical services from 1997 to 2016 in 13 countries. The countries included United States, United Kingdom, Germany, Canada, France, Hong Kong, India, China, Japan, South Korea, Singapore, Australia and Taiwan. . To identify relevant scholarly journals, the search words applied included “paramedics” “emergency, medical services” and ambulance. The number of articles were noted and tabulated.

Findings

Table 1: Countries with the highest Number of Research studies published in Paramedics and Emergency medical services from 2008-2016

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
United states	749	895	903	1130	1130	1530	1390	1750	1630
Australia	531	528	649	689	806	879	931	1170	1020
UK	799	936	1020	1190	1310	1570	1450	1710	1655
Canada	559	617	739	764	838	840	850	1070	949

Table 2: The total number of published Scholarly research studies in Paramedics and EMS in 13 countries, from 2007 -2016.

Year	Number of scholarly articles
2016	4620
2015	4750
2014	4090
2013	4090
2012	3650
2011	3330
2010	3000
2009	2710
2008	2550
2007	2130

Figure 1: Published scholarly journals on Paramedics from 1997-2016

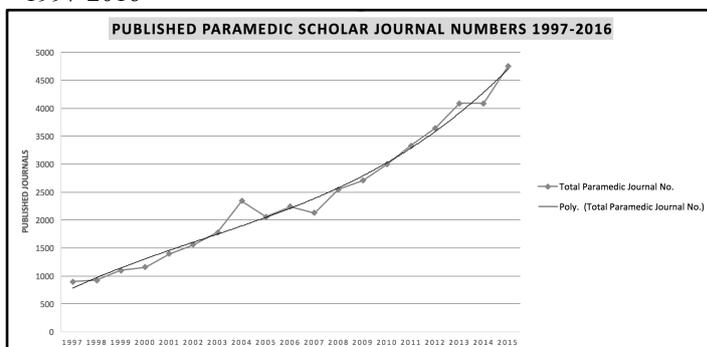
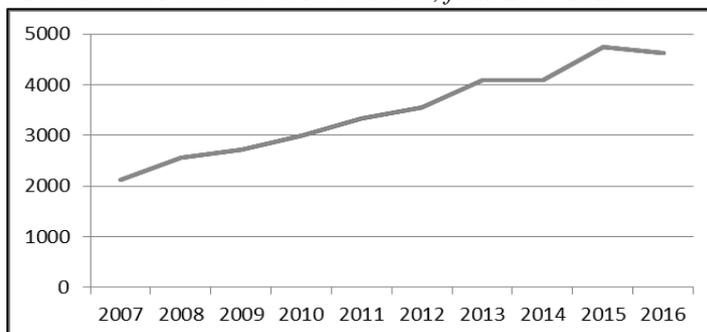


Figure 2: Number of scholarly research articles on Paramedics Published in 13 countries, from 2007-2016



Year	Total Paramedic Journal No.	Hong Kong	Singapore	Taiwan	Japan	South Korea	China	India	Australia	USA	Canada	Germany	French	UK
2016	4620	188	244	159	435	238	457	457	1020	1630	949	671	516	1650
2015	4750	201	243	156	473	339	478	459	1170	1750	1070	578	515	1710
2014	4090	150	168	149	433	254	422	390	931	1390	850	594	576	1450
2013	4090	141	344	122	525	227	384	349	879	1530	840	530	667	1570
2012	3650	173	158	122	393	207	398	349	806	1130	838	515	546	1310
2011	3330	145	217	109	355	185	376	325	689	1130	764	467	518	1190
2010	3000	139	157	97	311	158	347	292	649	903	732	471	459	1020
2009	2710	117	131	81	269	149	285	284	528	895	617	386	423	936
2008	2550	140	148	100	257	173	331	279	531	749	559	380	388	799
2007	2130	87	116	57	219	96	224	213	423	676	514	289	313	656
2006	2240	104	564	100	248	91	653	642	888	1160	949	782	289	1110
2005	2060	70	93	54	158	63	143	231	414	546	460	198	257	610
2004	2340	409	378	55	509	58	489	138	281	857	669	552	217	776
2003	1780	74	77	39	172	65	119	153	262	478	343	203	228	419
2002	1560	47	81	39	140	57	96	217	212	412	366	167	293	322
2001	1400	85	76	21	136	35	1005	127	242	425	248	202	177	368
2000	1160	35	37	24	97	37	65	82	144	314	185	123	125	212
1999	1100	38	17	11	104	35	67	73	125	280	198	110	109	231
1998	925	31	26	8	66	19	48	48	97	271	139	68	95	191
1997	900	36	18	11	75	19	36	35	147	294	180	102	72	167

Table 3: Journals published from 1997-2016 related to Paramedics

Table 1 demonstrates the leading countries in the publication of research on paramedics and emergency medical services from 2008 to 2016. During the period, there has been a gradual increase and interest in the area of paramedic research, as indicated by the increasing number of the publications. In 2008, a total of 2, 638 research articles were published in four countries leading in paramedic research in the world, namely United States, United Kingdom, Australia and Canada. In 2016, the total number of articles published in the four countries was 5,254 representing an increase of about 99% within the 9 year period.

Table 2 represents the total number of articles published in paramedics and emergency medical services in 13 countries across the world from 2007 to 2016. In 2007, a total of 2130 articles in the discipline were published in the discipline, which increased to 4,620 in 2016. This represented an increase of 116% within a period of 10 years (2007-2016). Table 3 demonstrates the trend in publication of scholarly journals related to paramedics in 13 countries, from 1997-2016. The table demonstrates a gradual but slow increase in the number of journals

published within the period, as indicated in figure 1 and figure 2.

Although there is has been a gradual increase in the number of scholarly research articles in paramedics and EMS published from 1997 to 2016 as indicated in figure 1 and figure 2, it does not compare with other disciplines in healthcare, such as nursing and medicine.

Discussions and Conclusion

To make research more pleasurable so as to foster life-long professional education and development, it should not be a process causing anxiety and pressure by spending more time reviewing various publications within the EMS framework. As researchers, we want to get our research to do it in a way that people will find accessible, enjoyable and engaging. I think it is time for all of us to begin looking at this continuing education system differently. For one, most if not all paramedics have to do, so obviously there is some benefit if the EMS field as a whole does this.

Paramedic practices are more based on conventional and mentorship practices which may slow to adopt most current trends. Nonetheless, promoting research as part of the continuing professional education for

paramedics to determine what constitutes better standard in the pre-hospital setting would allow for enhancements over time. To start with, there are many traditional or non-traditional journal articles including but not limited as listed below, where some emergency medicine journals are not for paramedic that at least occasionally include pre-hospital and ambulance related topics.

As EMS professionals in this unique and challenging world, we must remember that it is very important to stay up-to-date and research for the newest information so we can best treat our patients with knowledge to fit in different emergency scenes, it also leads to new treatments or prove existing practice may be improved by new initiatives; though the results are sometimes ambiguous, others simply open our eyes to innovative ideas and challenges.

Research findings indicate that incorporating various adult learning principles in training promotes development of learning culture. The principles include immediacy and selection of topics that are relevant to promote learners engagement, the other approach entails infusing a sense of curiosity in learners to initiate and sustain intrinsic motivation to engage in lifelong learning [1]. This fosters development of behaviors that encourage acquisition of new knowledge, which could ultimately result to increased engagement in research and lifelong learning among the paramedics.

Continuous professional development of paramedics should be made a mandatory component of medical practice to promote enhancement of skills, competence in addition to development and dissemination of new knowledge in EMS. However, this would require considerable investment by all stakeholders involved in EMS, including individual paramedic practitioners in taking stewardship of own learning. Addressing these issues is critical to promote a culture of lifelong learning and research in EMS practice. This would encourage a formation of a vibrant practice, which is updated on current best

practices to promote professional and personal development.

From time to time, it is not uncommon to hear that EMS providers discuss about not being considered as part of the medical profession (not doctor or nurse) or being left out for this reason or that. May be making this change will be the first step in achieving a more level playing field with some of our counterparts.

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Design and Modeling of an Enhanced Microwave Reactor for Biodiesel Production

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Abstract- A 1 kW, 2.45 GHz multi-mode microwave reactor with continuous power supply was designed in order to conduct the non-catalytic transesterification for biodiesel production. The microwave source used in this reactor is magnetron and it is equipped with a temperature probe and pressure gauge for continuous monitoring purpose. Besides, the electric field and temperature distribution within the reactant medium (mixture of palm oil and dimethyl carbonate) under the microwave irradiation was investigated using a commercial finite element method (FEM) software, COMSOL Multiphysics 5.1. Maxwell's equations and heat transport equation are coupled to describe the microwave heating process. Based on the simulation results, it was verified that the microwave cavity was well-designed as it reflected only 6.6% of microwave power back to the waveguide. Moreover, it has the heating ability to convert 75 % of microwave energy into thermal energy. The percentage difference of 7% between experimental and simulation S11 parameter also shows that simulation result is acceptable. Thus, this proposed model can be served as a good starting point for a more advanced analysis.

Index Terms- Microwave reactor design, Numerical simulation, COMSOL Multiphysics, Microwave heating

I. INTRODUCTION

The increasing of liquid fuel demand has eventually brought the research interest towards the alternative fuels. The liquid fuel is mostly contributed by the fossil fuel, which took hundreds of millions years to accumulate. Other than the depletion problem of fossil fuel, the environmental degradation and global climate change, caused by the higher level of greenhouse gas (GHG) emissions, have encouraged research on alternative liquid fuels. Hence, biodiesel should be given more attention as it consists of similar fuel properties with the current petroleum-based diesel and can be used directly in diesel engines without modification to achieve similar performance [1]. Biodiesel also has superior advantages over petroleum-based diesel [2–4]: (a) environmentally friendly, (b) renewable, and (c) biodegradable. In contrast, the major drawback of using biodiesel as an alternative fuel is that it is more expensive due to its higher production cost in term of the feedstock and the oil-to-biodiesel conversion process.

Generally, biodiesel production convert the oil into biodiesel through several refinement techniques, including micro-

emulsion, pyrolysis, dilution and transesterification. Among these, transesterification is one of the simplest and economical way in producing biodiesel. In catalytic transesterification, catalysts are used to shorten the reaction time and to produce biodiesel with better quality. However, this method has several drawbacks such as its complicated downstream purification process to remove the catalyst and impurities in order to meet the American Society for Testing and Materials (ASTM) biodiesel standard. Besides, the catalytic transesterification has low adaptability to feedstocks with high water and free fatty acids (FFAs) contents as it will results in negative effect to the transesterification reaction rate [5]. In the other words, this has limited the use of cheaper feedstocks for the biodiesel production using catalytic transesterification method.

To rectify the problems, many alternative methods have been proposed, such as: (a) pre-treatment with an esterification reaction with an acid catalyst to lower FFAs [6], (b) direct reaction with a heterogeneous catalyst for easier separation [7], (c) enzymatic reaction [8], and (d) reaction in supercritical alcohol [9]. Among these proposed alternative methods, supercritical method is very interesting as no catalyst is needed for this reaction and so, it is less sensitive to water and FFAs when compared with the conventional homogenous catalytic transesterification. Nevertheless, the major challenge of this method is that it must occur under very severe conditions (high temperature and pressure), and lead to high energy consumption. One of the research gaps observed is to reduce the operating cost due to high temperature and pressure requirement for non-catalytic supercritical reaction by performing the reactions at milder conditions.

Since last decade, it has been seen that there is an increase in the usage of microwave processing technology, substituting the conventional heating method, for chemical reactions. The potential of the microwave technology to accomplish superior outcomes over the conventional methods in biodiesel production was presented in the recent review paper [10]. Microwave processing is reported to be a better heating method due to its unique thermal and non-thermal effects [10]. Hence, it is proposed to implement the microwave technology to fill in the research gap that mentioned previously. So, a novel microwave reactor with reflux system was developed to carry out non-catalytic sub-critical reaction. Moreover, to further justify the non-catalytic biodiesel production as an economically viable process, a new methyl group donor, dimethyl carbonate (DMC), is introduced as a promising alternative to the conventional methanol. This is because DMC is a green solvent with less toxic

and it might improve the overall production process and eliminate the production of waste by-product (crude glycerol).

As the complicated interaction between microwave and the heated materials has not been sufficiently understood, the modeling of electromagnetic problem (eg: microwave heating) has been conducted by trial-and-error method [11]. It was reported that when there is load/food inside the microwave reactor, it is not possible to project the realistic temperature and electromagnetic field distribution [12]. Thus, partial differential equations (PDE) of electromagnetic and heat transfer models are required in the microwave heating modeling and should be solved in a coupled approach in order to maximize the consistency of simulation result. The PDE of electromagnetic problems are more difficult to solve in comparison with the heat transport equation, as the former involves vectors equations while the latter is a scalar equation. There are several numerical methods used to solve PDE, including finite-difference time-domain method (FDTD), finite element method (FEM) and finite volume method (FVM) [13, 14].

In this study, a 1 kW, 2.45 GHz multi-mode microwave reactor with continuous power supply was designed in order to study the non-catalytic biodiesel production under microwave irradiation. Furthermore, numerical simulation was conducted in order to study the electric field distribution and the temperature distribution within the reaction medium (mixture of palm oil and DMC at 1:6 molar ratio) under the microwave irradiation using this microwave reactor. A commercial FEM software, COMSOL Multiphysics 5.1 is used to solve the electromagnetic and heat transport equations in modeling this microwave heating.

II. MATERIALS AND METHODS

A. Microwave Design

The design requirements of the microwave reactor was listed in Table 1. Based on the requirements and the cost concern, a design was produced and its 3D model was drawn by using the Solidworks, a computer-aided design (CAD) software.

Table 1. Design features and requirement of the microwave reactor

Design Requirement	
Reactant volume	1-2 Litres
Maximum operating pressure	15 bar
Power supply	Continuous power supply
Control system	Microwave power (0-1000W) and timer
Process monitoring tools	Pressure and temperature
Insulation ability, ΔT	100 °C
Allowable heat loss (full loaded)	< 3% or 30 W
Other features	3-stub tuner, stirrer, sampling port, and reflux system

B. Numerical Simulation

The aim of conducting numerical simulation is to study the electric field distribution and the temperature distribution within the reactant medium under the microwave irradiation by using the microwave reactor designed. By coupling both non-linear electromagnetic field (microwave) with the Fourier's heat transfer, microwave heating can be modelled, as shown in Figure 1. Table 2 summarizes the simulation settings for the modeling of microwave heating in this study.

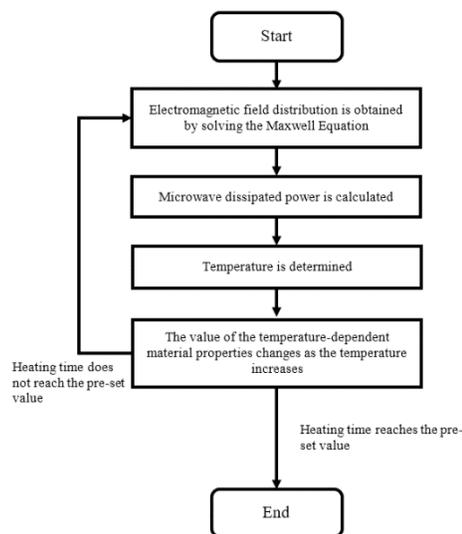


Figure 1. The general simulation procedure in microwave heating modeling

Geometric Model

A 3D geometric model is built for the designed multi-mode microwave heating system with the commercial finite element software, COMSOL Multiphysics 5.1. The microwave cavity is made of stainless steel of Grade 304 with an overall dimension of 450 x 450 x 290 mm (width x depth x height). The waveguide, however, is 112 mm long with a uniform rectangular cross section of 86.36 x 43.18 mm. This waveguide is positioned at the right-hand side and 72 mm from the top of the microwave chamber. On the other hand, the reactant medium takes the shape of the beaker. It is located 30 mm above the bottom of microwave cavity and is surrounded by insulator with 60mm thickness. As the target reactant volume is 1-Litre, so the height of the reactant medium is estimated to be 56 mm.

The numerical simulation is solved for half of the model (see Figure 2) by assuming the electric field distribution and the temperature profile of reactant medium is mirror with another side of the model. By applying the symmetry cut vertically through the microwave cavity, waveguide, insulator and reactant medium, the model size is reduced and hence, minimizing the simulation computational time and memory usage.

Table 2. Summary of the setting for microwave reactor simulation using COMSOL Multiphysics

Materials	Air	Stainless Steel 304 ^a	Reactant Medium ^b	Insulator/ Ceramic Fibre ^c
Relative permeability, μ_r	1	1	1	1
Relative permittivity, ϵ_r	1	1	$0.0291 * T - 0.3062 - (4.6818 - 0.0025 * T) * j$	0.5
Electrical conductivity, σ [S/m]	0	1.4×10^6	1.18×10^{-5}	0
Density [kg/m ³]	$101325 / (287 * T)$	$7945 - 0.2 * T - 3.7 \times 10^{-4} * T^2 + 2.2 \times 10^{-7} * T^3 - 5.1 \times 10^{-11} * T^4$	$1098.28 - 0.60 * T - 1.55 \times 10^{-5} * T^2$	160
Heat capacity at constant pressure, C_p [J/(kg·K)]	$1047.6 - 0.37 * T + 9.45 \times 10^{-4} * T^2 - 6.02 \times 10^{-7} * T^3 + 1.28 \times 10^{-10} * T^4$	$270.2 - 1.2 * T + 0.02 * T^2 - 7.5 \times 10^{-5} * T^3 + 8.1 \times 10^{-8} * T^4$	1999.5	1000
Thermal conductivity, k [W/(m·K)]	$-0.0023 + 1.15 \times 10^{-4} * T - 7.9 \times 10^{-8} * T^2 + 4.12 \times 10^{-11} * T^3 - 7.44 \times 10^{-15} * T^4$	$6.74 + 0.029 * T$	$0.188 - 6 \times 10^{-5} * T$	0.06
Microwave power input for half geometry [W]	500			
Operating Frequency [GHz]	2.45			
Time setting	From 0 to 5 min with a time step of 0.1min			

^a Material properties of stainless steel are adapted from [15, 16]. ^b The relative permittivity of the reactant medium are estimated according to the results reported in paper [17]. ^c Material properties of insulator are obtained from [18].

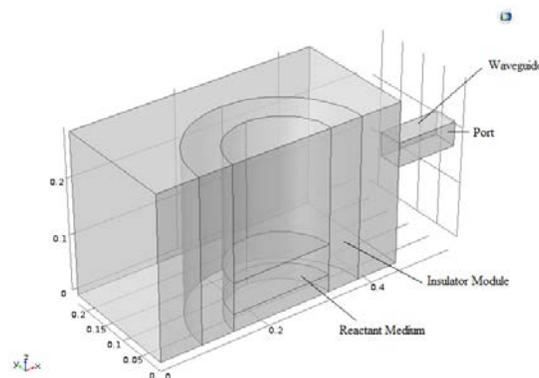


Figure 2. Symmetry model of microwave reactor

Governing Equation

(a) Electromagnetic Field Model

The basic equations for solving the electromagnetic problems are derived from the renowned Maxwell curl relation. By assuming that the electromagnetic fields vary sinusoidally in time at a known angular frequency, $\omega = 2\pi f$, and that the materials have linear properties with respect to field strength, the electromagnetic field model is described as:

$$\nabla \times (\mu_r^{-1} \nabla \times \mathbf{E}) - \frac{\omega^2}{c^2} (\epsilon_r - j\sigma/\omega\epsilon_0) \mathbf{E} = 0 \quad (1)$$

where μ_r is the relative permeability of a material while \mathbf{E} is referred to the electric field (V/m). ϵ_0 and ϵ_r are the permittivity of free space (8.85×10^{-12} F/m) and the relative permittivity correspondingly. σ , however, symbolizes the electric conductivity of a material (S/m), f is the frequency of the electromagnetic wave, and c denotes the speed of light in vacuum, 2.9979×10^8 m/s.

(b) Heat Transfer Model

The temperature distribution within a material under the microwave irradiation is obtained by solving the Fourier's conduction heat transfer equation [19]:

$$\rho C_p (\partial T / \partial t) + \nabla \cdot (-k \nabla T) = Q \quad (2)$$

where ρ indicates the density of the material (kg/m^3), C_p denotes the heat capacity at constant pressure ($\text{J}/(\text{kg}\cdot\text{K})$), T and t are the respective temperature (K) and time (s), k refers the thermal conductivity ($\text{W}/(\text{m}\cdot\text{K})$), and lastly Q is the dissipated power per unit volume (W/m^3).

The Poynting's theorem is a statement of energy balance for electromagnetic field. Based on this theorem, the electromagnetic energy that decrease in a certain region per unit time is equal to the total work done by the field forces plus the net outward energy flux per unit time. Hence, the electromagnetic losses are the thermal sources of the reactant medium under microwave heating. This conversion of microwave energy into power dissipation in a material, Q (W/m^3), can be determined by using the equation below:

$$Q_{RMS} = 1/2 \{ \sigma \mathbf{E} \cdot \mathbf{E}^* + \omega \epsilon'' \mathbf{E} \cdot \mathbf{E}^* + \omega \mu_r \mathbf{H} \cdot \mathbf{H}^* \} \quad (3)$$

where ϵ'' is the dielectric loss. The first, second and third terms of the right side of Eq. (3) represent the electromagnetic losses based on the electrical conductivity, dielectric loss and relative permeability of the material. In this study, only the electromagnetic loss due to the dielectric loss is accounted and so, Eq. (3) is reduced to:

$$Q = 2\pi f \epsilon_0 \epsilon'' E^2 \quad (4)$$

Boundary Condition

There are 3 types of boundary condition associated with electromagnetic problem:

- Port boundary condition is located at the opening of the waveguide (see Figure 2). The magnetron generates microwaves at 2.45 GHz in TE_{10} mode.
- Impedance boundary condition is assigned to the metallic surfaces of the microwave cavity and waveguide. This boundary condition is appropriate as the skin depth (metallic surface of microwave cavity and waveguide) is much smaller than the simulation model. It cannot be denied that there are currents flowing within the walls. However, it is believed that the skin effect will bring these

currents to the surfaces. Thus, by applying impedance boundary condition, it treats the currents flowing on the surfaces and hence, the meshing of the wall can be avoided and save computational effort dramatically.

- Perfect magnetic conductor boundary condition is set to the boundaries along the y -direction, which cut the full 3D geometry into half.

Assumption

The proposed model is depended on the following assumptions:

- The microwave energy absorption by the air is negligible.
- Heat transfer in the air is negligible and thus, only solve the heat equation in the insulator and reactant medium.
- The microwave cavity is perfectly insulated, and thus, no heat is lost through the wall.
- Conduction and convection is the primary mode of heat transfer.
- The microwave reactor system is perfectly symmetry.

III. RESULTS AND DISCUSSIONS

Microwave Design

In this paper, a 1 kW, 2.45 GHz multi-mode microwave reactor with continuous power supply is designed. Magnetron was chosen as the microwave generator, as it is the most frequently used tubes in producing continuous microwave power. Besides, this magnetron was equipped with an air cooling system to support long operating period. Besides, a rectangular waveguide is suggested as it allows the microwaves to be transmitted through successive reflection on its inner walls [20]. WR 340 rectangular waveguide was selected in this project to convey the microwave radiation to the reaction chamber. This is because it has a width of 8.636 cm (> 6.1 cm) and a height of 4.318 cm, which is large enough to fit one complete wavelength of the electromagnetic wave at 2.45 GHz ($\lambda = 12.2$ cm). Furthermore, its cut-off frequency of the lowest mode (TE_{10}) is 1.736 GHz. The cut-off frequency indicates the minimum frequency required to allow the electromagnetic wave to propagate. Hence, this WR 340 rectangular waveguide is able to propagate the microwave radiation at 2.45 GHz in this design. In addition, a teflon sheet with 5mm thickness is placed between two waveguides in order to filter any possible dust from the microwave cavity into the magnetron. Teflon is chosen as it is a microwave transparent material with a penetration depth of 90 m. Stainless steel of Grade 304 (SS304) is used as the main material in building the microwave metallic cavity/ applicator. It is the most versatile and widely used stainless steel due to its outstanding forming and welding features. SS304 has excellent oxidation resistance in alternating service up to 870 °C and up to 925 °C in continuous operating time. Inside the microwave applicator, there is an insulator module which allows a 5 L borosilicate beaker (chemical reactor) to sit on it. The insulator module is made of ceramic fibre, with a function to maintain the thermal energy inside the chemical reactor without losing to the surrounding. Moreover, the door was designed at the top of the microwave reactor and it is fixed with several screws. The distance between the screws was not more than 6.1 cm in order to prevent the microwave leakage.

Furthermore, there is an o-ring in between the door and the microwave applicator to prevent the leakage of the build-up pressure. To monitor the process continuously, the oven was equipped with a pressure gauge, a temperature probe and a sampling port. Besides recording the pressure within the reaction chamber, the pressure gauge also acts as the safety valve. Additionally, magnetic stirrer is utilized to improve the heating homogeneity. Lastly, this microwave system has the ability to connect with a reflux system in order to condense the vaporize dimethyl carbonate (DMC) back to the reactant medium. Figure 3 displays the 3D model of the finalized microwave system, which is created by using Solidworks CAD drawing software. The interior and exterior of the fabricated microwave reactor are also shown in Figure 4 and Figure 5.

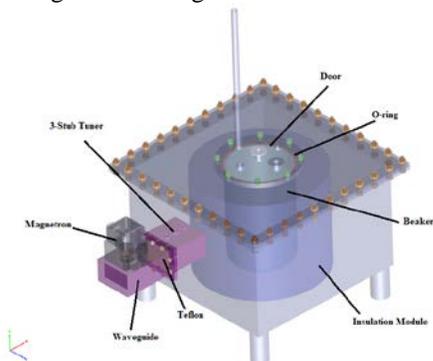


Figure 3. 3D model of final microwave reactor design



Figure 4. Interior of the fabricated microwave reactor



Figure 5. Exterior of the microwave reactor with its power control panel

Numerical Simulation

In this simulation, palm oil is chosen as the material of the reactant medium as it is the main ingredient of the transesterification process for biodiesel production. Nevertheless, the presence of the methyl group donor (eg: methanol, dimethyl

carbonate and etc.) cannot be ignored as well. Thus, the relative permittivity value of the reactant medium was modified based on the paper reported by Huang et al. [17]. Moreover, five second-order elements per wavelength are applied in this simulation study to resolve the electromagnetic wave propagation [21]. Upon fulfilling this meshing requirement and based on the material properties, the maximum mesh size for the microwave cavity and waveguide is 24.47mm, as both of them are filled with air. Whereas the maximum mesh size for insulator and reactant medium are 17.3 mm and 8.65 mm respectively.

After defining the material for every part of the study model, the electromagnetic heat source will be computed first, and then applied into the time-dependent heat transfer study step. Besides, COMSOL will update with new solution at each time step when the material properties change significantly due to heating until the end time of the thermal simulation is reached. As mentioned previously, in this project, a 2.45 GHz of microwave was generated by the magnetron, travelled along the rectangular waveguide in TE₁₀ mode and finally, entered the microwave cavity. Within the cavity, the microwave radiations reflected by the metallic wall, and resulting in an interference phenomenon, which is featured by the alternating high and low electromagnetic field intensity at different positions. In a multi-mode cavity, such as the microwave reactor in this study, there is a need to conduct the numerical simulation in order to get the particular electromagnetic field distribution. Unlike the single-mode cavity, the high and low electromagnetic field regions can be easily determined and calculated in comparison with the multi-mode cavity [11]. Notice that the simulation model used in this section consists of microwave cavity, waveguide, insulator and reactant medium only. For simplicity, the stirring effect is not taken into consideration as it involves only slow stirring (less than 100 rpm). Besides, the effect of thermocouples was also excluded during the simulation to reduce the complicity. Furthermore, the thermocouple used in this studied microwave reactor was shielded and grounded properly and hence, the electric interference will be reduced [22, 23].

By using the COMSOL Multiphysics software to model the microwave heating using the designed microwave reactor, some characteristics of the microwave heating are able to be observed and highlighted in this section. One of them is the electric field distribution within the microwave cavity. Figure 6 and Figure 7 show the electric field distribution in the unloaded and loaded multi-mode microwave oven. Both of the figures showing the presence of alternating higher and lower field strength within the cavity. The maximum and minimum of the electric field strength are also displayed in the figures. Based on Figure 6(b), the minimum and the maximum electric field strength for the unloaded microwave oven are 0.00605911 V/m and 59,825.9 V/m respectively. However, the electric field strength within the loaded microwave cavity (see Figure 7(b)) is within the range of 0.0147569 V/m to 39,589.8 V/m. Notice that there is a decrease of the maximum electric field strength. This suggests that there is microwave absorption by the load, in this case, the reactant medium. In addition, non-homogeneous electric field distributions are observed in both of the conditions, which is one of the main features of multi-mode microwave reactor [11]. Moreover, standing waves are detected in the waveguide and within the microwave cavity (see Figure 6(a) and Figure 7(a)).

Standing wave is the superposition effect occurred when only two waves travelling in the opposite direction, with same amplitude and frequency, interfere with each other. This phenomenon is usually happened when a wave is reflected back on itself. The standing wave observed in the waveguide indicates that the microwave is reflected by its metallic wall and interfere with the incident microwaves from the magnetron. Besides, the return loss, S11 parameter was determined to express how much of the microwave is reflected by an impedance discontinuity. The simulation results show that the S11 parameter of the studied microwave reactor is 11.783 dB. This value indicates that there is only ~6.6% of microwave power is reflected. To validate this value, a network analyser was used onto the fabricated microwave reactor and the S11 parameter obtained is ~11 dB (~7.94% reflected microwave power), as shown in Table 3. This concludes that the assumptions done previously is valid.

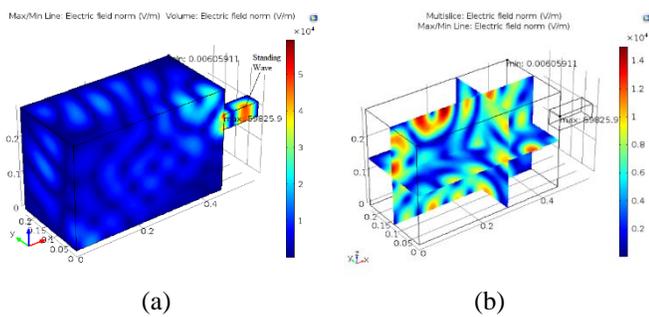


Figure 6. (a) Volume plot, and (b) Multi-slice plot of the electric field distribution of the unloaded microwave oven

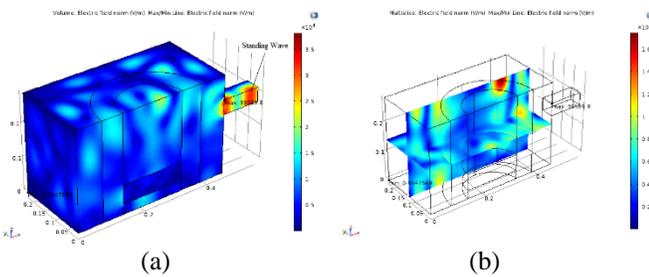


Figure 7. (a) Volume plot, and (b) Multi-slice plot of the electric field distribution of the loaded microwave oven

Table 3. Validation of simulation result for S11 parameter

	S11 parameter (dB)
Simulation result	11.783
Experimental result	11

Furthermore, the non-homogenous electric field distribution will result in heating inhomogeneity, and thus, hotspots will be observed. The simulation showed that after 5 minute of microwave heating, the maximum achievable temperature is 367 °C at the hotspot location. However, most area of the reactant medium is still remained in red colour (lower temperature). The weighted average temperature of the reactant medium is 140 °C after 5 minute of microwave heating.

As shown in Figure 8, the heating inhomogeneity of the studied microwave system is moderate. With the help of stirrer, it was reported that a more homogenous heating profile will be obtained [24]. Nevertheless, it is not a best solution. Further modification

on the microwave reactor design might be done to improve the heating homogeneity by installing an antenna into the microwave chamber [25].

From Figure 8, another fundamental feature of microwave heating is discovered as well, which is the volumetric heating. Microwave heating allows the heat transfer from the inner medium to the outer medium, unlike the conventional heating. This heat transfer style is validated in this simulation by observing the existence of higher temperature spot (white colour) near the centre of the reactant medium while at the same time, the temperature of the outer layer is still remained lower (red colour). Besides that, notice that there is no/little temperature increase of the insulator as it is microwave-transparent.

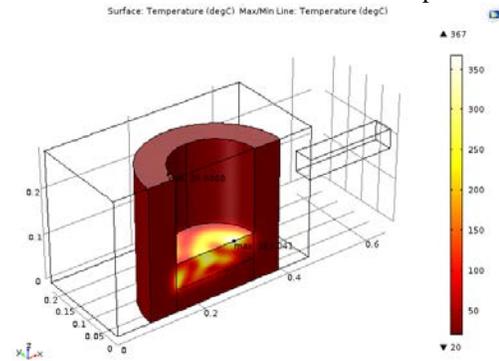


Figure 8. Temperature distribution of the reactant medium and insulator

As highlighted before, the electromagnetic losses are the thermal sources of the reactant medium under microwave heating based on Poynting's theorem. These electromagnetic losses can be now presented by the plotting of the total heat sources. The maximum value of the total heat source are $2.73 \times 10^6 \text{ W/m}^3$ (refer Figure 9). By performing the volume integration using COMSOL Multiphysics, the total thermal energy within the reactant medium is 377.78 W. Recall that the microwave power setting for this simulation was 500 W, as only half geometry was simulated. Thus, for a full model rated at 1 kW, the total microwave energy converted into thermal energy is doubled up, 755.56 W, which is 75.56 % of the microwave power input. This value shows that the efficiency of the studied microwave reactor is high.

A point within the reactant medium (red colour point in Figure 10(a)) is randomly selected to study its temperature profile over time. The temperature curve (see Figure 10(b)) shows that as the time increases, the temperature of the reactant medium increases from 20 °C to 65 °C parabolically within 5 minutes as the dielectric properties changes with temperature. The reactant medium modelled here is the mixture of palm oil and dimethyl carbonate (DMC). At temperature higher than 90 °C, DMC will be vaporized and built up the internal pressure as time increases. This non-linear effect, however, is not captured by this simulation model as the focus of this simulation is on the reactor itself, not the reaction process. Nevertheless, this model can serve as a good starting point for a more advanced analysis.

Figure 11 compares the simulated and experimental temperature profile. The experimental temperature profile was based on the three experimental replications. Notice that there was mismatch between these two temperature profiles, which might be due to the deviation of the magnetron operating frequency [26].

Generally, the instantaneous magnetron operating frequency emitted in a microwave reactor are affected by the cathode-anode voltage and the high frequency output impedance that depends on the load (target to be heated up) [27]. This load impedance, however, was varied with the material's dielectric properties which changes with temperature. This eventually alters the frequency of the magnetron and affects the heating rate and electric field distribution.

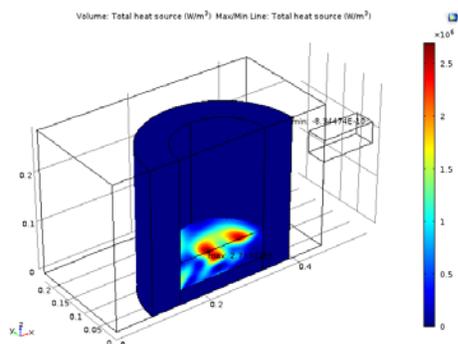


Figure 9. Total heat source within the reactant medium

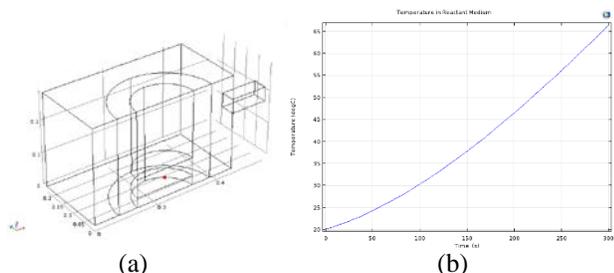


Figure 10. (a) A randomly selected point within the reactant medium, and (b) the temperature profile over time at the particular point

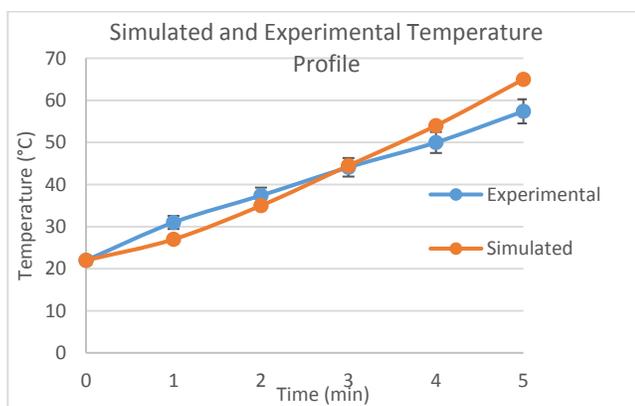


Figure 11. A comparison between the experimental and simulated temperature profile

IV. CONCLUSION

Electromagnetic field and thermal field are successfully coupled to simulate the heating of the mixture of palm oil and dimethyl carbonate, the raw materials for biodiesel production in this study, under microwave irradiation by using COMSOL

Multiphysics software. The results showed that the microwave heating under multi-mode microwave reactor is successfully modeled. The main characteristics, such as the presence of hotspot, heat transfer from the inner layer to the outer layer and non-homogeneous temperature and electric distribution profile, are clearly observed. Besides, it was shown that there is a decrease of the maximum electric field strength between the unloaded and loaded microwave reactor. This suggests that there is microwave absorption by the load, in this case, the reactant medium. Moreover, the simulation results was validated by measuring the S11 parameter. There is 7% difference between the real and simulation results. Thus, the simulation result is reasonable and makes it possible to calculate the total microwave energy converted into thermal energy and instruct the design of an efficient microwave-assisted biodiesel reactor. The microwave heating efficiency of 75.56% symbolizes that the enhanced-design of the microwave reactor in this study is good. In a nutshell, most of the non-catalytic transesterification was conducted under supercritical condition. However, this is a microwave reactor that allow subcritical reaction for the non-catalytic biodiesel production. Subsequence modification can also be done based on this design whereby the reaction time can be reduced by optimizing the waveguide position in order to obtain higher heating intensity.

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Administrative staff perception toward safety measures in AL-Najaf hospitals

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Abstract

Backwind: No doubt that occupations are associated with different safety concerns in all work fields, uniquely health care organizations, have the stock of workers who are more exposed to dangers from the different jobs. Therefore, the role of perception in strengthening and changing behaviors and concepts as general. This study focuses on evaluating management perception of the occupational health and safety measures used within a hospital in AL- Najaf city. **Methodology:** A descriptive analytic design cross sectional study was carried out in al-Najaf City hospitals (AL-Sadder Medical City, AL-Forat AL-Awsat teaching hospital, AL-Zahra'a teaching hospital, AL-Hakeem teaching hospital and AL-Sajad hospital) from October 8th 2017 to September 16th 2018. A non-probability (Purposive Sample) of (100) health administrator who manage different units of hospitals in order to assess their level of perception toward safety measures as well as finding out the relationship between the demographics of the element of the sample and their level of perception. A questionnaire consisting of two parts was used, including demographic information, and administrator's perception toward safety measures. **Results:** The findings of the existing study specify that the overall assessment of administrator's perception towards safety measures is fair. **Conclusions:** The study concluded that the administrator's level of perception towards safety measures is affected by years of experience as an administrator, and also found that there is no return-to-work program in hospitals in Al- Najaf city. Current study recommended that safety training is necessary so as to help employees to increase their knowledge and practice about health and safety at work. **Recommendations** Working on improving the policy and regulatory framework for occupational health in health organization, legalizations that keep the right of the employees and employer are necessary to be established and applied, tools and models for governments, employers and workers to establish practices that confer maximum safety at work, there is also the need for invest heavily into occupational health and safety research as it will influence positively on policy and decision making regarding health and safety issues among HCWs .and establishing a return-to-work program in workplace is a great need for rehabilitating the employees after being injured .

Key words: Perception, safety measures, administration

Introduction

No doubt that occupations have associated with different safety concerns in all work fields, uniquely health care organization which has stock of workers who are more exposed to dangers from their different jobs. According to World Health Organization(WHO) the global burden of disease from acute injuries resulted from occupational exposure such as dealing with sharps that have serious consequences like exposure to hepatitis B among health workers 37% of the cases and less than 10% of HIV among health workers and needle stick injuries are the cause of 95% of the HIV occupational sero conversion(Emmanuel, *et al.*, 2018).

Because of high rates of associated morbidity and mortality of exposed workers, occupational health and safety are an important issue. Statics shows 100,000 people die from occupational illnesses, while about 400,000 new cases of occupational diseases are detected every year more of them are a health care workers sector so here we need for occupational safety that means control of hazards in the work place to achieve an acceptable level of risk, irrespective of. (Occupational Safety and Health Administration, 2013).

When we talk about occupational safety and health in any organization, all employee are responsible but the employer has the biggest responsibility to provide guidelines ,protocols and procedures and its implementation which will ensure the safety of workers in their areas, that deemed necessary for better understanding of certain concepts (Worj, 2012).

Lack of adequate laws and policies regulating the work environment and it's in effectivity put many workers in dangers which may be life threatening, especially in developing countries which occupational

health and safety laws represent only about 10% of the general laws that make the occupation more hazardous and more serious especially in health care sector (Osaretin Owie and Apanga, 2016) .

It is well known that health care workers in both developed and developing countries have been faced with several occupational hazards that include biological hazards like bacteria ,and viruses), physical hazards (heat, dust, radiation, and noise), chemical hazards (toxic cleaning solutions), ergonomic hazards (heavy lifting),stress and violence in the workplace (Tipayamongkholgul *et al.*, 2016).

OSHA produced a set of means such as studies, and scales to help hospitals assess workplace safety needs, implement safety and health management systems. Preventing worker injuries not only helps workers it also will save resources for hospitals (Occupational Safety and Health Administration, 2013).

A first step in setting up a workplace health and safety measurement program is the identification of key metrics and compiling and analyzing these metrics over time so articulating a vision for change, and building a culture of health and safety by elevating the level of perception for employer which is one of these metrics charged(Loeppke *et al.*, 2017).

Objectives of the Study

1- To evaluate the level of administrative staff perception toward safety measures.

2-To find out the relationship between administrative staff perception toward safety measures and demographics

Methodology

A descriptive analytic design cross-sectional study was carried out, so as to attain the stated objectives, during the period from October 8th 2017 to September 16th 2018.

The study was conducted at general teaching hospital's units, (operational theaters, laboratory, wards, pediatric units, gynecology units, intensive care units (ICU), post-operative care units, maintenance unit, services unit and blood banks units, in Al-Najaf AL-Ashraf City, Iraq.

Instrument of the Study

By reviewing the related literature, the questionnaire was modified and prepared to measure the phenomena of administrative staff perception depending on previous studies. Managers can also use it to measure the level of implementation of safety systems that are already in place.(OSH ,work safe, 2015), and modified by experts. It was divided into two parts, (part one contained socio-demographic information, and part two contained eight main domains, and 33 questions.

The Statistical Analysis

The data of the (100) participant were entered and analyzed by means of the statistical package for social sciences (SPSS), V.23, 2015. Percentages, means, frequencies and standard deviation were obtained by descriptive statistics.

Results:

Table (1) Distribution of study sample by their demographic data.

Demographic Data	Rating And Intervals	Frequency	Percent
Age / years	20-24	1	1
	25 – 29	14	14

	30 – 34	29	29
	35 – 39	15	15
	40+	41	41
	Total	100	100
Gender	Male	70	70
	Female	30	30
	Total	100	100
Levels of Education	Primary school graduated	0	0
	Intermediate school graduated	3	3
	Secondary school graduated	19	19
	Diploma	48	48
	Bachelor	28	28
	Post graduate	2	2
	Total	100	100
Years of Experience	Less than one year	0	0
	1-5	15	15
	6-10	24	24
	11-15	18	18
	16-20	14	14
	21-25	9	9
	26-30	8	8

	More than 30	12	12
	Total	100	100
Years of Experience in as Administrator	Less than one year	7	7
	1-5	42	42
	6-10	29	29
	11-15	12	12
	16-20	4	4
	21-25	3	3
	26-30	2	2
	More than 30	1	1
	Total	100	100

Table (4.1) depicts the demography of study participants , (100) ,in regarding to age, higher percentage of the study sample is over 40 years old (41%), in addition concerning to gender the majority of sample is male (70%), also this table shows that most of study sample in regarding to their level of education is diploma (48%), furthermore this table shows in relating to years as an employee (6-10) years is the higher percentage (24%), and finally according to tis table the (1-5) years as an employer is the dominant percentage (42%).

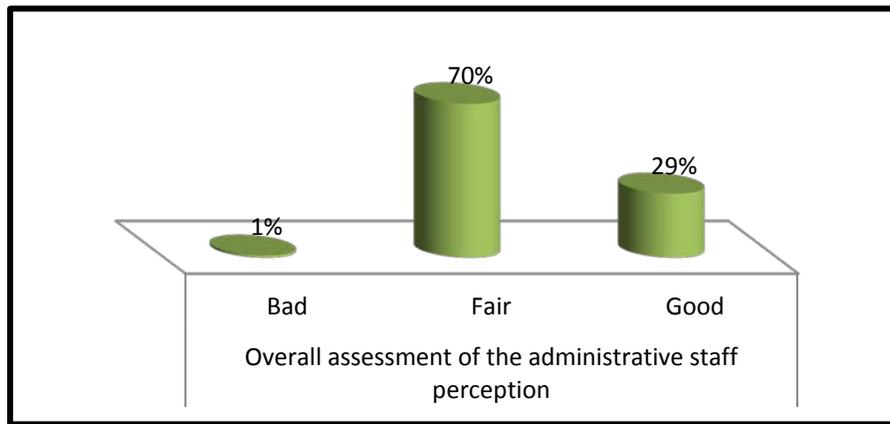


Figure (1) Overall assessment of the administrative staff perception toward safety measures.

Discussion:

Discussion of the administrators' socio-demographics.

With increasing age, knowingly or unknowingly individuals acquire more knowledge and naturally people tend to be more flexible and less assertive. So, they will exhibit lesser authority on their fellow beings. Another reason is that with growing age physically individuals start to depend on others for some type of help and this too might affect their psychology and this will affect their leadership styles.

In general, the present study highlights the contributions of some demographic variables in determining perception of administrators that's one of the trait of effectiveness of management among 100 Iraqi health administrators from the administrative staff in AL-Najaf hospitals, most of them aged (+40) in percent(41%) . This finding is consistent with the research done in (2009) by Nor Azimah that revealed demographics information where majority respondents (36.8%) were above the age of 40years. (Nor Azimah *et al.*, 2009) ,and also our study is agree with the study of Goswami and others in 2013 that shows the administrators aged 31+/-10.3yeras.(Gosawami ,et al,2013) .

There is an evidence that cognitive performance does not generally show any marked decrease until after the age of 70. It is suggested that is because cognitive skills such as intelligence, knowledge, language and complex problem solving are resistant to age-related declines and are likely to increase with age until 60 years of age. However, there appears to be considerable laboratory based evidence to support the theory that some specific cognitive abilities decline with age. These cognitive skills include working memory, reasoning, attention and processing speed. Where declines in cognitive abilities such as working memory and reaction time do occur, there is evidence that performance of tasks is unlikely to be affected because of the ability of an individual to compensate for these declines with experience, education, high motivation, better judgement and job knowledge. (Yeomans, 2011)and (Goswami, *et al.*, 2013).

Gender has a consequential correlation with management effectiveness. Both male and female managers have a diverse leadership trait which are the characteristic of their sex. And from the 'science of decision making' there is a key gender distinction in the behaviors between women and men, and how these behavioral differences influence and shape decisions as well as the outcomes of leadership styles employed.

Regarding the gender of participants, males were the dominant in (70%) percentage and (30%) female ,and that agree with the study stated by Goswami and others that reviled the participated manager was male in (77%) percentage and (23%) female(Goswami, Soni, Patel, & Patel, 2013), and disagrees with the study of Nor in 2009 that rived the percentage of male subjects was (54.32%)were females and (45.68%) (Nor Azimah *et al.*, 2009).

Kotur and Anbazhagan stated that, there is some significant difference between the male and female employees in terms of exhibiting their administration styles. The female employers are more autocratic to some extent than the male employers. Emotionally, there is some significant difference between the male and female employers, according to psychology (Kotur and Anbazhagan, 2014).

There are many effective measures to judge good job performance through many different jobs, educational level is one of these tools, that it is a significant and predictive measure of effective leadership. Education is critical for effective management, and this is theoretically founded on different leadership behaviors that need strong mental abilities such as problem solving, planning, communicating, decision making and creative thinking. All these attributes can be improved by education, and education helps administrators to well understand themselves and others.

As Clement and others claim that there is a relationship between education and management efficiency among the administrators. Consequently, they found that education and management efficiency are clearly and positively related. As education is one of the current measures of good job concert through local supervision managers' jobs. Also scholars propose that it is an important and predictive measure of good management varies (Clement, *et al.*, 2015).

So with respect to the level of education, the participant with diploma was 48 %, bachelor was 28%, secondary school graduate was 19% and that totally different from the result of study put by Goswami and others that revealed that the majority of participant get a master degree in 52% percentage(Goswami, *et al.*, 2013).

Discussion of the overall assessment of the administrator's level of perception:

Our study can be interpreted by there is a strong relationship between workers (employees and employers) perceptions and their behaviors, because the role of perception as a director for a person's actions. Because people's behavior is based on their perception of what reality is, not on reality itself, it is possible that two persons can see the same thing and interpret it differently. Hence, here administrator's decision will be impaired by wrong perception. One interprets situations or information in light of his or her own attitudes and experiences. If a person has had positive experiences in a similar situation, or with a similar type of manager or employee, he or she will perceive the new experience in light of the past and bring pre-conceived ideas, opinions, and expectations to their interpretation. This may cause positive or negative perception. Often the perceiver may not evaluate new data because he or she will not look past his or her initial evaluation.

With regard to the administrators s' overall perception toward safety measures, the study shows that the overall assessment of administrator's level of perception is fair in (70%) percentage and this finding disagrees with the study of Nor Azimah and others which depicts that, safety perception was perceived as fairly high (Nor Azimah *et al.*, 2009).

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Improving Sanitation on Tertiary Education Campuses

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ABSTRACT

This paper analyzes the problem of sanitation on University campuses in Ghana after clearly explaining what sanitation means. Its purpose is to equip the reader with every knowledge needed to initiate actions towards improving sanitation on tertiary campuses in Ghana and possibly in other developing countries.

GLOSSARY OF TERMS

Sanitation - generally defined as the promotion of hygiene and prevention of diseases by maintenance of good sanitary conditions.

'Perching' – is used to describe a situation where a student who is not officially given a room in a particular hall is able to secure accommodation with the assistance of a bona fide member of a particular room and enjoys the facilities of that room or hall.

'Shit-on-shit' – is used to describe a situation where students defecate on each other's excreta as a result of lack of water to flush the toilets.

'Free range' – is used to describe a situation where students defecate in bushes around the school.

I. INTRODUCTION

According to a 2006 UNICEF report on sanitation, millions of people worldwide lack access to reliable basic sanitation facilities and about 2.6 billion people (two in five) do not have access to improved sanitation facilities. Lack of safe water and sanitation facilities is the world's single largest cause of illnesses. Poor sanitation on campuses means that students have direct contact with environmental contaminants which results in sanitation related diseases.

Better sanitation and hygiene improves the livelihood and well-being of human beings. A safe and sustainable sanitary environment is fundamental for a healthy, productive and dignified life, yet many people lack access to improved sanitation facilities. In spite of the importance of good sanitation and hygiene in improving the health status of the university community, the University of Cape Coast has not given sanitation the needed attention it deserves. As a result of this, a greater proportion of the students suffer from sanitation related diseases, mainly, diarrhea, dysentery and typhoid. There is therefore the need to develop strategies to enhance comprehensive sanitation services delivery in the University.

II. STATEMENT OF PROBLEM

Generally, environment and sanitation factors are significant determinants of health and illness in developing countries. Poor sanitation, contributes to about 88 percent of deaths from diarrhea and other sanitation related diseases according to the 2006 UNICEF report on sanitation. The state of poor sanitation on the University of Cape Coast campus ranges from choked gutters, weedy environment, littered environment, inadequate sanitation facilities, overflowing refuse containers and sale of food at insanitary food vending stations. Some student residential facilities have malfunctioning or obsolete drainage and sewage systems. A typical case in point is the Atlantic Hall. These often contribute to food poisoning of students and other health related conditions and infections. It is important to state however, that comparative to other communities, the university's state of sanitation is far ahead. Over the last couple of years, the university has acquired a water tanker, waste disposal truck and a cesspit emptier, all as part of efforts to improve sanitation and reduce avoidable diseases. These notwithstanding, the spate of sanitation related ailments among students is high and therefore needs Management's attention.

III. COMPONENTS OF SANITATION

Components of sanitation include:

- (i) Personal hygiene
- (ii) Safe drinking water
- (iii) Toilet/human excreta disposal
- (iv) Disposal of waste water
- (v) Solid waste management-
- (vi) Environmental sanitation

IV. SOME CAUSES OF POOR SANITATION ON CAMPUS

- (i) Perching situation at the halls: - Most students prefer to perch with their friends or siblings at the halls in order to share food and other personal items or to enjoy the activities of that particular hall. This situation is more common with the male dominated halls on campus, such as Atlantic and Casley Hayford Halls. This situation puts pressure especially on the washrooms and water facilities. The toilet and bathroom facilities become overly dirty and students easily contract contagious diseases such as candidiasis, skin rashes and urinary tract infections. Normally, in the Second Semester, where there is shortage of water on campus, the toilet facilities then become unhygienic to use and the place develops a stench. Students then engage in '*shit-on-shit*' and '*free-range*'.
- (ii) Inadequate/overflowing refuse bins at vantage points: - there is at least a dustbin on every floor in the halls and at the faculties and departments. However, there

are not enough litter bins outside the halls, office areas and none at all at the Science Market. As a result of this, students tend to litter the campus with rubbish where they can't find any bins and this also puts pressure on the few ones that are outside. These bins then overflow with waste and breed houseflies and mosquitoes. A clear example of this is the refuse dump situated at the Science Taxi Station. This area is very close to the science market and whenever the place overflows with rubbish, food sold at the market may become contaminated and students may suffer food poisoning.

(iii) Uncommitted attitude of sanitary workers: - Sanitary workers at the University of Cape Coast are employed by the university and paid by the government. Most of these workers have adopted a lackadaisical attitude and are often absent at work. They sometimes do not clean the sanitary facilities well or clean without using the detergents provided them simply because they would have to fetch more water for rinsing. At the Student Representative Council (SRC) Hostel for example, where the cleaners are expected to clean twice daily before closing work, they mostly clean in the mornings only and use the rest of the day chatting and making unnecessary arguments. However, one of the sanitary workers in an interview gave a different angle to this. *"He said we do the cleaning alright but it means that whoever goes into the toilet and does not have water (because we do not provide water) for flushing will mess up the place again and this most at times does not motivate us to clean often"*

(iv) Lack of maintenance of sanitary facilities: -As student population keeps increasing, demand for residential accommodation is swelling up, putting more pressure on sanitary facilities. Increase in the student population now means that the facilities have become insufficient and there is the need to provide more sanitary facilities and renovate the existing ones. Most of the taps are not flowing, the sinks have become old and choked and the flush handles on the toilets are spoilt.

V. MEASURES TO IMPROVE SANITATION ON CAMPUS

Sanitation is a global problem, hence, there is no one-size-fits-all solution. Instead disciplining ourselves as individuals and showing commitment in eradicating this canker can help curb this situation. Below are some measures to improve sanitation on U.C.C campus.

(i) Education/counselling and involvement of students in sanitation issues: - The first step at curbing this problem should be vigorous education and involvement of the students themselves. It is important that general awareness about sanitation issues be improved to achieve the general goal of behavioral change among students. It is important for the students to understand the link between sanitation on campus and their health. The University Health Services in

conjunction with student leadership should take a lead role in this. For greater awareness, they could institute a "sanitation day" where health workers would be invited to give talks on sanitations and the students would be involved in clean up exercises.

(ii) Outsourcing of cleaning services to private contractors: - Another way to improving sanitation on campus is to outsource cleaning of sanitary facilities to private contractors. The school authorities should find a way of managing resources to pay the services of sanitary workers from private companies. This is because the private workers would be more diligent in discharging their duties, as they are better paid and have the fear of being sacked for inefficiency by their employers. This would make the sanitation facilities more hygienic and safer to use and protect students from contracting sanitation related diseases such as candidiasis, cholera, diarrhea and skin rashes.

(iii) Institution of an efficient sanitation task force. The university management should set up a task force that would ensure among other things that students do not litter the campus indiscriminately, sanitary workers come to work on time and clean as often as they ought to. Dustbins at vantage points are emptied regularly by the cleaners and students are not allowed to perch at the halls. They would also ensure that people living in nearby communities do not engage in unauthorized hawking and littering on campus. Offenders of these regulations should be made to pay fines and the money used to purchase dustbins and other cleaning materials. The task force would also ensure that dustbins are situated almost everywhere on campus to reduce littering. Members could be motivated with stipends from fines.

(iv) Rehabilitation and maintenance of sanitary areas: since the establishment of this institution many of the washroom facilities have not been renovated and are in bad shape. Most of the taps have rusted, sinks spoilt, and bathroom accessories damaged. Management should therefore renovate these areas and make sure that the spoilt equipment are fixed and in good shape. There could even be the construction of systems that would harvest rain water which could be used to clean the bathrooms and channeled to flush the toilets whenever the taps fail to flow.

(v) Provision of boreholes and water pumps in times of water shortage: one of the major challenges for students during the Second Semester is water shortage generally in Cape Coast. The washroom facilities become extremely dirty and unhygienic during this time. Management should therefore set up committees to provide bore holes and storage tanks for every hall and water pumps to supply water for use in the washrooms at such times. This would prevent students from misusing the places of convenience and keep the places neat at all times.

(vi) Encouraging waste segregation and recycling: waste segregation and disposal is important. Accumulation

of waste particularly organic waste is not only unaesthetic but leads to the breeding of insects which aid in disease transmission. Bins for different types of waste should be made available so that plastics could be separated from organic waste and other kinds of waste. Recycled papers from the offices and from students could also be recycled and transformed into toilet rolls and distributed to the students at the halls instead of having to buy from toilet roll producing companies. With this, the university could even sell the plastic and other kinds of recycled waste to industries that need them. Plastic waste materials could also be remanufactured into plastic items such as bowls and cups and buckets for use in the school and some sold for profit. Organic fertilizers could also be produced from the organic waste materials and sold for profit. Students and lecturers from the natural sciences and agriculture departments could be consulted in designing mechanisms to make the production possible.

(vii) Encouraging healthy competition on sanitation among the traditional halls: an award scheme could be designed on sanitation and given to particular halls at the end of each academic year. These halls should be made to embark on a sanitation projects each academic year and the hall with the most successful project should be awarded. At the end of each academic year, awards should also be given to the neatest hall on campus. This would motivate the students to keep their halls clean and cultivate good sanitation habits.

(viii) Training campus food vendors to ensure proper sanitation.

VI. CONCLUSION

Improved sanitation ultimately contributes to nation building by enhancing the health status of the citizenry and their economic productivity. Despite management's best efforts, there appears to be gaps in finding a holistic solution to sanitation challenges on UCC campus. Ensuring good sanitation is the collective responsibility of all stakeholders (University Management, Students, and the communities around the University of Cape Coast). All actors' roles are necessary in ensuring the maintenance of high environmental sanitation standards to prevent diseases caused by insanitary conditions on campus.

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Advancement Strategies for Tertiary Institutions

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ABSTRACT

This paper seeks to delve into the institutional advancement option of raising third-stream income for universities in Ghana, highlighting the benefits, road map, challenges and the recommendations that would see the efficient and effective operation of the advancement options for universities in the ever-increasing competitive world.

GLOSSARY OF TERMS

Advancement: is used to refer to the process of improving systems, processes and conditions.

Donor: a person who contributes something, eg. Money.

Alumni: a former student.

Engagement: is used to describe the interaction between and among people.

I. INTRODUCTION

In Ghana, university education has been free from the early days of nationhood. Tertiary institutions were established primarily to provide higher education, research and skilled labour to accelerate the country's development. However, in recent times, many universities in Ghana, especially the Public Universities have been greatly hit by a decline in government subvention to cater for their upkeep. This is not peculiar to Ghana but appears to be the current global trend.

Governments around the world continue to cut educational budgets for economic reasons and set up alternative funding options. To supplement the limited funding from government, universities have fashioned out alternative means of funding. These include various fee regimes from students, lease investments for themselves and embarking on various income generation activities. More often than not, the burden is shifted unto the students and this is having a great toll on the quality of education delivered.

Fredua-Kwarteng (2004) in her article on '*Financing Ghanaian Universities*' said that, 'Universities in Ghana are assigned to the high dependence category, because they depend on the government for 90% or more of their total funding. However, as other areas are competing more fiercely for our meager government revenues, our universities are getting less and less from the government than they need to carry on their operations. Given the inadequate government funding of our universities, they have resorted to a cost-sharing approach towards the solution of their funding problems. This approach involves sharing the cost of university education with students and their families or guardians. Accordingly, our universities have imposed tuition fees on their students; charges for room and for the facilities students use.'

(<https://www.modernghana.com/print/113751/1/financing-ghanaian-universities.html>) This policy has drifted away from the Dr. Kwame Nkrumah initiated tradition of free

university education for Ghanaians. Nevertheless, these approaches have only made a small impact in our universities' financial problems. They still rely heavily on government funding. One would think that continuous increment in fees would have ended the funding problem facing universities but that is not the case. To solve this problem of insufficient resources, these tertiary institutions have to explore other avenues for resources.

II. EMERGENCE OF THIRD-STREAM INCOME

It is as a result of these shortcomings that the concept of third-stream income comes to bear. A trend among universities that is described as using a range of measures such as knowledge transfer, community service, community engagement, and income derived from other sources than public subsidies and student fees. Higher education in Africa is funded by a combination of:

- (i) State subsidies (first-stream income)
- (ii) Student fees (second-stream income)
- (iii) Funding from other sources (third-stream income)

In line with higher education around the world, the sector's reliance on state subsidies has declined. Also because fee income has not kept up with inflation, many universities around the globe have turned increasingly to third-stream income to fund their operations. Paul Hoskins in his article: 'Why Universities must optimize third stream revenue opportunities' said that, 'the very name "third-stream revenue" relegated a potentially reliable source of income to a status akin to something that is considered third rate and very low priority. This notion was reinforced by numerous universities' websites where the sections dedicated to "Business", presented a nebulous array of ill-defined services and offerings that were poorly targeted and non-specific in their offer.' In Ghana, many universities have virtually no idea what third stream income activities entail and even where the idea exists, there is the lack of key competencies and know-how to successfully implement them.

Third-stream income includes options such as institutional advancement, innovation, bequest, income from contract or sponsored research, entrepreneurial or commercialization activities, philanthropic funding, provision of services and investments. It seems however that many universities are yet to position themselves with the necessary strategies; leadership or business models, to optimize the opportunities that exist for third stream activity and revenue though attempts are being made.

The development and implementation of a third-stream income strategy requires a change in the way universities typically operate in Ghana. 'It seemed that few universities

understood how to market third stream services, since most have a structure optimized for the promotion of teaching, learning and research. Few have understood how to make their commercial operations relevant to their core activities.' (Hoskins, 2011). There is a culture clash between academia and commercial enterprise, which inhibits the development of third stream activity. Perhaps, the most important contention is that university marketers understand how to market to students, but have little ability to market to businesses, probably due to tight-fist budgets available. This overview of the issues affecting the development of alternative revenue sources seemed to strike a chord with the majority of people. Establishing the third stream as a part of the continuum of education and/or research will enable universities to develop commercial strategies that are relevant to the academics as well as the administrators and budget holders.

This paper seeks to delve into the institutional advancement option of raising third-stream income for universities in Ghana, highlighting the benefits, road map, challenges and the recommendations that would see the efficient and effective operation of the advancement options for universities in the ever-increasing competitive world.

III. INSTITUTIONAL ADVANCEMENT

Institutional advancement as defined by Murrell (1977); "embraces alumni relations, fund raising, public relations, internal and external communications and government relations in a unified program and seeks to foster understanding and support for universities". Advancement is a strategic, integrated method of managing relationships to increase understanding and support among an educational institution's key consultants, including alumni and friends, government policy makers, the media, philanthropic entities and the community at large. It is a daily task of universities where they are engaged in nurturing a climate for their image enhancement. Enrolment and financial forecasts for higher education in the next decade undoubtedly will place even greater responsibility on advancement programs as well as on new academic programs designed to meet the needs of the institutions' various publics. Advancement is to inspire meaningful investment in universities by building relationships that transform lives and secure private and public support that make excellence possible. It is expedient that universities interpret themselves to their constituencies. Practitioners in higher education must understand the role of institutional advancement in sustaining not only specific programs or functions of the university but the basic objectives of higher education as well.

In the light of this new trend, many universities have started moving towards advancement in order to sustain their vision and existence. Notable among such universities are Ohio University, Harvard University, University of Nairobi and Cape Town University among others. These universities have in diverse ways carved strategies for benefitting from institutional advancement. These strategies fall within the ambience of:

- (i) Alumni relations

- (ii) Donor relations and fund raising
- (iii) Public Relations/Marketing and Communication
- (iv) Partnerships and collaborations with corporate institutions.

These core activities are structured in a way to create and promote the presence of the University among its publics such as the alumni, staff, corporate bodies, donor partners (national and international), board members, parents and government. At a time when public confidence in higher education is declining and resources are getting scarce by the day, advancement programs must be clearly understood and effectively implemented if the universities' objectives are to be fully realized.

IV. BENEFITS

The essence of institutional advancement is highlighted in the need for creating networks with the university's publics, as its survival largely depends on the relationships created and sustained. As already noted, the university is not isolated and independent of its self; interconnections with other partners enables it to exist. It is prudent therefore that these relationships are fostered in order to enjoy the rippling benefits, some of which are:

- (i) *Strategic promotion of brand to attract students and faculty*

Over the last couple of years, several private institutions are springing up in the country and increasing competition within the educational sector. Many universities are devising new strategies to find themselves appealing enough to prospective students since the wide array of universities present them with the decision of choice. The ultra-modern facilities available and mode of lecture delivery have shifted from the traditional one lecturer- to many students age to the ardent stage where lectures are delivered over the internet and other advanced media platforms. Others have reduced the lecturer- to -student ratio in order to give the students satisfaction for their money. Faculties are competing for resources from both national and international fronts in order to promote their image. Advancement takes care of all these and more by viewing the students as customers and giving them value for their resources. This is done by tailoring the course structure to the current needs and trends in order that these students become relevant to society in the end and not join the "unemployed graduates association" but identify their worth and add value to themselves and the world at large.

- (ii) *Industry linkages to attract funding and enhance students' employability:*

By establishing contacts with donor partners and corporate bodies, Advancement seeks to create a pool of human resources for industries to offer internship and employment opportunities to the students. These corporate bodies are also offered the opportunity to harness the potentials in the students

of the university by way of innovative and creative ideas. Advancement also paves way for certain partnerships to generate revenue and investment opportunities for the investing public. The establishment of an endowment fund and several giving societies in Ohio and Michigan State Universities for instance, have helped cater for the construction of certain facilities such as laboratories in the universities, refurbishment of the library and sponsorship for needy but brilliant students. The giving societies largely constitute alumni of the school who contribute towards certain sterling projects in the school. Advancement also helps the institution identify international donors to secure scholarships and exchange programs for their students. These programs put the university on a higher pedestal on the international front and promote the image of the university to the international community.

(iii) *Provide alternative funding sources*

Institutional advancement outlets of certain universities outside the country have been responsible for establishing Business Innovative Centers as in University of Western Cape in South Africa. The concept of a Business Innovation Centre (BIC) when established and introduced in Ghana would serve as the vehicle for managing the implementation of the third-stream income strategy and consolidating existing efforts, such as grants and contracts management, and the current un-coordinated third-stream income-generating activities in the various faculties and departments. Globally, many institutions have passed on a portion of the burden of decreased funding onto the students through increased tuition and other fees. Given the diverse income profile of the communities universities serve, the Advancement outfit chooses instead, to adopt the strategy of complementing and supporting operational expenses by expanding its capital reserve base and income from activities such as contract research, innovation, entrepreneurship and development and paving way for growth and diversification.

V. CORE ACTIVITIES

(i) *Alumni Relations*

Any university's survival depends largely on its networks and a key resource is its own output; which are the Alumni of the university. The human factor would always have a role to play in terms of inclination. The Alumni who are very much inclined to the school than any of its publics, contribute significantly to the survival of the university. Though many Alumni Offices exist and play their roles accordingly, which includes bringing all alumni together under one mother body, usually in the form of Alumni Associations, Advancement has a more clearly spelt out role which does not intend to usurp and cause an overlap of the responsibilities of these Alumni Associations. What it does is to identify with all alumni and develop meaningful relationships with them. By so doing, the university is able to collate a database of their

alumni and even identify industrious sons and daughters who are making it in academia, the corporate world, the political, media and legal arena to contribute their quota to the development of the university and establish a sense of belonging. It is also responsible for developing a strategy to engage alumni and key stakeholders of the university through social networking systems. In Ohio university for example, there is a mechanism called *PHONATOM*, which allows current students of the institution to call and get to speak with an alumnus who gets to share his or her experience and offer some form of mentoring to the students. This in a way gives some form of hope and encouragement to the students and dispels their fears, especially for those who are unaware of the career path they want to tread. Other functions of the Alumni Relations wing of Institutional advancement include developing initiatives that tend to increase students' awareness of alumni programmes and institutionalizing alumni fundraising events and alumni endowments.

(ii) *Donor relations and Fund raising*

According to Ohio Wesleyan University, Donor Relations promotes relationships with donors by offering assistance with regard to gift acceptance, gift acknowledgment, donor recognition and reporting. Donor Relations assists University Advancement's fundraising mission by coordinating special events, preparing annual endowment reports, organizing the acknowledgment and recognition for donors and serving as a resource for development of staff on matters of stewardship and recognition. The office enhances relationships with the university's benefactors by providing support to both internal and external constituents. Further, the office seeks to fortify donor trust and honor the donor's right to accurate and timely information about the use and impact of their gift(s). (<https://www.owu.edu/alumni-and-friends/give-to-owu/donor-relations/>). The initial strategy is to mobilize resources from University service providers who gain financial benefit from the University. The approach will ensure that giving is reciprocated through preferential schemes. In this regard, special packages will be designed to encourage donation from key university constituents. Examples of such packages are the Founder's Fund and the University of Cape Coast (UCC) Diamond Club initiative, targeted at donor companies and individuals. The second level is to develop a strategic product that targets "Very Successful Alumni" in all professional bodies, politics and business. This strategy aims at sourcing funds from Most Successful Alumni in well-positioned professional bodies both in Ghana and abroad. In return, the university will provide these Alumni with special honors, which may include naming university lanes, roads and facilities after them, providing them special publicity, providing their wards special admission packages under protocol regime, institutionalizing Guest Lectures in their name among others.

The third-phase considers foreign missions and grants offered by way of scholarship opportunities and exchange programmes for students. Advancement will support international relations units with more robust machinery that is able to quickly and efficiently forge relationships with International Offices especially in Africa and Asia (The emerging markets for student's mobility) and is able to raise

money from internationalization efforts through strategic interventions. The Advancement Services Unit will provide the strategy for raising money through internationalization efforts by securing contracts that will promote the image of the university on the international front on some very critical research and taught programmes. It also looks out for certain privileges entitled to educational institutions from these international donors to also benefit the staff through training and development sessions that some of these missions organize internally or abroad.

(iii) *Public relations / Marketing and communication*

A very powerful area universities are tapping into is the marketing and communication sections. Pre-existed public relations offices performed the role of communicating to the university's publics which narrowly included students, alumni, board members, staff and the partners of the university. Advancement broadens the scope to include parents, donors and international community, to not only keep them abreast with information, but to identify their needs and strategize to meet these needs to the benefit of all parties. Some of the mediums used include online alumni newsletter, magazine, radio slots, souvenirs and electronic shots (*E-shots*). The aim is to promote a vibrant image of the university to its publics in the face of stiff competition.

(iv) *Partnerships and collaborations with corporate institutions:*

The main brain behind this caption is to foster good relationships with corporate institutions and partners, by expanding the net of companies the university has business relations with and strengthening such relations to benefit the university. The thrust here will be to form key partnerships with industry in particular and educational institutions in areas that promise to be of strategic economic interest to both parties, by creating relationships with all the stakeholders in the area of training and consultancy services. It also calls for developing strategic fundraising programmes that are appealing enough to this sector. There is also the need to establish strong relations with professional bodies such as Institute of Chartered Accountant Ghana (ICAG), Chartered Institute of Management (CIMA), Association of Chamber of Commerce Executives (ACCE), Association of Chartered Certified Accountants (ACCA) and Chartered Institute of Marketing Ghana (CIMG) to mention but a few. These professionals, if contacted formally can expose the University to fundraising opportunities. Some can also provide opportunities for networking with international organizations that donate or provide funds themselves. There is therefore a need to consciously build data on these professional bodies and develop programmes that can maximize the benefits to be derived. This certainly will be the calling of the Institutional Advancement.

VI. CHALLENGES

Challenges are inevitable especially at the conceptualizing stage of every initiative. Institutional Advancement units across the world and universities, are likely to be confronted with the following challenges:

- (i) Difficulty in obtaining support from university board and other key bodies.

- (ii) Difficulty of identifying alumni, especially in an institution where proper records are not kept.
- (iii) Unwillingness of some alumni to contribute back to their alma mater based on student life experience.
- (iv) Conflict of interest in areas of institutional ownership.

VII. CONCLUSION

Ghanaian universities have for some time not been placed among the best universities on the globe though strides are being made gradually. The question however is "*Till when?*" It is clear that the higher education sector is going through an important transition in terms of its third-stream activities. Institutions are expected to become increasingly strategic. Decisions will need to be made by institutions in the future about how to allocate resources for such activities, with different decisions depending on their policy intentions and expectations. To ensure that the universities do not die off after some time, it is prudent that they tap into the Advancement option and not be left behind time.

VIII. RECOMMENDATIONS

To face the challenges cited above, an in-depth understanding of the advancement option is critical. There should be training workshops organized for key staff members to be enlightened on the benefits of Institutional Advancement. They would in turn educate and sensitize the university and its publics on the need to take advantage of Advancement in order to keep pace with competition and also ensure its survival over time. This is NOT to suggest that it would be in the public interest to turn universities into 'commercial' entities competing against private enterprises. Rather, the policy goal is that universities play a key public role in contributing to the development of commercial and other sectors within the society. This will require universities to develop commercial awareness and better capacity for working with the external world – but not because they should turn into profit-seeking bodies.

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Comparative Analysis of OSPF, Rip And EIGRP Convergence Time Using Riverbed Modeler

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Abstract: Routers have enhanced the way network devices communicate with each other in today's modern age. This comparative analysis aims to determine the effectiveness of different routing algorithm with convergence time being the key performance indicator by simulating a fairly large network with Riverbed Modeler academic edition. It was concluded that the router information protocol, RIP which implements the direct vector algorithm is the performing and slowest for the simulated relatively fairly large network.

Keywords: RIP, OSPF, EIGRP, Convergence, Routing Algorithm, Routing Protocols, Router .

INTRODUCTION

Routing is the communication of information around the network involving a source and destination. It is the process of choosing a path for traffic in a network, or between or across multiple networks [7]. This is done using routing algorithms, implemented in the design of routing protocols found on network routers.

It is how the information about the network links such as bandwidth, error rate and link failure are transmitted between the different routers in the network; including the processes involved in selecting the best route in a network, centered on various routing metrics used by different protocols. This paper simulates and compares the convergence time of different routing algorithms using Riverbed network modeling tool.

Routing Algorithm

Routing algorithm is a set of sequential processes utilized to direct network traffic effectively between its source and destination. As packets exits its source, there may be different paths available it may follow to arrive at its destination; routing algorithms mathematically determines the best path to take. Different routing algorithms use different methods to determine the best path. [3].

This formula is stored in the router's memory. It is a key performance factor in any routing arrangement, its main purpose is to make precise choices for the routers regarding best paths for data to be transmitted [4].

There are two categories of routing algorithms that can be used by routing protocols this includes

1. distance vector algorithm and
2. link-state algorithm

1. Distance Vector algorithm

The distance vector algorithms implements Bellman–Ford algorithm in calculating the shortest paths from a single vertex in a weighted digraph to all of the other vertices [7]. This method allocates a cost number to all the links between each network node in the network. Nodes conveys packets from various points e.g point A to B via the path that results in the lowest total cost.

The algorithm functions in an unsophisticated way; when a node switches on, its only aware of its direct neighbours and the shortest cost of reaching them. these record of destinations, total cost to each destination and the next hop to transmit data to get there, forms the routing table, or distance table. Each network node, on a constant basis sends to each neighbour node its own current valuation of the total cost to get to all the destinations its aware of.

The neighboring nodes examine this evaluation and compares it to what they already 'know' and anything that seems to be an improvement on what they already have, they incorporate it in their own routing table(s). Over time, all the network nodes learn the best next hop for all destinations, and best total cost.

Distance vector routing is a simple routing protocol used in packet-switched networks that exploits distance to choose the best packet forwarding path. Hop counts represents distance.

2. Link State algorithm

Link-state algorithms graphically represents the network using information from every available node then provides the whole network with information about all every other node it can interconnect with, every node then individually rebuilds this information into a map. With this map information, each router individually decides least-cost path to other nodes using Dijkstra's algorithm. The outcome is a graph tree, rooted at the current node, so that the path through from the root to any other node is the least-cost path to that node on the tree. This tree helps to form the routing table, stating the “best-next” hop to get from the current node to any other node.

Routing protocols

Routing protocols are sets of rules routers implements to ascertain the best paths to forward packets from source to its appropriate destinations. it governs how routers speak with other routers, distributing information that enables them to select routes between any two nodes on a computer network. Routers routing protocols gives out information about others connected to it, firstly amongst its proximate neighbors, then all over the network. In this manner, routers acquire complete awareness of the entire topology of the network.

The attributes of routing protocols also involve the way it avoids routing loops, how they choose preferred routes using hop costs, the time they attain routing convergence and scalability etc.

Although many routing protocols exist, Three (3) major classes are in widespread use on IP networks.

	Routing Protocol	Routing Algorithm Used	Example
1.	Type 1 - Interior gateway protocols	Link state	<ul style="list-style-type: none">• Open shortest path first• Intermediate System to Intermediate System

2.	Type 2 - Interior gateway protocols	Distance Vector	<ul style="list-style-type: none"> • Routing Information Protocol (RIPv2) • Interior Gateway routing protocol (IGRP)
3.	Exterior Gateway Protocol	Path Vector	<ul style="list-style-type: none"> • BGP (Border Gateway Protocol) • Path Vector Routing Protocol

Table 1: Routing Protocols

Convergence

Convergence is the state a set of routers in a network assumes when they all have identical topological data about the internetwork in which they are connected. A set of routers converges, when they have put together all obtainable topology information from each other through the implemented routing protocol, this information they have collected must not contradict any other router's topology information in the given set and as well, reflect the actual state of the network. [2]. A converged network has all its routers acquiesce on the look of the entire network topology [1].

Convergence Time

Convergence time measures how quickly a set of routers in a given network reach convergence [1]. It changes with the size of the network; bigger networks converge slower than smaller ones. Network convergence time is one of the expedient design goals for network engineering and as well an important key performance indicator (KPI) for routing protocols, which implements a mechanism that allows all routers running the protocol to accurately, quickly and reliably converge.

SIMULATION AND RESULTS

Simulation Tool

Academic edition of the Riverbed Modeler 17.5 was used for the simulation; It replaced IT Guru Academic Edition for educational users who want to utilize simulation software for networking classes. Riverbed modeler integrates tools for different phases networking study including model design, simulation, data collection, and data analysis [6].

Simulation Setup

A mesh network which is comprised of twenty-one (21) routers; which simulates a relatively large network using the Riverbed modeler. This setup is done in other ascertain and compare the convergence time of different routing protocol using different routing algorithm.

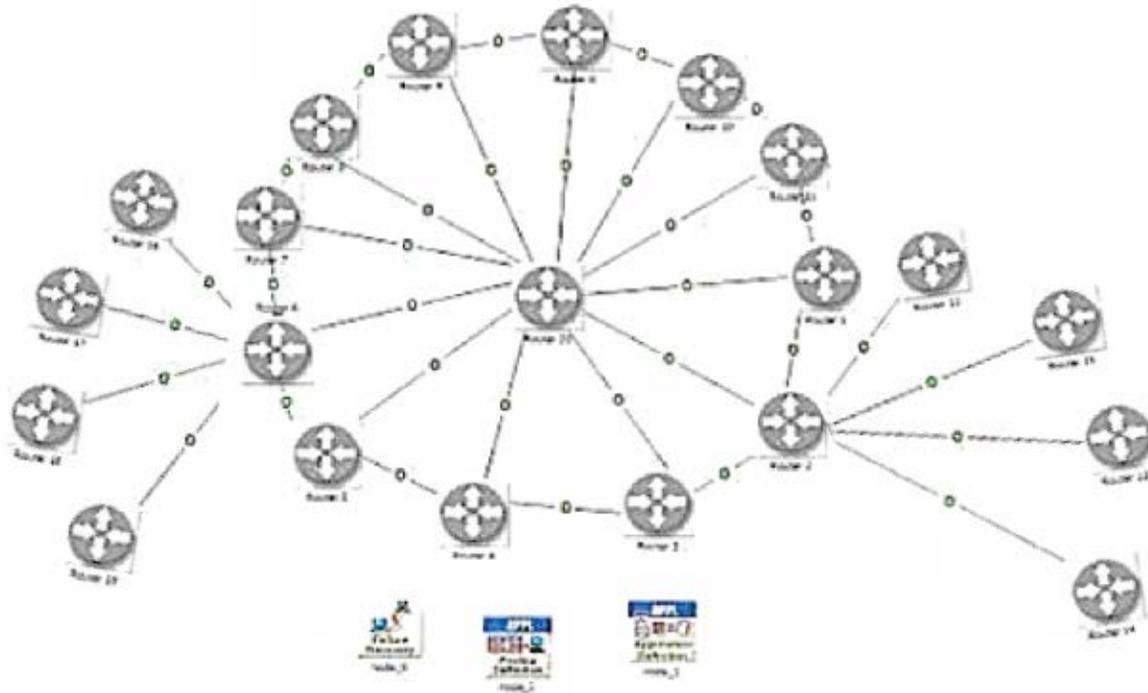


Figure 1: Mesh network architecture for testing for convergence.

Different routing protocol RIP, OSPF and EIGRP was configured and ran on the hybrid network architecture.

RESULTS

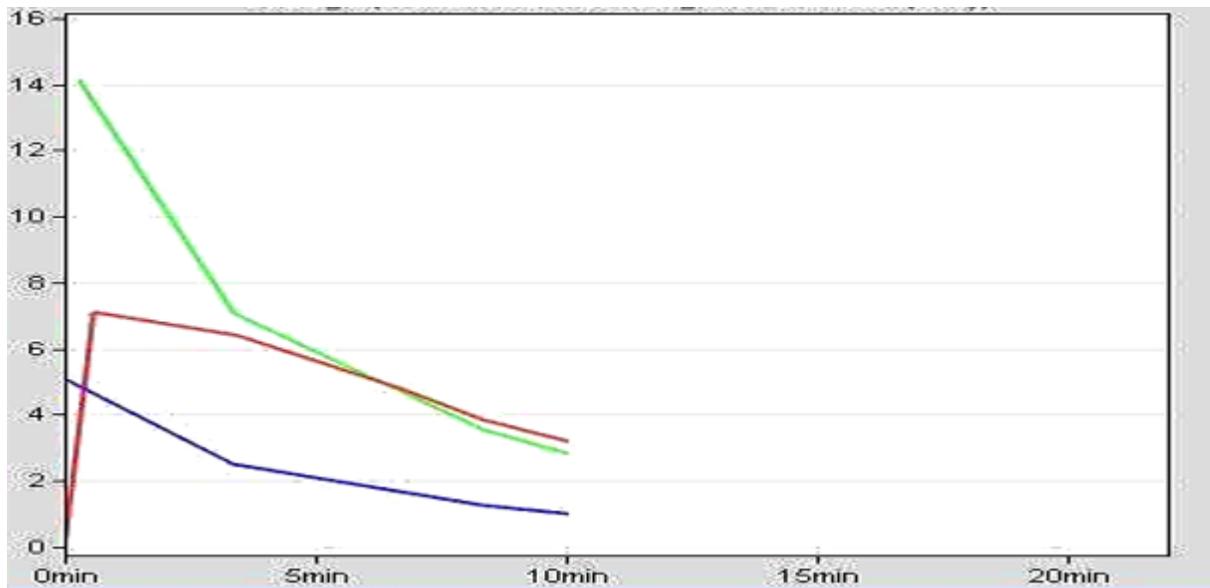


Figure 2: convergence time EIGRP, OSPF and RIP

Blue shows the convergence time of EIGRP, Green color shows the convergence time of RIP, and Red color shows the convergence time of OSPF.

COMPARISON OF CONVERGENCE TIME OF DIFFERENT ROUTING ALGORITHMS

<i>Protocol</i>	<i>Routing Algorithm</i>	<i>Convergence time</i>
EIGRP	Path Vector	5.00 secs
OSPF	Link-state algorithm	7.02 sec
RIP	Direct vector algorithm	14.15 secs

Thus, it can be clearly seen with convergence time being a key performance indicator, its clearly seen that RIP which uses the Direct vector algorithm has the least performance.

Other Comparison of RIP, OSPF and EIGRP are as follows

Protocols	OSPF	RIP	EIGRP
Hop Count	No limit	Maximum of 15	Maximum of 224
Security	MD5	MD5	MD5
Metric used	Shortest Path	Hop Count	Bandwidth, reliability, Delay, load and maximum transmission unit (MTU)
Subnetting	Yes	No	Yes and classless inter-domain routing (CIDR)
Algorithm	Link state	Distance vector	Hybrid
Standard	Open	Open	Cisco Propriety
Convergence	faster	slower	fastest
Memory requirement	More	less	less
Easy of configuration	Difficult to configure	Relatively easy	Relatively easy

CONCLUSION

In the networking world today, RIP, OSPF and EIGRP are the most commonly used routing protocols. From the simulation carried out it can be concluded that the RIP that implements the direct vector algorithm is the slowest of all 3 protocols analyzed for a relatively large hybrid network. Though it uses less memory and easier to configure and setup.

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The Generations of The Internet (Past, Present and the Future)

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Abstract: The concept of the internet started over 50 years ago when computers filled the entire room, today it is an ubiquitous information infrastructure, the initial prototype of what J. C. R. Licklider called the inter-galactic computer network. Its history is complex and involves many aspects – technological, organizational, and community; its influence reaches not only to the technical field of computer communications but throughout society. Categorizing internet into different generations seeks to give us a microscopic view of what the internet was, what it is now and its future. The internet generation is divided into four (4) guided by its usage, number of users, technology, protocols device used and transmission technology.

Keywords: ARPANET, Internet, IoT, World Wide Web, internet generations.

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1st Generation: Research and Development (1965-1980)

In the first generation, internet was a vague idea, and concepts which dwell majorly in the laboratory and publications, it was purpose built to solve specific problems of research, knowledge transfer and avoid the doubling up of already existed information, four (4) network concepts existed, the ARPANET, RAND Corporation (US Military), NPL (National Physical laboratory) a commercial network in England, and the French scientific network

CYCLADES. The inter-connection of this four (4) concepts eventually became the internet.

During this period, network device companies operate a limited self-developed system internally and severely incompatible, proprietary and network protocols existed internally; computer networks at this period were

independent, incompatible and not interoperable.

The main features of the first-generation internet are:

- Very few hosts about 2000
- Independent
- Incompatible
- Not interoperable
- The protocols were incompatible (vendor-developed and proprietary standards)
- Very Slow backbone connection speed about 56kb/s
- IMPs (interface message processors) dominated usage as interfaces to the Mainframe timeshared services.
- Operated by the government and military.
- Usage was mainly for emails.

The pioneer protocols were the X.25 Protocol stack and NCP (network control protocol) used by the ARPANET, 75% of the internet traffic were mostly email.

2nd Generation: Creating the Internet (1980 -1994)

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The formalization and harmonization of the TCP/IP protocol suite for ARPANET, unified technologies and paved way for the interconnection of several intranets to the internet, more countries joined internet, thus solving the problem of independent, incompatible and not interoperability. The ISO (International Standard Organization) OSI (Open System Interconnect) model was created in an effort to standardize computer networking device manufacturing and production, this also solved the problem of vendor developed proprietary standards.

This lead to one of the first definitions of "internet" as a connected set of networks (specifically those using TCP/IP, and "Internet" as connected TCP/IP internets). The NCP (network control protocol) of the ARPANET was replaced by the TCP/IP; and it went global, hence the internet was born. DNS servers where developed so that people wouldn't have to remember the IP addresses of the specific computer they are trying to reach.

The World Wide Web was developed by Tim Berners-Lee during this period as a way for people to share information.

The hyper-text (Hyper link) format available through his web made the internet much easier to use because all documents could be seen easily on-screen without downloading. The first "internet browser" software "Mosaic" - was introduced by Marc Andreessen in 1993, and it enabled more fluid use of images and graphics online and opened up a new world for internet users.

The main features of the second-generation internet are:

- Users numbered in millions (estimated at 16 million users by 1993)
- MiNET separated from the Arpanet
- Standardization of protocols
- interconnected
- Fast backbone connection speed (44.736Mbps)
- Deployment of DNS servers
- Usage was mainly for world wide web (WWW)

The pioneer protocol during this era was the hypertext transfer protocol (HTTP), the world wide web dominated the traffic.

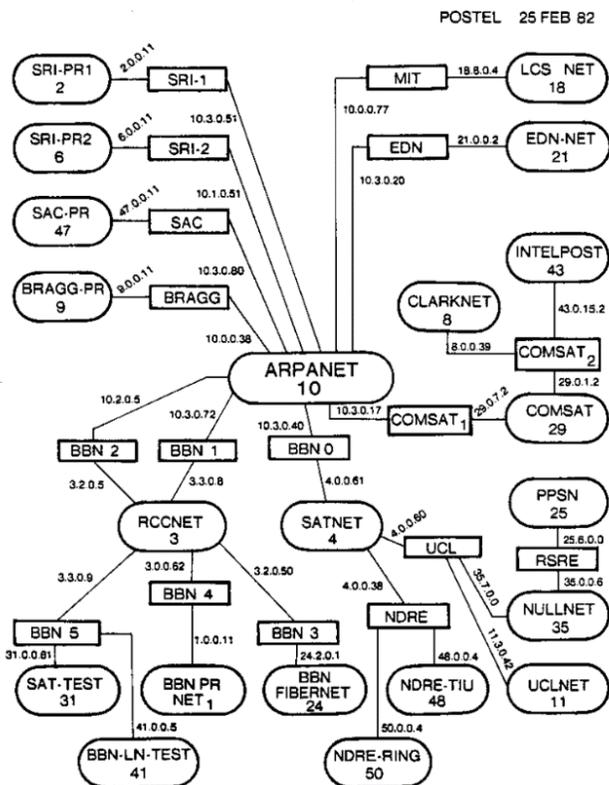


Diagram 1 (Contemporary map of the entire Internet in semi-production phase (many hosts attached to the ARPANET were still using NCP at this point) in February 1982. The ovals are sites/networks (some sites included more than one physical network), the rectangles are individual routers. No individual hosts are shown. Drawn by Jon Postel of the Information Sciences Institute, under a DARPA research contract as part of Internet development.) Source: [1].

3rd Generation (1995 - 2017): Commercializing the Internet

The internet was separated from the military completely and not controlled by the government, it became commercialized and accessible to all for a fee, more and more services was rendered through the internet including, online adverts, ecommerce, online education, internet banking, online entertainment, it became part of everyday life of an individual.

Smart mobile devices, wearables and breakthroughs in data transmission technologies made it a lot easier for more people to be connected.

The Internet became a lucrative source of income, many tech giants emerged, likes of google and facebook worth hundreds

of billion dollars with Amazon CEO, Jeff Bezos as the richest person in the world [2].

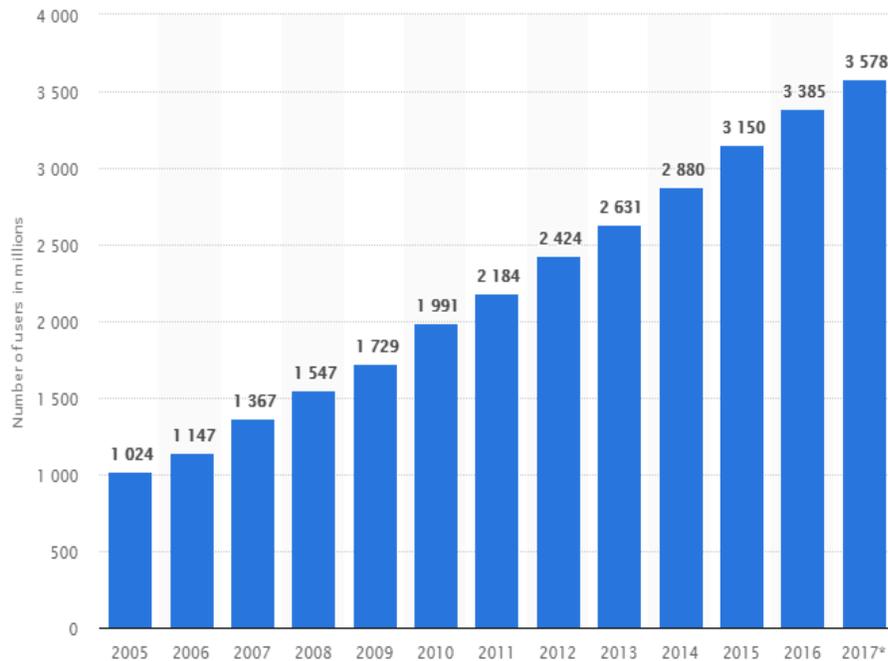
Furthermore, its importance and influence can be felt in every facet of our very existence, politics, governance, health and education.

The main features of the 3rd -generation internet are:

- High capacity transmission technologies (Fibre optics, Wifi, 3G, 4G-LTE)
- Users numbered in billions, 1 in every 7 people on earth access Facebook
- The internet goes global

- Upsurge of malware and DDoS attacks and growth of cyber terrorism (Ransom-Ware etc)
- Very fast internet backbone links (Gb/s)
- IPv4 addresses exhausted and to be replaced IPv6 address

Number of internet users worldwide from 2005 to 2017



© Statista 2018

Diagram 2: Internet Users [3]

4th Generation (2018 □): The Future (Politicized internet / Internet of Everything)

The internet is a work in progress, its usage and capability not yet fully exploited, with the invention of the IPv6 with number of host reaching 2^{128} (enough for every single device and individual on earth to have a unique IP address) and advances in routing and switching technology such as the MPLS (multi-protocol label switching).

There have been several assumptions about the future of the internet, but the internet of the future will be motivated by politicizing the internet and Internet of Everything (IoE) including implants such as radio frequency identification (RFID). These will be characterized by the following:

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1. Politicizing the internet, The internet because of its ubiquity and ease of access, will be more and more exploited for political gains by politicians and people with political interest; according to a research carried out by Pew Research Center, 35% of respondents within the ages of 18 and 29 years opined that social media was the most helpful source of news information about the 2016 American presidential campaign [4]. Exploiting the internet to influence politics can also be seen in Facebook–Cambridge Analytica data scandal where personal identifiable information (PII) of about 87 million Facebook users were exploited to influence voter opinions in 2015 campaign of united states and 2016

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Brexit vote [5]. Most likely, there will be more and more political interests on the internet to police fake news, cyber-bullying, cyber-warfare and internet as human right.

2. Wireless technology will continue to evolve, giving us ability to connect at unprecedented speeds, technologies like 4G-LTE, WiMAX, 5G and LIFI (light fidelity) will give us the ability to access the Internet wirelessly at speeds comparable to broadband connections, it is evident that the Internet connection speed will be faster, more pervasive and available.

3. Everyone on earth will have access to the internet, connection to the internet will become a right, that cannot be alienated.

4. Internet of things (IoT): A means where connected devices can be accessed/pinged by other connected devices is called Internet of Things (IoTs). It is estimated that 26 billion devices / units to be installed within the Internet of Things by 2020 [6], example, our coffee makers, electric cookers, home light switches, cars, body implants etc. this do not include PCs, tablets and mobile phones. Devices will be able to talk to one another, take decision without the need for human interventions and becomes self-aware.

5. A mix of machine learning / artificial intelligence with the internet of things (IoT) will give the internet of the future unimaginable capacities; like online intelligent doctors and lawyers etc.

Conclusion

The internet is developing at a fast pace, with recent developments and innovations in computing power,

miniaturization of devices, virtual reality and advances in developing artificial intelligence and machine learning, the future of the internet is beyond imagination; but it's evident the internet of the future will be politicized because of its ubiquity and ease of access and everything else will be connected to the internet (IoE) as new marketing advertising innovations.

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Management of Supply Chain in Clinical laboratories

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Abstract – Recently, effective management of supply chain in clinical laboratories has been an emerging interest. This paper aims to investigate a Logistic Management Information System (LMIS) coupled with Radio frequency identification (RFID) to improve data collection, analysis and decision making during each phase of laboratories supply chain. The proposed model promotes to reduce cost, decrease delivery time and standardize the total process.

Index Terms - Laboratory Supply chain, Inventory, LMIS, DQOH, ROP, RFID.

I. Introduction

Clinical laboratories tests playing a significant role in diagnosis and treatment plan for patients, also it has a direct effect in the quality of delivered health services and the total national health care system. In developed countries, the cost of supply represents a critical portion of the total expenses of operating clinical laboratories and estimated between (15% to 40%) [1]. Therefore, management of supply chain in clinical laboratories consider as formidable challenge. In 1979, the concept of supply chain management was introduced by Thomas A, and Davis SE, to control the cost of clinical laboratories [2]. Other study achieved by Weinstein et al. 1985 revealed that inventory procedures promote the management of supply chain and yield to financial benefits regarding to clinical laboratories [3]. Typically, the supply chain of clinical laboratories includes raw materials, manufacturers, distributors, and the end user. Materials can be categorized into three main groups. Disposable or non-reused items that used only once during laboratory test, including a wide variety of items such as specific disposable material (microscope slides, cover slips) or general laboratory consumables such as (tubes, gauze, gloves and alcohol). Durable materials that can be reused for multiple test. Bulk chemical material including reagents that used to detect and measure analyte. It vary widely in price, stability, environmental condition of storage such as cold and dry requirement for storage and biological hazard. Practically, the work load is the essential factor affecting the consumption of supplied materials in parallel to other factors related to delivery of vendors, shipment delay and performance of sock materials.

The careful monitoring of materials consumption leads to improve the management of supply chain and reduces the cost by ensuring that sufficient supplies are on hand and used before their expired date. As well as, purchase orders are completed at the specified time. To achieve the ideal supply chain for clinical laboratories, many parameters should be taken into account including the main following points:

- The rate at which the supply materials are used.
- The lead time to order and receive the supplied materials.
- The availability and cost of storage space.
- Unique specification of materials and expiration date or the need to use a specific lot.
- Lists of all suppliers used with vendor name, catalog number, price and storage location
- History of purchase for each supplied materials.
- Estimates of supply wastage.
- Unique characteristics of each supply, such as a short expiration date.

Well designed logistic supply chain is an essential issue to provide continuous supply of good quality of laboratories materials during the whole process of clinical laboratories. The good design of supply chain includes development of logistic management information system (LMIS) which contains tools, process for managing information, inventory control system and procedures for ideal storage and distribution for supplied materials. The main goal of LMIS is to build a mechanism that allow staff to collect and mange information to improve decision making, ensure an uninterrupted supply and identify any problem within the supply chain. Consequently, implementation of LMIS can be achieved through two main phases including; development and maintain standard operation procedures (SOP) to provide instructions about how to operate LMIS, completing the required forms and responsibilities of all staff in the subsystem. Therefore, appropriate training of staff is required to ensure optimal utilization of the designed system.

II. Methodology

The proposed model of supply chain management is based on circular design of work flow combined between clinical laboratories process and supply chain of required materials. In details, the suggested model is developed to count and determine the needed materials that require to be supplied based on the principle of consumption rate of used materials and the actual needs. Clinical laboratories requirement are sent to the supply chain information system. Then a priority of order takes a place on the system. Checking the storage for the desired materials, if it is available direct delivery will take place, if not available a purchasing order is generated and send to the vender department. Checking accuracy, quantity and other unique specification of desired material is the responsibility of LMIS. The below diagram illustrates the management of supply chain through clinical laboratories.

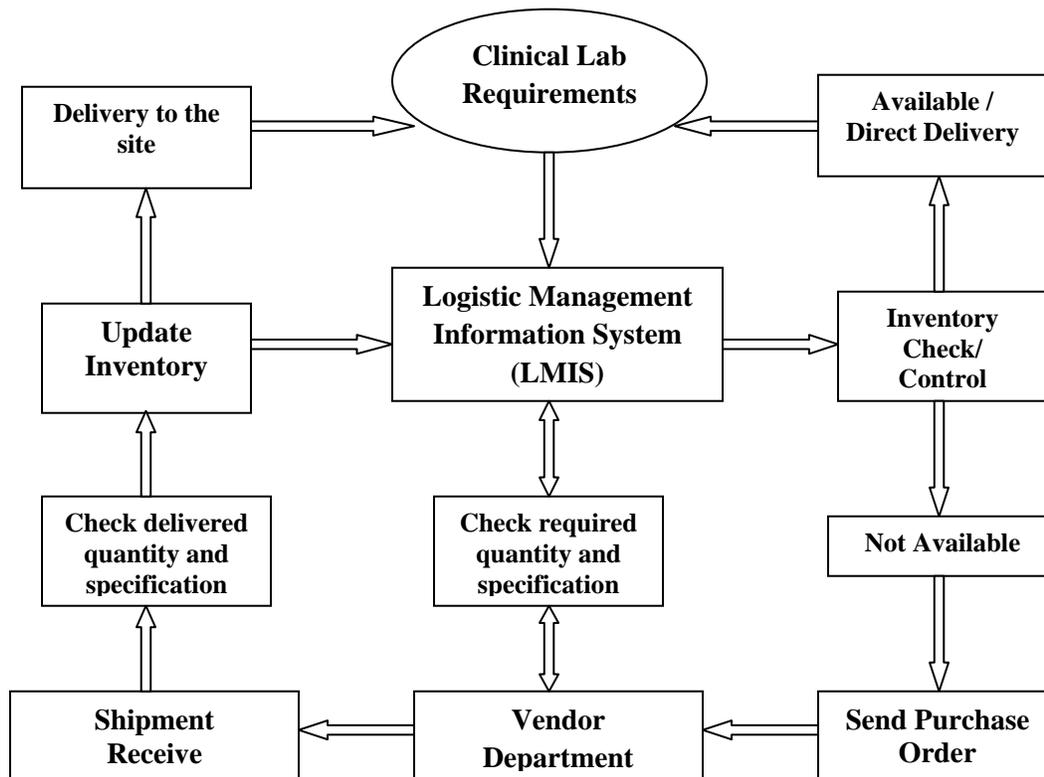


Figure 1: Supply Chain Management in Clinical Laboratories

III. Discussion

Management and utilization of collected data by logistic management information system (LMIS) enables the staff to calculate the desired quantity on hand (DQOH) and the reorder point (ROP) for each supplied material. Indeed, DQOH can be determined by reviewing the previous purchase history of each supplied material coupled with an understanding of the time needed for new supply material to arrive on the correct time (lead time). While, ROP can be determined by taking into the account the usage and consumption rate of each supplied material [4]. Practically, lead time is a critical issue regarding supply chain management. Therefore, it is recommended to utilize the principle of safety stock in supply chain to avoid any unexpected delay of supplied materials that allow sustainable work flow of clinical laboratories. Therefore, the proposed LMIS suggests that order should be placed when supply level reach ROP, and the quantity of ordered materials should cover at least the difference between quantity on hand (QOH) and desired quantity on hand (DQOH). Consequently, LMIS can generate purchase order (PO) automatically based on the previous information about the supplied materials. However, the quantity of supplied materials within the (PO) can be edited and modified to increase or decrease the order quantity. In addition to that, tracking lot numbers and expiration dates can be achieved by LMIS when the shipped materials received. For each supply material, the quantity, lot numbers and expiration dates can be entered to the LMIS. Furthermore, query wizard reports are the main source of collected information about supply. Filling up these reports can cover all data about materials including cost of stock report, lot numbers, inventory, ROP, purchase history reports, vendor details and any other unique specification. Enabling accurate and rapid retrieving of information about any supplied material. On the other hand, supply contracts setting up the relation between manufacturer or their local agents and the buyers, specifying the prices, quality, delivery lead time and the returns. Also, distributing strategies playing an essential role in reducing the cost of storage and transportation of supplied materials. Enabling the decision makers of clinical laboratories to chose direct shipment to the point of usage or to the main storage.

Recently, the growing popularity of electronic business and web based applications are significantly moved the traditional supply chain of clinical laboratories into automated or electronic version. The implemented technologies of information system is a key component in successful supply chain management and enable to deploy capabilities to enhance quality management and reduce the cost and the risk related to supplied materials in clinical laboratories. One of the most common information system used in automated supply chain management is Radio frequency identification (RFID) which is referred to identification and tracking of supplied materials using radio waves. RFID is an automatic identification solution that can identify and acquired data of supplied materials to improve effective information flow within the supply chain and improve quality control through the supply chain [5]. In addition to that, RFID system provide the staff with an access to the collected data to perform real time monitoring, tracing and control the work flow during each phase of supply chain [6]. In parallel to that, RFID can be combined with Internet of Things (IoT) applications to provide automatic tracing capability over web based network [7]. Work flow management of supply chain in clinical laboratories is mainly depending on the understanding of national laboratories network and the guidelines of national healthcare system.

The successful management of supply chain aims to increase efficiency and productivity in clinical laboratory. It has been focused in three main phases including; planning phase, implementation phase and monitoring phase.

- Planning Phase:

All clinical laboratories, whether governmental or private facilities have limited resources that must be used in the most efficient manners. Planning phase significantly provides critical information to develop required management system that allocates all available resources. Assessments of available supply chain and laboratory services provided are a key point of planning phase which provides the decision making and procurement process with required technical information about selection of supplied materials, delivery time quantity, price and the location. After that, quantification process of laboratory requirements including reagents, durable materials and consumables are made, followed by forecasting that projects the quantity of requirements to meet the future needs based on collected data from the clinical laboratories field. Finally, budgeting to estimate the cost of forecasting supplied materials including any required training or maintenance is performed to compare available resources with required supply, modification of supply quantity can be made to meet the available funds, as well as, increasing fund is possible to meet the requirements.

- **Implementation Phase:**

Implementation of procurement process has to be considered according to the collected information of the previous phase, especially quantification and forecasting. Product specification is the essential issue at the phase, where standard and technical specification should be developed to all laboratory products including disposable, test kits, reagents, equipment, and durable materials. Also, specifications have to meet the correct quantity of requirements and technical attributes, and ensure the best quality with best cost. Pre-selection of supplier to determine the open versus limited sourcing for supplied materials can be performed during bidding stage according to the national health regulations. Finally, training and maintenance requirements should be specified previously and implemented at this phase. Preventive and corrective maintenance for laboratory equipments must be achieved according to regular schedules.

- **Monitoring and Evaluating Phase:**

Many indicators should be monitored and evaluated during the management of supply chain in clinical laboratories. Firstly, supplier performance during the supply chain should be evaluated and continuously monitored to ensure correct delivery time, quality, price, inventory control, and customer services. In addition to that, post market surveillance is an important role to determine product quality after utilization in clinical laboratories and assess end users feedback. Furthermore, lot testing can be performed to validate the quality of supplied materials especially before consignment is released to distribution. Also, samples of lot can be tested at different intervals through the year to ensure continuous monitoring of quality. The below diagram shows the workflow at each phase of clinical laboratories supply chain.

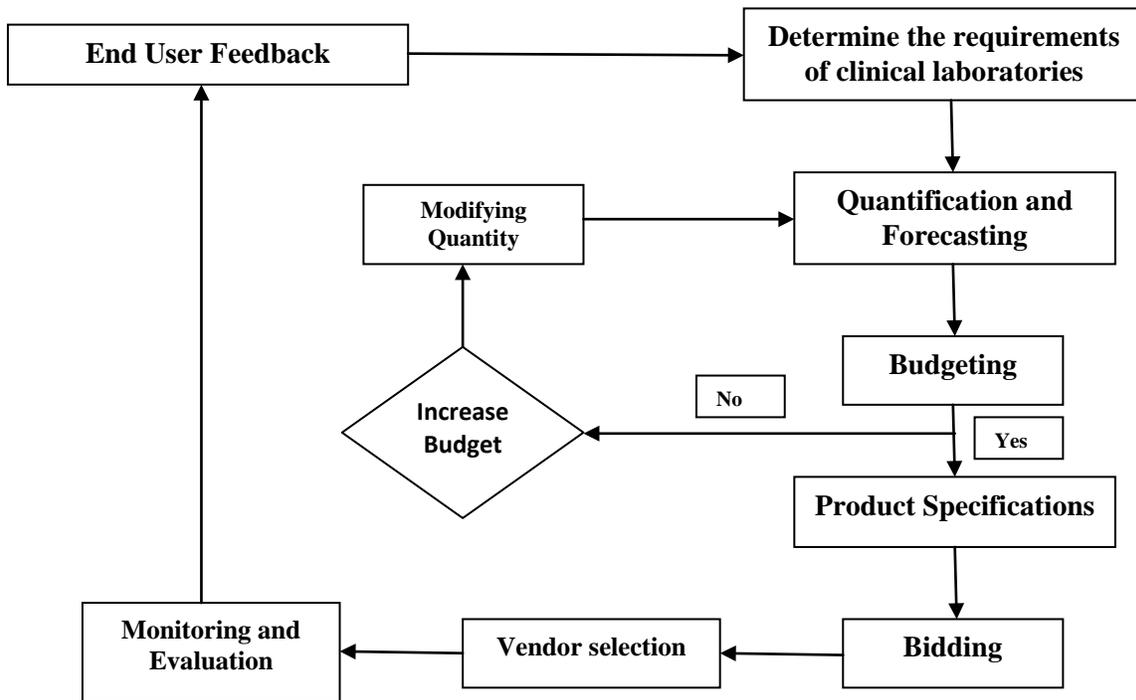


Figure 2: Supply Chain Phases

IV. Conclusion

The management of supply chain in clinical laboratories is a critical issue regarding different parameters that have involved during the process. Management of DQOH, ROP, QOH, PO, lead time, inventory stock can be achieved by computerized system deals with collected information at each phase of supply chain and prompts accurate decision making to ensure sustainable supply for clinical laboratories. Our suggested model of Logistic Management Information System (LMIS) aims to reduce cost and time needed to deliver clinical laboratories requirements. As well as, ensure accurate delivery time, best quality of supplied materials and perfect distribution of materials between laboratories and stock inventory. In addition to that, the development and improvement of electronic supply chain based on using of automated identification system such as RFID coupled with web applications or IoT facilitate optimal utilization and retrieving of collected data, and enhance continues monitoring and evaluation of logistic supply chain. Finally, management of supply chain is a continuous strategic process that cannot be achieved in isolated steps, but it should be performed as a sustainable operation for clinical laboratories.

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Optimal Design of Overhead Tank Supporting Structure

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Abstract- The provision of water supply in most of the nations of the World is an obligation of the government but in some African countries especially Nigeria, the responsibility has shifted to the citizenry. Most of the structures used by some household to support their tanks to provide gravity flow of water have failed prematurely. In some cases, excessive materials have been used in the construction leading to high cost. This paper analyses and optimizes such supporting structures used by the most household. Patran/Nastran software was used for the analyses and optimization because of its efficiency. It was discovered that the final mass of water tanks (of capacity 2 cubic meters and 3 cubic meters) dropped from 1107.64Kg to 891.16Kg while that of 2 cubic meters and 5 cubic meters dropped from 1107.16Kg to 962.59Kg. The design is hereby recommended for domestic use as it will definitely reduce costs and eliminate waste of materials to the barest minimum.

Index Terms- optimal design, supporting structure, structural analysis

I. INTRODUCTION

The use of overhead tank support for load carrying purposes abounds in Africa, particularly in Nigeria's urban cities. Water is a commodity that everyone needs for various purposes ranging from drinking, washing, agricultural use, and so on. However, the provision of this life-threatening commodity is left on individuals to cater for in some countries like Nigeria. Even though The Nigerian Government has long agreed that the provision of water supply and sanitation services be the responsibility of the Federal, State and Local governments[1]. The United Nations as part of its Millennium Development Goals (MDGs) stipulates that by 2015 the population of people without sustainable access to safe water will be reduced by half. As a result of this, efforts were made by developed nations to increase the provision of domestic water and sanitation, but no serious efforts are made by the developing nations to meet this target[2]. Estimates of the investment in water supply and sanitation (WSS) required to meet 2015 sector MDG targets range from US\$2.5 billion to US\$4 billion annually[3] but today we are in 2017 the target is far from been achieved. So, every household that can afford to sink a borehole makes use of the overhead tank for water storage while others may patronize water vendor, like truck pushers. For the former, their tanks are supported with the structural arrangement made of steel pipes with a different cross section for carrying the water tank in a various household for

domestic use as the ruling governments have failed to provide pipe born water for the citizenry. An example is shown in figure 1 below.

The purpose of this study is to analyze and optimize the structural arrangement used for the purpose of carrying overhead tank as some have failed prematurely while some use excessive materials in the construction leading to high cost

Structural analysis using finite element software has been in use for over three decades which has wider application in aerospace engineering for spacecraft structure and aircraft.

The finite element method (FEM) is a numerical method which can be used for the approximate solution of complex engineering problems. The method was first developed in 1956 for the analysis of aircraft structural problems. Thereafter, within several decades, the potentialities of the method for the solution of different types of applied science and engineering problems were recognized. Over the years, the finite element technique has been so well established that today it is considered to be one of the best methods for solving a wide variety of practical problems efficiently. One of the main reasons for the popularity of the method in different fields of engineering is that once a general computer program is established, it can be used for the solution of any problem simply by changing the input data[4].

With the use of finite element analysis software packages such as NASTRAN, ABAQUS, ANSYS, and others, it is possible to model structures in great detail and to examine their behavior under various static and dynamic load conditions. For instance, in a dynamic simulation, the structure's natural frequencies can be assessed and relative phase information of deflection shapes at different locations within the structure can be indicated. A number of thesis work has been handled by SUAT ONTAC, [5]and CIHAN [6] both works were on microsatellite structural analysis where vibration induced loads were investigated.

MACNEAL-SCHWENDLER CORPORATION (MSC) Patran/Nastran software had provided a user-friendly environment to accomplish structural design using Sol 200 where sensitivity analysis is automatically invoked when optimization is required.

Using sensitivity analysis Creto (1998) improve the frequency and mass of a Brazilian Scientific Satellite (SACI-1).[7], XIA[8] uses three methods, the modified feasible direction algorithm, sequential linear programming, and sequential quadratic programming to obtain an improved cross-sectional area of a large scale structural design.

In addition, Yin et al (1992) optimized a waffle panel which is a bidirectional stiffened panel to obtain an optimal design using sequential quadratic programming (SQP)[9].

In conjunction with structural analysis and optimization of MSC Nastran, automated systems have been used to solve complex and large-scale structural problems in the field of aerospace and engineering. Notable among them are (ASOS)

automated structural optimization system[10], satellite optimization system SAT-OPT[11]. ASOS was used by Woo to reduce the weight of a honeycomb sandwich component of a scientific large-scale satellite using frequency constraints.

Through this work, optimal design, efficient load carrying capability and minimum cost of construction of the overhead tank supporting structure had evolved.



Figure 1 A household showing the overhead tank and its support in Satellite Town (Lugbe) Abuja Nigeria

ANALYSIS AND OPTIMIZATION

Static analysis and optimization which was done using (MSC) Nastran software were to verify the strength of the arrangement. A group of scholars has done a lot of work on analysis using Finite Element Method particularly using Nastran software though on different application but of the same principle as this study. Among them are found in these references[12][13][14][5][15], where various ways of using MSC Nastran in analyzing structures were established.

The application of structural optimization came to limelight as far back as 1960 when L. A. Schmit introduced the theory of mathematical programming into the structural design of cone shell which generally was accepted as a foundation for the research area[16]. Further presentations by the same author in providing different methods for effective structural synthesis have over the years had enhanced robust mathematical programming algorithms for efficient solution e.g. approximation concept in[17][18] and multilevel approach in [19][20] some uses genetic algorithm[21] and dual method[22].

II. METHODOLOGY

The analysis was carried out and then optimized. The process involved in design optimization consists of the following general steps [23]. The steps may vary slightly, depending on whether performing optimization interactively through the Graphical User Interface (GUI), in batch mode, or across multiple machines:

- ✓ Create an optimization design module which in this case was done in(MSC) Patran software,

- ✓ defining design variable (pipe cross-sectional radius) declaration
- ✓ defining the constraints, i.e. margin of safety ≥ 0
- ✓ design objective, that is to minimize mass and design study
- ✓ Initiate optimization analysis and wait for the process to run on MACNEAL-SCHWENDLER CORPORATION (MSC). Nastran
- ✓ Review the resulting design sets data and post-process results.

A general structural optimization (SO) problem can take the form as:

$$(SO) \begin{cases} \min f(x) \\ \text{s.t. } g_j(x) \leq 0 \quad j = 1 \dots m \end{cases} \dots\dots\dots (1)$$

Where f(x) is the objective function,

$x = \{x_1, x_2, \dots, x_n\}^T$ and $g_j(x) \leq 0 \quad j = 1 \dots m$ are design and constraints variables respectively.

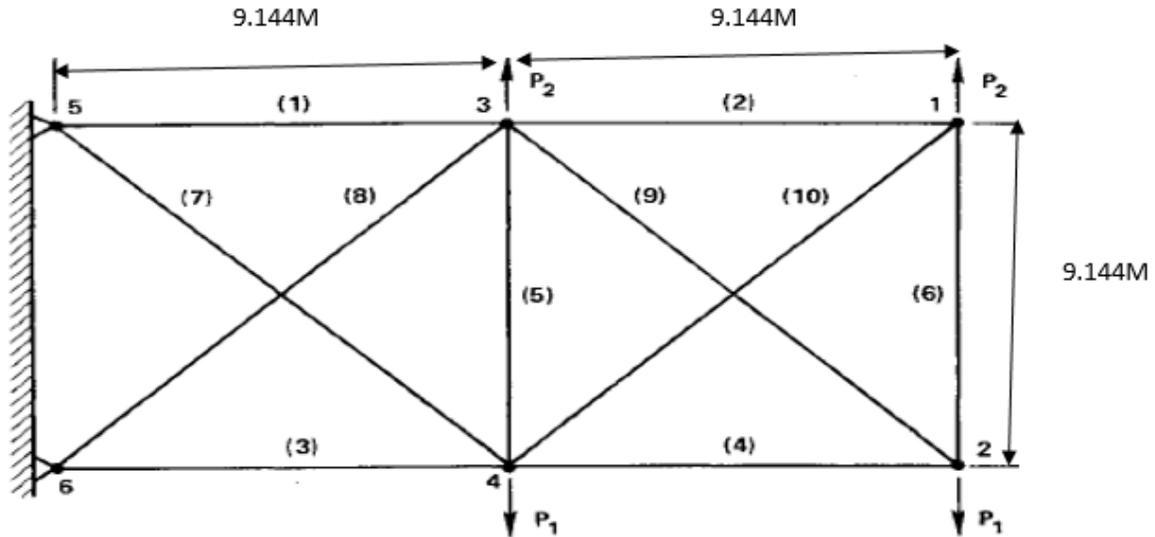
The optimization problem statement requires an explicit description of the design objective, as well as bounds which define the region in which it may search[16].

Before the optimization report is presented as a numerical example to test the efficiency of the software was examined.

III. TEST EXAMPLE

The example problem presented is a familiar ten member planar truss (see Fig. 2) for which results have been previously reported in [24]. The material properties, stress limits, minimum member sizes, and load condition data for this example are given in Fig. 2 and results are given for four distinct cases in Table 1

and 2. Cases 1a and 2a involve stress and minimum member size limits only while Cases 1b and 2b include vertical displacements limits of ± 2.0 in at all points in addition to the stress and minimum member size constraints. No design variable linking has been employed in this example. The minimum weights obtained are essentially the same as can be seen in the following two tables 1 and 2.



MATERIAL: ALUMINUM, $E = 10^7$ psi, $\nu = 0.1$

STRESS LIMITS: ± 25000 psi (ALL MEMBERS)

LOWER LIMITS: 0.00254 M (ALL MEMBERS)

UPPER LIMITS: NONE

LOADING CASE 1: SINGLE LOAD $P_1 = 100$ K, $P_2 = 0$

LOADING CASE 2: SINGLE LOAD $P_1 = 150$ K, $P_2 = 50$ K

Figure 2 Ten bar truss

Table 1 Previous result as reported in [24] [15]

Case	Minimum weight (kg)	No of analysis	CPU run time (sec)	Member areas for optimum design (m^2), all values in multiple of 10^{-3}									
				1	2	3	4	5	6	7	8	9	10
1a	722.66	20	0.9	5.12	0.06	5.21	2.54	0.06	0.06	3.71	3.59	3.59	0.06
1b	2308.33	23	1.0	19.61	0.06	15.36	9.54	0.06	0.06	5.39	13.38	12.70	0.06
2a	755.00	20	0.9	3.84	0.06	6.49	2.55	0.08	1.32	5.52	1.78	3.60	0.06
2b	2128.16	22	1.0	15.14	0.06	16.35	9.23	0.06	1.27	8.17	8.09	14.17	0.06

Table 2 Present work result for ten bar truss

Case	Minimum weight (kg)	No of analysis	Member areas for optimum design (m^2), all values in multiple of 10^{-3}									
			1	2	3	4	5	6	7	8	9	10
1a	723.48	17	5.12	0.06	5.21	2.54	0.06	0.06	3.71	3.59	3.59	0.08
1b	2296.09	15	19.61	0.06	15.36	9.54	0.06	0.06	5.50	13.52	13.45	0.06

2a	755.23	15	3.84	0.06	6.49	2.55	0.07	1.32	5.52	1.78	3.60	0.06
2b	2115.55	12	15.14	0.06	16.35	9.23	0.06	1.27	7.98	8.27	13.01	0.06

As shown in table 1 and 2, the present study is in agreement with previous work so, the application of (MSC) Nastran is reliable for the current optimization procedure.

IV. THE FINITE ELEMENT MODEL OF OVERHEAD SUPPORTING STRUCTURE

The mathematical model which is the translation of the physical system was obtained using MACNEAL-SCHWENDLER CORPORATION (MSC). Nastran/Patran software which ensures that the model was as close as possible to the actual system by using appropriate interpolation function. The steel pipes were modeled using beam element while shell elements were used for the sheets of metal used to transfer the load to the steel pipes to enhance uniform pressure on the supporting steel pipes. Figure (3) present the FE model of the structure.

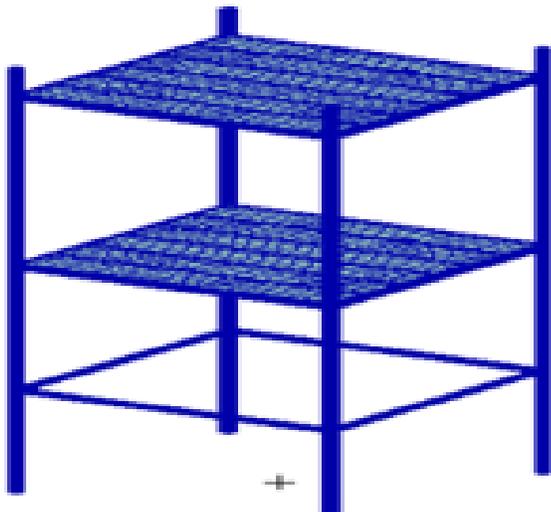


Figure 3 FE model of the overhead support structure

The arrangement was made of 4 vertical steel pipes of 5m in length each, 9 horizontal arrangements of steel pipes in a different orientation of 2m in length each and of two sets that interface the two tanks. Another 4 horizontal steel pipes were used to brace the lower part to increase the stability of the arrangement. The entire arrangement is as shown in figure (3) above.

Material: the steel pipes were made of steel of mechanical properties 210GPa elastic modulus, 241MPa as allowable yield strength [25]

Load: two tanks were used, 2000litres tank on the top, and 3000litres on the second set. These were converted to pressure as follows:

$$\text{Mass} = \text{density of water} * \text{volume} = \frac{1000\text{kg}}{\text{m}^3} * 2 \text{ m}^3 (\text{i. e. } 2000\text{litres}) =$$

$$\text{Force} = \text{mass} * \text{acceleration due to gravity} = 2056\text{kg} * 9.81\text{m/s}^2$$

Cross sectional area, A was calculated as 2.07m²(1.625m diameter of tank)

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}} = \frac{2056 * 9.81}{2.07} = 9743.65\text{Pa for } 2000\text{liters and } 14$$

V. RESULT AND DISCUSSION

The stress distribution after optimization is shown in figure (4)

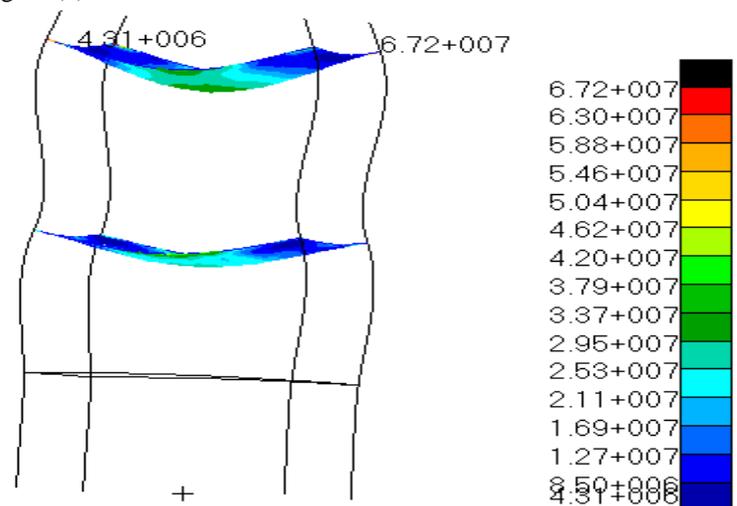


Figure 4 Stress distribution

The maximum stress as shown above figure 4 is 67.2MPa which is lower than the allowable yield strength.

Load case: two load cases were used, case 1: 2 cubic meters and 3 cubic meters (2 M³ and 3 M³), and case 2: 2 cubic meters and 5 cubic meters (2 M³ and 5 M³), the result are shown in the following table 4.

Table 3 OPTIMIZATION RESULT IN METERS

S/No	Label	All values are in meters			Optimal Design	
		Initial (X 10 ⁻³)	Lower (X 10 ⁻³)	Upper (X 10 ⁻³)	Case 1 2 M ³ and 3M ³ (X 10 ⁻³)	Case 2 2 M ³ and 5 M ³ (X 10 ⁻³)

1	A1	38	10	80	18.982	43.864
2	A2	34	10	40	13.149	39.416
3	B1	38	10	80	14.712	14.267
4	B2	34	10	40	10	10
5	C1	40	10	80	24.589	27.564
6	C2	34	10	40	18.589	22.52
7	D1	30	10	80	11.465	11.366
8	D2	28	10	40	10	10

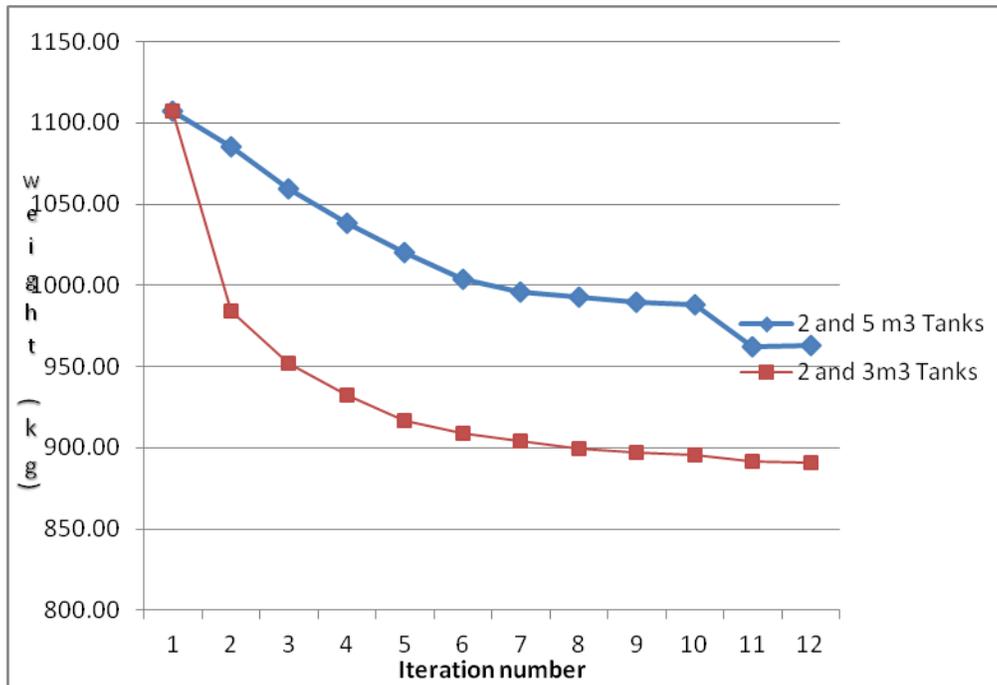


Figure 5 OBJECTIVE ITERATION CYCLE

A1,2 refer to the outer and inner radius of upper horizontal steel pipes respectively, B1,2, are for outer and inner radius of middle horizontal steel pipes, C1,2 gives the outer and inner radius of vertical steel pipes and D1,2 refer to the lower four horizontal steel pipes for stability. It's important to note that this design is only for these load carrying capability as other loads different from these must be analyzed and optimized to avoid premature failure or excessive use of materials.

VI. CONCLUSION AND RECOMMENDATION

1. Through the example presented the validity of the design can be ascertained and the software trusted.
2. The final mass of 2 cubic meters and 3 cubic meters volumes of water tanks arrangement has dropped from **1107.64Kg** to **891.16Kg** while 2 cubic meters and 5 cubic meters drop from **1107.16** to **962.59Kg** as shown in figure (5) which satisfied the weight reduction objective.
3. As table 3 depicts, A1 has a maximum radius of 44mm, A2 radius of 39mm, B1,2 and C1,2 are as shown, which are readily available in the market.

4. The design is hereby recommended for domestic use as the aim of this study is to ease difficulties in terms of cost and material resources

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Impact of globalization on good governance: An analysis on Local government in Bangladesh

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Abstract

Globalization and Good governance both are important issues in the modern time. This study has been conducted to provide the understanding of globalization impact on good governance at the local government in Bangladesh. Based on secondary sources, the study findings suggest that present local government structure is not suitable for coping globalization opportunities that helps to ensure good governance. Local governance will be more strong through the component of good governance. Globalization spreads technology and local government activities can be more transparent with the help of technology. The study also discusses the challenging issues which create obstacles in ensuring good governance in local government.

Index terms: Globalization, Governance, Good Governance, Local government, Local Government in Bangladesh.

I. Introduction

Now a days “Globalization” is a popular term in our daily life. Globalization reduces the state boundary. Though globalization evolved as a economic and business term but now it is an unavoidable matter and influences all the sectors of a country. Without being influenced by internal and external forces, no single state can formulate and execute policies. Most of the developing countries, such as Bangladesh faced pressure from external forces for reforming its socio-political institutions and external forces giving instructions for managing different aid conditions [1]. Bangladesh is a third world country and global interdependency and interconnection affect Bangladesh. Improving the governance quality is a essential pre-condition for developing Bangladesh. Decentralizing local government is a positive step for improving governance system. At present, good governance issue is an important issue. Multilateral organizations and donors are giving importance to that policies that ensure good governance. Globalization is influencing local people in various ways. Local government understand local people’s problems better. As a result, local government works as promoters of development of a country. So, the impact of globalization on good governance in local government is an important issue. The aim of this study is to find out the impact of globalization on good governance of local government in Bangladesh (in this study local government means upazilla and union parishad).

II. Study Methods

The aim of the paper is to discuss the impact of globalization on good governance in local government. The research followed secondary sources such as : related articles, books, journals, newsletters, annual reports of different organizations. Data from different websites have been used in this study.

III. Studies and Findings

A. Conceptual Framework

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Globalization

People all over the world can interact and transact with one another through the benefit of globalization. According to Cerny (1999:188) globalization is “the convergence of economics and politics across borders into single dominant model, a variant of liberal capitalism aligned with neo-liberal politics” or “the intersection of different forms of both convergence and divergence [2]. Giddens (2003) defines globalization as “the intensification of worldwide social relations which link distant localities in such a way that happenings are shaped by events occurring many miles away and vice versa” [3]. Some scholars define -movement of people, language, ideas, and products around the world as globalization [4].

Governance

According to World Bank (1992) Governance is “the manner in which power is exercised in the management of a country’s economic and social resources for development” [5].

Landell-Mills and Serageldin (1991) define the concept ‘governance’ as ‘the use of political authority and exercise of control over a society and the management of resources for social and economic development’ [6]

Good Governance

According to Etoungue Manguella: “Good governance implies presence of rule of law, safeguard of human rights, and existence of honest and efficient government, accountability, transparency, predictability and openness” [7]

According to United Nations Economic and Social Commission for Asia and the Pacific—“Good governance has 8 major characteristics. It is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law. It assures that corruption is minimized, the views of minorities are taken into account and that the voices of the most vulnerable in society are heard in decision-making. It is also responsive to the present and future needs of society” [8].

Local Government

According to Duane Lockard “Local government as a public organization is authorized to decide and administer a limited range of public policies within a relatively small territory, which is a sub-division of a regional or national government. Local government is at the bottom of a pyramid of government institutions, with the national government at the top and intermediate Governments (of states, regions, provinces) occupying the middle rung. Normally, local government has general jurisdiction and is not confined to the performance of one specific function or service [9].

Local government in Bangladesh

Bangladesh became independent in 1971. Generally local government is embodied locally. In Bengal there had always been local government historically. But the structure of local government bodies was changed time to time [10]. Bangladesh is a democratic country and it has two tiers of government system : national and local government. Bangladesh constitution enshrined local government in chapter three . There are three types of Local Government in Bangladesh. These are: rural, urban and hill districts. City corporations and town pourshavas are included in urban authorities and zilla parishad, upazilla parishad, union parishad are included in rural authorities [11].

B. Good governance at local government in Bangladesh

Good governance is an important issue in Bangladesh constitution and Bangladesh constitution provides all necessary elements for ensuring good governance in Bangladesh but Bangladesh government cannot promote fully appropriate policies, surroundings, institutions, capability and good governance practice [12]. Good governance in local government is essential for ensuring good governance in all over the country. Ensuring good governance in local government is also important for institutionalizing democracy and people's welfare [13]. "Local Government is the yard stick of Good Governance" (Begum, Khan and Ahmed: 1998 quoted from Islam, F ;& Haque, M.A).The principles of good governance such as : people's participation, consensus orientation, responsiveness, effectiveness and efficiency, equitability, inclusiveness practicing are absent in local government. Practicing of rule of law is also absent in local government system in Bangladesh. There are no measures starting at local government bodies for ensuring good governance [14].

Mezbah-ul-Azam Sowdagar in the article "Challenges of Local Governance : A study on new upazila Administration in Bangladesh" identifies some challenges for ensuring good governance at local government in Bangladesh .These are-

Intervention

Relationship of central and local government system in Bangladesh is always authoritative. Member of parliament interfere local planning at the respective area but local people can understand local problems properly. As a result, the planning for local government will not bring any effective result for good local governance.

Corruption

Corruption is one of the major causes that hindrances good governance in local level. Due to poverty, many local people get involved in corruption. Central government allocated resources for local development but personnel of local government could not show their honesty and integrity in the time of resource allotment and local people cannot involved themselves in development implementation stages. As a consequence, corruption occurred in local level and it created hindrances in ensuring good governance.

Accountability and Transparency

The accountability and transparency are two essential tools for ensuring good governance in local government of Bangladesh. But these mechanisms are very poor and traditional in local government system of Bangladesh.

Lack of peoples participation in planning and decision making

Local political leaders and economic elites intervene in planning and decision making process. They create hindrances in people's active participation. Lack of people's participation in planning and decision making process do not ensure good governance. [15]

Pranab Kumar Panday & Md.Golam Rabbani in the article "Good Governance at the Grass-roots : Evidence from Union Parishads in Bangladesh" discuss some issues which are related to good governance in union parishad. These are

Bangladesh local governance condition is not favorable for ensuring good governance. Bangladesh government incorporates various provisions such as ward shava ,open budget, citizen charter and right to information in the Local Government Act (union parishad)2009, for ensuring good governance at local level in Bangladesh.

People's participation

According to the constitution of Bangladesh, people can participate at all levels of governance but people's participation opportunity is not sufficient in decision making process. At the local level, information dissemination rate is very low, accountability and transparency in every work and decision process is negligible. Though Local Government Act 2009 (up Act 2009) incorporate the provision of ward shava ,open budget, but no residents of the union parishad give positive opinion in this regard .

Accountability and Transparency

Transparency and accountability rate are very low in local government. Lack of standing committees, lack of council to monitor union parishad activities, poor commitment of representatives, lack of communication, lack of information sharing among NGOs , government officials and stakeholders are the main reasons for this [16]

On the above discussion it is clear that good governance is not ensured in local government.

Impact of globalization on good governance in local government

Governance process and public policy are directly influenced by the global institution in Bangladesh. Dependence on other states and organizations is increasing day by day through the process of globalization in Bangladesh. Bangladesh receives various external suggestions and conditions in the time of changing its governance structure and it also influences local government [17]. In modern world, globalization and local governance both are the reality. The most important fact in life at the modern age is globalization. Globalization impacts on local government by creating new opportunities to democracy, governance and developing process. Globalization obscures challenges and local government merges global opportunities with local interests for capacitating themselves with these challenges. Different types of opportunities and challenges arising from globalization is adopted by the local government through “negotiations, joint agreements, exchanges of knowledge, experiences, technical knowledge and ideas with donors, aid agencies, international NGO’s and development partners”. External and local actor’s interaction is very helpful for global and local development process. But the existing structure of local government in Bangladesh is not suitable for making any linkage with the global development actors. Present local government structure fails to ensure any direction to cope with globalization opportunities [18]. Though Local Government Act 2009 (UP and Upazila Act 2009) incorporates the provision of using advanced technology, right to Information Act, ward shava, open budget for people’s participation which help to ensure good governance at local government. The basis of globalization is strong technology. Globalization expanded technological communication and it influenced local government but it could not ensure good governance fully.

IV Conclusions

Good governance is an essential pre-condition for developing the local government as well as the whole country. Impact of globalization on good governance in local government is also important. Bangladesh is a democratic and developing country, here globalization influences us in many ways. Globalization influences us both positively and also negatively. It creates opportunities and also challenges. Local government in Bangladesh cannot take globalization’s advantages due to its structure and governing practices. If suitable local government structure can be ensured then local government will be able to take globalization opportunities which helps to ensure good governance in local government.

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Prevalence of mastitis at cow and quarter level and correlated threat factors in selected districts of Gurage zone, Ethiopia

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Abstract- Cross-sectional study design was applied from March 2017 to February 2018 to determine the prevalence rate of mastitis at quarter and cow level in smallholder dairy farms in selected area of Gurage zone, South Ethiopia. Various correlated animal and environmental factors to mastitis were also investigated. Among 333 totally investigated lactating cows (75 zebu and 256 cross breeds), overall prevalence of mastitis at cow level was found to be 199 (59.8%) of which 62(31.2%) and 137(68.8%) were identified as positive for clinical and subclinical forms of mastitis respectively. The clinical form was identified by visible clinical signs whereas subclinical one was screened by using California Mastitis Test (CMT). Among 1332 quarters examined, 142(10.6%) were found to be blind leaving among 1190 functional quarters. the prevalence of mastitis at quarter level was 796 (66.9%) of which the clinical and sub clinical forms of mastitis at quarter level was found to be 20.8% and 46.1% respectively. Breed, age, hygiene score, body condition score, presence of feet deformity, experience of pre hand washing, teat dipping were assessed risk factors and the result showed there was strong associated between the factors and the outcome of interest ($\chi^2=47.709, 50.741, 47.304, 73.680, 45.331$ and 9.231 respectively) with ($P<0.05$) that shows high significance difference. The high prevalence rate of mastitis in this study indicates that, it is the thorniest problem of lactating cows in the study area. So as to combat occurrence of the disease, farmers who are venturing dairying should be trained on prevention of mastitis, hygienic milking procedures, proper feeding regime, keeping sanitation of cows, and investigation of mastitis at regular interval, culling of old aged and repeatedly infected cows should be done on regular planned basis.

Index Terms- Gurage zone, Lactating cows, Mastitis, Prevalence and Correlated-factors.

I. INTRODUCTION

Bovine Mastitis is one of the most prevalent, important and costly diseases of dairy animals worldwide, with losses of over 1.7 billion dollars a year in the United States of America alone [1].

Mastitis was found to be responsible for 70% of economic losses and has a prominent place amongst the factors that limit

milk production. Mastitis has therefore become a major area of concern in the field of veterinary clinical practice worldwide [2].

The investigation of mastitis is difficult. Clinical mastitis is confirmed by observation of clinical signs by the farmer (direct detection) while subclinical one is recognized by indirect detection [3].

Various risk factors which have been associated to clinical mastitis are milking routine, type of housing, feeding, and season, as environmental effects. In addition, older cows, later first calving, first stages of lactation and cows with deep udders, weak attachments, and high production are more liable to mastitis. Health problems have negative consequences not only on animal welfare but also in economics of herds because of additional costs in veterinary, medicines, reduction of production, discarded milk, and involuntary culling [4].

Various researchers indicated mastitis as tricky disease in the dairy industry of different parts of Ethiopia and it has long been known and its prevalence, associated potential risk factors and anti-bio gram susceptibility test was studied in some part of different agro-ecological zone of the country [5-9].

Therefore, conducting researches on the prevalence and prompting factors of mastitis which is considered as overwhelming disease problem in dairy production is paramount important. However, information on the prevalence of the disease, correlated factors in smallholder dairy farms at selected areas of Gurage zone is not studied yet therefore, this study is aimed at determination of the mastitis prevalence at cow and quarter level and correlated factors favoring the occurrence of the disease in lactating cows at selected area of Gurage zone.

II. MATERIALS AND METHODS

3.1. Description of the Study Area

This study was conducted in selected areas of Gurage zone of the Southern Nations, Nationalities and People Regional State, located at 155 km south west of Addis Ababa.

3.2. Study Population

The study population comprises lactating cows of local breeds and/or their crosses in the selected kebeles of the study area.

3.3. Study Design

3.3.1. Prevalence study

Cross-sectional study design was applied to determine the prevalence rate of mastitis and related factors in the study area at cow and quarter level based on clinical manifestations for clinical prevalence and indirect test using CMT reagent for subclinical prevalence. Prevalence rate was calculated according to the formula given by [10].

$$\text{Prevalence} = \frac{\text{No. of diseased animals} \times 100}{\text{No. of animals at risk}}$$

3.3.2. Sampling methods and sample size determination

Purposive sampling method was implemented to select small holders that have lactating cows of either breed based on their accessibility then simple random sampling was used to take 333 heads of cows and milk sample from 1190 quarter of teats collected from each study sites. The sample size was determined, by considering 95% confidence interval, with the 5% precision and 50% of expected prevalence. Total sample size was 384 lactating cows according to the formula given by [10].

$$n = \frac{(1.96)^2 * P \text{ exp. } (1-P \text{ exp.})}{d^2}$$

Where,

n=sample size

P exp. = expected prevalence

d=desired absolute precision

3.3.4. Animal Examination

Animal examination was conducted to determine their body condition, presence or absence of feet and leg problems, soundness of udder and hygiene score. Body condition scoring was implemented using 1-5 point scale based on palpation of back bone and lumbar process and evaluation of coverage of fat and muscle [12]. Presence or absences of feet and legs problems were evaluated through visual inspection and palpation. Hygiene scoring of cows was determined based on a scale of 1 - 4 for three zones of the body; udder, lower leg and upper leg and flank [11].

Structure of udder attachment was examined visually and then palpation was applied for presence of cardinal signs of inflammation, visible injury, and fibrosis of the tissue. The size and consistency of mammary quarters was inspected for abnormalities, such as difference in size, swelling, firmness, and blindness. Physical appearance of milk secretion from each mammary quarter was examined for the presence of clots, flakes, blood and watery secretions.

3.4. Data collection

3.4.1. Questionnaire survey and personal judgment

A pre-tested structured questionnaire was developed and information regarding animal data like breed, age, parity, lactation length, milk yield, previous mastitis history, presence of blind teat and management aspects like herd size, milking practice at the time of milking, before milking and after milking was collected. Farm hygiene score and body condition score (BSC) was assessed through subjective judgment based on the standard given by [12].

3.4.2. Preparation of udder and teats for milk sample collection

Udder and teat were cleaned and dried before taking milk sample. Any dirt material adhered to udder and teat was removed by brushing the surface of the teats and udder with a dry towel. The teats was washed with tap water and dried. Then the teats was disinfected with cotton, soaked in 70% ethyl alcohol [13].

3.4.3. Investigation of sub clinical mastitis

Subclinical mastitis at cows and quarter level was diagnosed based on CMT results and the nature of coagulation and viscosity of mixture of milk and CMT reagent), which showed the presence and severity of the infection. From each quarter of the udder, a squirt of milk sample was placed in each of the strip cups on the CMT paddle and an equal amount of 3% CMT reagent added to each cup and was mixed gently. The result was interpreted based on the thickness of gel formed by CMT reagent and milk mixture and was scored as 0(negative), T (trace), 1(weak positive), 2(distinct positive) and 3(strong positive). Finally quarters with CMT score of 1 or above was judged as positive for sub clinical mastitis; otherwise negative [13].

3.4.4. Examination of the udder for clinical mastitis

In order to detect presence of clinical mastitis, udder was examined using necked eye and then by palpating the mammary gland, cardinal signs of inflammation, injuries, and swelling of lymph nodes and presence of blindness were identified [13].

3.5. Statistical analysis

All collected data was analyzed and summarized using Statistical Package for Social Sciences (SPSS) statistical software version 20 and significance of all associated variables with the occurrence of mastitis was tested by chi-square (χ^2) statistical test. The level of significance was set at 0.05 with 95% confidence interval.

III. RESULTS AND DISCUSSION

Table 1 Prevalence of mastitis at cow level and breeds n=333

Breed	Total number of cows tested	Status of mastitis		Overall prevalence
		Clinical	Sub clinical	
Local	75(22.5%)	5(6.7%)	14(18.7%)	19(25.3%)
Cross	258(77.5%)	57(22.1%)	123(47.7%)	180(69.8%)
Total	333(100%)	62 (18.6%)	137(41.1%)	199(59.8%)

Table 2 Distribution and proportion of blind teats.

Table 3 Quarter level mastitis prevalence (n=1190).

Quarters	Total No of teats examined	No of blinded teats	Proportion (%)
Right fore	333	22	6.6
Right hind	333	52	15.6
Left fore	333	32	9.6
Left hind	333	36	10.8
Total	1332	142	10.6

Quarter	Total quarters examined	No of positive and		Overall Prevalence (%)
		Clinical mastitis (%)	Subclinical mastitis (%)	
Right fore	311	52(16.7)	120(38.6)	172(55.3)
Right hind	281	72(25.6)	154(54.8)	226(80.4)
Left fore	301	40(13.3)	124(41.2)	164(54.5)
Left hind	297	84(28.3)	150(50.5)	234(78.8)
Total	1190	248(20.8)	548(46.1)	796(66.9)

Table 4. Chi – Square Analysis Output for the Dependent Variables, Mastitis and the Predictors.

Variable	Category	Status of mastitis				Total	Chi - square (Sig.)	LR (Sig.)
		No		Yes				
		Count	%	Count	%			
Breed	Local	56	74.7	19	25.3	75	47.709 (0.000)	47.755 (0.000)
	Cross	78	30.2	180	69.8	258		
Age	Young	50	58.1	36	41.9	86	50.741 (0.000)	54.273 (0.000)
	Middle	63	53.4	55	46.6	118		
	Old	21	16.3	108	83.7	129		
Udder Attachment	Non Pendulous	104	74.8	35	25.2	139	118.64 (0.000)	116.19 (0.000)
	Pendulous	30	15.5	164	84.5	194		
Feet problem	No	104	56.5	80	43.5	184	45.331 (0.000)	43.255 (0.000)
	Yes	30	20.1	119	79.9	149		
Hand per wash	No	98	36.3	172	63.7	270	9.231 (0.002)	9.064 (0.003)
	Yes	36	57.1	27	42.9	63		
Udder or teat washing	No	23	11.3	180	88.7	203	180.73 (0.000)	197.248 (0.000)
	Yes	111	85.4	19	14.6	130		
Body condition score	Poor	38	20.1	151	79.9	189	73.68 (0.000)	75.845

	Good	96	66.7	48	33.3	144		(0.000)
Hygiene score	Bad	53	25.7	153	74.3	206	47.304 (0.000)	47.659 (0.000)
	Good	81	63.8	46	36.2	127		
Previous exposure to mastitis	No	124	95.4	6	1.8	130	269.665 (0.000)	320.527 (0.000)
	Yes	10	1.9	193	95.1	203		
Presence of blind teat	No	103	53.9	88	46.1	191	34.89 (0.000)	36.232 (0.000)
	Yes	31	21.8	111	78.2	142		
Parity	1 – 2	113	91.9	10	8.1	123	216.202 (0.000)	242.976 (0.000)
	>3	21	10.0	189	90.0	210		

4.1. Prevalence of mastitis

Cross-sectional study design was implemented to determine the prevalence of mastitis from March 2017 to February 2018. A total of 333 lactating cows (75 zebu and 256 exotic or their cross) in smallholder dairy farms in selected area of Gurage zone.

Table 1. Shows within the total of 333 lactating cows, 199 of them were found to be positive for either forms of mastitis. This indicated that overall prevalence of mastitis was found to be 59.8%. In contrary the result of mastitis prevalence in this study was higher than the prevalence reports of [5] and [6], who reported mastitis prevalence 44.1% and 33.6% in the dairy farms of Holeta and Adama respectively. On the other hand the result in this study was lower than the report of [14] and [15] who reported that the overall prevalence of mastitis were 83.1% and 65.42%, respectively in Bahir Dar and its surrounding and Selale/Fitche Area.

Among 333 totally investigated lactating cows, overall prevalence of mastitis, found to be 199 (59.8%) of which 62(31.2%) and 137(68.8%) of them were found to be positive for clinical and subclinical forms of mastitis respectively. This is greater than the report by [9] who found 4% and 38% in East Shewa zone. Whereas the prevalence of sub-clinical in this study is lower than the report of [7] who reported 88.1% in Adama town. It is a well-accepted fact that agro-ecology, milking practice, breed difference, management practices and other risk factors influence mastitis prevalence, which might explain the observed differences between the reports of various authors in mastitis prevalence.

In current study, the higher prevalence rate of sub clinical mastitis compared to clinical form is investigated. This finding is in agreement with earlier reports revealed by [8], [16], [17] and [25]. This result reveals that subclinical mastitis is more challenging. The domination of sub-clinical mastitis in the herd of study are is most likely attributed to the little attention paid by the farmers to this form of mastitis, as the infected animal shows no obvious clinical symptoms and secretes apparently “normal” milk. Lack of implementation of regular mastitis monitoring program such as CMT or other screening tests by all of the farms also contributed to the observed high prevalence of sub-clinical mastitis in our case. Perhaps this fact may justify the lack of awareness on the invisible losses from sub-clinical mastitis.

In this study prevalence of mastitis was found to be higher in cross breeds than local ones which is 69.8% and 25.3% respectively, $\chi^2= 47.709$ and $p>0.05$ (table.1). The finding in this

study is supported by the report of [8], [9] [18], [19], and who revealed cows with exotic blood level are more subjected to mastitis than local ones. This might attributes to variation in immunity to combat the disease, which reflects that local breeds of cattle have strong defense mechanism than pure or cross breeds against the occurrence of mastitis.

Table 2 shows out of 1332 quarters examined 142(10.7%) were found to be blind which is higher than the report given by [8] who found 4.3%, and [6] reported 2.3% blind quarters respectively in their study herds.

Table 3 indicates out of 1190 totally examined quarters, 796 (66.9%) were positive for both forms of mastitis. From this finding, the prevalence of clinical and sub clinical mastitis at quarter level was found to be 20.8% and 46.1% respectively. Among quarters tested and investigated for both forms of mastitis, highest prevalence rate at hind quarter was identified than front quarters which is similar to previous studies revealed by [20] and [22] this might be due to the lower position of the hind quarters in relation to fore ones, which make them more prone to contamination with environmental pathogens or exposure to injurious materials which can exposed to mastitis.

4.2. Correlated risk factors to prevalence of mastitis

In the present study, various correlated factors found to be contributor of prevalence of mastitis. Association of those factors and the prevalence of mastitis is displayed in following tables.

As indicated in table 4, the prevalence of mastitis in relation to age was higher as the age advances with the prevalence rate of 83.7%, 46.6% and 41.9% in older, middle age and young cows respectively. There was statistically significant difference among different age groups $\chi^2= 50.741$ and $p<0.05$. This finding is in agreement with reports revealed by different authors in different parts of Ethiopia, [8] and [23] who reported age considered as potential risk factor to mastitis and cows with advanced age were more prone to mastitis than younger cows, increase in prevalence rate with the advancing age may be due to gradual suppression of immune system of the body, structural changes in udder and teats and repeated exposure to milking practices.

Table 4 expresses cows with udder of pendulous morphology showed higher mastitis prevalence with compare to non-pendulous ones. This is in line with the result indicated by the report of [5] and [8] at Holeta and Hawasa dairy farms respectively this might be pendulous one is more prone to injury and environmental contact.

Table 4 illustrates there was strong association between deformities on feet and presence of mastitis $\chi^2=45.331$, $P<0.05$. This might be partly due to longer time the cows with feet abnormality spend more time in laying position and that increase the contact with environmental pathogens and will be prone to mastitis than cows with normal feet.

In this study practice of hand washing before milking reduces the prevalence of mastitis (table 4) the prevalence of mastitis with prewashed hand and unwashed ones at the time of milking found to be 42.9%) and 63.7%) $\chi^2 = 9.231$ $p<0.05$. This is in agreement with the report of [7] this might be attributed to possibility harboring mastitis causing agents on unwashed milker's hand.

The current investigation showed that cows washed before milking found to be less prone to mastitis than unwashed ones with prevalence rate of 88.7% and 14.6 % respectively (table 8). This is in agreement with the report of [7] who found 82.5% of prevalence rate at Adama town. This might be due to presence of mastitis causing pathogens on skin of unwashed teat or udder.

Body condition score was considered as risk factor to mastitis in this report. Cows with poor body condition had more prevalence rate (79.9%) than those with good body condition (33.3%) and the difference was statistically significant $P<0.05$. this is companionable with the investigation made by [6] who found body condition as one of associated risk factors to mastitis. This might be justifiable with poor body condition and immune system has direct relationship (Table 4).

The prevalence of mastitis in cow's with poor hygiene score and cows with good hygienic status was found to be 74.3% and 36.2%) respectively. This is in line with report of [16] this shows that the more likely of being infected with mastitis is higher in dirt animals than clean ones. This might be attributed to contaminated body of cows may harbor environmental mastitis causing pathogens (Table 4).

Cows which suffered with mastitis before, were found to be more prone to mastitis at current investigation than non-exposed ones, 95.1% and 4.6 % respectively. This is supported by reports of [6] who more cows with past experience of udder/teat infection were more likely to be re-infected than those not exposed. This might be attributed to possibility of pre-exposed cows remained carrier state and the disease will be reemerged when the immunity of cows suppressed (Table 4).

Presence of blind teats and cows with multiple parous, exhibited higher prevalence rate of mastitis (78.2%) and (90%) respectively. In contrast, animals with absence of blind teats and with few parities showed lower prevalence rate of mastitis (46.1%, and 8.1 %) respectively. Multi parity was also one of the factors associate with the presence of mastitis. Similar documents have also been documented in a number of studies, [27] and [28]. This might be associated with high milk yield as the age advance and that will in turn the reducing of immunity and make ease to prone by disease. In the current study it was noticed that all of the older cows particularly those with four or more parities had pendulous udder and previous history of mastitis. It has also been stated that cows with the most pendulous quarters appear to be the most susceptible to mammary infections, the pendulous udder exposes the teat and udder to injury and pathogens easily adhere to the teat and gain access to the gland tissue [22] (Table 4).

In this current study, the trend of post or pre dipping of teats with antiseptics was included as risk factors to the presence of mastitis and the result shows that nobody practiced the issue in the study area. Similarly, response of practice of milking mastitic cows at last showed 100% impractical. This might attributed to high overall prevalence rate due to high rate of transmission between infected and non-infected quarters at the time of milking. It is also supported by [29] as failure to milk mastitic cows last would favor spread of mastitis pathogens between cows by milker's hands resulting in contagious mastitis

CONFLICT OF INTEREST

We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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Correlation of Some Morphological Traits in Upland Cotton (*G. hirsutum* L.)

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Abstract- Correlation is the analysis to determine mutual linkage among various traits of plants. The present research was conducted in the experimental area of University of Agriculture, Faisalabad to estimate the correlation coefficient among the nine yield and fiber quality traits. The F₂ population of two crosses 30m x Arizona queen and 30m x Lss along with parents were subjected to simple correlation analysis. The results revealed that ginning out-turn had a positive correlation with the fiber length. Number of sympodial branches had positive association with number of bolls per plant and ginning out-turn while had the negative association with the boll weight. Boll weight had the negative correlation with the ginning out turn in both the crosses. Number of bolls per plant had a positive correlation with ginning out turn. Fiber strength had a positive association with the fiber length in both the crosses. Plant height had positive correlation with number of sympodial branches, number of bolls per plant and negative correlation with boll weight in both the crosses.

Index Terms- Cotton, Correlation, Morphology, Traits, upland, fiber length

I. INTRODUCTION

Cotton is a fluffy and soft fiber that develops around the seed in boll of cotton plant. Cotton is 2nd very important oil seed and textile fiber crop. Historically, cotton belongs to Indus civilization. Pakistan is an agricultural country. Its economy depends on cotton and other agricultural products. Cotton is a major cash and fiber crop for earning the foreign exchange of the country. Pakistan's textile industry totally depends on cotton. The total production of cotton was 23.7 million tons during the year 2014-15. Cotton account for 6.9 % to value added in agriculture and 1.6% to GDP in 2013-14. Cotton was cultivated on an area of 2.96 million hectares during the year 2014-15. Production cost of the cotton is increasing due to increasing plant protection against insect pests, diseases and the crop nutrition needs [1] and results in the low return to growers. Cotton production is also affected by the abiotic stresses [2] especially on the germination and maturity stages of crop [3].

Genetic linkage is an analysis to determine mutual linkage among various traits of plants. Study of gene linkage is very useful for improving yield and fiber quality traits in cotton. Pakistan has made a remarkable progress in cotton breeding however, further improvement is possible. Correlation analysis is a suitable method for obtaining the most suitable combinations among the studied quantitative traits [4]. Correlation analysis also determines the correlation of one character with another, thus predicting the proportionate change in on character and its effects on the counterpart trait [5]. Correlation studies helps cotton breeders to develop high yielding cotton with quality fiber traits. The present study was initiated to estimate genetic linkage among various traits in cotton such as number of sympodial branches and monopodial branches per plant, plant height, number of bolls per plant, boll weight, ginning out-turn, fiber fineness, fiber strength and staple length. The information generated from this study would be helpful for plant breeders for developing high yielding varieties of cotton with quality fiber.

II. MATERIAL AND METHODS

The F₂ population of two crosses 30m x Arizona queen and 30m x Lss along with parents were sown in randomized complete block design with three replications in separate experiments. The experiment was conducted in the experimental area of the Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad during the normal growing season 2011. Each replication contained a single row for each of the parents and twenty rows for each of the F₂ population. In each row there were 10 plants. All the recommended agronomic practices will be followed from sowing till harvest.

At maturity the data were collected from 5 guarded plants in each row on the traits (plant height, number of bolls per plant, boll weight, number of sympodial and monopodial branches, fiber fineness, staple length, fiber strength and GOT%). Fiber characteristics including staple length, fiber fineness and fiber strength from the cotton samples of the selected plants would also be recorded by using Spin lab HVI-900 from the Department of Fiber Technology, University of Agriculture, Faisalabad.

The data collected were subjected to analysis of variance in order to determine the significant differences in plant characters among the parents and F₂ generation in each cross [6]. The characters showing significant genotypic differences among the hybrids and their parents were further analyzed for correlation coefficients, calculated by the formula as outlined by Dewey and Lu (1959) using Minitab.

III. RESULTS AND FINDINGS

Data were subjected to the analysis of variance technique [6]. All the accessions showed significant differences among them. Mean values of all traits and Correlation coefficient means are illustrated in the table1 and table2.

Table 1: Mean of the parents and F₂ population for traits of crosses

30M x Arizona Queen									
Genotype	PH	SB	MB	NB	BW	GOT%	FF	FS	FL
30 M	90.33	8.47	1.40	19.33	3.03	37.15	4.40	22.44	29.27
Arizona Queen	91.33	8.67	1.33	18.47	2.97	36.97	4.49	23.01	29.90
30M X Arizona Queen	95.79	10.29	2.07	17.28	2.91	35.34	4.47	21.43	26.34
30M x LSS									
30M	90.33	8.47	1.40	19.33	3.03	37.15	4.42	22.44	29.27
LSS	96.07	8.60	1.40	18.53	3.04	37.23	4.44	22.71	29.28
30M x LSS	91.59	10.00	1.73	17.53	2.90	35.39	4.20	19.70	26.46

Plant height (PH, cm), number of sympodial branches (NS), number of monopodial branches (NM) number of bolls per plant (NB), boll weight (BW), ginning out-turn (GOT %), fiber fineness (FF, ug/inch), staple length (SL, mm) and fiber strength (FS, g/tex).

Plant height had positive correlation with number of sympodial branches, number of bolls per plant and negative correlation with boll weight in both the crosses. While it had positive correlation with ginning out-turn in the cross 30M x LSS and negatively correlated

with monopodial branches in the cross 30M x LSS and with fiber length in the cross 30M x Arizona Queen. The results showed that due to increase in plant height, number of fruiting branches and number of bolls, ginning out-turn would be increase while monopodial branches, boll weight and fiber length would be decreased.[7] reported the positive association of plant height with seed cotton yield. Plant height was positively associated with number of bolls and number of fruiting branches [8].

Table 2. Correlation matrix among the traits of crosses

PHSB	MB	NB	BW	GOT%	FF	FS		
SB	0.443** 0.810**							
MB	0.054	0.101						
	-0.292**	-0.301**						
NB	0.757**	0.405**	-0.012					
	0.809**	0.821**	-0.303**					
BW	-0.447**	-0.243**	0.010	-0.607**				
	-0.701**	-0.699**	0.250**	-0.753**				
GOT%	0.111	0.115	-0.066	0.231**	-0.161*			
	0.239**	0.158*	-0.196**	0.273**	-0.246**			
FF	0.001	-0.000	0.084	0.076	-0.052	0.074		
	0.037	0.108	-0.027	0.056	-0.046	0.042		
FS	-0.055	0.028	-0.209**	0.101	0.072	0.103	-0.093	
	-0.018	-0.074	-0.138*	0.096	0.080	0.131	0.186**	
FL	-0.144*	0.013	-0.210**	0.028	-0.010	0.206**	-0.033	0.354**
	0.046	-0.051	-0.152*	0.101	0.065	0.205**	0.038	0.328**

Plant height (PH), number of sympodial branches (SB), number of monopodial branches (MB), number of bolls per plant (NB), boll weight (BW), ginning out-turn (GOT%), fiber fineness (FF), fiber length (FL) and fiber Strength (FS) in two crosses 30M x Arizona Queen (upper) and 30M x LSS (lower).

* = p < 0.05

** = p < 0.01 ns = non-significant

Number of sympodial branches had positive correlation with number of bolls per plant and negatively correlated with boll weight in the both crosses. While it had positive correlation with ginning out-turn and negative with monopodial branches in the cross 30M x LSS. The results revealed that with the increase of sympodial branches, bolls numbers and ginning out-turn are expected to increase while boll weight would decrease. Sympodial branches showed positive relationship with number of bolls and ginning out-turn [9]. Findings also proved the sufficient increase in the yield through sympodial branches[10].

Number of monopodial branches had negative correlation with fiber strength in the both crosses and also showed negative correlation with fiber length in the cross 30M x Arizona Queen. While it had positive correlation with boll weight and negatively correlated with number of bolls per plant and ginning out turn in the cross 30M x LSS. The results revealed that due to increase in number of monopodial branches, number of bolls per plant, ginning out-turn, fiber length and fiber strength is expected to decrease while boll weight was increase. Vegetative branches had negative association with plant height, fiber length and strength [11].

Number of bolls per plant had positive correlation with ginning out-turn and negative correlation with boll weight in the both crosses. The results revealed that due to increase in number of bolls, lint percentage is increase but boll weight is expected to decrease. The number of bolls had a positive association with the ginning out-turn and negative correlation of no. of bolls with boll weight [12]. Boll weight had negative correlation with ginning out-turn in both the crosses. The results showed that when boll weight is increased, ginning out turn is expected to decrease. Boll weight had negative relationship with Ginning out-turn and seed index. Ginning out-turn had positive correlation with fiber length in the both crosses. The results showed that when ginning out-turn increase, fiber length would also increase. Ginning out-turn had positive correlation with fiber length and yield of seed cotton [13]. Fiber fineness was not correlated with any of the traits in cross 30M x Arizona Queen while it had positive correlation with fiber strength in the cross 30M x LSS. Fiber fineness was positively associated with fiber strength. Fiber strength had positive correlation with fiber length. So that with increase in fiber strength than would be simultaneous in fiber length. Fiber strength had positive association with staple length and also a positive linkage with fiber length.

IV. CONCLUSION

It can be concluded from the study of such morphological traits of cotton would be helpful in improving the crop. In present study, all the morphological traits were measured carefully and efficiently and then analyzed through Pearson correlation technique. Plant height had positively correlated with other morphological traits for example number of monopodial and sympodial branches, number of bolls and ginning out turn etc. So the plant height for improving such desired traits of the plants which would help us improving yield of the crop.

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Herdsmen/Farmers Conflicts in Kogi State: Security And Developmental Implications

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Abstract- One major security and developmental challenge that has attracted much national discourse in the recent past is the conflict between herdsmen and farmers in different parts of the country. The crisis has become a recurring decimal, especially in Kogi State and indeed a time bomb, which appears not to have been given the desired national attention by government at all levels. Irked by the bizarre dimension herdsmen/farmers conflicts have taken in Nigeria in recent time and Kogi State in particular, this research was carried out with a view to proffering solutions that could arrest the ugly situation and prevent it from becoming a monster like Boko Haram crisis. Thus, this research was carried out to achieve the following objectives:

1. Identify the root causes of herders/farmers conflicts in Kogi State.
2. Examine the security implications of the herders/farmers conflicts in Kogi State.
3. Examine the socio-economic implications of herders/farmers conflicts in Kogi State.
4. Proffer workable solutions that can be put in place by both the Federal and Kogi state Government to resolve the herders/farmers conflict in Kogi State.

The study was a survey research. Three hypotheses were formulated to guide the study. The area of study is Kogi State. Data for the study were generated from primary and secondary sources. The instruments used for data collection were questionnaire and interview. The population for the study was drawn from farmers, herders, traditional rulers, community leaders and security agents from the study area. The data collected were presented and analyzed using qualitative and quantitative approaches. Descriptive statistics was used with the aid of Statistical Package for Social Sciences (SPSS) version 16. Findings were made based on the tested significance level of the responses as revealed by the standard deviation analysis. Based on the results of the analysis, the study categorized the causes of herders/farmers conflicts in Kogi state into **major** and **incidental** factors. The major factor centred on economic use of land resources while incidental factors include policy framework, deficient response and demographic, ecological/environmental factors. Far reaching recommendations were made among which were: the need for definite policy enactment on use of land resources as it relates to grazing lands as well as establishment of Alternative Dispute Resolution Mechanisms (ADRM) for

resolving disputes between farmers and herdsmen as the conflict groups (farmers/herders) have lost confidence in the Nigerian judicial system, establishment of ranches, combating desertification and mop up of illicit arms amongst others.

Index Terms- Farmers, Herdsmen, Conflict, Land use, Economy.

I. INTRODUCTION

The herdsmen/farmers conflict in Nigeria in the past few years especially in the last five years or so portends a very great danger and a serious security threat to peace, unity, and socio-economic development of the country and Kogi State in particular. Pages of newspapers and empirical studies are replete with stories of massive killings arising from the conflicts between herders/farmers across various States in Nigeria particularly Kogi State.

Areas affected by the conflict in the North Central Zone include Kogi, Benue, Kwara, Nasarawa, Niger, Plateau and the Federal Capital Territory, Abuja, which have left heavy casualty figures, (Chinweizu, 2015 and Abiodu, 2016). Other parts of the country affected by the crisis include Ukpabi Nimbo in Uzo-Uwani Local Government Area of Enugu State, Oyo, Ekiti, Ondo, Osun, Abia, Anambra, Delta, and Edo states respectively. Virtually all States in Nigeria have had (or are still experiencing) the herdsmen/farmers conflict (Abraham, 2017).

Many writers, commentators and researchers have expressed different opinions and dimensions to the causes of these conflicts. Some people see it from the cultural/historical perspective of nomadic pastoralism and climate change, (Adogi, (2013); Stone, (2013). Yet, others see it from socio-economic perspective and the struggle for resource control (Abba, 2008). Other groups also view the conflicts from ethno-religious angle, while another school of thought views the crisis from the land use planning occasioned by land tenure system in Nigeria (Isah, 2012). Those who subscribe to the land resource control premised their arguments on the presumption that farmers believe that they are the traditional owners of the land and are strongly in support of the old order which gives them inheritance of land as ancestry hereditary, patrimonial and transmissible and opposed to any unauthorized occupation or intrusion on their lands by herdsmen for forceful grazing. The herdsmen on the other hand, want free access to any grazing land for their cattle and reject or

oppose to the old order of land as hereditary and transmissible. In pursuance of these conflicting interests by the two parties, clashes ensued.

Reports in newspapers and empirical studies have indicated that there are tensions in any parts of country including Kogi State as a result of incessant conflicts between herders/farmers. The dimension the conflict has taken in recent past is left much to be desired. If the problem of herdsman/farmers conflict is not tackled early enough and with dispatch too, it could lead to deviant defeatism and may be more catastrophic than Boko Haram crisis because of its spread, and sophistication which may degenerate into a threat to national security, peace and development.

It is interesting to note that the rapid escalation, spread and frightening dimension that the herdsman/farmers crises have assumed in recent time, and the increasing use of sophisticated weapons as well as the impunity with which they carry out their dastardly acts call for a very serious early decisive attention to the issue in order not to allow this time bomb to degenerate beyond control. In an increasingly interconnected and complex world, it has become clear that security and development are inextricably linked, especially in a developing nation like Nigeria. Threats to security can have socio-economic implications which could impinge on development if not tackled early enough.

As the world sets a new global agenda for sustainable development, security and development research becomes very crucial to bridge these two domains. Thus, the 2003 European Security Strategy and the 2005 European Consensus on Development acknowledged the fact that there cannot be sustainable development without peace and security, and that without development and poverty eradication, there will be no sustainable peace (The WRC³, 2017). Literatures have shown that conflicts have enormous costs in terms of human, financial and infrastructure resources. Hence, International Cooperation and Development, (2017) strongly noted that Development cooperation must tackle the root causes of conflicts as instability, insecurity, violence, organized crime etc not only deter investment, hinder trade, divert public social expenditure and hamper access to development, but also severally weaken democracy, human rights and the rule of law which are core values of development (ICD, 2017). It is for the foregoing reasons that this study was carried out to identify the immediate and remote causes of herdsman and farmers conflicts in Kogi State with a view to finding lasting solutions to the problem so as to pave way for peace, harmony and development.

II. STATEMENT OF THE PROBLEMS/JUSTIFICATION

There has been hue and cry by many people in various communities across Kogi State on the incessant herdsman/farmers conflicts in the recent past. The conflicts have taken new dangerous dimension to the extent that the clashes have become so frequent culminating into killings, maiming, and in some cases burning of houses and invasion of communities. Cases in point include various communities in Kogi State such as Agojeju-Idaka in Dekina Local Government Area where herders invaded the village early hours of the morning in October, 2015

and killed about 23 persons, destroyed properties and burnt down houses. Egbolo in Igalamela/Odolu Local Government Area, Umomi in Ofu Local Government Area, and the most recent was the 2018 attack in Omala Local Government Area in Kogi State where the following communities were affected by the attack – Ajichekpa, Opada, and Agbenema, while Amuro in Mopa Moro Local Government area in Kogi West and a host of other communities had experienced the same fate (Oladipo, (2018). In each of these conflicts lives were lost, property worth billions of Naira destroyed and houses were burnt. It has been observed that in the very recent past, herdsman/farmers conflicts have increased exponentially.

Many people have attributed the conflicts to different factors such as cultural/historical, backdrop of nomadic pastoralism (Adogi, 2013). Others also attributed the causes of the conflicts to factors such as migration due to climate change, Boko Haram insurgency, policy on land law and land resource control system (Okpaleke, 2016).

Whatever may be the perceived/presumed causes, it is germane to state that a thorough research is necessary with a view to unearthing the actual causes of the conflict so as to take proactive measures that could put a stop to the herders/farmers conflict. The continuous neglect of this all important challenge poses a great threat to peace, unity, security and socio-economic development of the State and Nigeria at large as any problem in any part of the country directly or indirectly hinder national development. This research work was therefore undertaken with a view to proffering solutions that could identify early warning signals, use conflict risk analysis method and mediation to prevent eventual crisis.

Going by the foregoing backdrop, this study addressed the following research questions:

1. What are the causes of herders/farmers conflicts in Kogi State?
2. What are the security implications of herders/farmers in Kogi State?
3. How does farmers and herders conflict affect the social and economic development of Kogi State?
4. What policy measures can be put in place by both the Federal and State Governments to resolve herders/farmers conflicts in Kogi State?

III. OBJECTIVES OF THE STUDY

The study examined the causes of herdsman/farmers conflict in Kogi State.

More specifically the study:

1. Identified the immediate and remote causes of herdsman/farmers conflicts in Kogi State.
2. Examined the security implications of herdsman/farmers conflicts in Kogi State.
3. Examined the social and economic implications of farmers/herders conflict in Kogi State.
4. Proffered mitigative measures that could lead to the resolution of herders/farmers conflict in Kogi State.

IV. HYPOTHESES

1. **H₀:** Herders/farmers conflict in Kogi State emanates from the struggle for economic use of land resources.

H_i: Herders/farmers conflict in Kogi State does not emanate from the struggle for economic use of land resources.

2. **H₀:** Herders/farmers conflict constitutes security threat to Kogi State.

H_i: Herders/farmers conflict does not constitute security threat to Kogi State.

3. **H₀:** Farmers/herders conflict impedes socio-economic development of Kogi State.

H_i: Farmers/herders conflict does not impede socio-economic development of Kogi State.

V. LITERATURE REVIEW

HISTORICAL EVOLUTION OF NOMADIC PASTORALISM

Nomadic pastoralism is a form of agriculture where livestock such as cattle, sheep, goats and camels are taken to different locations in order to graze on fresh pastures. According to New World Encyclopedia, nomadic pastoralism is commonly practiced in regions with little arable land, typically in developing world. The New World Encyclopedia also identified three basic kinds of nomads, namely hunter gatherers, pastoral nomads and peripatetic nomads. Nomadic hunter gatherers have been probably identified as the original life style of most indigenous people world over as they subsist harvesting seasonally available wild plants and game. Pastoral nomads, on the other hand raise herds and move about with them with the intent of obtaining fresh pastures to graze, hence their continuous movement from place to place, while peripatetic or tinker nomads travel from place to place offering trades and services wherever they go. Peripatetic nomads are said to be commonly found in industrialized states. The diverse groups that are commonly called Gypsies are the typical examples (Editors of Encyclopedia Britannica). Pastoral nomads who depend on domesticated livestock migrate in an established territory to find pastures for their flocks, with the focal sites that they occupy for a considerable periods of the year (Encyclopedia Britannica).

Historically, nomadism appears to have been the earliest type of human society. However, most such cultures are now extinct with only a few tribes still living with nomadic life style. As noted in the World Encyclopedia, as human societies evolve, different life styles emerged, many of them sedentary, hence nomadism declined significantly. Thus, the development of modern agriculture, industrialization and technology have come to change the hitherto life style. Pastoral nomadism have declined severally in the 20th century for both economic and political reasons, including the spread of systematic agriculture, the growth of industry and the policies of governments (world over) that view nomadism as incompatible with modernity (Encyclopedia Britannica).

In the early days of nomadism, the relations between farmers and herders, especially in Africa were characterized by close reciprocal ties often referred to as symbiotic. However, the reciprocal ties and symbiotic relationships have waned due to

many factors such as breakdown of traditional social ties, Hussein (1998), population increase, Ibrahim et al, (2017), live-hood interference, Dimelu et al, (2017), land use/land tenure system, (International Crisis Group Report 2017). The waned relationship between herders and farmers created a gap which culminated into the development of cold war between farmers and herders resulting into the present open conflicts.

VI. ORIGIN OF FARMERS/HERDERS CONFLICTS IN NIGERIA

It has not been easy situating the origin and main causes of conflicts between sedentary farmers and Fulani herdsmen in Nigeria. Many presumed reasons have been adduced in literature ranging from historical background of Nigerian herdsmen, economic, ethno-religious, political to climate change.

Tracing the history of herdsmen in Nigeria, Danver, (2015) noted that Hausa Language speakers interpret the term Fulani largely describing the nomadic people commonly found across West Africa. Historical pundits also trace the history of nomadism in Nigeria to the backdrop of Fulani herdsmen of Futa Jalon in the present day Guinea specifically Takrur on the Futa Jalon highlands of the 15th century (Tordoft and Fage, 2013). The innate behaviour of Fulani origin of Futa Jalon background was said to be settling and razing as strangers in unused parcel of land, and that it is normally expected that they breach pre-existing security protocols and order and would move to conquer any less powerful land owners and tribes (Mandal, 1990, Sotunde, 2016). This type of behaviour, according to Abraham (2017) is characteristic of the Fulani herdsmen in Nigeria which has consistently defined their strategy by friendly occupation before getting into hostilities, with the host communities.

Historical antecedents showed that the Fulani's who migrated to the Northern Nigeria were of the Futa Jalon origin who upturned the political equation in Jalonke and then started competing for power with the indigenous people from 1726 – 1750 (Hammond, 1961). This backdrop, according to Makiberidze, (2013) in Abraham (2017) unarguably laid the foundation for violence attack by Fulani herdsmen in Nigeria.

The pattern and mode of Fulani herdsmen attacks on host communities in Nigeria over the years, have been sources of controversy with arguments skewed around religious, social-economic and ethnic dimensions Mikailu (2016). According to a study of the attack carried out on Batern Village in Riyon Local Government Area of Plateau State in March, 2010, it showed that the attack repeated a historical pattern of besieging a community with imported trained mercenary fighting forces (Emeni, 2012). Again, the report of the attack by herdsmen on Uzo-Uwani Local Government Area of Enugu State in 2016 where it was claimed that over 40 villagers were said to have been killed was also said to have been executed by imported mercenary, Sandra and Oyiyepe et al, (2016), Sotubo (2016).

Those who view farmers/herders conflict from the economic perspective assert that the struggle over the use of land resources for livelihood and economic interests has been at the centre of farmers and herders conflicts in Nigeria (Zayyad, 2018). For instance, a study carried out by Ibrahim et al (2015) showed that the increase in crop farming in wetland areas and the expansion in grazing land areas have been sources for conflict

between farmers and herders in Nigeria. The study further showed that there has been an increase in agricultural land uses in all parts of the country, with the major change appearing to be intensive row crop farming covering large areas in Taraba, Benue, Nasarawa, Jigawa and parts of Cross River, Oyo and Niger States. In the same vein, the study also revealed that extensive grazing has also expanded with the main expansions covering lands in Taraba, Plateau, and Kwara States. The summary on the study of land use by farmers and herders showed that intensive row crops consumed 43,778.60km of the Nigeria's total land area, while extensive grazing consumed 21,913.75km of the country's total land area, (Ibrahim et al 2015). The study further revealed that the increase in the land use by both farmers and the herders brought about some form of overlap, that is, an extension or encroachment of one into another leading to more competition over available land space for utilization by the two interest groups.

As rightly observed by Rashid (2012), the multifarious uses of land and its limitedness have necessitated that various shades of competition for its uses must ensue. Thus, Rashid noted that competition for land between and within various user groups (for economic purposes) has been the centre of mankind conflict since time immemorial.

Tenuche (2009) observed that conflicts arose in the Benue Valley as a result of loss of land which the people considered as the basis of their social, economic and spiritual existence. Tenuche (2009) further noted that a high percentage of conflicts in Benue arising from land disputes have to do with land matters and conflict between Fulani herdsmen and farmers over grazing land. He also observed that the inability of the state (government) to address the indigene and settler phenomenon in Nigerian constitution, the unresolved issues of grazing land and water spots which are central to the economic survival of both the herders and farmers, and the Nigerian land tenure system which has had serious implications for land acquisition by the peasants and the low class are factors that keep the conflict lingering, since the economic lives of both the farmers and herders revolve around the use of land resources. Thus, causes of herdsmen/farmers conflicts linked to economic interests as outlined by Adisa (2012) include inequitable access to land, diminishing land resources, antagonistic values among user groups, policy contradiction and non-recognition of rights of indigenous people.

Other scholars and writers attribute the conflict between farmers and herdsmen to ethno-religious and reprisal factors, Musa et al (2014). Such view was also expressed by the International Crisis Group Report of September 19, 2017 where it was observed that the conflicts, particularly herdsmen attacks on farming communities have spawned dangerous political and religious conspiracy theories. Noting that one of such theories is that the attacks are part of a longer term Fulani plot to displace indigenous populations and seize their lands. While among Christian communities, herdsmen attacks are widely seen as a subtle form of Jihad, the International Crisis Group Report added.

The interview conducted by the International Crisis Group as reported in the September 19, 2017 edition read in part:

In March 2016, the Prelate of the Methodist Church of Nigeria, Dr. Samuel Uche said: we are aware there is a game

plan to Islamise Nigeria, and they are using Fulani herdsmen to initiate it.

In the South East, the Biafra separatist groups describe the attacks as part of a Northern plot to overwhelm the peoples of the South and forcefully convert them to Islam.

However, the Crisis Group Report concluded that the above charges are not supported by any solid concrete evidence but that such comments are capable of aggravating inter-faith distrust and undermining the country's fragile unity.

Others who frown at the religious dimension being introduced into the conflict include President of America, Donald Trump and the Nigerian President Buhari. The two leaders condemned the attacks in strong terms. President Trump on his part said; "we have had very serious problems with Christians who are being murdered in Nigeria. We are going to work on that problem very, very hard because we cannot allow that to happen". President Buhari on his own part also knowing the implications of the incident had this to say: "this latest assault on innocent persons is particularly despicable. Violating a place of worship, killing Priests and worshipers is not only vile, evil and satanic, it is clearly calculated to stoke up religious conflict and plunge our communities into endless bloodletting" (Business Day, 2018).

The statement credited to T.Y. Danjuma on March 24, 2018 on the herdsmen/farmers conflict in Nigeria also corroborated the ethno-religious theorists. T.Y. Danjuna, a onetime Minister of Defence, called on Nigerians to rise and defend themselves against ethnic cleansing at the maiden convocation ceremony of Taraba State University, Jalingo. His statement read in part: *you must rise to protect yourselves from the people (the Fulani's), if you depend on the Armed Forces to protect you, you will all die. This ethnic cleansing must stop in Taraba and it must stop in Nigeria; these killers have been protected by the military, they cover them and you must be watchful to guide and protect yourselves because you have no any other place to go. The ethnic cleansing must stop now; otherwise Somalia will be a child's play* (Vanguard News March, 24, 2018).

The accusation by T.Y. Danjuma was also corroborated by the report in the Vanguard News, March 27, 2018 as reported by David which chronicled the efforts made by the Taraba State Government by reporting various threats of attack to presidency and the military high command but that no action was taken by either the presidency or the military high command.

In the series of communications between the Taraba State Government, the presidency and the military high command, David, (2018) noted, the State Government had severally drawn the attention of the presidency to the activities of military commanders in the State who turned blind eye to series of attacks by the armed men against local farmers and natives of the state, some of such letters, as reported by David in the Vanguard include, the accusation by the State Government of military collusion against the Taraba people, paving way for the herdsmen militia to attack; a letter to the Chief of Army Staff dated February 23, 2016 where the State Government accused the military of disrespect for the Office of the Governor as the Chief Security Officer of the State, a letter to the Presidency on the threat to peace in the State involving Fulani herdsmen and Tiv which led to the sacking of about 200 settlements in Gassol, Bali, Ibi, Donga and Gashaka Local Government Areas by

herdsmen believed to have moved into the State from neighbouring countries, and several others, but that the government did not take any positive action (David, 2018).

However, the Director of Defence Information of the Nigerian Army, Brig. Gen. John Agim refuted the allegations by T.Y. Danjuma and the Tartaba State Governor, and said that the military has been neutral and has been carrying out its constitutional duties (Vanguard, March 27, 2018).

Moreover, other writers who still view the attack from ethno-religious angle accused the Miyetti Allah Cattle Breeders Association of Nigeria and its leaders of being the brain behind the attacks (Global Terrorism Index Report, 2015). The Global Terrorism Index Report accused the Fulani militant herdsmen under the Miyetti Allah, of not just a terrorist group, but the world fourth deadliest. Again, the Miyetti Allah Cattle Breeders Association of Nigeria refuted the allegation and exonerated their members from any vicious terrorist crime, but blame such attacks on Fulani herdsmen from other West African countries (Ojo, 2016). The argument against the above defence by Miyetti Allah, according to Abraham (2017) is that if it is true that Fulani herdsmen from other West African regions are the ones attacking farming communities in Nigeria, why are such illegal aliens not arrested by the Nigerian Security Forces, and why are (some of) the Northern leaders and government officials defending their murderous atrocities against Nigerian citizens? That is why it is believed in some quarters that the attacks are sponsored and ordered from the 'above' by people like Fulani Emirs, Governors, Senators and other top Fulani bourgeoisie, (Olanian, in Abraham (2017). These calibers of people with Fulani ancestral ties are said to own most of the cattle and co-opt the cooperation of Fulani Security Officers which explains where the AK47 rifles come from (Eweka, 2017).

The foregoing school of thought, though not yet empirically substantiated with any concrete and empirical data/evidence, also corroborated the alarm raised by T.Y. Danjuma and other Nigerians and alluded to the fact that there could be some form of neglect, incompetence or overt or covert collusion by some powerful individuals. That is why the Catholic Bishop of Gboko, Williams Avenya as reported by Tor (2018) in Independent News, reminded the Vice President Yemi Osinbajo of the campaign promises of President Buhari that he would protect the interest of all Nigerians including citizens of minority ethnic groups if voted into power, noting that the killing of Christians and members of the minority ethnic group particularly in Benue State had proved that the Federal Government under Buhari was not living up to expectation (Tor, 2018).

In his reaction to the claim of religious coloration to the killing, Osinbajo averred that there was no religious matter, but if it was, he would not mind resigning his appointment as the Vice President. Osinbajo also debunked allegations that there was an agenda to Islamise the nation (Tor, 2018).

s Ofuoku and Isife (2009) citing Tonah (2006) opined that since farmers and herders groups have very different values, customs, physical and cultural features, disputes between them are frequently characterized as ethnic conflict. Ofuoke and Isife (2009) concluded that the feeling of belongingness that is extant among the members of the group is focused around their

economic interest and the protection of the values, culture and power. Noting further, they observed that the Fulani nomadic cattle rearers, being a minority in host communities have their unique culture and strong sense of solidarity and are often isolated from the farming population. Given the foregoing scenario, conflict between them and the farming population of the host community is always regarded as having ethnic coloration. A study carried out by Umar (2002) on pastoral agricultural conflict in Zamfara State revealed that Hausa farmers and the Fulani herdsmen have some perceptions for each other which affect their relationship. The study revealed that while the Fulani's see the Hausas as 'kado' (infidels or unbelievers) whose property can be used without offending God, the Hausas see the Fulani's as intruders, uncivilized and uninformed. These perceptions, according to Dimelu et al (2017) have been on since the Jihad of Sokoto caliphate and they have been at logger head triggering conflict at any slightest provocation.

Another school of thought which attributed the cause of the conflict to geographic factors opined that, the crisis emanated from the climatic condition which has pushed the herdsmen from the North to look for greener pastures to the Middle Belt region and the Southern parts of the country (International Crisis Group Report, 2017). This school of thought anchored its argument on drought and desertification. The International Crisis Group Report (2017) observed that Nigeria's far north is arid and semi-arid with a long dry season from October to May and low rainfall (600 to 900mm) from June to September. In 2008, the National Meteorological Agency reported that over the past thirty years, the annual rainy season dropped from an average 150 to 120 days; adding that in the last six decades, over 350,000sq km of the already arid region turned to deserts or desert like conditions. The report further indicated that in Bauchi, Borno, Gombe, Jigawa, Kano, Kastisna, Kebbi, Sokoto, Yobe and Zamfara States, estimates suggested that 50 – 75% of the land area was becoming desert. These environmental changes wreaked havoc to agriculture and human livelihood, compelling pastoralists and others to migrate south in search of greener pastures.

The migration was initially seasonal where herders migrate from December to May to the Central Zone before returning to the North, but later herders started staying longer up to June or July due to climate change, while more recently some herders become more sedentary and prefer to graze their herds there permanently. This situation has aggravated dispute on land resources utilization between farmers and herders in the north central zone.

Another related area of the causes of the conflict between farmers and herders identified in the International Crisis Group (2017) is the loss of grazing reserves. The Report revealed that most of the 415 grazing reserves established by the Northern regional government in the 1960s have since been lost, with only 114 formally documented or demarcated. Equally too, it was observed in the Report that the government did not back the establishment of the grazing reserves with legislation which could guarantee exclusive usage or take active measures to prevent encroachment (interview with the Miyetti Allah by the ICG (2016). State creation, population growth and other developmental factors connived to overrun the land hitherto

designated as grazing reserves making herders to seek for pastures elsewhere.

The changing patterns of pastoralism and farming have also been identified as some of the factors that contributed to increase in herders and farmers conflict. Literatures indicated that over the last three decades, some cattle herders have gradually become sedentary, leaving cattle herding to very young and inexperienced youths who always violate the hitherto rules of the game by grazing on farm crops. This always leads to crisis escalation.

The International Crisis Group Report (2016) observed that the introduction of Agricultural Development Projects in the 1970s encouraged expand land cultivation thus, shrinking areas left for grazing. In the same vain, the introduction of Fadama Development Projects produce little residue for livestock feeding, complicating and diminishing available fodder, making the competition for use of land resources stiffer than ever before, especially in the absence of negotiations between farmers and herders to secure access to grazing grounds and livestock routes (International Crisis Group Interview, 2016). The foregoing analysis also agrees with Akpaki (2002) who said that farmers increasingly compete with nomadic herders for farmland, pastures, water, trees and the use of range land. The interview conducted by the International Crisis Group (2016) indicated that farmers ignored the 1988 National Agricultural Policy Provisions that 20 percent of the flood-plains be set aside for grazing. This neglect has made the competition between farmers and herders stiffer.

Rural banditry and cattle rustling have also been identified as some of the factors that precipitated the movement of herders from the core north to North Central and Southern parts of the country (Egwu, 2016). The main theatres of rural banditry and cattle rustling have been identified to be Kanuku forest in Kaduna, Falgore forest in Kano, Dansadau forest in Zamfara and Davin Rugu forest stretching through Kaduna, Katsina and Zamfara States (International Crisis Group Report, 2017).

Other supposed causes of the conflict which could be termed incidental causes of the conflict include escalating conflicts across Northern Nigeria which have displaced herders and made them to move southward and the erosion of traditional mechanisms (International Crisis Group (2010) . The erosion of traditional mechanism was said to begin with the involvement of the Police and Courts in disputes resolution between farmers and herders in the 1970s which were fraught with competition thereby creating more crisis between the farmers and the herders. Instead of amicable resolution, the matter became the highest bidder gets justice which was alien to herders and farmers alike. This was also exacerbated by the interference of the political class in conflict management who were not transparent enough in the process of their mediation, as political consideration dominated the process of mediation, which brought about more confusion and mistrust (International Crisis Group Interview Report, 2016).

Other incidental causes include arms proliferation arising from weapons from various sources such as Libya's looted stockpiles which created opportunity for people to have easy access to arms, including assault rifles. This was equally corroborated by the statement credited to the Nigeria President Buhari while speaking with the Arch Bishop of Canterbury in

London on April 11, 2018, when he said that attacks by herdsmen in Nigeria were carried out by Libya's Muamar Gadhafi strayed trained militia who found their ways into Nigeria (Sahara Reporters (2018). This statement from the Nigerian President was utterly condemned by a cross section of Nigerians as reported by Emmanuel Okagba in the Vanguard News of April 19, 2018, saying that utterances of such from the Nigerian President showed a lack of competence on the side of government whose primary responsibility it is to defend the integrity of the country from any external aggression.

Population increase has also been identified in literature as one of the factors responsible for the herders and farmers conflict. The population growth rate of Nigeria per year is put at 3.2% as recorded by the National Population Commission (2012), while population continues to increase, the land mass remains static. As rightly observed by the Minister of Information and Culture, Lai Mohammed (2018), he said in 1963, the Nigeria's population was 52 million but in 2018, the population was estimated to be over 180 million, yet the land space has remained the same. Against this background, he notd, the contest for land and other natural resources is bound to be keener and more friction, (Oyeyemi in the Vanguard News, May 17, 2018).

Others who view the crises from population perspective include Dimelu et al (2017) who observed that population growth of herds and human has brought about more competition over the use of land resources.

Other causes of the conflict include livelihood failure and vulnerability (Philip, 2010) and government failure to implement policies. The 1988 National Agricultural Policy provided for a minimum of 10% of National territory, that is, 9.8 million acres of land to be allocated to grazing reserves. However, only 2.82% was said to have been acquired (Ibrahim, 2015), controversy on land use Act 1978 which prevented the National Assembly from enacting the National Grazing Route and Reserve Bill, (Kumolu, 2014) are all contributory factors to farmers and herders crisis in Nigeria as the law on land failed to give clear demarcation of crop and grazing lands. The lack of clear demarcation for grazing creates competition between farmers and herders.

Politicization of crises has also been seen as one of the causes of escalation of farmers/herders conflicts in Nigeria. This was succinctly explained by the International Crisis Group Report of September 19, 2017, where it was noted that:

More often, the country's dysfunctional law enforcement and criminal justice system fails to arrest and/or prosecute any perpetrators. Moreover, authorities have generally treated these crimes as political rather than criminal acts, arguing that sanctioning suspects could spark further violence. Even if commissions of inquiry are established, they typically are used as instruments to temper tensions rather than pursue justice. These responses, however well meaning, create a climate of impunity.

The above observation by the International Crisis Group Report (2017) was supported by empirical evidence of inaction of government in various crises across the country including the Agatu herders and farmers conflict in Benue State in 2016, Ukpabi Nimbo attack in Enugu State in April, 2016, Southern Kaduna clashes in late 2016 where about 200 – 800 people were said to have been killed (International Crisis Group Report, 2017).

Literatures showed that the lack of adequate, transparent, decisive and early actions by the Federal Government has generated a number of reactions which threaten the unity of the country as many militia groups are being formed by various states across the country, such group include self-defence vigilante group by some communities in the Middle Belt Region. One of such comments was made by Leonard Kashima Shilgba, an ethnic Tiv leader in March 2014 when he warned that if the Federal Government could not stop the attacks, the Tiv people would also demonstrate that they equally have the right and the capacity to raise standing army of thousands from each ward and kindred (The source, 2014). Other reactions include the threat by the movement for Actualization of the Sovereign State of Biafra ordering Fulani herdsmen to vacate Biafra Land or face their wrath (Vanguard, April 27, 2016), a sound of warning by the then Ekiti State Governor, Ayodele Fayose of possible attacks on Fulani herdsmen if their alleged predatory behaviour against the locals continued (International Crisis Group Report, 2017).

These reactions are enough warning signals for serious government to take proactive actions to prevent attacks and reprisal attacks, which is ominous.

VII. SECURITY IMPLICATIONS OF FARMERS AND HERDERS CONFLICTS

An important aspect of changed nature of the conflict between herdsmen and farmers has been the increasing availability and use of modern sophisticated weapons which not only constitute security threat to the means of livelihood of the conflict groups but also threatens the nation. Thus, Moritz, (2010) rightly observed herdsmen-farmers conflicts not only have direct impact on lives of those involved, they also disrupt and threaten the sustainability of agricultural and pastoral production in West Africa, and invariably the sustainability of the livelihoods of the rural communities. Hence, the primary impact of the conflict is the resultant food insecurity. That is why Adetula (2007) noted that more often, crop farmers are highly vulnerable, perhaps due to the subsistence, small scale, rudimentary system of production and over dependence on natural resources for livelihood. In the same vein, Attah (2012) equally observed that farmers have limited resources and are dependent on rainfall, traditional farming implements, family are hired labour with poor access to institutional and infrastructural facilities (input, advisory services and market information, roads, etc) which have implications for yield per hectare, and any threat to the farmers constitute serious threat to food security with its attendant negative multiplier effects.

International Crisis Group Report (2017) indicated that proliferation of light arms and infiltration of looted stockpiles from Libya, constitute great security implication that is heightening conflict in Nigeria. As indicated in the said Report, easy access to small arms, including assault rifles, make the conflict situation more dangerous, as weapons come from various sources, some local, others from black markets across West and Central Africa.

This situation has made the conflict groups (herdsmen and farmers) to have easy access to weapons. Thus, the increasing prevalence of weapons has simplified the human cost. The

International Crisis Group Report (2017) noted that there may be wider regional implications of herdsmen vs farmers conflicts as a major confrontation involving Fulani herdsmen could draw into Nigeria their brethren from beyond Nigeria as they could mobilize support including fighters from several West and Central African countries which could worsen the security situation. The said report corroborated Spring, (1993) who noted that Fulani herdsmen that migrated to Nigeria were already in the act of organized mercenary fighting force which was what they applied during Uthman Danfodio's Jihad war in Northern Nigeria. Equally too, a study carried out by Emeni (2012) on the crisis in Batern in Riyon Local Government Area of Plateau State indicated that mercenaries were deployed. The mercenary approach was also said to have been deployed in various other herdsmen – farmers crises such as Benue and Kogi States, George (2014), Nimbo in Uzuwani Local Government Area of Enugu State, in 2016 (Sandra and Oyiyebo, 2016), Kaduna (Aljazeera News, 2014).

The mercenary approach also validates the raiding approach as a means of forcefully obtaining more land by Fulani cattle rearers, as explained by Oba (1992) where one pastoralist group could make an area unstable for others by constantly raiding the other groups with the intent of weakening the other group so as to take over the land.

Again, investigations carried out by Premium Time in 2016 showed that attacks by herdsmen in the North-Central Nigerian State of Benue had led to the killing of at least 1,269 persons between 2013 to July 2016.

A study carried out by Abraham (2017) reported that the spate of killing and the intensity it takes pose serious security challenge to the Nigerian nationhood. Abraham (2017) further reported that between 2012 and 2016, herdsmen attacks across the country led to the death toll of about 9,037 and over 5,991 injured. Between 2017 to 2018, the attacks continued unabated with more frequencies and high intensity across the North Central States, particularly Benue, Kogi, Nasarawa, Kwara and Plateau. In Kogi State, it was reported by Olaniyi and Akubo (2018) that herdsmen invaded three communities in Dekina and Omala Local Government areas leaving at least 35 people dead. The communities attacked according to report included Oganenigu, Ojiapata, Iyale and Ojoo in Dekina Local Government Area, while in Omala Local Government Area Obakume, Abejukolo, Agojeju-Ikpoba and Ogo communities were said to have been attacked. This was said to be a reprisal attack for 2016 altercation that led to the death of four Fulani herdsmen and a number of cattle, (Olaniyi and Akubo, 2018), Oladipo, (2018).

As revealed from available literature, it has been observed that from 2011 to 2016, herdsmen attacks have occurred in virtually all states of the federation, with Kebbi State having only one of such attack in 2014 (S.B. Morgan Intelligence Report 2016). This report was also supported by Abraham (2017) whose findings revealed that the established pattern of attacks, injuries, deaths and timing suggests that herdsmen attacks obviously poses a great threat to contemporary security situation in the Nigeria. The security threat of herdsmen attacks as observed by Asabo (2017) may create a hydra headed security challenge that may become more monstrous than the challenge

posed by Boko Haram terrorists because of the spread of herdsmen attack across the country.

The summary of the frequency of the attacks across the country for a period of five years, 2012 – 2016 as noted in Abraham (2017) put the figure at 830 times throughout the country (see appendix 1). That is why Crisis Group Report of September 19, 2017 warned that the geographical spread and escalation of the conflicts could put Nigeria security forces under greater stress.

Security implications of climate change and the likely effects on the Sahel were widely documented in literature. The most striking and widely referred to is the Solana Report of 2008 which identified the likely threat that may be posed by climate change and sent a warning signal to Africa in 2008. The report, according to Philipp (2010) identified seven climate change related threats to state and global security which it hypothesized that they may not necessarily degenerate into armed conflict. The Solana Report viewed climate change as a threat multiplier which could exacerbate existing trends, tensions and instabilities. The report as cited in Philipp (2010) read in part:

These threats and forms of conflict cover all countries, however, Africa is identified as one of the continents most vulnerable to climate change because of multiple stresses and low adaptive capacity, and is therefore likely to cause growing international insecurity that directly affects European interest.

The above report could be seen as a warning note to African leaders and their governments to be more proactive in relation to climate change and its security threat to the African continent.

Again, arms proliferation, especially in Africa and Nigeria in particular has been described as great security threat to the nation.

A recent study on arms proliferation as reported in This Day, August 19, 2016 indicated that out of the 857 million small arms and weapons in the world, 500 million are illegal out of which 100 million were found in sub-Saharan Africa, with about 7.5 percent of (that is 75%) of the 100 million found in Nigeria. This was validated by the findings of the Presidential Committee on Small Arms and Light Weapons in 2015 which found that 350 million of the 500 million small arms and light weapons in West Africa are in Nigeria. This was equally supported by Kehinde (2016) whose study reported that Nigeria holds about 70% of the estimated 500 million of small arms and light weapons proliferation in West Africa sub-region. Kehinde further observed that Nigeria is one of the countries that are experiencing devastating effects of arms proliferation due to spillover effects of crisis in Libya and Mali as well as the unresolved internal conflicts in many parts of the country, including farmers-herders conflicts.

VIII. ECONOMIC AND SOCIAL IMPLICATIONS OF HERDSMEN – FARMERS CONFLICTS

Farming and cattle rearing are two economic means of survival of the two groups (herders and farmers) that have always engaged in the conflict. At any point in time, there is conflict between these two groups, the economy of the groups and of course, the state(s) suffer retardation. It is pertinent to note that

the contributions of these groups to the economic development of Nigeria cannot be overemphasized. Thus, farmers and herdsmen conflicts have socio-economic implications which affect not only the individuals or groups involved in the conflict, but also the state(s) and nation at large. As reported in the Premium Times of July 5, 2017, Governor Samuel Ortom of Benue State lamented that more than 1,878 people were killed between 2014 and 2016, with tens of thousands displaced and disengaged from their main economic activities. Equally too, The Nation Newspaper March 22, 2017 reported that the Benue State Government lost N95 billion between 2012 – 2014 to herdsmen attacks, as asserted by the State Governor, Ortom. The International Crisis Group Report of 19th September, 2017 indicated that between January 2015 and February 2017, about 62,000 persons were displaced in three states mostly affected by the herders-farmers conflict, namely; Benue, Kaduna and Plateau. This has brought serious social and economic dislocation to the people of the affected states as most people sought shelters in other rural communities, compounding the existential stress on the available scarce resources.

Similar reports were given in Kogi State in March 2018 where herdsmen razed down some communities notably Ojuwo-Ajomayeibi, Iyade, Agbenema and Opada villages in Omala Local Government Area where the locals allegedly said that the herdsmen had come to displace them in order to take over their land for cattle colonies, Boluwaji (2018). The economic effects of the crisis also hit the national government as reported by Mercy Corps, (2015). The Mercy Corps of July 2015 reported that the Federal Government of Nigeria was losing about \$13.7 billion revenue annually due to herdsmen and farmers conflicts in Benue, Kaduna, Nasarawa and Plateau States with the four states losing nearly 47% of their annual internally generated revenues.

Similarly, Dimelu et al, (2017) citing Ofuoku and Isife (2009) revealed that crops worth about N40 million were usually lost annually in the South-South Region, notably Delta and Edo States as a result of invasion of cattle on farmers' crops.

A study carried out by Dimelu et al (2017) in Kogi State also revealed that various local governments in the state have experienced farmers-herders conflicts with substantial loss of revenues. Tenuche and Ifatimehin (2009) also reported that conflict between farmers and herdsmen, especially in the Benue Valley has always resulted in loss of lives and property, destabilizing economic activities and the livelihood of the people.

The conflict between farmers and herdsmen centers on the conflict groups desire to protect their individual economic interests. This always leads to high competition between the two. Hence, Adisa (2012) observed that the competition between the two agricultural land-user-groups has often times resulted into serious overt and covert manifestation of hostilities and social upheavals in many parts of the country, which have high potential for social and economic crises nationwide. Economic and social losses arising from herdsmen and farmers conflicts as revealed by the study carried out by Adisa (2012) include loss in quality of relationship, loss of job status, self-esteem and personal/family health. Direct economic losses on farmers include income losses, loss of yields and household resources. Other ancillary implications of the conflict which affect both

social and economic lives of the conflict groups reported by Adisa (2012) include marital dissatisfaction, declining quality of children's education, physical exhaustion, reduction in food quality/quantity, farm/job abandonment and frequent complaints. These are all tied to economic and social lives of the affected groups and other residents as no meaningful economic and social activities can take place in tensed and crisis-ridden environment.

IX. THEORETICAL FRAMEWORK

Piaget's theory of adaptation (1896 – 1980) was used for analysis in this study.

The theory of adaptation by Piaget postulates that cognitive development occurs from two processes – namely; adaptation and equilibrium. Adaptation involves the child's changing to meet situational demands, and this requires assimilation and accommodation. Assimilation is said to be the application of previous concept in the face of new information or development. Equilibrium on the other hand, is the search for balance between self (what one use to be) and the world (the exigency of the time), and involves the matching of the persons adaptive functioning to the situational demands.

Equilibrium keeps human moving along the developmental path way. Thus, Morphy (1993) defines adaptation as man's adjustment for survival in an environment. Hence, adaptation theory is sometimes referred to as survival theory. Adaptation according to Morphy (1993) is viewed from both short-term and long-term perspectives. The short-term defines the way and manner in which individuals modify their behaviour to align with environmental conditions and dictates where they found themselves, hence behavioural adaptation is regarded as short-term adaptation. Cultural adaptation on the other hand, refers to the ability of a group of people to adapt to predictable environmental changes which is regarded as long-term and it relates to a society or group of persons. Thus, King (2018) noted that adaptations occur over generations of species with those traits that help an individual animal eat and mate most profusely being passed down from one generation to another until the whole species changes to be better suited to their environment.

X. THEORETICAL APPLICATION TO THE STUDY

The adaptation theory is therefore very relevant to the study of behaviour of Fulani herdsmen and sedentary farmers, as the two groups (herdsmen and farmers) must, as a matter of necessity, be ready to adapt to the environmental dictates of the time and adjust accordingly in accordance with the exigencies of the time. In this regard, the herdsmen must be able to realize that the status quo ante of continuous free range grazing can no longer stand the test of time in view of the wind of change that has been blowing over the years worldwide ranging from population explosion both of human and herds, climate change, technological development and a host of other changes that have affected the use of land resources. The same is also applicable to farmers. Therefore, the two groups need to be properly educated and sensitized by the elites in government, using the governmental instrument as the moderator, modifier, balancer

and societal regulator to create the desired equilibrium. Every human culture is dynamic in relation to situation, environment and time. That is why Birket-Smith (1964) in Hann (1997) asserted that all cultures adapt themselves to the environmental conditions under which they exist, even though they do not all exhibit the same degree of adaptation but adaption is seen as sine-qua-non to harmonious coexistence.

The most important is that adaptation theory tries to awaken the consciousness of the groups involved in the interaction to be conscious and mindful of time, space and environment and make all the necessary adjustments required for adaptation to enable them move and cope with the dynamics of society and the world at large for peaceful coexistence.

The forgoing is in-tandem with the explanation of adaptation theory by Benneth (1976) who views adaptation as action-focused, and refers to the coping strategies or mechanisms adopted by humans in obtaining their wants or achieving their objectives or adjusting their lives to the surrounding milieu or the milieu to their lives and purposes. This theory also conforms with inter-cultural adaptation of Benneth as explained by Pietila (2010) which calls for dialogue that would lead to higher levels of intercultural sensitivity resulting in intercultural encounters that would be beneficial to both parties in the intercultural adaptation process, with the ultimate purpose of arriving at integration which will result in harmonious coexistence among the parties.

This theory is very apt and relevant to the analysis of farmers and herdsmen conflict in Kogi State and Nigeria at large, as Hussein (1998) noted that conflict could sometimes be positive resulting to the necessary adaptation and achievement of desired change. That necessary desired change can only be attained if the political elites, as the moderators and regulators of society can cultivate the right political will and attitude to educate, sensitize and enlighten the critical stakeholders to develop the right spirit, attitude and readiness to make the necessary adjustment and adaptation to achieve this all important goal for harmonious coexistence, national cohesion and development.

XI. RESEARCH METHODOLOGY

RESEARCH DESIGN

The research design used in this study was survey design.

AREA OF THE STUDY

This study was carried out in Kogi State. The study covered the three Senatorial Districts of the State, namely, Kogi Central, East and West respectively. The Local Government Areas selected for the study across the State were those affected by the crisis. In Kogi Central, Adavi Local Government was selected; Kogi West Mopa Muro Local Government and Kogi East which was the most affected area, the Local Governments covered include Ankpa, Dekina, Igalamela/Odolu, Ofu and Omala respectively. The localities/communities covered in the study include Adavi in Adavi Local Government Area, Amuro in Mopa Muro Local Government Area, Agojeju-Idaka, Ogane Enugu, Ojuwa-Ajomaye-igbi in Dekina Local Government Area, Ajichekpa, Agbenema, Opada and Ikpoba in Omala Local Government Area, Egbolo, Okpakpata and Odolu in

Igalamela/Odulu Local Government Area, Ogegume and Umomi in Ofu Local Government Area Ogbagbala, Onupi and Ogodo in Ankpa Local Government Area respectively.

SOURCES OF DATA COLLECTION

The data for this study were collected from primary and secondary sources. The primary data were obtained from the subjects (respondents) selected for this study, while the secondary data were derived from information obtained from documented sources such as textbooks, journal, articles, published research reports, internet and other print media

INSTRUMENTS OF DATA COLLECTION

The major instruments used to obtain primary data/information from the subjects were interview and structured questionnaire method. Data for the study were collected by the use of interview schedule with the respondents. The services of interpreters were employed, especially in situations where the respondents could not communicate effectively in English Language. Where necessary, local languages were also used to enable researchers get detailed information from the respondents. Pilot survey was initially carried out to avoid overlooking errors. Appointments were made to meet with the respondents for the interview. Some research Assistants were also engaged having been tutored on the use of the interview schedule.

POPULATION OF THE STUDY

The population for this study was drawn from farmers and cattle rearers (herdsmen) in the study area, as well as traditional rulers, community leaders and the security agents. The population frame was drawn from among the entire farmers and herders in the study area.

A total of 130 farmers were purposively selected from the various communities/localities selected for the study made up ten (10) from each locality which represented the diversity of

other farmers, while a total of 52 herders comprising of four (4) from each locality were purposively selected for the study. First class and second class traditional rulers in the Local Government Areas studied totaling fourteen (14) were included in the population of the study, while a total of fourteen (14) community leaders drawn from the studied communities were also included in the study. The 7 Miyetti Allah officials included in the study were drawn from the local government areas selected for the study while the security agents included in the study were drawn from the heads of security agencies in the study area, namely, the Nigeria Police Force, the SSS and the Nigeria Security and Civil Defence Corps in the Local Government Areas studied. In all, a total of 238 respondents was used for the study.

POPULATION SAMPLING TECHNIQUE

The population sampling technique adopted in this study was the purposive sampling method.

METHOD OF DATA PRESENTATION AND ANALYSIS

The data collected in this study were presented and analyzed with quantitative and qualitative methods. The quantitative method made use of descriptive statistics (percentages and mean) with a bench mark of 3.5 (upper limit of mean of 3.00) as the decision rule while chi-square was used to test the significance level of the responses so as to determine the strength of the responses for causal relationship

DATA PRESENTATION AND ANALYSIS

The major focus of the section of the study is to present and analyse the data collected and derive findings therefrom. Data presentation is structured as follows:

SOCIAL CHARACTERISTICS OF RESPONDENTS

Table 1: Age Distribution of respondents

Age	No. of Respondents	Percentage (%)
15 – 25	20	08
26 – 35	50	21
36 – 45	80	34
46 – 55	68	29
56 and above	20	08
Total	238	100

Source: Field survey, 2018

As shown in table 1 above, 20 respondents, equivalent of 8% fall within the age range of 15 – 25, 50 respondents (21%) are within the age bracket of 26 – 35 years, 80 respondents representing 34% are within the ages of 36 – 45, 68 respondents (29%) fall within the ages of 46 – 55, while 20 respondents (08%) were 56 years and above. This shows that the population of the respondents is predominantly people within the productive ages.

Table 2: Marital Status of respondents

Age	No. of Respondents	Percentage (%)
Married	209	88
Single	10	04
Divorce	08	03

Widow	11	05
Total	238	100

Source: Field survey, 2018

The analysis on table 2 shows that 209 respondents (88%) of the population are married, 10 of them or 4% are single, 08 or 03% divorcees, while 11 or 05% are widow.

Table 3: Sex Distribution

Sex	No. of Respondents	Percentage (%)
Male	218	92
Female	20	08
Total	238	100

Source: Field survey, 2018

Table 3 shows that 218 (92%) of the respondents are male while 20 (08%) are female. This shows that males are the dominant people in both farming and cattle rearing activities in Kogi State.

Table 4: Educational Level Distribution

Educational Qualification	Respondents			
	Farmers, Traditional Rulers/Community Leaders/Security Agents	%	Herders/Breeders	%
Degree/HND	30	17	03	05
ND/NCE	42	23	17	29
WASC/WAEC O/L	85	47	30	51
FSLC	22	13	09	15
Total	179	100	59	100

Source: Field survey, 2018

In the area of educational level distribution, 30 (17%) of the farmers, traditional rulers, community leaders and security agents have either first degree of HND while 3 or 5% of the herders/cattle rearers/breeders have same qualifications. Again, 42 or 23% of the farmers, traditional rulers, community leaders and security agents possess either ND or NCE, 17 or 29% of the herders, cattle rearers/breeders possess the same ND or NCE. 85 people or 47% of the farmers, traditional rulers/community leaders and security agents have WAEC certificate. 30 persons or 51% of the herders, cattle rearers/breeders possess WAEC certificate. Finally, 22 respondents or 13% of the farmers and their categories have FSLC, while 9 persons or 15% of the herders and their group have FSLC. This analysis shows that majority of the respondents have basic Western education for effective communication in English Language.

Table 5: Occupational Distribution

Occupational/Role	No. of Respondents	Percentage (%)
Farmers	130	55
Cattle rearer/breeders	59	24
Traditional Rulers	14	06
Community Leaders	14	06
Security Agents	21	09
Total	238	100

Source: Field survey, 2018

In the occupational level, 130 or 55% of the respondents are farmers, 59 or 24% of them are cattle rearers/breeders, 14 or 6% are traditional rulers, another 14 or 6% of the respondents are community leaders while 21 or 9% of the respondents are security agents.

XII. CAUSES OF FARMERS/HERDERS CONFLICT

Table 6: Causes of farmers/herders conflicts (farmers, community leaders and traditional rulers' perception).

Table 6 below shows the mean score and SD of perceived causes of farmers/herders conflict in Kogi State from the perspective of farmers, traditional rulers and community leaders.

Perceived Causes	Mean	SD	Remarks
Crop destruction by herds	3.6	.56736	Major factor
Violation of grazing agreement	3.5	.88464	Major factor
Refusal to pay compensation by herders	2.81	1.21277	Insignificant factor
Indiscriminate grazing by herdsmen	3.6	.58330	Major factor
Destruction of water sources by herds	3.7	.61098	Major factor
Cattle rustling	1.8	1.12286	Insignificant factor
Cattle killing by farmers	2.0	1.22887	Insignificant factor
Reprisal attacks due to poor dispute resolution	3.7	.61098	Major factor
Over grazing on fallow lands	3.7	.57161	Major factor
Violent reaction to dispute by herdsmen	3.7	.55642	Major factor
Violent reaction to dispute by farmers	3.2	.90907	Insignificant factor
Rape of women	2.1	1.23940	Insignificant factor
Poor handling of dispute by security agencies	3.6	.56736	Major factor
Inadequate capacity of security agents	3.5	.79302	Major factor
Soil degradation and land scarcity	3.5	.82198	Major factor
Politicization of dispute/conflict	3.7	.5542	Major factor
Ethno-religious divide	2.8	.122591	Insignificant factor
Population growth of human and herds	3.5	.88580	Major factor
Climate change	3.5	.88464	Major factor
Changing patterns of farming/grazing	3.5	.88565	Major factor
Inadequate institutional framework for dispute resolution	3.5	.73333	Major factor
Lack of proper understanding of grazing desire by traditional rulers	3.5	.79302	Major factor

Source: Field survey, 2018

Table 7: Causes of farmers/herders conflict (herders perception)

Causes	Mean	SD	Remarks
Crop destruction	3.3	1.17444	Fairly significant
Refusal to pay compensation	2.8	1.21276	Insignificant
Refusal by farmers to allow free grazing	3.6	.61636	Major factor
Restriction by farmers to water sources for cattle use	3.6	.61636	Major factor
Cattle rustling	2.9	.93631	Insignificant
Cattle killing by farmers	2.4	.94253	Insignificant factor
Farming on grazing reserves/routes	3.0	1.16695	Not too significant
Inappropriate demarcation of grazing lands	3.6	.48290	Major factor
Violent reaction to dispute by farmers	3.4	.87333	Not too significant
Violent reaction to dispute by herders	3.2	.90907	Not too significant
Poor handling of dispute by security agencies/other constituted authorities	3.5	.81733	Major factor
Inadequate institutional framework for dispute resolution	3.5	.81733	Major factor
Rape of women by herdsmen	2.0	1.17444	Insignificant factor
Climate change affecting range land	3.6	.62343	Major factor
Population increase of human and herds	3.7	.75139	Major factor
General development activities affecting land	3.5	.81733	Major factor
Ethnic and religious differences	2.2	1.25037	Insignificant factor
Politicization of farmers/herders conflicts	3.5	.75100	Major factor
Lack of capacity of security agents to provide security	3.5	.70400	Major factor
Reprisal attacks due to poor dispute resolution	3.5	.65050	Major factor
Lack of clear policy on grazing land	3.5	.65319	Major factor
Traditional rulers do not always understand the grazing desires of herders	3.5	.67907	Major factor
Changing patterns of farming/grazing	3.6	.62343	Major factor

Source: Field survey, 2018

The above data show the mean score and standard deviation of the perceived causes of farmers/herders conflict from the herders' point of view.

Table 8: Causes of escalation of farmers/herders conflicts (security agencies perspective).

Causes	Mean	SD	Remarks
Inadequate security personnel	3.8	.51177	Major factor
Poor attention to security needs by government	3.6	.87014	Major factor
Lack of capacity by security agents	3.6	.65828	Major factor
Climate change	3.6	.74642	Major factor
Lack of clear grazing policy	3.6	.73030	Major factor
Ethno-religious differences	2.7	1.27055	Insignificant factor
Poor dispute resolution mechanism	3.5	.87286	Major factor
Politicization of farmers/herders conflict	3.6	.74001	Major factor
Changing patterns of farming/grazing	3.6	.66904	Major factor
General development activities affecting land	3.6	.66904	Major factor
Inadequate demarcation of grazing land	3.5	.87287	Major factor
Population increase of human and herds	3.6	.87282	Major factor
Lack of definite policy on grazing	3.6	.73030	Major factor
Poor understanding of grazing needs of herdsmen by traditional rules	3.5	0.87282	Major factor
Soil degradation	3.7	.76139	Major factor

Source: Field survey, 2018

SECURITY IMPLICATIONS

Table 9: Security implications of farmers/herders conflicts

Security Implications	Mean	SD	Remarks
Loss of human lives	3.6	.73775	Leads to societal devastation
Stresses security agents	3.6	.8535	Results in security Inefficiency
Leads to development of militancy	3.6	.7632	Results to deviant behaviour
Heightens tension in the state	3.6	.70988	Makes the state volatile
Creates instability	3.5	.78344	Stresses security agents/ government
Leads to infiltration of criminals from external forces	3.6	.73775	Creates ground for breeding and development of criminality
Creates ethno-religious suspicion	3.7	.7377	Threatens harmonious co-existence
Leads to arms proliferation/arms running	3.6	.83459	Potential danger to the state

Source: Field survey, 2018

XIII. SOCIO-ECONOMIC IMPLICATIONS

Table 10: Socio-economic implications of farmers/herders conflicts

Socio-economic Implications	Mean	SD	Remarks
Disruption of economic activities	3.8	.51603	Leads to economic destabilization
Loss of livelihood opportunities	3.6	.78122	Social/economic dislocation
Loss of property	3.7	.67684	Leads to psychological trauma to the citizenry
Increase in poverty and diseases	3.5	.89339	Could lead to criminality and risk state
Traumatizes the people	3.6	.83407	Frustrates the citizens
Leads to migration	3.5	.84442	Brings pressure to the economy of urban centres
Loss of revenue to government	3.5	.93570	Declining fortune for government

Strains farmers/herders relationships	3.7	.53888	Creates mutual suspicion
Leads to closure of schools/dropouts	3.6	.69048	Potential danger to the state
Stresses government resources	3.5	.78439	Diverts government resources from development activities
Leads to individual/group frustration	3.6	.75292	Retards socio-economic development
Leads to food insecurity/hunger	3.6	.83417	Leads to poverty/penury

Source: Field survey, 2018

XIV. TESTING OF HYPOTHESES

Three major hypotheses were formulated to guide the study:

Hypothesis One

The assumptions made in the first hypothesis were:

H₀: Farmers/herders conflict in Kogi State emanates from the struggle over the economic use of land resources.

H₁: Farmers/herders conflict in Kogi State does not emanate from the struggle over the economic use of land resources.

In order to test the assumptions of the above hypothesis, respondents were asked to rate the perceived factors responsible for the conflicts between farmers and herders in Kogi State. Their responses indicated that the major causes of the conflict centred on the desire by the conflicting groups to make economic use of the land resources as revealed by the mean score (3.5 and above) of the respondents rating in tables 6, 7 and 8 where the factors relating to economic use of land resources were discovered to be the trigger of the conflict.

We therefore accept the null hypothesis and reject the alternative.

Hypothesis Two

In the second hypothesis, it was postulated thus:

H₀: Farmers/herders conflict constitutes security threat to Kogi State.

H₁: Farmers/herders conflict does not constitute security threat to Kogi State.

In order to test the assumptions of the above hypothesis, respondents were asked to rate the security implications of the farmers/herders conflict in Kogi State. Their responses on security implications as shown on table 9 had mean scores of 3.5 and above which point to the fact that farmers/herders conflict constitute great security threat to Kogi State.

We therefore accept the null hypothesis and reject the alternative.

The assumptions made in hypothesis three were:

H₀: Farmers/herders conflicts impede socio-economic development of Kogi State.

H₁: Farmers/herders conflicts do not impede socio-economic development of Kogi State.

In testing the above postulations, respondents were asked to rate the impact of the conflicts on socio-economic development of the State. The mean score of their responses on table 10 which had a mean score of 3.5 and above indicated that the conflict have negative impact on socio-economic development of the State. Thus, the null hypothesis is accepted while the alternative is rejected.

XV. DESIRED REMEDIES

Table 11: Desired Remedial actions to farmers/herders conflicts (as perceived by the conflict groups)

Desired Remedies	Mean	SD	Remarks
Establishment of grazing reserves /Establishment of ranches	3.7	.67816	Accepted by the conflict groups
Continuous use of open grazing	1.4	1.02497	Not sanctioned
Use of judicial/legal dispute resolution	1.8	1.13231	Not welcomed
Use of Alternative Dispute resolution method	3.6	.95353	Seen as a welcome development
Strengthen capacity of security agents	3.6	.70692	Welcomed by the conflict groups
Effective intelligence network of locals and security agencies	3.6	.7032	Supported by the conflict group
Definite policy on grazing lands	3.6	.74816	Accepted as a welcome development by the conflict groups
Formation of standing committees of stakeholders to dialogue and constantly review strategies for harmonious coexistence	3.6	.74730	Supported by the conflict groups

Quick response to early warning signals by government	3.6	.74283	Well taken by the conflict groups
Adequate awareness to stakeholders on any policy initiative before implementation	3.5	.84513	Leads to support for policy implementation
Curbing illegal arms proliferation	3.7	.55229	Seen as panacea to conflict impunity

XVI. FINDINGS

Based on the analysis of the data collected in this study, it has been revealed that the causes of farmers/herders conflicts in Kogi State are myriad and have been categorized as follows:

1. Economic use of land resources has been discovered to be the major trigger factor which led to other incidental factors, such as:
 - i. Policy framework factors, which include lack of definite policy on grazing land and traditional rulers acceptance of herdsman for grazing settlement without clear understanding of grazing desires
 - ii. Deficient response/poor policy implementation factors, such as poor dispute resolution mechanisms and politicization of herdsman-farmers conflicts.
 - iii. Ecological/environmental factors, resulting into desertification and rural banditry, and
 - iv. Security related factors which include inadequacy of personnel, lack of capacity and equipment infrastructure, ECOWAS protocol policy and arms proliferation
2. Security implications of the farmers/herders conflicts include loss of lives, overstressing of security agencies, encouraging the development of militancy, and arms proliferation/arm running, creating suspicions and making the state tensed and volatile.
3. The social and economic implications of the conflict as the study revealed include economic stagnation, loss of livelihood opportunities, loss of revenues to government, food insecurity and hunger, school closures and dropouts among the school children.

XVII. CONCLUSION

This study identified the factors responsible for the conflict between farmers and herdsman in Kogi State and their security and socio-economic implications. Notable among the factors include struggle over the use of land resources which is the main trigger of the conflict as the conflict groups regard land resources as their major economic sources of livelihood. Other factors include poor policy framework, deficient response/poor policy implementation, and ecological/demographic factors such as climate change, soil degradation, population increase of human and herds and general development activities affecting land. Escalation of farmers/herders conflicts is one of the most pressing security challenges the State and the country have to grapple with and if not carefully, decisively and properly handled, it can degenerate into a monster which may portend more danger than Boko Haram insurgency because of its sophistication and spread. Therefore, it is our submission that the recommendations in this study should be brought to the

attention of relevant critical stakeholders/authorities for implementation as panacea to the farmers/herdsman conflict in Kogi State and Nigeria at large.

XVIII. RECOMMENDATIONS

1. It is hereby recommended that the Federal Government, through the instrumentality of National Assembly should enact new and definite law on the use of land resources as it relates to grazing lands as the present Land Use Act is fraught with deficiencies/irregularities which have created confusion over the control and use of land resources in in this respect in Nigeria.
2. As an interim solution, grazing lands should be clearly and definitely acquired and demarcated in selected areas in the State where fallow lands are surplus and fallow for cattle grazing. This should be done as a temporary measure to restrict cattle roaming until ranches are established. This is not equivalent to cattle colony. The acquisition of such lands should be done through a proper survey and must be with the consent of the traditional custodians of the lands. Adequate consultations must be made by government with the critical stakeholders and the decision to establish grazing lands must not be forced or imposed on any community.
3. Government should take further steps to encourage establishment of ranching as the ultimate long-term panacea to the conflict as the present free rein or open grazing and roaming cattle has been increasingly the source of conflict between farmers and herders. In order to achieve this goal, government must engage the critical stakeholders in dialogue through continuous sensitization and education on the benefits of ranching over roaming cattle/open grazing system to convince the herders to accept the new method of grazing. This could be done through sponsorship of critical stakeholders on inter-country visits, especially the leaders of herdsman and sfarmers to appreciate and understand the benefits of ranching on the productivity of cattle as well as the economic benefits therein to the herdsman, farmers and other stakeholders.
4. Traditional rulers should consult widely with their community leaders/members before accepting to allocate grazing settlement for herdsman and their cattle. Such acceptance and settlement should be done only where there are enough fallow lands which could be used exclusively for grazing to avoid cattle roaming into crop farms.

5. It is also recommended that the State Government should constitute/set up committees on Alternative Dispute Resolution in local governments across the State where herders settle to handle disputes arising between farmers and herdsmen in the state. Membership of the committees must be selected based on the credibility, integrity and honesty of purpose of the individuals; the membership must be drawn from elite farmers and herders alike, devoid of any partisan coloration. This should involve tested and trusted individuals including religious leaders of repute. The committee should be saddled with the responsibility of constantly reviewing strategies to building peaceful and purposeful relationships for harmonious co-existence between farmers and herders. This has become necessary due to the suspicions created between farmers and herders as a result of the conflict over the years.
6. Government at all levels should, as a matter of necessity and urgency ensure the provision of adequate security to all nooks and crannies of the state to secure peoples' lives and property. This should be done by recruiting more security personnel in all levels and areas such as Police, Army, Civil Defence, etc. The government should equally reinvigorate the Nigeria security agencies by strengthening their capacity to combat security challenges. The capacity building should be done in the areas of adequate personnel, provision of needed security apparatus and gadgets including modern technology gadgets and training of personnel to enable them function more effectively.

Security issues should not be treated on reactionary or on ad-hoc basis as being practiced currently. Security operatives should be made to be more efficient and proactive through effective intelligence gathering with the usage of local intelligent informants so as to be able to nip criminals/crimes in the bud with ease. The locals are the closest to the grassroots and they know the criminals among them and can give more accurate and reliable intelligent information to curb crimes. Thus, formation of Local Security Intelligence Corps which will be responsible for gathering, analyzing and disseminating intelligence information to security agencies will go a long way to curb criminalities in various localities and communities and minimize crisis.

7. Political office holders should stop politicizing farmers/herders conflicts. Farmers and herders should be seen as critical stakeholders in the Nigerian project and issues relating to their economic affairs and means of livelihood should not be treated with disdain and levity but be given the needed serious attention. On this note, the fast growing grasses proposed by the Minister of Agriculture should be given desired attention to encourage ranching along with more other improved method of animal husbandry as practiced in developed climes.
8. The Federal Government should as a matter of necessity and urgency, tackle the issue of rural banditry in the Northern region/states which has spilled-over into the North Central and Kogi State in particular. Rural banditry in the Northern region has become a fertile

training ground for criminals and they have become ready tools for destabilization. The Federal Government must therefore deploy the necessary security forces to bring down the rural banditry in the North from becoming a monster. All security forces including Air Force, Military and State Security Services should be deployed to face these bandits and bring them down before they degenerate beyond control.

9. It is also recommended that Federal Government should make immediate effort to combat desertification which is responsible for the movement of the herdsmen from the core North to the North Central and other regions in the country.

Issue of desertification was well reported and documented many years ago but neglect by governments at all levels to respond to early warnings on climate change made Nigeria to be caught up with desertification, provoking considerable losses in economic means of livelihood of the citizenry. Nigeria, as the giant of Africa must take the lead in the implementation of the Great Green Wall (GGW) which is aimed at rehabilitating 22,500sq km of degraded land by 2020 as recommended by Nigeria's National Agency for the Great Green Wall (Essen, 2017).

10. It is recommended that ECOWAS protocol be reviewed. In view of the new revelations that foreign herders were part of those attacking farming communities in Nigeria, step must be taken urgently to review the ECOWAS protocol on free movement of persons, goods and services because of the security challenges it is posing to Nigeria. The need for this review was succinctly captured by the Minister of Agriculture, Audu Ogbе when he said the government would present proposals at the African Union "to compel member countries to take steps to prevent their herdsmen from grazing into neighbouring countries". This should not end up as a mere political statement; follow up action is therefore needed to actualize that dream urgently.
11. One major drivers and impetus to the escalation of conflict between farmers and herders is the proliferation of small arms and light weapons which have become common place in Nigeria and Kogi State in particular. It is therefore recommended that decisive actions be taken by Kogi State Government in collaboration with the Inspector General of Police to ensure that all illicit arms and weapons in the State are mopped up as a matter priority, necessity and urgency. A definite action and deadline must be given for the mop of these arms and weapons by security agents particularly the Nigeria Police. Any deviant must be brought to book to serve as deterrent to others. The Nigeria Police must carry out this task professionally and not succumb to any political pressure of sacred cows.

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How Relationships are Influenced by Business Dealings

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Abstract- This paper presents the effects of multilevel marketing on relationships and friendships in India. The paper describes what multilevel marketing is, where did it originate from, the way people approach customers and how the customers feel about it. Multilevel marketing is used for product distribution through independent distributors. This paper will also look into the type of mediums these distributors use and how effective each one is in selling their products.

I. INTRODUCTION

This paper looks at how relationships are influenced by business dealings. In this particular study, I happened to interview people who are into network marketing. I interviewed both buyers and sellers, and then looked at how relationships were getting affected between friends and relatives. I also looked at the relationship between sellers who were strangers and their relationship with the buyers. Then I compared our findings and found out that there is a difference between the relationship of a friend with the buyer and a stranger with the buyer.

II. BACKGROUND:

Face-to-face selling of products started in the 20th century. First one of its kinds was the door-to-door selling which took place in places that were urbanized. Then a second type of face-to-face marketing came about which gave everyone joining the company a business opportunity via multilevel marketing (MLM). This type of marketing gave competition to the single-level commission-based traditional direct selling. MLM gives compensation to its distributors not only for selling the products, but also for recruiting other distributors which creates a down line of distributors and a hierarchy of multiple levels of compensation. Most of the times, salespeople are expected to sell the products directly to consumers by means of relationship referrals and word of mouth marketing.

III. LITERATURE REVIEW:

According to the Direct Selling Association in the United States, 70% of the revenue from the direct selling industry was generated by network marketing companies (Coughlan & Grayson, 1998). Although combining friendship and business in the same relationship can be beneficial, it can also create conflict. True friends are expected to be unmotivated by benefits that can

be used beyond the relationship (e.g., money, status), whereas business partners are, by definition, at least partly motivated by these more “instrumental” concerns (Kent, 2007). Each social role encourages people to meet (and/or abstain from) a core set of critical role behaviors and leaves room for individual discretion on other behaviors (Levinson 1958). We all play different roles in society and these roles are not supposed to conflict with each other. Friends are expected to seek out each others company willingly rather than to interact only because of bureaucratic demands or practical convenience (Allan 1979, 1989) In friendship, we should not feel obligated by any means. An intrinsic relational orientation is the desire to maintain a relationship because of inherently enjoyable aspects of the relationship (Carrier 1999) and because “the relationship itself generates its own rewards” (Rempel, Holmes, and Zanna 1985, p. 98). For centuries, scholars have noted that friends are expected to have an intrinsic orientation. In Aristotle’s view, friendship exists on a sliding scale depending on how much the relationship is motivated by “wishing the other well for the other’s sake” (Mitchell 1997). To him, the best form of friendship is one in which “the partners love each other for themselves, cherishing each other for their characters” (Pangle 2003, p. 43).

There can be positive effects of combining friendships with business though. When we have someone who we can trust, money matters become easy and we know that our friend will not cheat us. Therefore, it is not surprising that much empirical work on friendship in marketing has found that friends are more likely to be valuable exchange partners; that is, they exhibit characteristics that are likely to influence the bottom line positively (Johnson and Selnes 2004). For example, friends are more loyal business partners because there is a sense of trust.

People can at times be concerned that their so-called friend is taking advantage of their friendly willingness to be useful. When this instrumental perspective combines with friendship, the result is role conflict. The best thing we can do when such a situation arises is that we need to terminate the development of such relationships. For example, in Halpern’s (1996, p. 1536) study of real-estate agents, some informants reported that they did not develop friendships in business because “you are representing your client and all that stuff can get in the way of your relationship.” As another example, some informants in Beatty and colleagues’ (1996, p. 232) study of retail customers indicated that they did not want to build a friendship with a retail sales associate because it “might cause them to feel pressured into buying something they did not want.” In the same spirit,

Heide and Wathne (2006) predict that people faced with role conflict often either switch roles or resist the new role rather than operate with conflicting demands.

Method:

For this research paper, five qualitative interviews were conducted which were thirty minutes each. There was a mix of close and open ended questions. Questions can be found at the end of the paper. Sellers and buyers in a multi-level marketing company called Herbal Life interviewed. The company has been running for over 25 years. These were structured interviews consisting of a series of predetermined questions that all interviewees answered in the same order. This helped me to compare and contrast different answers given to the same questions.

Friendship is the independent variable here. I am doing this research from a sociologist's perspective and hence focusing on relationships/ friendships. Therefore, these interviews focused on two types of network marketing relationships: relationships between respondents and their relatives/close friends and relationships between respondents and sellers who are strangers. The hypotheses for this study is that relationships are affected positively when business comes into the equation.

IV. RESULTS:

After conducting the interviews, I found that people who were selling the products loved their jobs because they were meeting new people everyday. Relationships did matter in this kind of marketing. There was a big difference between buying products from a friend or family member and a stranger. As one person said that, "I think that the relationship does matter because if it is a random person asking me to buy products, I either never open the door, or I send my child and he says that my mother is not home. That way they leave without me having to face them." On the other hand, when a friend or relative goes to someone's house, they are offered tea and then they have conversations about the products. It was a more relaxed conversation. These kinds of relationships were being exploited though. Buyers feel like they are being pressured to buy something they do not want or need. In one of the interviews, a lady said that she had to buy \$200 worth of beauty products from a distant relative because they told her that she will be making a lot of money once she joins the company. The relative showed her pictures of members of the company who had lavish cars and influenced her that way. Five years later, the lady had not used a single product and was not able to influence anyone to join the company. Hence she feels like she lost money. On top of everything, she never saw her relative again. They exploited their relationship. So here I can see that the relationship between the buyer and seller does matter. If it is a stranger, he is treated differently but relatives and friends are welcomed as no one wants to offend them. In return, these friends and relatives are taking advantage of their relationships by encouraging them to join their network market. They are making money off of their existing relationship but in the long run are losing their close relatives.

I also learned that people get competitive when they are in a network marketing company. In another interview, the owner of the Herbal products company said that he has hundreds of

people working for him and a lot of them are his friends or relatives. He said that a lot of his close ones have betrayed him in the business. People join his company, come close to him, get to know about all the knicks and knacks and after a couple of years start their own companies. Hence he is competing with his relatives who are running the same business in the same city. He also said that he has had relatives who were selling products but were not giving back his share. After a couple months, those relatives left the company without giving him any money.

All the experiences were not bad though. One lady said, "When people ask me to buy something, my answer is usually a big 'no', but when the seller of this product told me that he had tried it first and that he had a great experience, it persuaded me to buy this product. I decided that I would try this product for 1 month at least and then come to a conclusion, whether to use it or not. My main questions were that if I'd get allergies from this as I'm prone to skin allergies, if I will get great results in less time' and if it would make me feel more confident about myself and appearance. So, I gave it a shot, and my results were way more than my expectations. I did not get any issues with my skin. I decided that I would talk to the manufacturer of this product and join their company. I clicked the before & after pics of my hair so that I could show them that I had tested their product on my own and that was the reason that brought me to them." However, only one person out of five had a positive experience. The conclusion would be that when a stranger approaches a buyer, they are not ready to listen to him. People have a hard time trusting sellers they do not know and hence do not entertain them. On the other hand, buyers invite their relatives and close friends who are sellers but then feel obliged to buy those products. Once they buy the products, they never hear back from their relatives and friends because they just come to them with the motive of making money.

In another interview, a woman shared her experience with a seller who was a stranger. She said that one time, two men came to her doorstep and offered to clean her jewelry. They asked for very little money and she thought why not? She went ahead and gave a gold bracelet to the men. They started washing it and once they were done, her bracelet did not look the same. After a couple of second she realized that they had taken the gold off of the bracelet. Then she called the cops and they were able to get her gold back. It was a network marketing scandal where the gold was shared with the company and the dealers got to keep some of it. I am seeing exploitation even in this kind of business dealing where the seller is a stranger.

V. CONCLUSION:

My hypothesis was that relationships are affected positively when business comes into the equation. After studying all the interviews, I conclude that I reject the null hypothesis because relationships are getting affecting negatively in business dealings. This research found that there is exploitation of relationships in business dealings and I happen to look at network marketing in this particular project. Network marketing is negatively impacting friendships and relationships because the main motive of people is only to make money. They do not care about their relationships as much and money is more important to them. Secondly, buyers who are family or friends are feeling

pressured to buy the products they are being sold because of the close relationship they have with the seller. These buyers are being cheated on time and again by their closed ones and strangers as well. Markets need to understand that if they want to be successful in their venture of network marketing, then they need to focus on their foundation which is relationships. Relatives and friends are the ones who become the very first customers of these sellers and if they start exploiting them, then how will strangers trust them, their products and their company? Business dealings can take place even without harming friendships. Sellers need to be taught the way they should approach people and how they should not force anyone into buying a product that is of no use to them. The only motive of these sellers when they join these companies is to make money. Businesses should teach them about the importance of products and make them passionate about the things they are selling. Otherwise, if these sellers keep on ruining relationships, the foundation of network marketing will be affected and the businesses will fail. Sellers need to be taught that they should tell the truth to the buyers and not instill in them these dreams of having expensive cars and holidays.

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Interview Guide:

Questions:

For Sales person:

- [1] What has been your experience with network marketing? -- what product?
- [2] Who initiated the contact - you or the person you were buying from?
- [3] What motivated you to not only use the product but continue to sell it?
- [4] What has been your experience as a seller -- positive or negative?
- [5] How do you determine your clientele? Is it family, friends, relatives, referrals?
- [6] What is most successful way to contact clients? (person, phone, message, etc.)
- [7] What is the least successful?
- [8] How is your relationship different with people when they buy from you? When they reject you?
- [9] What sort of difficulties have you encountered as a seller? -- how do you deal with those?

For Customer:

- [1] What has been your experience with network marketing? -- what product? Positive or negative?
- [2] How do you feel when someone asks you to buy a product?
- [3] Why do you feel that way? (questions regarding that...)
- [4] Do you react/feel differently when it is a random salesperson vs a friend/relative or acquaintance? (Does the relationship with that person matter?)
- [5] When you know the person, does your relationship change after they try to sell to you? How so?
- [6] Does the medium matter? (in-person v. phone)
- [7] Would you say you have felt pressured by the salesperson?
- [8] What did they do to make you feel that way? (pressured or not)
- [9] Would you ever become a salesperson? Why, why not?

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Frequency of Beta Thalassemia Trait in Pregnant Females Presenting With Microcytic Hypochromic Anemia in First Trimester

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Abstract- Background: Anemia of pregnancy primarily affects women of low socioeconomic status. Globally, by WHO (World Health Organization) criteria, 52% of pregnant women from undeveloped or developing countries are anemic compared with 20% from industrialized nations. Heterozygous β -thalassemia (β -thalassemia trait; β -TT), caused by the inheritance of a single β -thalassemia allele, either β^0 or β^+ , is an important cause of anemia. More importantly, however, its diagnosis is important for the prevention of beta thalassemia major.

Objective: To determine the frequency of beta thalassemia trait in pregnant females presenting with microcytic hypochromic anemia in first trimester.

Method and Material: This is a cross sectional survey and was conducted in Pathology department, King Edward Medical University, Lahore and all cases were selected from Lady Atchison Hospital and Lady Willingdon Hospital (affiliated with Mayo Hospital, Lahore, Pakistan). After telling the patients about pros and cons of the procedure and taking informed consent and ensuring their confidentiality.

The following investigations were carried out from Pathology department, King Edward Medical University, Lahore:

Complete blood count: Blood samples were collected in K₃EDTA vials and analyzed within 1-3 hours of collection by using a haematology analyzer Sysmex KX-21 for Hb, total red cell count, MCV and MCH.

Peripheral blood smear: Blood films were made from each sample stained by Giemsa and examined for red cell morphology i.e microcytosis, hypochromia, NRBCs and anisocytosis.

Hemoglobin Electrophoresis: Blood samples in K₃EDTA vials were subjected to cellulose acetate electrophoresis and Hb A₂ estimation done by elution.

Results: A total of 120 patients were included. Majority (39%) were between 26 and 30 years of age with a mean and SD 27.43 \pm 3.11 years. Mean \pm SD of the quantitative variables of the patients with beta thalassemia trait were as follows; Hemoglobin 10.77 \pm 0.97 g/dL, MCV 62.07 \pm 4.26 fL, MCH 19.51 \pm 2.45 pg, MCHC was 28.08 \pm 2.16 g/dL and mean HbA₂ was 4.29 \pm 0.37%. Frequency of beta thalassemia trait in pregnant females presenting with microcytic hypochromic anemia in first trimester was 15.33% (n=19).

Conclusion: Beta thalassemia trait is one of the commonest causes of microcytic hypochromic anemia. Pregnant females presenting with microcytic hypochromic anemia should be investigated for beta thalassemia trait along with iron studies. Beta thalassemia trait detection in pregnant females can be an important step for prevention of beta thalassemia major.

Index Terms- Beta thalassemia Trait, Microcytic Hypochromic Anemia, Pregnancy, First trimester.

I. INTRODUCTION

Anemia is defined as a reduction in the hemoglobin concentration of the blood according to age and gender, which is less than 13.5g/dL in adult males and less than 11.5g/dL in adult females. Anemia is classified as microcytic, hypochromic; normocytic, normochromic and macrocytic.(1) The causes of microcytic, hypochromic anemia include iron deficiency, anemia of chronic disease (chronic inflammation, malignancy), thalassemia trait and sideroblastic anemia.(2)

There are marked physiological changes in the composition of the blood in healthy pregnancy, mainly to combat the risk of hemorrhage at delivery. Plasma volume and red-cell mass increase by 50% and 18-25% respectively, resulting in delusional decrease in hemoglobin concentration called the physiological anemia of pregnancy, which is maximum at 32 weeks of gestation. WHO has recommended a cut-off value of 11.0 gm. /dl to define anemia at any time during pregnancy (3). Microcytic hypochromic anemia is very common and is found in 11.2% of pregnant females during first trimester, the common causes of which are iron deficiency and thalassemia trait(4). Out of these patients beta thalassemia trait has been found in 8.5% of pregnant females patients. (5) Beta thalassemia trait is one of the causes of microcytic, hypochromic anemia. Although it presents like iron deficiency anemia, it has significant genetic implications (6). Prevalence of beta thalassemia trait in Pakistan is 5% (7). A diligent approach is to rule out iron deficiency anemia first since Iron deficiency anemia can mask beta thalassemia trait in laboratory investigations.(8) Beta thalassemia trait can be diagnosed in laboratory with the help of RBC indices that show low MCV (<75 fL) and MCH (<25 pg.), peripheral

blood picture that shows microcytic hypochromic RBCs, hemoglobin electrophoresis for HbA₂ estimation (>3.5%) and confirmation can be done by PCR for the mutational analysis (9). Mild to moderate degree of microcytic hypochromic anemia is encountered in the carriers of beta thalassemia trait. In the absence of definitive diagnosis, many of these patients receive oral or parenteral iron therapy. This may go on intermittently or continuously for prolonged periods of time because the anemia persists. This sort of iron therapy is not only unnecessary but may be harmful because of iron overload. Beta thalassemia trait can be easily diagnosed and with the help of this study patients of microcytic hypochromic anemia will be assessed for the cause of this anemia thus categorizing them as iron deficiency anemia or beta thalassaemia trait. The current study will help in early identification of beta thalassemia trait patients and then subsequent referral to the antenatal units to confirm presence or absence of thalassaemia major fetus. This study will help the obstetricians and physicians to properly identify the cause of microcytic hypochromic anemia and thus ensuring proper management and strengthening the importance of antenatal checkup with special emphasis on beta thalassaemia trait. It will also help hematologists and physicians to consider judicious use of iron therapy. We only need to give beta thalassaemia trait a proper place in lists of differential diagnosis of microcytic hypochromic anemia, and thus appropriate management that comes with it. Once diagnosed to have beta thalassaemia trait, they can be referred for proper antenatal checkup and then determination of trait status of spouse becomes mandatory to determine the fetal chances of inheritance of thalassaemia major. If thalassaemia major is diagnosed termination of pregnancy could be offered to them. If thalassaemia major children's birth is not prevented then it will take a toll on country's finances. Conventional therapy of beta thalassaemia major is life-long transfusions and iron chelation or bone marrow transplant, and these treatment regimens do pose a significant load on the health sector blood transfusion services financially and demands a lot of time and resources. Prevention of birth of children with beta thalassaemia major would thus spare a lot of distress, effort and expenses for the families involved and for society. It is important that we diagnose them in first trimester as early termination of pregnancy is better tolerated. Such studies have been conducted in western countries but the exact frequency in pregnant female patients has not been established in our setup. According to a literature published in Maharashtra, India, the frequency of beta thalassaemia trait in pregnant females is 3.1% (10), whereas as previously it was reported to be 8.5%. In order to confirm / refute the discrepancy, this study will be of great help.

II. RESULTS

A total of 120 cases fulfilling the inclusion criteria were enrolled to determine the frequency of beta thalassaemia trait in pregnant females presenting with microcytic hypochromic anemia in first trimester.

Table no 1: Age Distributions of the Patients (n=120)

Age (in years)	No. of patients	%
20-25	35	29.17
26-30	47	39.17
31-35	38	31.66
Total	120	100
Mean and SD	27.43±3.11	

Age distribution of the patients was done, which shows majority of the patients between 26-30 years of age i.e. 39.17 % (n=47) while 29.17 % (n=35) between 20-25 years and 31.66 % (n=38) were between 31-35 years of age, mean and SD was calculated as 27.43±3.11 years. (Table No.1)

Other quantitative variables

Table no.02: Quantitative Variables in Patients having Beta Thalassaemia trait. (n=19)

Variables	Range	Mean and SD
Hemoglobin g/dL	11-15 g/dL	10.77±0.97
MCV fL	75-95 fL	62.07±4.26
MCH pg	25-34 pg	19.51±2.45
MCHC g/dL	29-35 g/dL	28.08±2.16
HbA ₂	3.5-7%	4.29±0.37

Mean±SD of other quantitative variables of the patients with beta thalassaemia trait were calculated and presented in Table No. 2, where mean Hemoglobin was 10.77±0.97 g/dL, mean MCV was 62.07±4.26 fL, mean MCH was 19.51±2.45 pg, mean MCHC was 28.08±2.16 g/dL and mean HbA₂ was 4.29±0.37 % (Table No. 2).

TABLE No. 3 Hemoglobin in Patients Having Beta thalassemia Trait and in Patients Not Having Beta Thalassaemia Trait. (n=120)

Beta thalassemia trait	No. Of patients	Hemoglobin g/dL Mean±SD
Yes	19	10.77±0.97
No	101	7.93±1.29

Mean±SD of Hemoglobin of the patients with beta thalassaemia trait was 10.77±0.97g/dL while Mean±SD of Hemoglobin of the patients not having beta thalassaemia trait was 7.93±1.29g/dL (Table No. 3).

Table no. 4: RBC Indices (MCV, MCH and MCHC) In Patients Having Beta Thalassemia Trait and Patients Not Having Beta thalassemia Trait. (n=120)

Beta thalassemia trait	No. Of patients	MCV fL	MCH pg	MCHC g/dL
Yes	19	62.07±4.26	19.51±2.45	28.08±2.16
No	101	70.52±5.94	23.59±4.11	24.02±2.97

Mean±SD of RBC Indices of the patients with beta thalassaemia trait were calculated and presented in Table No. 4, where mean MCV was 62.07±4.26 fL, mean MCH was 19.51±2.45 pg and mean MCHC was 28.08±2.16 g/dL (Table No. 4).

Mean±SD of RBC Indices of the patients not having beta thalassaemia trait were calculated and presented in Table No. 4, where mean MCV was 70.52±5.94fL, mean MCH was 23.59±4.11 pg and mean MCHC was 24.02±2.97g/dL (Table No. 4).

Table no. 5: HbA2 status in Patients having Beta Thalassemia Trait and patients not having Beta Thalassemia Trait (n=120)

Beta thalassemia trait	No. Of patients	HbA2 % Mean±SD
Yes	19	4.29±0.37
No	101	1.88±0.67

Mean±SD of HbA2 of the patients with beta thalassaemia trait was 4.29±0.37% while Mean±SD of Hemoglobin of the patients not having beta thalassaemia trait was 1.88±0.67% (Table No. 3).

Table no. 6: Frequency of Beta Thalassemia Trait in Pregnant Females presenting with Microcytic Hypochromic Anemia in First Trimester. (n=120)

Beta-Thalassemia Trait	NO.OF PATIENTS	%
Yes	19	15.83
No	101	84.17
Total	120	100

Frequency of beta thalassemia trait in pregnant females presenting with microcytic hypochromic anemia in first trimester was found to be 15.33 % (n=19) while 84.17 % (n=101) patients had no findings of the morbidity. (Table No. 6)

III. DISCUSSION

Beta thalassemia trait is caused by the inheritance of a single β -thalassemia allele, either β^0 or β^+ . It is usually characterized by a mild anemia with hypochromic microcytic red blood cells, elevated levels of hemoglobin A2 (HbA2), variable increases of hemoglobin F (HbF) (up to 2.0%) and polypeptide globin chain biosynthesis showing an approximately twofold chain excess.(11) Carriers of β -TT are usually asymptomatic. However, they are at risk of having children with severe clinical outcomes if their spouses are also carriers of the same type of thalassemia or other haemoglobinopathies. Carriers of β -TT may be at risk of having β -thalassemia major children who have a lifelong dependency on regular blood transfusion for survival, if the partner has β -thalassemia as well.(12)

In our study 120 pregnant females presenting with microcytic hypochromic anemia in first trimester were taken. In Pakistan the frequency of beta thalassemia trait in general population is 8-10 %.(13) A study conducted by Nisa Q showed that the frequency of thalassemia trait in pregnant women was 8.5% (5), while my study showed 15.83% carrier rate. This great variation in result was due to selection of pregnant females with microcytic hypochromic red cells as the study population.

Generally, beta thalassemia trait patients have mild anemia.(14)(15)

In my study the results are coherent with the previous studies i.e. all the women with thalassemia minor are mildly anemic and mean hemoglobin was 10.77±0.97 g/dL.

It has been observed in different studies that the sensitivity and specificity of red cell count and red cell indices is very high for screening of beta thalassemia trait.(14)(16) The MCV & MCH values are reduced in beta thalassemia trait. The MCHC is normal or only slightly reduced (14).My study showed reduced MCV and MCH. And along with them the values of MCHC were also low. This could be because of iron deficiency anemia. Mean MCV was 62.07±4.26 fL (Mean±SD), mean MCH was 19.51±2.45 pg and MCHC was 28.08±2.16gm/dl. A study conducted by Nisa Q showed that the values of MCV, MCH and MCHC are reduced in beta thalassemia trait

The most consistent feature of beta thalassemia trait is an increase in HbA2. Raised level of HbA2 confirms significant number of patients with beta thalassemia trait (14). Mean HbA2 in our study was 4.29±0.38 % (Mean±SD). This increase in HbA2 level is coherent with previous studies (5).

Low mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH) with an increased HbA₂ value identify an individual with increased probability of being a β -thalassemia carrier.

IV. CONCLUSION

- Beta thalassemia trait is one of the commonest causes of microcytic hypochromic anemia. Pregnant females presenting with microcytic hypochromic anemia should be investigated for beta thalassemia trait along with iron studies. Beta thalassemia trait detection in pregnant females can be an important step for prevention of beta thalassemia major.

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Comparison of PAP, Modified Pap and Gram Stained Cervico-Vaginal Smears in the Diagnosis of Bacterial Vaginosis in Women Attending Thika District Hospital

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ABSTRACT

Objective: To compare Pap, Modified Pap and Gram stained cervico-vaginal smears in the diagnosis of bacterial vaginosis in women to establish if Modified Pap was a suitable alternative to Pap method.

Design: Descriptive cross-sectional survey of bacterial vaginosis with a comparative evaluation of three methods.

Setting: Thika District Level Five (County) Hospital.

Subjects: A total of 150 female patients who consulted for services at Antenatal Care and Family Planning clinics at Thika district Level 5 (County) hospital between November 2016 and May 2017 and who met the inclusion criteria were recruited into the study.

Main outcome measures: Presence or absence of bacterial vaginosis.

Results: The study showed that Pap and Modified Pap methods yielded sensitivity of 47.6% and 26.2%, positive predictive value (PPV) of 80.0% and 68.8%, negative predictive value (NPV) of 82.4% and 76.9%, likelihood ratio of positive result (LR+) of 10.3 and 5.69, likelihood ratio of negative result (LR-) of 0.55 and 0.77 respectively and specificity of 95.4% and overall diagnostic accuracy of 38.9% for both methods.

Conclusion: The Modified Pap staining method has diagnostic value when it is positive in diagnosis of bacterial vaginosis and can therefore be a suitable alternative to Pap method as a confirmatory test for bacterial vaginosis.

INTRODUCTION

Bacterial vaginosis (BV) is a vaginal infection caused by imbalance in the normal vaginal flora. It is characterized by low levels of normally predominant *Lactobacilli species (spp)*, which is replaced by *Gardnerella vaginalis*, *Prevotella spp*, *Porphyrromona spp*, *Bacteroides spp*, *Mobiluncus spp* and *genital Mycoplasma spp*. [1]. It is among the most common reproductive tract infections in women worldwide [2]. Estimated prevalence of BV ranges from 20% to 50% in African populations [3], with higher levels being documented in female sex workers [4].

Until recently, BV which was originally thought to be of little long-term clinical significance, has been implicated in increasing the risks of preterm birth [5], development of pelvic inflammatory disease [6], pregnancy loss, still births, gestational bleeding, preterm birth, preterm labour, premature rupture of membranes, amniotic fluid infection, postpartum endometritis and post caesarean wound infections [7].

Recent studies have shown that Pap stained cervico-vaginal smears can be used to diagnose BV [8-10] and can be a wholly adequate alternative to Gram-stained smears [11] hence the need to validate its use for diagnosis of BV. Therefore, this study sought to establish if Modified Pap method can be used to diagnose BV in cervico-vaginal smears and if Modified Pap method is a suitable alternative to Pap method in diagnosis of BV in cervico-vaginal smears.

MATERIALS AND METHODS

This descriptive cross-sectional study was done at Thika District Level 5 (County) Hospital's family planning (FP) clinic, antenatal clinic (ANC) and medical laboratory. Thika District Level 5 (County) Hospital is a government hospital located in Thika town, Kenya and serves as a referral hospital for neighbouring districts and also as a teaching hospital.

The inclusion criteria were all females aged 18-45 years (child bearing age), sexually active, had no vaginal bleeding at the time of study and who gave voluntary consent to participate. The exclusion criteria were all females who at the time of the study had not met the inclusion criteria. Ethical clearance was given by Kenyatta National Hospital/University of Nairobi (KNH/UON) Ethics and Research Committee and also by Thika District Hospital, where the study was conducted, as well as by the National Commission for Science, Technology and Innovation (NACOSTI).

A sample size of 150 women was determined statistically and women who met the inclusion criteria were informed about the study and consent obtained through signing informed consent form. A structured questionnaire was then administered to all the subjects to obtain and record socio-demographic information (age, occupation, residence, education, marital status and number of sexual partners), reproductive history, vaginal and menstrual hygiene practices as well as clinical history.

Cervico-vaginal smear was then collected from the posterior fornix and lateral vaginal wall from each participant using a cervical scraper, but in women who were pregnant or suspected to be pregnant, sampling was restricted to lateral vaginal wall. The colour of the discharge (if present) was first noted and documented.

Three smears were prepared from each cervical scraper; two of the smears were fixed in 95% alcohol for 15 minutes and then stained with Pap and Modified Pap methods respectively. Pap staining method protocol consisted of 15 dishes and Modified

Pap staining method protocol consisted of 14 dishes with the smears held in respective dishes for 10 seconds (dips) with blotting done in between changes from one dish to the next. Mounting was done using DPX mountant and coverslip attached with overnight drying (Table 1). The air dried smear was stained using Gram stain method (Table 2).

Blinding of the staining method used was done using unique codes to label the smears. The three sets of smears were examined using light microscopy with the threshold for a positive BV diagnosis being presence of >20% clue cells in Pap and Modified Pap stained smears and a 7-10 Nugent score of bacterial morphotypes in Gram stained smears.

Primary examination of the smears was done by the principal investigator (PI) using Bethesda System 2001 of reporting cervico-vaginal smears for Pap stained smears and Nugent classification system for bacterial morphotypes in the Gram stained smears. In order to minimize intra- and interobserver variability, two cytologists and two microbiologists confirmed the Pap stained smears and Gram stained smears respectively. It is only at the end of this that the microscopists revealed their reports and any discrepancies resolved.

RESULTS

All the three sets of smears prepared from the sample of 150 were found to be satisfactory for evaluation and data analysis was done using 95% confidence interval (CI) and a statistically significant P-value of less than 0.05.

The mean age of the subjects was 26.9 years with a median of 25 and standard deviation (SD) of 5.9. The minimum and maximum ages were 19 and 42 years respectively. Majority of the subjects, 55.3% were 18-25 years old, followed by 31.3% who were 26-35 years while the least number, 13.3% were 36-45 years old (Figure 1).

Gram stain method using Nugent's scoring system which was the diagnostic gold standard in this study was able to detect forty two (28%) positive cases of BV. There were 6 subjects with intermediate flora and were counted as negative for BV. On the other hand, out of 150 smears stained with both Pap and Modified Pap methods, twenty five (16.7%) and sixteen (10.7%) smears respectively were BV positive with presence of >20% clue cells which was the threshold for positive BV diagnosis. Majority of BV positive cases using Gram stain method were in the age group of 26-35 years with twenty (47.6%) cases. The results indicate that there is a difference in diagnosis of BV in cervico-vaginal smears between the three staining methods, Pap, Modified Pap and Gram stain (Figure 2).

The results of Pap and Modified Pap methods were compared to the results of Gram stain method using Nugent's scoring system which was the confirmatory diagnostic gold standard test in this study and which was administered concurrently with the other two methods to each participant. A positive result in Pap and Modified Pap methods was considered "true positive" if it was confirmed positive using Gram stain method; a negative result in Pap and Modified Pap methods was considered "true negative" if it was confirmed negative using Gram stain method; a positive result in Pap and Modified Pap methods was considered "false positive" if it was confirmed negative using Gram stain method and a negative result in Pap and Modified Pap methods was

considered "false negative" if it was confirmed positive using Gram stain method.

Pap method showed BV in twenty (20/42) subjects who tested positive on Gram stain method giving a sensitivity of 47.6%. On the other hand, Pap method showed negative results for BV in twenty two (22/108) subjects with negative results on the Gram stain method giving a specificity of 95.4%. Twenty two subjects who tested negative on Pap method and had BV on Gram stain method gave a false negative rate (FNR) of 52.4% while five subjects who had BV on Pap method and a negative result on Gram stain method gave a false positive rate (FPR) of 4.6%. Positive predictive value (PPV) was 80.0% while the negative predictive value (NPV) was 82.4%. The likelihood ratio for a positive test (LR+) was 10.3 while likelihood ratio for a negative test was 0.55. The overall diagnostic accuracy was 38.9% (Table 3). Modified Pap method showed BV in eleven (11/42) subjects who tested positive on Gram stain method giving a sensitivity of 26.2%. On the other hand, Modified Pap method showed negative results for BV in thirty one (31/108) subjects with negative results on the Gram stain method giving a specificity of 95.4%. Thirty one subjects who tested negative on Modified Pap method and had BV on Gram stain method gave a false negative rate (FNR) of 73.8% while five subjects who had BV on Modified Pap method and a negative result on Gram stain method gave a false positive rate (FPR) of 4.6%. Positive predictive value (PPV) was 68.8% while the negative predictive value (NPV) was 76.9%. The likelihood ratio for a positive test (LR+) was 5.696 while likelihood ratio for a negative test was 0.77. The overall diagnostic accuracy was 38.9% (Table 4).

The results show that Pap and Modified Pap methods vary in sensitivity, 47.6% and 26.2% respectively, but had similar specificity of 95.4%. However, even though their NPV's were fairly close, PPV of Pap method, 80.0% was relatively higher than 68.8% of Modified Pap. This indicates that Modified Pap method can be a suitable alternative to Pap method especially in excluding BV in truly negative cases. The diagnostic capabilities of Pap and Modified Pap methods in the diagnosis of BV in cervico-vaginal smears were analyzed using Cohen kappa statistics to determine the consistency between the two methods to establish if Modified Pap was a suitable alternative to Pap method in this case. The results indicate that there is a statistically significant ($p \leq 0.05$) level of agreement between the two methods with the kappa value of 0.692 representing moderate agreement between Pap and Modified Pap methods in diagnosis of BV indicating that Modified Pap method can be a suitable alternative to Pap method in diagnosis of BV (Table 5).

Table 1: Pap and Modified Pap staining protocols

Pap protocol		Modified Pap protocol	
Tap water	10 dips	1% acetic acid	10 dips
Harris Haematoxylin	10 dips	Pre-heated Harris's	10 dips
Tap water	10 dips	Haematoxylin (60 ⁰ C)	10 dips
95% ethanol	10 dips	Tap water	10 dips
OG-6 stain	10 dips	1% acetic acid	10 dips
95% ethanol	10 dips	OG-6	10 dips
EA-50	10 dips	1% acetic acid	10 dips
95% ethanol	10 dips	EA-50	10 dips
95% ethanol	10 dips	1% acetic acid	10 dips
100% ethanol	10 dips	Methanol	10 dips
100% ethanol	10 dips	Methanol	10 dips
100% ethanol	10 dips	Methanol	10 dips
Xylene	10 dips	Xylene	10 dips
Xylene	10 dips	Xylene	10 dips
Xylene	10 dips	Xylene	10 dips
DPX mount and coverslip		DPX mount and coverslip	

Table 2: Gram stain method protocol

Heat fix air dried smear	
Crystal violet stain	1 minute
Tap water	
Gram's iodine	1 minute
Tap water	
Acetone-alcohol	6 seconds
Tap water	
Neutral red	2 minutes
Tap water	
Air dry	

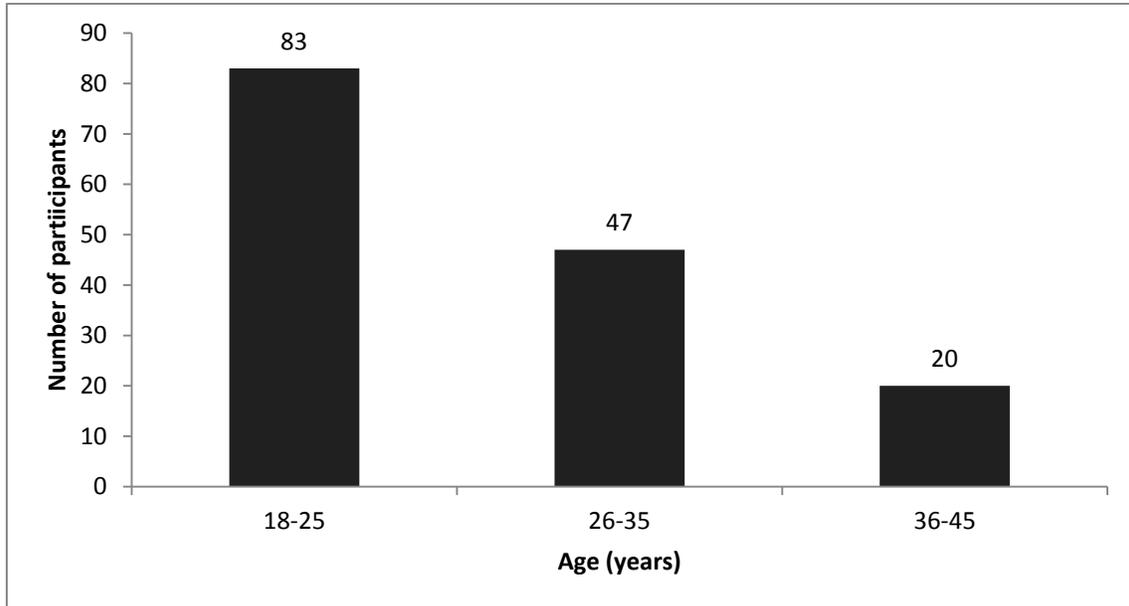


Figure 1: Age distribution of the subjects

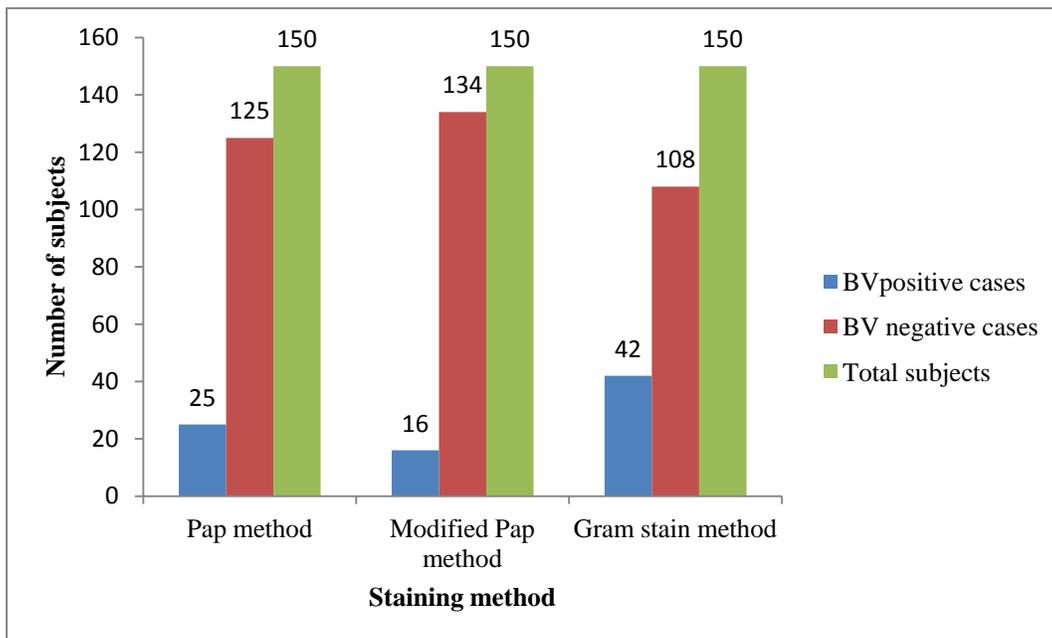


Figure 2: Frequency distribution of BV positive and negative cases in cervico-vaginal smears stained using Pap, Modified pap and Gram stain methods

Table 3: Sensitivity, specificity, Positive Predictive Value (PPV) and Negative Predictive Value (NPV) of Pap method with reference to Gram stain method as the gold standard in the diagnosis of BV

		Gram stain method			
			Positive	Negative	Total
Pap method	Positive	Count	20	5	25
		% within Pap_method	80.0%	20.0%	100.0%
		% within Gram stain method	47.6%	4.6%	16.7%
	Negative	Count	22	103	125
		% within Pap_method	17.6%	82.4%	100.0%
		% within Gram stain method	52.4%	95.4%	83.3%
Total	Count	42	108	150	
	% within Pap_method	28.0%	72.0%	100.0%	
	% within Gram stain method	100.0%	100.0%	100.0%	

*Pap_method * Gram stain method crosstabulation.

Table 4: Sensitivity, specificity, Positive Predictive Value (PPV) and Negative Predictive Value (NPV) of Modified Pap method with reference to Gram stain method as the gold standard in the diagnosis of BV

		Gram stain method			
			Positive	Negative	Total
Modified Pap method	Positive	Count	11	5	16
		% within Modified Pap_method	68.8%	31.2%	100.0%
		% within Gram stain method	26.2%	4.6%	10.7%
	Negative	Count	31	103	134
		% within Modified Pap_method	23.1%	76.9%	100.0%
		% within Gram stain method	73.8%	95.4%	89.3%
Total	Count	42	108	150	
	% within Modified Pap_method	28.0%	72.0%	100.0%	
	% within Gram stain method	100.0%	100.0%	100.0%	

*Modified Pap method * Gram stain method crosstabulation.

Table 5: Cohen kappa measure of agreement for Pap and Modified Pap methods

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Agreement	Kappa	.692	.086	8.753	.000
N of Valid Cases		150			

*Modified Pap method * Pap_method Crosstabulation Symmetric Measures

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

DISCUSSION

Pap smear test is a simple cytology screening test primarily used in detection of pre-neoplastic and neoplastic changes in the uterine cervix. In reporting cervical pap smear results, a remark is usually made on presence of cervico-vaginal infection due to bacteria, fungi and candida with the Bethesda system having a class on reporting 'shift in vaginal flora, suggestive of BV' [12]. Conventional Pap method has undergone several modifications to reduce alcohol use to make it cost effective in resource poor settings. One of the modified Pap protocols is Rapid, Economic, Acetic acid, Papanicolaou (REAP) method [13] that has successfully been utilized in screening for cervical cancer in Pap smears with no compromise on staining quality and diagnostic standards.

This study was to compare Pap, Modified Pap and Gram stained cervico-vaginal smears in the diagnosis of BV to establish if Modified Pap was a suitable alternative to Pap method in this regard.

The subjects in the study were 150 (n=150) from whom three sets of smears were prepared and found satisfactory for evaluation. The age range of the female subjects was 19-42 years, with majority in the 18-25 years old age group. Mean age of the subjects was 26.9 years with a median of 25 and standard deviation (SD) of 5.9. This is comparable to a study done by Shayo *et al.*, [14] in Mwanza, Tanzania where median age of the subjects was 26 years. In the present study, BV was detected in 28% of the women and this is similar to a study in Ghana by Aubyn *et al.*, [15] that reported BV prevalence of 28%. This present study utilized Gram stain method as the reference diagnostic standard in evaluating diagnostic performance of Pap and Modified Pap methods and reports sensitivity of 47.6% and 26.2%, specificity of 95.4% and 95.4%, PPV of 80% and 68.8% and NPV of 82.4% and 76.9% for Pap and Modified Pap methods respectively. The results for Pap method are comparable to those reported by Platz-Christensen *et al.*, [16] of sensitivity, specificity, PPV and NPV values of 88.2%, 98.6%, 96.8%, 94.7% respectively and concurs with Livengood [17] who reported that Pap test has sensitivity as low as 50% and specificity of about 95% in diagnosis of BV indicating that a positive result is reliable evidence of BV presence but a negative result does not exclude presence of BV. However, these results differ from that of a prospective study done by Karani *et al.*, [18] in Mombasa, Kenya that reported sensitivity, specificity, PPV and NPV values of 59.4%, 83.3%, 67.3% and 78.0% respectively. The varied results may be attributed to interobserver variability, type of population used, environment and other socio-demographic characteristics of the subjects, research design and specimen source site (cervix/endocervix as opposed to posterior fornix and lateral vaginal wall).

In this study, a kappa value of 0.692 showed moderate agreement between Pap and Modified Pap methods with the overall diagnostic accuracy of 38.9% for both methods. Additionally, Filho *et al.*, [19] reported that Pap method would be a valid diagnostic option in comparison to gold standard when it especially gives a positive BV result and a mean specificity of 95% and this criterion has also been fulfilled by Modified Pap method.

CONCLUSION

In conclusion, this study faced several limitations that will affect the generalizability of the results. First, due to limited resources and time in conducting this research, the research subjects were recruited from only one hospital during the study period and this may not be representative of the annual female population served by the hospital. Secondly, only women visiting ANC and FP clinics were recruited and the results may not be applicable to women delivering at the hospital but this will be augmented when the research can be applied to other populations of women. Thirdly, due to recall or social desirability bias, self-reported information may have been misreported or under-reported during the questionnaire interview and lastly, extensive training requirements made it impossible to perform Nugent scoring of Modified Pap and Pap methods.

In spite of these limitations, the greatest strength of this study is that it showed that Modified Pap has diagnostic value for BV diagnosis when it is positive and is therefore suitable as a confirmatory test for BV. Therefore, this study supports the use of Modified Pap as an alternative to Pap method in diagnosis of BV in cervico-vaginal smears.

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Mathematical Model For The Compressive Strength Of A Sedimentary Rock Aggregate Concrete

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Abstract- In this work 12mm maximum size sedimentary rock aggregate from Nkwere-Ezunaka in Anambra State, Nigeria, was studied in order to determine its suitability for structural concrete production as it has very visible silt content. In so doing sieve analysis test was conducted on the sample of aggregate. The strength of the concrete for a predetermined number of mix proportions was obtained and a mathematical model formed, and optimized. It was observed that the aggregate contained 21.9% silt/clay, and had an optimum strength of concrete 11.403 N/mm² for a mix proportion of 1: 1.35: 2.65, being ratios of cement, sand and gravel respectively, at a water/cement ratio 0.54. It was concluded that the contamination was high and it was the cause of the general low strength of the concrete made from the aggregate as optimum strength of 11.403N/mm² was half of an expected value of 20N/mm² obtainable from an alternative clean granite aggregate. It was recommended that this size of aggregate from Nkwere-Ezunaka quarry be disused as structural concrete aggregate where high stress is expected. The aggregate should be restricted to concretes for lintels and columns of two storey buildings. Further processing of the aggregate by sieving was recommended before use to improve the strength of the concrete.

Index Terms- Aggregate, Contaminations, Concrete strength, Sedimentary rocks, Simplex method, Optimization.

I. INTRODUCTION

There are two main types of rock aggregates used in Nigeria for making concrete. They are sedimentary rock and granite rock aggregates. Granite aggregates are more uniform in chemical composition and strength than the sedimentary rock which vary in strength, density, hardness, toughness and silt contamination from one rock outcrop to the other. One advantage of sedimentary rock aggregate is that they are often found in abundance and are much cheaper than granite in most cases. In fact fifty percent of the surface area of Nigeria land mass is covered by sedimentary rock [1]. The problem with sedimentary rock aggregates is that it is difficult to predict the strength of concrete made with it by any known mix design process as a result of high variation in the properties of the aggregate. This work is concerned with 12-millimeter (maximum size) aggregates from Nkwere-Ezunaka which contains a lot of clay and silt contaminations and which can cause the strength of concrete made with it to be unexpectedly very low. The aim of

this report is to produce a mathematical model for the strength of concrete made with the aggregate, using Scheffe's simplex method, within a pre-determined range of water-to-cement, coarse aggregate and fine aggregate ratios that are commonly used in making concrete. The model can then be optimized to obtain optimum mix proportion and associated strength, with the objective of advising engineers and other users of the aggregate on how to safely use the aggregate to prevent structural failures.

1.1 Scheffe's Simplex Method of Optimization

A fair knowledge of simplex is needed for understanding Scheffe's simplex method of optimization. Akhanazarove and Kafarove[2] defined a simplex as a convex polyhedron formed by K intersecting hyper planes and having K + 1 vertices. In other words a simplex is a geometrical figure having K + 1 vertices, where K is the number of intersecting planes forming it. A simplex is a straight line if it is formed by one plane, and is called a one-dimensional simplex. It is a triangle if it is formed by two planes, and is called a two-dimensional simplex. A simplex is a tetrahedron shape, if it is formed by three planes and is also called three-dimensional simplex. If all the sides of a simplex are equal, it is regarded as a regular simplex. A simplex can be used to relate data information graphically.

Scheffe[3] used a regular simplex of (q - 1) dimension, where q is the number of components in the mixture, to describe a domain for selected mixtures, such that a polynomial model can be formed to relate any property of the mixture studied with the concentration of the components of the mixture. The properties of the mixture were assumed to be entirely dependent on the concentrations of the components.

For concrete, the number of mixture components is usually four, and a simplex formed by three intersecting hyper planes with four vertices (a tetrahedron shape) is required to describe the domain of the mixtures involved in the study, and for which a general polynomial model can be formed, following Scheffe's principles, and this is used to describe the property of any particular mixture in the domain with respect to the concentrations of its components. Traditionally a high degree polynomial of the general form in Eq 1 is used for this purpose. The number of coefficients of the resulting model which depends on the number of components q and the degree of the polynomial is given by the combination, .

Knowing also that the sum of the mixture component ratios (or concentrations) must be equal to unity (Eq 2)

,where represents concentrations of the various components in the mixture, Scheffe[3] was able to derive a new polynomial with fewer number of coefficients given by , thereby reducing the bulk of experimental work required to evaluate the coefficients. From Scheffe’s derivations, the second degree polynomial (n = 2) for 4 component mixtures (q = 4) needed for concrete is given by Eq 3

(3a)

where

(3b)

and are responses from the various experimental trials. Eq 3 has 10 coefficient instead of 15 that is obtainable from direct use of Eq 1. The number of experimental trials required to evaluate the coefficients in Eq 3a is ten, given by Eq 4.

(4)

These ten mixtures are carefully chosen so that they are uniformly distributed on the edges of the simplex. In this way the domain or boundary space of the mixtures and the relative proportions of the mixtures’ components are carefully described, see Fig1.

Fig. 1: Factor notations on the simplex

The information in Fig1 is further presented in a tabular format with extra column for responses from which the coefficient of the model, β_i and β_{ij} of Eq3b can then be calculated after the experiments (see Table 1)

Table 1: Matrix table of mixture components and responses for Scheffe’s second degree polynomial in 4 components

Component Concentrations					Responses
S/N	X ₁	X ₂	X ₃	X ₄	
1	1	0	0	0	Y ₁
2	0	1	0	0	Y ₂
3	0	0	1	0	Y ₃
4	0	0	0	1	Y ₄
5	½	½	0	0	Y ₁₂
6	½	0	½	0	Y ₁₃
7	½	0	0	½	Y ₁₄
8	0	½	½	0	Y ₂₃
9	0	½	0	½	Y ₂₄
10	0	0	½	½	Y ₃₄

Obviously, Fig 1 and Table1 do not display mixtures that are similar to concrete mix proportions, and has to be changed to proportion that resembles concrete mixtures. This is done by carefully choosing 4 concrete mix proportions that will show the range of water-to-cement ratio (w/c), cement, fine aggregate and coarse aggregate components that the proposed model is likely to cover. These are placed on the vertices of the simplex and the rest of the required test points to replace X₁₂, X₁₃, X₁₄, X₂₃, X₂₄, X₃₄ are obtained by interpolation. Choosing X₁, X₂, X₃ and X₄ as 0.6: 1.0: 1.5: 4, 0.5:1.0:1.0:1½, 0.55:1.0:1½:3 and 0.555:1.0:1½:4, respectively, for this purpose we have Fig2 to replace Fig1 as shown.

Fig. 2 Factor Notations on the simplex for concrete mix proportions.

A transpose of a matrix formed from the chosen concrete proportions becomes a conversion factor from Fig1 to Fig 2. Point X₁₂ in Fig2 is for example obtained as follows:

$$T = \begin{matrix} 0.6 & 1.0 & 1.5 & 4.0 \\ 0.5 & & & \end{matrix}$$

0.5		1.0	1.0	1.5
	0.5			
0.55		1.0	1.5	3.0
	0			
0.55		1.0	1.5	4.0
	0			
0.6		0.5	0.55	0.555
½		0.55		
1.0		1.0	1.0	1.0
	½	=	1.0	
1.5		1.0	1.5	1.5
	0		1.25	
4.0		1.5	3.0	4.0
	0		2.75	

The rest of other points are obtained in a similar manner and are shown in Fig2.

Table 1 is then modified as shown in Table 2

Table 2: Matrix table for scheffe’s second degree polynomial for concrete

S/N	Pseudo-Components				Responses	Real Components			
X	X ₁	X ₂	X ₃	X ₄		W/C Z ₁	Cement Z ₂	Fine Aggregate Z ₃	Coarse Aggregate Z ₄
•	1	0	0	0	Y ₁	0.6	1.0	1.5	4.0
•	0	1	0	0	Y ₂	0.5	1.0	1.0	1.5
•	0	0	1	0	Y ₃	0.55	1.0	1.5	3.0
•	0	0	0	1	Y ₄	0.555	1.0	1.5	4.0
•	½	½	0	0	Y ₁₂	0.55	1.0	1.25	2.75
•	½	0	½	0	Y ₁₃	0.575	1.0	1.5	3.5
•	½	0	0	½	Y ₁₄	0.578	1.0	2.0	4.0
•	0	½	½	0	Y ₂₃	0.525	1.0	1.25	2.25
•	0	½	0	½	Y ₂₄	0.528	1.0	1.75	2.75
•	0	0	½	½	Y ₃₄	0.553	1.0	2.0	3.5

The mix proportions shown as Real-components on the left hand side of Table 2 is instead used for the experiments and the various responses,, etc. resulting from the experiments recorded appropriately for calculation of the coefficient of Scheffe’s polynomial model for concrete.

II. METHODOLOGY

2.1 Material and Equipment

Sample of 12-mm coarse sedimentary rock aggregate was obtained from Nkwere-Ezunaka. A washed river sand was also obtained from Onitsha (River Niger) both of them were stored indoors to prevent excessive moisture variation. Portland cement from dealers was also obtained and store in a dry place under room temperature. Laboratory equipment employed in the research include; universal crushing machine, 150x150x150-mm cube mold, weighing balance, curing tank, trowel, B S Sieves and sieve shaker.

2.2 Methods

(i) Concrete Strength Test

For each mix proportion shown in Table 2, water, cement, fine aggregate and coarse aggregate were weighed out in such a quantity that would serve for three cubes. The materials were thoroughly mixed together inside a non-absorbent container, before water was added and final mixing was done. The fresh concrete was filled into the moulds in three layers, each layer tamped 25 times and leveled off. It was left for 24 hours to set and harden, after which the moulds were removed and the cubes immersed in water in the curing tank for 28 days. Sixty cubes were made in the total – 3 cubes for each mix proportion or test point. At the expiration of 28 days, the cubes were crush in the universal crushing machine. The compressive cube strength was calculated for each cube and the average cube strength for each mix proportion in Table 2 was calculated and all recorded in a table . Ten extra test points were included for validation of the model.

The model was formed, using the responses (average strength response) from the first ten experimental prints, as in Table 2, by substituting them into Eq 3b to obtain the model coefficients. The coefficients were then substituted into Eq 3 to obtain the model.

(ii) Validation of the Model

The model was validated for adequacy using Fisher’s variance ratio test (F-ratio) given by

$$(5)$$

Where

$$(6)$$

and

$$(7)$$

In the above formula F is Fishers ratio, is sum of squares of goodness of fit, is sum of squares related to error mean square. N is number of experimental points, m is the number of replicate trials in each experimental point and is the number of coefficient in the model. F-ratio value obtained by calculation using Eq 5 must not be greater than the value read from any table of F-distribution using the degree of freedoms and at significant level of 0.05.

(iii) Optimization of the Model

The model obtained was used to optimize the strength of the concrete through a Quick Basic Computer Program with the flow-chart is shown in Fig (3)

(iv) Sieve Analysis Test

Sieve analysis test for the coarse aggregate was carried out in accordance with BS 812: Part 1 requirements. The sieves were selected in the prescribed manner and arranged in descending order of sizes with the largest on top of the stalk and the smallest at the bottom and finally the tray. 1000g of air-dried sample was introduced into the stack and vibrated until passage of aggregates stopped. The weight of aggregate retained on each sieve was weighed and tabulated. The percentage passing each sieve was calculated and presented graphically in a semi logarithmic plot.

III. RESULTS

The result of the concrete strength test is presented in Table 3. The mix proportions from which the concretes were cast are tabulated in the last four columns and headed ‘Real Components’. The cube strength values for the three replicate tests and their averages are shown at the middle columns of the table and labeled “Replicate Response” and “Average Response”

respectively. The prediction from the model is also given and is headed 'Predictions'. The first ten results were used to build the model and the remaining ten were incorporated for validation and as control so that predictions from the model can easily be compared with experimental results. The grading curve for the

coarse aggregate is shown in Fig4 in which percentage passing sieve size of 0.075mm or 75 is regarded as clay or silt contamination.

Table 3: Responses from Experiments and Predictions from Model

Pseudo-component					Response symbol	Replicate (N/mm ²)		Response	Average Response (N/mm ²)	predictions (N/mm ²)	Real-components		
N	X ₁	X ₂	X ₃	X ₄		1	2	3			W/C	Cement	Fine a
•	1	0	0	0	Y ₁	4.43	4.43	4.87	4.58	4.58	0.6	1	1½
•	0	1	0	0	Y ₂	9.72	7.97	8.41	8.7	8.7	0.5	1	1
•	0	0	1	0	Y ₃	7.09	6.64	8.87	6.2	6.2	0.55	1	1½
•	0	0	0	1	Y ₄	4.87	4.87	4.87	4.87	4.87	0.555	1	2½
•	½	½	0	0	Y ₁₂	11.07	11.51	9.72	10.77	10.77	0.55	1	2¼
•	½	0	½	0	Y ₁₃	9.74	8.15	8.00	8.96	8.96	0.575	1	1½
•	½	0	0	½	Y ₁₄	7.97	8.41	7.97	8.12	8.12	0.578	1	2
•	0	½	½	0	Y ₂₃	10.04	9.00	11.51	10.18	10.18	0.525	1	1¼
•	0	½	0	½	Y ₂₄	9.74	9.74	10.19	9.89	9.89	0.528	1	1¾
•	0	0	½	½	Y ₃₄	7.53	7.53	8.41	7.82	7.82	0.533	1	2
CONTROLS													
•	½	0	¼	¼	C ₁	7.33	8.67	9.11	8.37	9.11	0.576	1	
•	¼	0	½	¼	C ₂	9.56	9.11	6.44	8.37	9.24	0.564	1	
•	¼	¼	¼	¼	C ₃	8.33	11.33	8.78	9.48	10.89	0.557	1	
•	2/3	0	0	1/3	C ₄	7.22	10.44	7.00	8.22	7.69	0.585	1	
•	¼	¼	½	0	C ₅	9.78	11.33	10.44	10.52	10.60	0.55	1	
•	¼	½	0	¼	C ₆	10.00	8.67	11.78	10.15	11.18	0.539	1	
•	¼	0	¼	½	C ₇	9.11	8.44	9.33	8.96	8.86	0.535	1	
•	½	¼	0	¼	C ₈	9.89	10.78	9.22	9.96	10.22	0.564	1	
•	¼	½	1/8	1/8	C ₉	10.69	11.56	10.67	10.97	11.14	0.538	1	
•	1/3	1/3	0	1/3	C ₁₀	10.67	10.87	9.78	10.44	10.77	0.552	1	

Fig. 4 Grading curve for Nkwere-Ezunaka sample

The model developed using the data in Table 3 and Eqs3a and 3b is given here as Eq 8

(8)

The model was validated using Eqs 5 – 7. The F-ratio value obtained at a significant level of 0.05 was 1.9 which was less than 2.1 obtained from the table of F-distribution with V₁=10 and V₂ = 40;and this indicates that there were no statistically significant differences between the experimental and predicted strength values. The predictions of the model can be compared with the controls in Table 3.

The optimization of the strength of the concrete was done using the model, Eqn 8, in a Quick Basic Computer Program whose flow chart is given in Fig 3. The maximum strength and corresponding mix proportion within the range shown in the simplex was obtained as 11.403N/mm² (for strength) and 0.541: 1.0: 1.35: 2.65 (for mix ratio of water, cement, sand and gravels). The contamination in the coarse aggregate or gravels is 21.9%.

IV. DISCUSSION OF RESULTS

In Table 3, the concrete strengths (responses and predictions) are all less than the prescribed value for structural design[4] which is 20N/mm². A good granite aggregate (the gold standard) for which this is stipulated must be clean, but the contamination in the aggregate under study is 21.9%. This contamination is the reason for the low strength [5]. For this aggregate to be good enough for structural concrete it must be cleaned of the dirt to a level of less than 5%[6].

V. CONCLUSION AND RECOMMENDATIONS

Based on the results and discussion, it is clear that the strength of concrete from Nkwere-Ezunaka gravel (12-mm maximum size) is very low because of high contamination (dirt in the aggregate). The following recommendations are therefore made:

- The aggregate should not be used for bridges, culverts, columns of building above 3 storeys and any other structural

element where stress is known to be above the obtained optimum value, unless it is washed thoroughly.

- It is recommended for short lintels of all building and columns of two storey building without cleaning.
- Washing or sieving the aggregate is recommended for improved concrete strength before it can be used for other purposes.

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A Survey Review on Solving Algorithms for Travelling Salesman Problem (TSP)

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Abstract- Travelling Salesman Problem (TSP) is one of the best known NP-hard problems. It is also a classic tour problem in which a hypothetical salesman must find the most efficient sequence of destinations in his territory, stopping only once at each, and ending up at the initial starting location. To handle with this problem there is no suitable algorithm that solves it in polynomial time. Many algorithms were applied to solve TSP with more or less success. There are many ways to classify algorithms, each with its own merits. This paper is a review on various algorithms like Ant Colony Optimization Algorithms (ACO), Particle Swarm Optimization (PSO) and Genetic Algorithms (GA) available with respective attributes to find the nearest optimal solution for the traveling salesman problem. It also relates the traveling salesman problem with the available algorithms and provides the advantages in providing a solution for TSP.

Index Terms- Travelling Salesman Problem, And Colony Optimization, Particle Swarm Optimization, Genetic Algorithms,

I. INTRODUCTION

Traveling Salesman Problem (TSP) is a classical combinatorial optimization question, which now can only be solved by meta-heuristics to get the approximate solution. The travelling salesman problem is quite simple: a travelling salesman has to visit customers in several cities, exactly one customer in each cities. Since he is interested in not being too long on the road, he wants to take the shortest tour. He knows the distance between each two cities which he wants to visit. So far, nobody was able to come up with an algorithm for solving the traveling salesman problem that does not show an exponential growth of run time with a growing number of cities. There is a strong belief that there is no algorithm that will not show this behavior, but no one was able to prove this (yet). The Pictorial and mathematical structure of the TSP is a graph in which the nodes, edges, vertices etc.. are termed as the attributes.

TSP is a problem to find the best shortest suitable path by the salesperson to visit n cities so that we can reach each and every city exactly once & finally comes to the initial position with least resources utilization as well as time. It can be well represented by a graph G having N no. of cities and E no. of paths between cities. Let $G = (N, E)$ be a graph where N is a set of vertices representing cities and E is set of edges representing paths. Let C be a cost matrix (or distance matrix) associated with E . C can be defined in Euclidean Space as follows:

$$C_{ij} = \sqrt{(x_i - x_j)^2 + (y_i - y_j)^2}$$

The path with least values is considered as shortest path.

II. APPLICATIONS

The TSP has several applications even in its purest formulation, such as planning, logistics, and the manufacture of microchips. It appears as a sub-problem in many areas, such as vehicle routing, microchips manufacturing, DNA sequencing, logistics, resource allocation, job sequencing, computer wiring and many more. In these applications, the concept city represents, for example, customers, soldering points, or DNA fragments, and the concept distance represents travelling times or cost, or a similarity measure between DNA fragments. The TSP also appears in astronomy, as astronomers observing many sources will want to minimize the time spent moving the telescope between the sources.

III. LITERATURE REVIEW

This paper reviews on solving algorithm for Travelling Salesman Problem (TSP). TSP belongs to the category of NP-hard problems. A various number of algorithms have been designed to solve this problem. The aim of this literature survey is to study and analyze the available algorithms to predict a prominent or optimal solution for TSP. TSP is defined as a permutation problem with the objective of finding the path of the shortest length (or the minimum cost). TSP can be modeled as an undirected weighted graph, such that cities are the graph's vertices, paths are the graph's edges, and a path's distance is the edge's length. Over the last three decades, TSP received considerable attention and various approaches are proposed to solve the problem, such as branch and bound, cutting planes, 2-opt, particle swarm, simulated annealing, ant colony, neural network, tabu search, and genetic algorithms. Some of these methods are exact, while others are heuristic algorithms.

A. Ant Colony Optimization Algorithm

The ant colony optimization algorithm (ACO) is a probabilistic technique for solving computational problems which can be reduced to finding good paths through graphs. By analyzing the ants behavior the ACO algorithms are designed to search for a shortest path between their nest and a source of food. It is a relatively novel meta-heuristic technique and has been successfully used in many applications especially problems in combinatorial optimization.

An ant will move from node i to node j with probability

$$p_{i,j} = \frac{(\tau_{i,j}^\alpha)(\eta_{i,j}^\beta)}{\sum (\tau_{i,j}^\alpha)(\eta_{i,j}^\beta)}$$

where

$\tau_{i,j}$ is the amount of pheromone on edge i, j

α is a parameter to control the influence of $\tau_{i,j}$

$\eta_{i,j}$ is the desirability of edge i, j (typically $1/d_{i,j}$)

β is a parameter to control the influence of $\eta_{i,j}$.

The following are paper reviews on ACO algorithms for solving TSP.

In 2008, [1] proposed a paper on ACO where the new ants remember the best solution present so far. The presented model was termed as Ants carrying Memory. In this paper, they did some important work like introducing the previous knowledge of the TSP, Ant System & ACS & define the parameter used and explain about ants with memory and merge them in ACS, and then the results were obtained by modified ants and compare the efficiency of each algorithm. This algorithm is capable to unite into at least a proximate optimal solution swiftly. The presented algorithm is so easy as well as better performing. This algorithm suits for small and mid-size problems however in case of larger problem it may trap into local optima.

In 2008, [2] offers an enhanced ACO for solving TSP. In the paper they proposed a selection mechanism that is based on Held-Karp lower bound to obtain the optimal path for TSP. it obtains information from deposition of pheromone & heuristic information and uses the HK method for the selection of best route.

In 2011, [3] gives a solution for TSP based on enhanced Ant Colony Optimization. They proposed an algorithm mixed with candidate list approach & dynamic upgrading of heuristic parameter of local search solution. In dynamic candidate list a number of preferred nodes are stored in a static list. When an ant moves from one node to other then it selects the node that is present in the preferred list. This strategy is used to put up searching scheme of ant colony system on bigger data. The upgrading was based on entropy & emergence of solution. From their experimental results, the proposed system is much effective in order of speed (convergence) & the ability to discovering better solutions.

In 2012, [4] affirmed that the Ant Colony Optimization (ACO) is a heuristic algorithm which has been proven a successful technique and applied to a number of Combinatorial Optimization (CO) problems. There are several reasons for the choice of the TSP as the problem to explain the working of ACO algorithms it is easily understandable, so that the algorithm behavior is not obscured by too many technicalities; and it is a standard test bed for new algorithmic ideas as a good performance on the TSP is often taken as a proof of their usefulness. They presented an approach for solving traveling salesman problem based on improved ant colony algorithm.

B. Genetic Algorithm

A simple and pure genetic algorithm can be defined in the following steps.

- Step 1. Create an initial population of P chromosomes.
- Step 2. Evaluate the fitness of each chromosome.
- Step 3. Choose P/2 parents from the current population via proportional selection.
- Step 4. Randomly select two parents to create offspring using crossover operator.
- Step 5. Apply mutation operators for minor changes in the results.
- Step 6. Repeat Steps 4 and 5 until all parents are selected and mated.
- Step 7. Replace old population of chromosomes with new one.
- Step 8. Evaluate the fitness of each chromosome in the new population.
- Step 9. Terminate if the number of generations meets some upper bound; otherwise go to Step 3.

In 2001, [5] proposed a paper for solving TSP with precedence constraints using genetic algorithm. In this paper, they used topological sort to order the vertices to be visited by the salesperson. Also they give a new crossover operator which is similar in many aspects of natural moon i.e. half-moon, full moon etc. are implemented. This crossover operator selects a random subset from population and is mixed with the selected parents to produce an offspring. The author compares their newly developed moon crossover operator with earlier operators that are OX operator and position based operator where they found that their performance is almost equivalent but the OX and position based operators do not give optimal results for the trials. However their approach is much efficient for small and mid-size problems but in case of bigger problems it gives best solution but there is no guarantee for the optimality.

In 2012, [6] used an indigenous search technique to increase the solution quality. In this paper they used Elitism technique for selection which initially imitates the best chromosome to newly generated population and the rest is performed in conventional way. It can swiftly escalate the performance of GA because it avoids losing the preeminent found solution. In searching procedure a crossover location on a chromosome is defined and then SCX operator is applied to exchange the information. This newly generated crossover operator is superior in terms of cost and time as compared to traditional SCX operator. In this way a proximal optimal solution is achieved but not an optimal solution. They presented a comparative study among greedy approach, dynamic programming & genetic algorithm for solving TSP. GA seems to seek better options for TSP, and nonetheless it is dependent very much on the way the problem is described & the strategies of crossover & mutations used. They proposed a new crossover operator (SCX) which is better in terms of quality of solutions. They used a local search technique to improve the solution quality.

In 2012, [7] proposed that genetic algorithm is one of the best methods which is used to solve various NP-hard problem such as TSP. The natural evolution process is always used by genetic Algorithm to solve the problems. They presented a critical survey to solve TSP problem using genetic algorithm methods that are proposed by researchers. They observed that there is requirement to design new genetic operators that can enhance the performance of the GA used to solve TSP. There is lot of scope for the researcher to do work in this field in future.

In 2013, [8] stated an enhanced genetic algorithm for TSP problem. In their paper they calculate the distances between various cities visited using Euclidean formula and form a matrix from the data evaluated. They work on a symmetric TSP i.e. the distance between two cities is same in both orders while moving from city a to city b and vice versa. They generated an initial population randomly and then assign them a fitness value which is taken as the distance between the cities. After this they applied the tournament selection for selecting best population from the given set and applied two-point crossover method combining the knowledge from heuristic methods & GA for solving the TSP. Finally interchange mutation is implemented for generating new population. It appears to find better solutions for symmetric TSP but it is not much efficient for asymmetric problems.

C. Particle Swarm Optimization

In 2007, [9] offered an algorithm based on novel particle swarm optimization for TSP. An undetermined searching approach & a crossover elimination method are used to increase the speed of convergence when compared with the predominant algorithms for solving TSP using swarm intelligence; it has been proven that the problems with large size can be solved with presented algorithm. Moreover, the generalized chromosome technique is used to further extend the algorithm.

In 2010, [10] had presented a hybrid discrete PSO algorithm that adds adaptive disruption factor, reversion operator and heuristic factor, into the approach. In the work he implemented an update mechanism for kinetic equations to improve the efficiency of particle swarm optimization (PSO). Here they use heuristic factor for search operations i.e. to find a better route and adds reversion mutant for swapping between the paths and correlates it with noise. This adaptation increases the efficiency considerably irrespective of the convergence velocity or accuracy.

In 2012, [11] proposed a new PSO algorithm which overcomes the drawbacks of GA like premature convergence i.e. giving suboptimal solution. They mixes the three approaches i.e. PSO-GA-ACO and makes a 2-stage hybrid swarm intelligence optimization algorithm which offers a better and much efficient solution to TSP problem.

IV. CONCLUSION

After reviewing various research papers to solve TSP the heuristic algorithms (GA, ACO, PSO etc.) are proved to be much efficient algorithms than the conventional ones (like dynamic programming, greedy algorithm, branch and bound methods etc.). Heuristic algorithms are more effective for small and mid-sized problems than other algorithms. There are certain issues with these also that are confinement to sub-optimal solution only like stagnation behavior in case of ACO, premature convergence in case of GA and convergence speed in case of PSO. From the beginning of these approaches a lot of amendments are done for improving their performance such as different – 2 selection, mutation, crossover strategies are given from time to time in order to improve GA. Different updating mechanisms and route selection mechanisms and adding memories in ants are implemented for the enhancement in ACO as well as in PSO. But still there is a lot of work to do for betterment of these algorithms.

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Genetic Diversity of Dodder (*Cuscuta Spp.*) Collected from Khartoum and Gezira States

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Abstract- The study was carried out at the field dodder (*Cuscuta spp.*) in Khartoum and Gezira states, to study variation between 28 samples of it in two States using DNA Markers (RAPD). Four primers were used (OPAL15, OPAL18, OPB17 and OPAL20) to amplify the genomic DNA of 28 samples of *Cuscuta spp.* Two primers (OPB17, OP AL20) showed high percentage (100%) to amplify the genomic DNA polymorphism bands, while the other two primers (OPAL15, OPAL18) were produced (91.7%) polymorphism bands. UPGA analysis showed RAPD Distance Matrix range (0.10-0.98) which reflected high genetic diversity. The RAPD UPGA Tree Diagram showed high Molecular Variation within States. The resulting of four RAPD Markers analyses were Observed that tree diagram showed two groups A and B. Group A Consists of two sub group. As sub –group A1, and sub-group A2. Sub –group A1 have two sisters (Jebal-Ramtook and Jebal-Molokha) ,(Toti-Remet and Jebal-Amoyogha) and sub-group A2 have five sisters (Alkabash Alfalfa and Alfaki-hashim- Alfalfa) ,(Wad-Alkawahala- Onion and wada-Almajzoub Onion),(Shambat-Lime and Shambat Balloon plant),(Alalaphon Alfalfa and Omdurman- lime) and (Gezira Slang Alfalfa - and Shambat - Alfalfa).A group A and B correlated Consists variables. group B Have one sisters (Hantoob- Onion and Madina-Arab, Dahaser), (Helat-kok-Ghobash) As Sub- group A1, (Algeli - Alfalfa, Toti- Alfalfa, Khartoum- Dames, wad-Alkawahala-Onion and Algeli - Ramtook) has sub-group A2, (Shambat –Euphorbia) correlate with sub-A1, And A2 was showed sample (Alalaphon Dahaser) as out group and genetically close to each other's (sisters).

Index Terms- Cuscuta, DNA, PCR, dodder

I. INTRODUCTION

Dodder (*Cuscuta spp.*), an annual holoparasitic plant of legume crops, which belongs to family *Cuscutaceae* ,is agenus cosmopolitan occurrence , thus *Cuscuta* species are widely distribution and colonized diversity of habitats throughout the temperate and tropical zones (Belize,1987). The most common name, dodder, possibly originates from the Old German word “dotter” which means yolk (Dawson et al. 1994). Many species of *Cuscuta* have been introduced to different

parts of the world due to similarity of their seed to those of commercial crops ,especially legumes like alfalfa (*Medicago sativa L*) *Cuscuta species* ,commonly known as dodder and it is one of the most invasive weeds, (Lowe *et al.*,2001). Musselman (1984), reported seven species and described their geographical distribution in country .He reported the occurrence of *C. pedicellata* ladeb, In Khartoum, Gezira and Bahr Al Gazal state, and *C. pedniflora Ten* .In southern Darfur and Red Sea state he found *C. Hyaline* and in the Northern States, Kassala, Northern Kordofan and Khartoum States. Musselman and Bebawi, (1983) reported *C.campestris* yunker, in Shambat and Toti Island and widely spread through much of Sudan as a contaminate of Lucerne seeds. The uses of molecular markers are based on the naturally occurring DNA polymorphism, which forms basis for designing strategies to exploit for applied purpose. A marker must to be polymorphic i.e. it must exit in different forms so that chromosome carrying the mutant genes can be distinguished from the chromosomes with the normal gene by a marker it also carries. Genetic polymorphism is defined as the simultaneous occurrence of a trait in the same population of two discontinuous variants or genotypes. DNA markers seem to be the best candidates for efficient evaluation and selection of plant material. Unlike protein markers, DNA markers segregate as single genes and they are not affected by the environment. DNA is easily extracted from plant materials and its analysis can be cost and labor effective (Kumar, 2009).

The basis of RAPD methodology is the PCR (polymerase chain reaction)which has swept through molecular biology laboratories over the last few years. In 1991 Welsh and McClelland developed a new PCR-based genetic assay namely randomly amplified polymorphic DNA (RAPD). This procedure detects nucleotide sequence polymorphisms in DNA by using a single primer of arbitrary nucleotide sequence. In this reaction, a single species of primer anneals to the genomic DNA at two different sites on complementary strands of DNA template. If these priming sites are within an amplifiable range of each other, a discrete DNA product is formed through thermo cyclic amplification. On an average, each primer directs amplification of several discrete loci in the genome, making the assay useful for efficient screening of nucleotide sequence polymorphism between individuals (William *et al.*, 1993). However, due to the

stochastic nature of DNA amplification with random sequence primers, it is important to optimize and maintain consistent reaction conditions for reproducible DNA amplification. RAPDs are DNA fragments amplified by the PCR using short synthetic primers (generally 10 bp) of random sequence. These oligonucleotide serve as both forward and reverse primer, and are usually able to amplify fragments from 1–10 genomic sites simultaneously. Amplified products (usually within the 0.5–5 kb size range) are separated on agarose gels in the presence of ethidium bromide and view under ultraviolet light (Jones *et al.*, 1997) and presence and absence of band will be observed. These polymorphisms are considered to be primarily due to variation in the primer annealing sites, but they can also be generated by length differences in the amplified sequence between primer annealing sites. Each product is derived from a region of the genome that contains two short segments in inverted orientation, on opposite strands that are complementary to the primer (Kumar, 2009). The aim of this study to identify *Cuscuta spp.* in Khartoum and Gezira States and determine variation between dodder samples by DNA markers.

II. MATERIALS AND METHODS

1. Plant Materials

The fresh tissues of the *Cuscuta spp.* samples were carefully collected from different areas in Khartoum and Gezira States without any parts of host plant, cleaned, labeled and covered by Foil Aluminum then stored in liquid nitrogen. Samples of *Cuscuta spp.* transferred to the laboratory and frozen until use

2. DNA Extraction

DNA was extracted from fresh tissues of *Cuscuta spp.* colluded using modified CTAB method. The modification was made in intention to improve the DNA quantity and the quality. In this method the fine powdered plant materials was frozen - dried tissue powder with a pestle and mortar after frozen in liquid nitrogen. Samples immediately transferred into 15 ml Falcon Tubes containing 6 ml CTAB. the samples were then incubated in a water path at 60°C with gentle shaking for 30 minutes. As shaking after each 5minutes and left to cool at room temperature for 10 min. Chloroform: Isoamylalcohol mixture (24:1) was added to each tube and the phases were mixed gently for 10 min at room temperature to make a homogenous mixture. The cell debris was removed by centrifugation at 4000 rpm for 15 minute and the resulted clear aqueous phases (containing DNA) were transferred to new sterile tubes. The step of the chloroform: Isoamylalcohol extraction was repeated twice. The nucleic acids in the aqueous phase were precipitated by adding equal volume of deep cooled Isopropanol let the DNA to settle down over night in Refrigerator. The contents were mixed gently and collected by centrifugation at 4000 rpm for 5 minute. The formed DNA pellet was washed twice with 70% ethanol and the ethanol was discarded. Let ethanol and DNA to dry room temperature. Then add TE buffer and store in -20°C. The amount of TE to be added

depends on the amount of DNA. Allow the DNA to dissolve in TE before storing in -20°C. for further use DNA.

3. PCR of the RAPD Technique

The PCR reactions were carried out in 25 µl volume containing 15µl sterile distilled water, 2.5 µl 10Xbuffer, 2.5 µl (2 mM/µl) DNTPs, 1.5 µl (50 mM) MgCl₂, 2 µl (10 pmol/µl) primer, 0.5 µl (5u/ µl), *Taq* DNA polymerase and 1 µl (10 to30 ng/µl) template DNA, for each sample. The PCR amplification protocol was programmed for 5 min at 94°C for initial denaturation, follows by 40 cycles of 1min at 94°C, 1 min at (36°C) and 1 min at 72°C, final extension was programmed for 7min at 72°C followed by hold time at 4°C until samples were collected.

4. Documentation

The extracted DNA samples with use Ethidium Bromide and agarose gel the 1% agarose gel stained with 0.5µl (1mg/100ml) was used Electrophoresis was done at 80 Volts. The separate fragments were visualized with an ultraviolet (UV) transilluminator. As Visualized and photographed under a UV transilluminator. As. A sample without template DNA was included as a negative control in each experiment to check contamination. The sizes of DNA fragments were estimated by comparison with standard ladder.

5. RAPD Data Analysis

The number of polymorphic and monomorphic bands was determined for each primer. Genotypes were scored (1) for present band, and (0) for absent band and then entered into a data matrix. Percentage of polymorphism was calculated as the following equation: (polymorphic bands/total number of bands x 100). The tree diagram was produced by clustering the similarity data with the UPGMA method using *STATISTICAver.10*.

III. RESULT AND DISCUSSION

1. DNA extraction

To isolate high quality of DNA, the CTAB-based procedure optimized in the present study, yielded good quality DNA free of phenols, which may inhibit the activity of *Taq* polymerase. Four primers tested for amplification of the 28 accessions (*Cuscuta spp.*) two primers showed high percentage of polymorphic bands (100%) (**OPAL20**, **OPB17**) the four primers were selected and used to evaluate the degree of polymorphic and genetic relationships among the genotypes under study Total of 41 amplified fragments were distinguished across the selected primers and the *Statistical* analysis showed 39 polymorphic bands among the accessions. The maximum number of bands were produced by primers (**OPAL15**, **OPA18**) with 91.7% polymorphism, while the minimum number of fragments' pattern produced by OPB17 (8 bands) with 100% polymorphism. RAPD fragments' pattern produced by four primers is showed in Table 1, Figure 1, 2,3and 4.

Table 1 Polymorphism and percentages of Monomorphic detected by the use of Four RAPD primers on 28 Sample *Cuscuta spp.*

Primer	Sequence	Total number of bands	Number of polymorphic	Number of monographic	Percentage of polymorphic bands	Percentage of Monomorphic bands
OPAL15	AGGGGACACC	12	11	1	91.7%	8.3%
OPAL20	AGGAGTCGGA	9	9	0	100%	0%
OPA18	AGGTGACCGT	12	11	1	91.7%	8.3%
OPB17	AGGGAACGAG	8	8	0	100%	0%
Total		41	39	2	95.1%	4.9%
Average		10.3	9.7	0.5	95.85	4.15

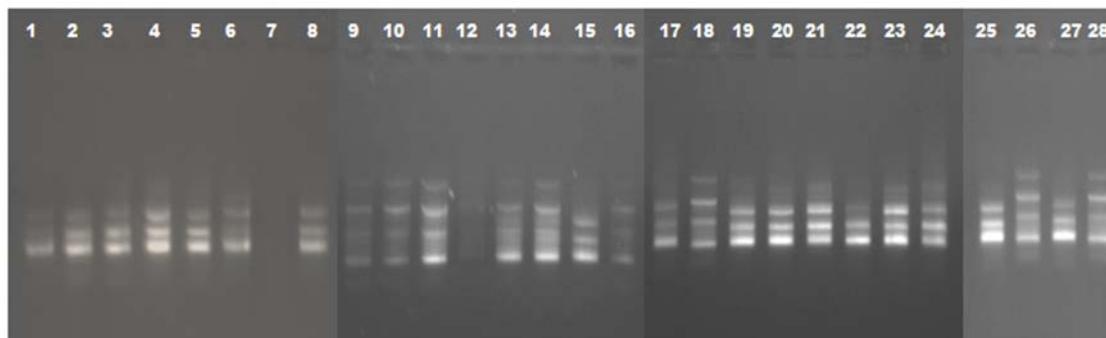


Fig. 1 RAPD analysis with primer: OPB-17 (lanes-1-8), OPB-17 (lanes-9-16), OPB-17(lanes-17-24), OPB-17 (lanes-25-28) on genomic DNA isolated from

(Ramtook ,Euphorbia ,Alkabash, Alafalfa, Remet, Amoyogha, Molokhia, Alafalfa),(Ramtook, Alafalfa, Alafalfa, Alafalfa,Dhaser Alafalfa, lime ,Damas) ,(lime ,Balooplant ,Alafalfa, Alafalfa ,Onion, Onion , Onion, Alafalfa),(Onion, Dahasar,Lokha,Onion).

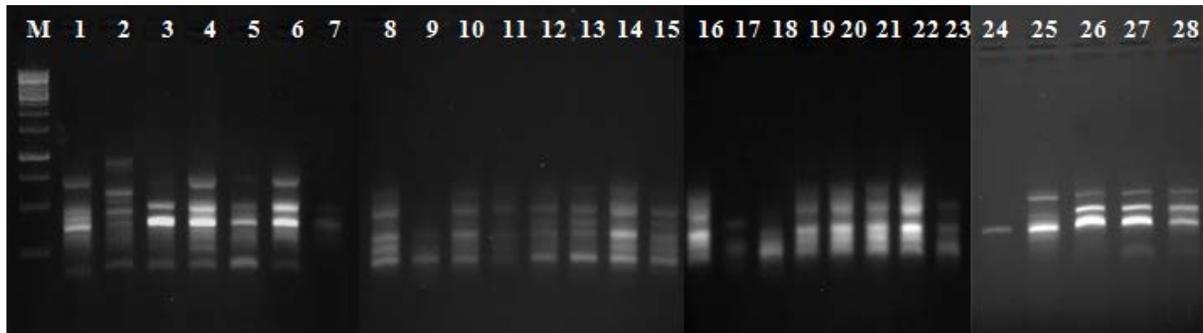


Fig. 2 RAPD analysis with primer: OPAL-18 (lanes-1-7), OPAL-18 (lanes-8-15), OPAL-18 (lanes-16-23), OPAL-18 (lanes-24-28) on genomic DNA isolated from (Ramtook ,Euphorbia ,Alghbash, Alafalfa ,Remet, Amoyogha, Molokhia),(Alafalfa, Ramtook, Alafalfa, Alafalfa, Alafalfa,Dhaser, Alafalfa,Lime),(Damas,Lime,Baloon plant, Alafalfa , Alafalfa, Onion,Onion,Onion),(Alafalfa, Onion, Dahsar,Lokha,Onion).

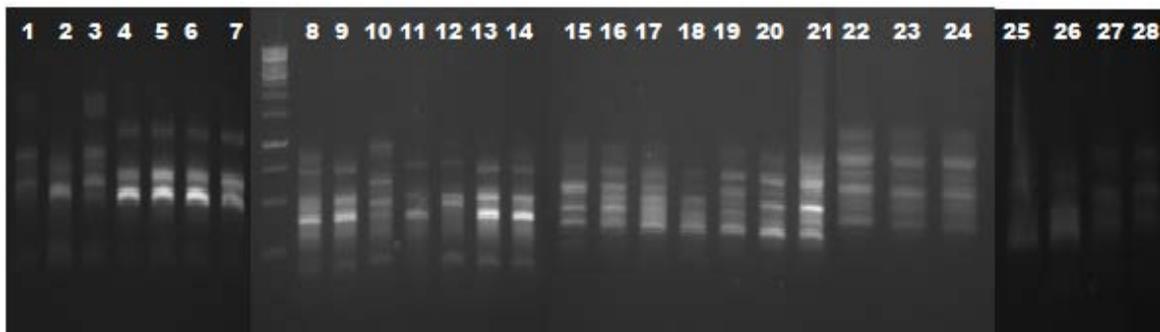


Fig. 3 RAPD analysis with primer: OPAL 15 (lanes-1-7), OPAL 15 (lanes-8-14), OPAL 15 (lanes-15-21) OPAL 15 (lanes-22-24) (lanes-25-28), on genomic DNA isolated from (Ramtook ,Euphorbia ,Alghbash, Alafalfa ,Remet, Amoyogha, Molokhia) ,(Alfalfa, Ramtook, Alafalfa, Alafalfa, Alafalfa,Dhaseir, Alafalfa),(Lime, ,Damas, Lime, Baloonplant, Alafalfa, Alafalfa,Onion),(Onion, Onion, Alfalfa),(Onion, Dahsar,Lokha,Onion).

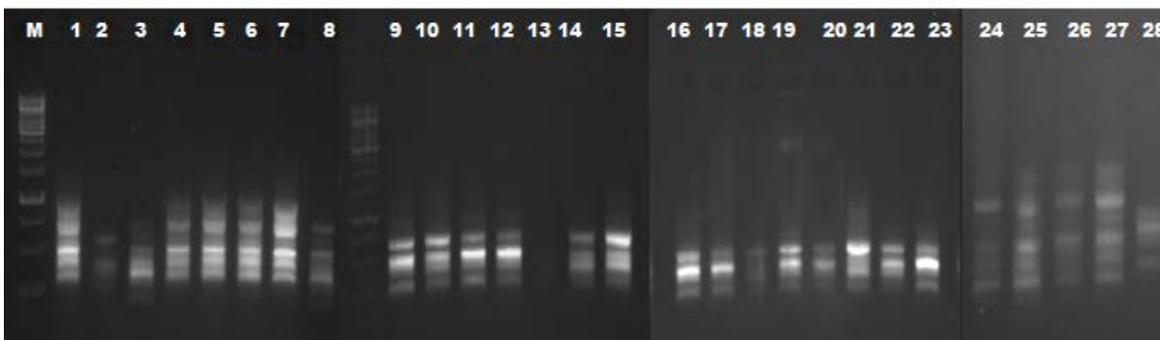


Fig. 4 RAPD analysis with primer: OPAL-20 (lanes-1-8), OPAL-20 (lanes-9-15), OPAL-20 (lanes-16-23) OPAL 20 (lanes-24-28) on genomic DNA isolated from (Ramtook , Euphorbia ,Alghbash, Alfalfa ,Remet, Amoyogha, Molokhia), Alfalfa),(Ramtook, Alfalfa, Alfalfa, Alafalfa,Dhaseir, Alfalfa, Lime,),(Damas, Lime, ,Baloonplant, Alfalfa , Alafalfa, Onion,Onion,Onion),(Alafalfa,Onion, Damas dahaseir,Lokha,Onion).

2. The tree diagram-

The resulting of four RAPD Markers analyses were Observed that tree diagram showed tow groups A, and B .group A Consists of two sub group. As sub –group A1, and sub-group A2. Sub –group A1 have two sisters (Jebal-Ramtook and Jebal-Molokha) ,(Toti-Remet and Jebal- Amoyogha) and sub-group A2 have five sisters (Alkabash Alfalfa and Alfaki-hashim- Alfalfa) ,(Wad-Alkawahala Onion and wada-Almajzoub Onion) ,(Shambat-Lime and Shambat Balloon plant),(Alalaphon Alfalfa and Omdurman- lime) and (Gezira Slang Alfalfa - and Shambat - Alfalfa).A group A and B correlated Consists variables. group B Have one sisters (Hantoob- Onion and Madina-Arab, Dahaser), (Helat-kok-Ghobash) As Sub- group A1, (Algeli - Alfalfa, Toti- Alfalfa,

Khartoum- Dames, wad-Alkawahala-Onion and Algeli - Ramtook) has sub-group A2, (Shambat –Euphorbia) correlate with sub-A1, And A2 was showed sample (Alalaphon Dahaser) as out group and genetically close to each other's (sisters). **Figure 5 UPGA**

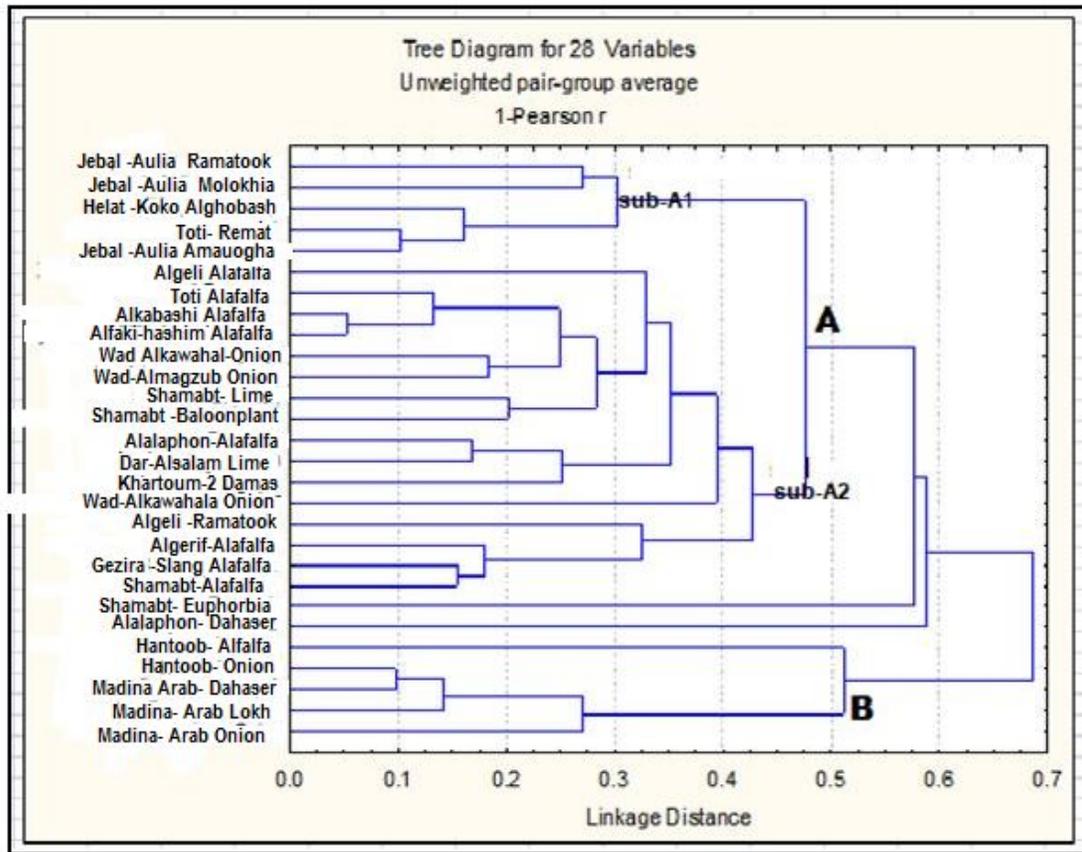


Fig.5UPGA Tree resulting from the analyses of four RAPD primers reflecting the Variation the 28 Sample of *Cuscuta* spp. (Ramtook ,Euphorbia ,Alghbash, Alafalfa ,Remet, Amoyogha, Molokhia, Alafalfa, Ramtook, Alafalfa, Alafalfa, Alafalfa,Dhaser, Alafalfa,Lime,Damas,Lime,Baloonplant, Alafalfa, Alafalfa, Onion,Onion,Onion, Alafalfa,Onion, Dahaser,Lokha,Onion)

The results was obtained genetic distance matrix values between the accessions were showed in Table (2) below. The highest similarity value of 0.98 was between accessions. (Hantoob onion and Alalaphon - Dahaser), (Madina Arab- Onion and wad Alkawahala Onion) where the genetic distance between each of the two samples mentioned Where as accessions one (Khartoum with Gezira state) and one sample (Gezira state) had the lowest similarity value of 0.10 was between accessions (Madina Arab- lokh and Madina Arab- Dahaser), (Madina Arab-Dahaser and Hantoob -Onion).

Table 2 The Genetic Distance Matrix of 28 dodder (*Cuscuta spp.*) Were tasted and analysis four RAPD primers

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
00																					
54	0.00																				
32	0.42	0.00																			
33	0.54	0.43	0.00																		
32	0.42	0.32	0.21	0.00																	
22	0.43	0.32	0.11	0.10	0.00																
27	0.50	0.40	0.38	0.29	0.27	0.00															
43	0.53	0.32	0.21	0.32	0.32	0.50	0.00														
41	0.62	0.41	0.51	0.41	0.41	0.51	0.31	0.00													
43	0.53	0.42	0.43	0.32	0.32	0.50	0.32	0.20	0.00												
51	0.52	0.41	0.41	0.41	0.41	0.51	0.41	0.41	0.20	0.00											
58	0.68	0.58	0.47	0.47	0.47	0.56	0.37	0.36	0.16	0.15	0.00										
81	0.71	0.71	0.70	0.71	0.70	0.92	0.50	0.61	0.50	0.51	0.45	0.00									
56	0.75	0.54	0.45	0.54	0.45	0.70	0.32	0.41	0.32	0.30	0.26	0.27	0.00								
62	0.71	0.37	0.51	0.48	0.51	0.64	0.26	0.35	0.37	0.35	0.31	0.31	0.17	0.00							
67	0.65	0.43	0.56	0.54	0.56	0.59	0.32	0.41	0.43	0.41	0.36	0.48	0.33	0.17	0.00						
58	0.68	0.37	0.36	0.47	0.47	0.56	0.26	0.36	0.58	0.47	0.52	0.66	0.47	0.31	0.36	0.00					
55	0.56	0.46	0.45	0.56	0.55	0.67	0.25	0.36	0.56	0.67	0.62	0.56	0.55	0.38	0.45	0.20	0.00				
49	0.59	0.27	0.38	0.37	0.38	0.55	0.16	0.36	0.37	0.46	0.42	0.55	0.38	0.22	0.27	0.31	0.29	0.00			
43	0.53	0.21	0.32	0.32	0.32	0.50	0.11	0.31	0.32	0.41	0.37	0.50	0.32	0.15	0.21	0.26	0.25	0.05	0.00		
69	0.65	0.54	0.46	0.54	0.57	0.68	0.31	0.61	0.54	0.50	0.47	0.57	0.57	0.41	0.46	0.35	0.32	0.27	0.31	0.00	
52	0.60	0.36	0.40	0.48	0.40	0.62	0.25	0.44	0.48	0.55	0.52	0.62	0.40	0.36	0.28	0.29	0.36	0.32	0.25	0.43	0.00
57	0.65	0.31	0.46	0.43	0.46	0.57	0.20	0.39	0.43	0.50	0.47	0.57	0.46	0.29	0.34	0.24	0.32	0.27	0.20	0.36	0.18
51	0.62	0.41	0.62	0.52	0.51	0.41	0.52	0.52	0.62	0.52	0.67	0.82	0.62	0.56	0.62	0.47	0.67	0.57	0.52	0.61	0.55
63	0.75	0.54	0.63	0.54	0.52	0.67	0.65	0.76	0.65	0.66	0.81	0.98	0.63	0.78	0.84	0.81	0.92	0.69	0.65	0.83	0.65
66	0.67	0.56	0.66	0.56	0.55	0.67	0.67	0.77	0.67	0.67	0.82	0.97	0.66	0.82	0.77	0.82	0.92	0.72	0.67	0.87	0.58
69	0.79	0.68	0.80	0.68	0.69	0.76	0.68	0.78	0.68	0.78	0.83	0.97	0.69	0.85	0.80	0.94	0.93	0.74	0.68	0.91	0.63
55	0.56	0.56	0.55	0.56	0.45	0.56	0.67	0.77	0.67	0.67	0.82	0.87	0.66	0.82	0.77	0.82	0.82	0.72	0.67	0.98	0.58

IV. DISCUSSION

Investigated DNA Marker-based PCR technology using the markers is RAPD using 4 random primers where explained the relationship between species on the basis of the appearance and disappearance of the bands, specialized molecular markers use four primers OPAL15, OPAL18, OPB17, OPAL20 for the detection of the species appeared in the main bands when the general molecular weight (1-10bp) and, were used for species identification by DNA fingerprinting. Primers were used to be tested. Two primer's showed high percentage of polymorphic bands 100% showed polymorphism in dodder accessions 41 polymorphic bands. While other two primers 39 polymorphic bands among the accession the maximum number of bands were produced by primers. The variation within a species in dodder the plant samples were collected from the same area was used for analysis of inter-specific variation. Overall it was considered that the tested accessions. The analysis were classified into groups A,B group observed consist two sub group, as sub group A1, and

sub group A2 the group A 1 obtained as two sisters (Jebal-Ramatook and Jebal-Molokha) , (Toti -Remat and Jab-Amoyogha) and sub group A1 was obtained five sisters (Alkabash Alfalfa and Alfaki-hashim-Alfalfa) ,(wad-Alkawahala Onion and Wada-Almajzoub Onion) ,(Shambat-Lime and Shambat Balloon plant),(Alalaphon Alfalfa and Dar Alslam Oum bada- lime) a group A and B with correlated consists variables a group B have one sister (Hantoob Onion and Madina-Arab Dahaser) ,(Helat koko Housa). Sub group A1 with correlated sub group A2 .was showed sample (Alalaphon – Dahaser) as out group and genetically close to each other's (sisters). The results were findings in agreement with R. V. *et al* (2009) were found a proper method for estimation of genetic diversity and genetic relationships among different germplasm of *Jatropha curcas* L., random amplified polymorphic DNA (RAPD) technique based on polymerase chain reaction (PCR) was used for described purpose. Out of 55 decamer primers tested, 26 primers produced good amplification products. A total of 6,011 amplification products were scored from which only 1,859 bands (30.92%) were found to be polymorphic and the size

of bands ranged from 300 to 2,500 bp. Unweighted pair group method using arithmetic average cluster analysis revealed clear genetic difference among *J. curcas* germplasm. Also agreement Khan, *et al.*, (2010) the study, the randomly amplified polymorphic DNA (RAPD) technique was employed for authentication of *Cuscuta reflexa* and its adulterant *Cuscuta chinensis*. Thirty two decamer oligonucleotide primers were used to amplify the genomic DNA isolated from the dried stems as well as seeds of both the species. Out of the thirty two primers used, fourteen did not amplify, eleven gave faint and non-reproducible, while seven gave species-specific reproducible unique bands. The unique bands obtained in PCR amplification clearly discriminated the two species, having similar morphology and thus, RAPD may serve as a complementary tool for quality control. Showed the distance matrix range the results was obtained genetic distance matrix values between the accessions were shown the highest similarity value of 0.98 was between accessions Hantoob Onion and Alalaphon Dahaser, Madina Arab Onion and wad Alkawahala Onion. Where the genetic distance between each of the two samples mentioned whereas accessions one Khartoum with Gezira states, and one sample Gezira state. had the lowest similarity value of 0.10 was between accessions Madin Arab lokh and Madin Arab Dahaser. (0.10-0.98) which reflected high genetic diversity. The phylogenetic analysis indicated high genetic variation within the two States.

V. CONCLUSION

Dodders have become noxious parasitic weeds on several economically important crops in Sudan. Recent surveys (2017 - 2018) in Sudan indicated that the parasite had spread and has infested crops such as citrus spp. Additional research is needed to determine the distribution of these ecotypes and their phylogenetic analysis in other states. Furthermore, differences in species identity between these types may develop a future plan in dodder management.

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Investigation of Fabric Waste Reduction Strategies in Awoven Bottom Manufacturing Industry in Sri Lanka.

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Abstract- Fabric waste reduction strategies formulation, especially maximum utilization and unnecessary waste reduction strategies are certainly valuable for textile industries to acquire the maximum waste reduction and profit. This study formulated the best fabric waste reduction strategies for unnecessary fabric wastes generating places of the woven cloth production while performing the fabric waste audit for a single product of a selected style bottom within a boundary of a woven manufacturing industry. From the total allocated fabric raw materials (7037.2 kg), 20 % of the fabrics were measured as waste (1375.704 kg) and 80 % of the fabrics were used (5661.496 kg) to produce 10045 pieces of garments. Accordingly, 137 g of fabrics were generated to produce a single garment. In these wasted fabrics, 79 % of the wastes were from cuttings (1083.5 kg) and others were from final inspection (139.634 kg) 10%, sewing (65.55 kg) 5%, fabric inspection (39.7 kg) 3%, re cut (27.184 kg) 2%, finishing (20.09 kg) 1%, and zero wastage in washing. Fabric inspection process, marker making, layering process were identified as necessary to formulate reduction strategies to reduce fabric waste generation in cutting process and washing defects were identified as main reason for final rejections.

Index Terms- fabric wastes, cutting, final inspection, sewing, fabric inspection, recut, finishing, washing

I. INTRODUCTION

Industrialization is the remarkable turning point to the planet from the history of the human revolution on environment and the natural stability. Usage of machineries and the factories for the mass production and the economy led to the numerous environmental hazards frequently (Singh Ahuti, 2015). Municipal solid wastes (MSW) with increasing rapid urbanization and industrialization, managing and handling of MSW has become a major issue in where the population share is 35% in the urban areas like China and Thailand and less developed countries, currently waste generation per capita ranging from 0.2 to 1.7 kg per day (Gunaruwan *et al.* 2015) and is eight times higher than 1947.

In Sri Lanka, approximately generated per capita 0.62 kg of solid wastes per day (Visvanathan and Trankler 2006) and daily 3,242 Metric tons of municipal solid wastes are collected by the local authorities (Figure 1). Waste collection and disposal is

a serious problem in most of the urban areas in Sri Lanka (Karunarathne 2015).

Solid waste disposal possess a greater problem because it leads to land pollution when openly dumped, water pollution when dumped in low land and air pollution when burnt (Alom 2016). Intergraded Solid Waste Management (ISWM) is a comprehensive waste prevention, recycling, composting and disposal program and involves evaluating local condition and requirements, through that selecting and combining the most appropriate waste management activity efficiently (Gunaruwan *et al.* 2015).

In case of fabric solid wastes generation, most garment industries are taking main part and considering the production with environmental sustainability manner factories really rare (Bahareh Zamani 2012). Annually they consume 19,000 to 38,000 tons fabric and it produces 10 - 20% of off cuts fabric wastes per each garment factories (Jayasinghe *et al.* 2010). The amount of waste production will vary within the range and depends on their techniques of the production. Within that, 25 % only reused and recycled but 8,000 to 19,000 tons are incinerated under adverse condition so, generating toxic gases like dioxins, particularly from rayon and nylons (Jayasinghe *et al.* 2010) and others often release directly to the environment or dump without any proper safety measures at municipal landfills (Islam *et al.* 2014) and lead to land, air and water pollutions (Chavan 2001).

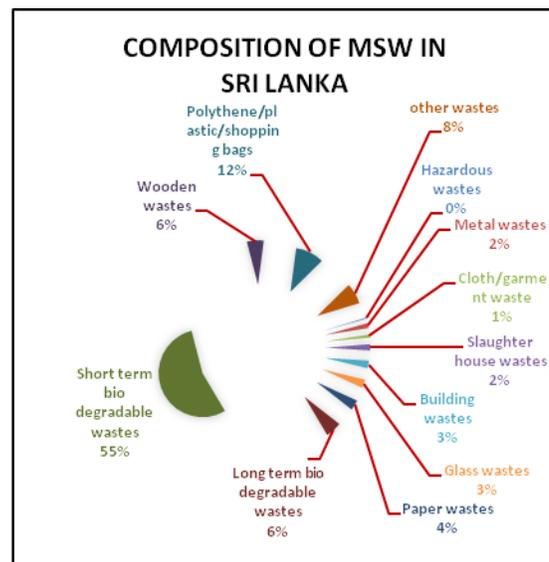


Figure 1. Daily collected MSW by local authorities of Western province of Sri Lanka (Karunarathne 2015).

As a result of demand in customers' consumption pattern changes to environmental friendly production, industries should change their production process pattern to environmental friendly measures (Claudi Vignali *et al.* 2009; Collins and Glendinning 2005). Several process stages in the production flow of garment industries generated wide range of fabric wastage: fabric inspection, layering, cutting, sewing and finishing section (Rahman and Haque 2016; Islam *et al.* 2014) and major waste types which are generated by this process are fiber wastes, offcuts, packaging and pool (Agrawal & Sharan 2015). Figure 2 describes the flow chart of the clothing process of industries.

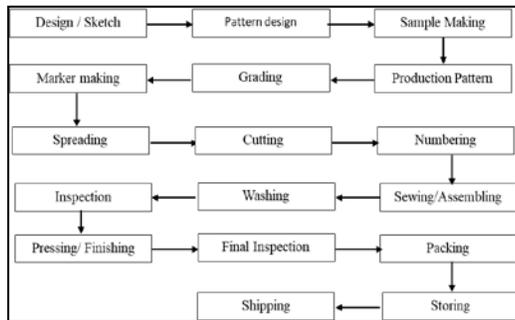


Figure 2. Process flow of garment industries

However, fabric wastages are the most considerable element in this sector because 70 – 80 % of the total cost of the garment production is associated with that fabric cost (Rahman & Haque 2016). Thus, the proper management and accurate measures to the waste generation and reduction strategies must be required (Karunaratne 2015). Waste management is the way best handling method of wastes by considering on reduction, recycling, treating and disposal toward recycling, energy harvesting and improvement of treatment and best suitable healthiest disposal method will help to maintain the factory with sustainability. Improving the process efficiency and consequently reducing the cost of the production also push down the environmental impacts. Figure 3 shows the waste management Hierarchy (Senthil Velmurugan *et al.* 2014).

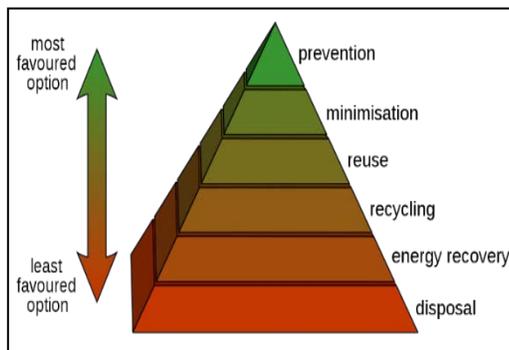


Figure 3. Waste management hierarchy

Fabric wastes generation is unavoidable one but to manage and get maximum utilization of raw material is one of the big

challenge that the garment industries are really facing (Tojo *et al.* 2012), mostly fabric wastes includes fiber wastes, yarn spinning wastes, beaming wastes, offcuts, packaging, spools and creels (Ishrat Jahan 2017).

Moreover, this research was conducted in a woven cloth manufacturing industry to (a) identify the unnecessary fabric waste generation sources and (b) to identify reduction strategies possibilities for best utilization of fabric materials.

II. MATERIALS AND METHODS

Table 1. Product details for the waste audit

Product Details:					
Total purchased order quantity	9567	pcs	5% Additional cutting	10045	pcs
Total roll numbers allocated	127	rolls	Total allocated fabric lengths	13399.45	yds
Total weight of fabrics	7037.2	kg			

The audit was conducted through the chain from the very first of the raw fabric material unloading to the factory to final loading to shipping within the boundary line (Table 1). Each generated fabric wastes were collected and weighted as kg and noted for the study from July to November of 2017 (Figure 4).

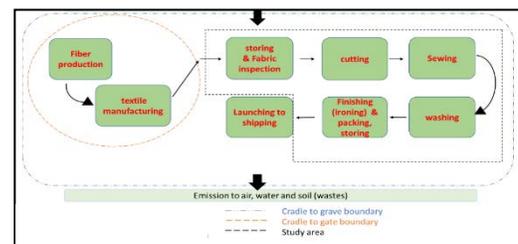


Figure 4. Audit boundary

The most initial fabric waste generation was started in the store as the process followed cut and separation some piece of raw fabric materials for the quality and quantitative checking of the raw fabric materials. Then fabric inspection process was followed next before starting to produce. Randomized selection of 10 % from raw fabric materials from allocated, are cut and separated for testing purposes on color shading and shrinkage.

According to the four point fabric inspection system, maximum defection limit of a fabric roll is 20% (Slayback 2005). But the allocated fabric rolls for this bulk production was 12%. Therefore, fabric raw materials got permission to supply for further production process. 24 hours of Fabric relaxation was done after fabric inspection process. Then fabric raw materials supplied to layering process and then to cutting process. Small pieces of fabrics were removed for making level and straight to

put proper lengthy layers. While the cutting process offcuts, and other fabric waste parts were collected in separate bin and measured the weight of those bins in kg and noted. After that cloth cut pieces were put into sawing process and fabric waste parts were collected and measured. Finished cloths from sawing process, sent to washing process.

After washing process, finishing with quality checking was done by quality control team people and removed excessive parts of the cloths. Removed excessive parts of the cloths were collected and measured in kg and noted for the audit process.

Finally, some garments were removed from shipping loads because of poor quality and defects. Therefore, rejected garments also measured in weight and noted for the waste audit.

2.1. Data Analysis

$$\text{Used fabrics (kg)} = \frac{\text{Total weight of Raw Fabrics (kg)} - \text{Total weight of wasted fabrics (kg)}}{\text{Total weight of Raw Fabrics (kg)}} \quad \text{Equation 1}$$

$$\text{Fabric utilization Per product (kg)} = \frac{\text{Total Used fabrics (kg)}}{\text{Total product (kg)}} \quad \text{Equation 2}$$

$$\text{Fabric wastage Per product (kg)} = \frac{\text{Total amount of fabric wastages (kg)}}{\text{Total product}} \quad \text{Equation 3}$$

$$\text{Rejected garments} = \frac{\text{weight of single garment (kg)} \times \text{Total rejected garments}}{\text{Fabric weight (kg)}} \quad \text{Equation 4}$$

2.2. Graphical analysis:

Collected fabric wastes in each process of the production were entered in MS – EXCEL sheet and graphical analysis was done by using pie chart and percentage of waste generation in each process obtained from the graph.

2.3. Interviews and discussions with relevant people

Major fabric waste generation places and unnecessary waste generation sources were identified in each process through the prepared graphical analysis. Furthermore, the main causes, sub causes and places for waste generation were identified by immediate questions interviews and through discussions with the top management of the relative processes as well as the other workers in the relevant process.

III. RESULTS AND DISCUSSIONS

Fabric waste audit was done by considering the specific system boundary (Figure 4). Before performing the waste audit, a walk-through audit was done to identify the production process of the industry and diagram was drawn and describes the detail production flow diagram of the production process. In the waste audit, storing, fabric inspection, layering, cutting, panel checking, sewing and inspection were identified places for fabric waste generation and shows the process and generated fabric waste amounts in kg.

Fabric inspection process is an important procedure for quality products (Tarek Habib *et al.* 2014). But the fabric defects are a constant and continues problem, despite major improvements in fabrics production, yarn manufacturing equipment and weaving machines (Kazım H. *et al.* 2016). Zero defects is still remains a goal and not an accomplished objective of most textile mills (Silvana.Z. *et al.* 2013). In this waste audit,

from fabric inspection process, 39.70 kg of fabrics were as waste and it was 3 % of the total fabric wastes.

Main causes for the unnecessary fabric waste generations were identified in the fabric inspection process as: they are following 4 – point international standard and it will allow the fabric raw materials to production if within maximum of 20 % of defects (Kazım H. *et al.* 2016). But just below the limit also allow for production therefore, rejections will happen in the final checking with the results of the defects in the raw fabric materials (Alvelos *et al.* 2016).

Fabric relaxing, layering and marker making are pre-process before cutting cloth pieces for sawing. Fabric relaxing process will be act as resistance to deformation during the production process as well as shape saving after finishing (Virginijus Urbelis *et al.* 2007). Therefore, garment rejections and defects because of fabric stress as like: shape out, shrinkage, elasticity and other faults will be under control and fabric wastages will be reduced. Layering process was followed after 24 hours of fabric relaxation and fabrics were spread for the set length and the number of layers of fabric is dictated by the number of garments needed and the fabric thickness (Li *et al.* 2008). Before spreading, the spreader should configure with layer length, spreading tiers, spreading mode and etc. while the worker doing layering process, will left additional 1- 2 cm both sides to obtain through the layout length (Li *et al.* 2008). From this layering process, 14.3 kg of fabrics were measured as wastes.

Marker making is the process making an efficient layout with pattern pieces for a particular style of fabric and size distribution. The patternmaker makes a pattern (on paper or computer) based on the designer's sketch; the pattern guides the cutter in cutting fabric (Timo Rissanen 1994). In such a way, maximum fabric will be used and minimum fabric will be wasted (Puranik and Jain 2017). Contribution of the marker making process for unnecessary fabric waste generation were identified throughout the study as: dividing the bulk order to purchased order wise and producing different times with different deliveries, needed to draw different marker drawings for a same product because of more than four shrinkage classes of raw fabric materials, raw fabrics materials not in the same booking status of the factory in length and width, time duration to draw the markers in auto TUKO drawing software not enough to achieve maximum efficiency drawing (Ziyne Onoğan and Cetin Erdogan, 2006). Increasing numbers of spreads flies in a layer will caused to more fabric wastages because of marker paper movement or mismatch.

Cutting is the process of cut out the needed shaped, size, pattern pieces from allocated determined fabric layers with the help of marker (Silvana.Z. *et al.* 2013). This is the major process in which fabric wastage high and the recent study tells us 16.36% of fabric raw materials will be wasted from this process (Rahman and Haque 2016). Garment industries mostly focus on reducing the cost of raw materials which often reach up to 75% of total production cost.

This in turn, the technique of orders and planning of cutting layers are of utmost important for effective utilization of fabric raw materials to increase the efficiency of cutting process (Silvana.Z. *et al.* 2013). From the cutting process, 1069.2 kg of fabrics were measured as wastes. In the end of the cutting process, 1083.5 kg of fabrics were measured as waste (layering –

14.3kg + cutting – 1069.2kg) and contributed 79% of the total measured fabric wastes.

After cutting process, cut pieces will be transported to the sewing section and all the parts will be attached as sequentially with the help of needle and threads according to the buyer requirement (Golder 2015). From this process 6.37% of the allocated fabrics are wasted normally in the garment textile production (Rahman and Haque 2016) will be the result of as: needle damage, thread breakages, broken stitches, pleated seam, wrong stitch density, uneven stitch density, staggered stitch, improper sewing, and etc(Howard *et al.* 1991). In this study, 65.55kg of fabrics were collected and measured and contributed 5% of the total measured fabric wastes.

Washing process is one of the important process followed by sawing and by through this, dust, dirt and infectious materials will be separated from the cloth and will get a good look to the garment as per buyer requirement and customers' preference (Mondal & Mashur Rahman 2014). Many treatment processes are followed here such as: enzymatic treatment, bleaching treatment, acid treatment and Silicone treatment. Therefore, finally it will stimulate the customers to buy the garment and increase the continuity of the market potential preference to the garment (Rouf .A. *et al.* 2015). While processing to wash, fabrics will be rejected as wastes because of damages or process failures in the washing factory. But in this particular quantity products, no any fabrics wastage. After washing there is an issue, lots of garment rejections were there, because of Garment size may be change with shrinkage of fabric material, some patches will be created with material partly removed, undesired color changes (Dakuri Arjunet *et al.* 2013).

It is very important one after finishing the product before launch to shipping. Low quality with buyer requirement and defecion in any ways will be identified and corrective actions will be done in this process (Hameed and Hamzawy 2017). From this finishing process, 20.09kg of fabrics were collected and measured as wastes. Consumers want a best quality product with low price and garment factories will insure and confirm their produced product with certain standard randomly or for full garments (Rehman *et al.* 2009). In mass production garment factories huge numbers of garments will be rejected and wasted from this step because of poor quality and defects. It causes additional costto correct those poor-quality garments. In this re-production process 27.184 kg of fabrics were wasted and rejections in this final checking process will make more reduction in the profit of the factory and take more additional time consumption (Tincher *et al.* 1993). In the end of the final checking process after re production of clothing, 242 pieces were rejected as poor in quality from 10045 pieces of total produced bottoms.

By the way, from 7037.2kg of allocated fabrics (

Table2),totally 1236.024 kg of fabrics were measured as wastes for produce 10045 quantity of cloths and 577g of fabrics were consumed for make a single bottom (5801.176 kg / 10045). In case of final 242 bottoms rejection 139.634 kg of fabrics were wasted (242 X 577g). Finally, 1375.704 kg of fabrics were measured as waste (1236.024kg + 139.634kg). Therefore, to produce a single bottom, 137g (1375.704kg /10045) of fabrics were wastes.

Throughout the research study, the amount of fabric waste generated from cutting, final checking, sewing, fabric inspection, recut, finishing and washing were 1083.5 kg (79%), 139.634 kg (10%), 65.55 kg (5%), 39.7 kg (3%), 27.184 kg (2%), 20.09 kg (1%) and 0 kg respectively. Total fabric wastage per single garment was 137g and the percentage of total fabric waste from total production is 19.54% and a used fabric for the whole production is 80.46%.Figure 5, graphically describes the summary of waste audit andthe fabric waste audit.

Table2.Process and generated fabric wastes amount

No	Process	Amount of fabric waste
01	Fabric Inspection	39.70 kg
02	Cutting	1083.50 kg
03	Sewing	65.55 kg
04	Re-cut	27.18 kg
05	Washing	0 kg
06	Finishing	20.09 kg
07	Final checking	139.63 kg
Total		1375.70 kg

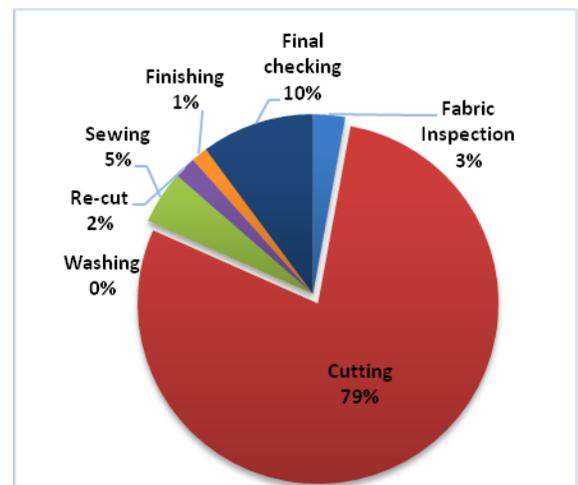


Figure 5.Waste audit results.

IV. CONCLUSION

In this research study, fabric waste audit of a one style bottom was selected in a woven cloths manufacturing industry. According to the waste audit, from the total allocated fabric raw materials (7037.2 kg), 20% of the fabrics were measured as waste (1375.704 kg) and 80% of the fabrics were used (5661.496 kg) to produce 10045 pieces of garments. 137 g of fabrics were generated to produce a single garment. In these wasted fabrics, 79% of the wastes were from cuttings (1083.5 kg) and others were from final inspection (139.634 kg) 10%, sewing (65.55 kg) 5%, fabric inspection (39.7 kg) 3%, re cut (27.184 kg) 2%, finishing (20.09 kg) 1%, and zero wastage in washing. Fabric inspection process, marker making, layering process were identified as necessary to formulate reduction strategies to reduce waste generation in cutting process and washing defects were identified as main reason for final rejections.

V. SUGGESTIONS

In the fabric inspection process, through organize Risk analysis meeting, formulate different allowable limits to fabric defects percentage for different fabrics, doing fabric inspection process twice with different randomized selections and shift the inspection from manual to computerized inspection process were suggested to formulate in the factory operation to use as fabric waste reduction strategies. In marker making process, producing all the ordered quantity in a one continues process will help to avoid fabric waste generation as left balanced quantity. If the factory limit and strict on the shrinkage classes to 2-3 will help to no more different drawings, cuttings and other process so out shapes, rejections, left overs so, waste generation will be reduce, factory should instruct and advice the fabric mill to deliver requested width and length as standard for all fabric rolls, as a result of this, may able to use all fabrics with maximum utilization efficiency, auto computerized cad drawings for the instead of manual drawings for all products will help to utilize the fabric materials maximum and limit the number of flies in layering process should limit less than 100 to reduce more rejections and mismatches were suggested as unnecessary fabric wastes reduction strategies.

In cutting process, experienced spreader machine operator should appoint to operate the machine and length of the fly should accuracy much as possible as like drawing's length, implementing straight cutting methods and tries to reduce this uneven width and layering should done after received the drawing and in washing process, If the buyers' requirement make more rejections and damage to fabric then make risk analysis meeting with buyers and convince them to safety process and before sending to the factory from wash garment, factory external checking should be implement there and washing problems should be corrective before sending to the factory for finishing process were suggested to formulate best fabric waste reduction strategies to reduce unnecessary fabric waste generations in the operations.

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The Association between Socio-Demographic Variables and Organisational Commitment of Academic Staff

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Abstract: This study investigated the relationship between socio-demographic variables and organisational commitment among academic staff of southwestern Nigerian universities. A descriptive research design was used in this study. The sample consisted of 766 (comprising 383 from federal, 153 from state and 230 from private) academic staff, selected from the sampling frame through proportionate stratified sampling technique. Data collected were analysed using the Crosstab Chi-Square. Results revealed that there is a statistical significant association between university type and organisational commitment; years in present university and organisational commitment; age and organisational commitment. On the other hand, there is no statistical significant association between job status and organisational commitment; gender and organisational commitment; marital status and organisational commitment.

Keywords: socio-demographic variable, organisational commitment, academic staff

Introduction

The commitment of academic staff is important to fostering and building up a nation's future and the ability of academics to inject into work may build up individuals who can think and come up with solutions to the numerous national issues. The commitment of academics can be said to be represented at the centre of a cycle with arrows pointed to different angles of a nation; that is these behaviours may directly or indirectly impinge on a number of institutions; economic, social, political among others. A problem with commitment of academics may invariably be a problem with the quality, reputation and international recognition of the academic institutions which may also translate to the political and economic institution among others, all of which has bearing on national image. It is therefore no news that it is the aspiration of many countries across the world to ensure that quality is synonymous with its educational sector.

The theory of planned behaviour of Ajzen (1991) has intuitive value in that it explains organisational commitment, in that behaviour can be deliberate and planned. Behavioural intention to be committed is a function of attitudes toward that behaviour and subjective norms concerning that behaviour. Specifically, socio-demographic variables can influence either the belief components associated with attitude toward commitment (that is, beliefs about the consequences of the behaviour or beliefs about the desirability of those consequences), or either of the subjective norm components related to that behaviour (beliefs about what relevant others believe one should do and motivation to comply with that norm).

Literature review

Organisational commitment has attracted considerable interest in an attempt to understand and clarify the intensity and stability of an employee's dedication to the organisation (Lumley, 2010, cited in Lumley, Coetzee, Tladinyane, & Ferreira, 2011), which is evident in the numerous studies in the area. Socio-demographic variables of the individual have been quite researched on, although mixed findings exist. Ahmad and Abubakar, (2003) submits that gender have no significant relationship with organisational commitment among white workers in Malaysia. Other researchers have also found that socio-demographic variables such as salary, age, gender, marital status, job tenure, job status, education among others is significantly related to the organisational commitment of industrial organisation employees (Becker & Billings, 1993; Dodd-McCue & Wright, 1996; Ellemers, Gilder, & Hevvel, 1998; Hunt & Morgan, 1994; Mannheim, Baruch, & Tal, 1997).

Similarly, Angle and Perry (1981) and the later study of Opayemi (2004) indicates that the organisational commitment of women were higher than their male counterparts. In essence, their study found a significant gender difference on organisational commitment among their study sample. In the same vein, Popoola (2006) in his study of records management personnel found that socio-demographic factors of gender, age, marital status, religion, level of education, length of service, among others has bearing on the organisational commitment.

Research shows that organisational commitment is positively related to socio-demographic factors like age (Mathieu & Zajac, 1990), tenure in organisation (Luthans, McCaul, & Dodd, 1985; Mathieu & Zajac, 1990; Meyer & Allen, 1997). Meyer and Allen (1997) similarly surmise that overtime, the longer employees work in an organisation, the quicker it is that they become emotionally attached to that organisation which invariably impacts on their turnover intention. They further opined that the positive association indicates the logical notion that in any given organisation, uncommitted employees will always leave while the committed one will keep working for the organisation. From the foregoing, it is evident that a positive association exists between tenure and organisational commitment.

Similarly, marital status is said to be positively related to commitment (John & Taylor, 1999). This means that married people are more committed to their organisation than unmarried people, and could be explained from the light that married people have more

family responsibilities which makes them susceptible to requiring stability and/or security in their jobs; this may make them to likely be more committed to their organisation than their unmarried counterparts. Moreover, negatively related to the employee's level of education (Glisson & Durick, 1988; Steers, 1977), this means that people with low levels of education generally have more difficulty changing jobs because they view themselves as having low selling power and therefore show a greater commitment to their organisations as they have nowhere else to go.

Studies that investigated different types of work sectors have found that employees in public sector are higher on continuance commitment in comparison to other sectors employees (Meyer & Allen, 1997; Perry, 1997). This is not unrelated to the support and job security that public sector employees enjoy which ultimately bears on their motivation. Public sector employees in the past have been shown to be different from other type of employees thus they exhibit higher levels of organisational commitment (Perry, 1997). Lio (1995) likewise opines that many public employees today, are more appreciative of the job security characteristic of the public sector employment, hence their loyalty and commitment to the organisation.

Meyer and Allen (1997) notes that three sets of beliefs have been shown to have a strong association with organisational commitment. The first which is supported by Eisenberger, Fasolo, and Davis-LaMastro, (1990) is the belief that the organisation is supportive. The second which is supported by McFarlin and Sweeny, (1992) is the belief that the organisation treats its employees fairly, and third is the belief that the organisation impacts on the self-worth of employees and their feeling of personal competence (Mathieu & Zajac, 1990; Steers, 1977). Moreover, Meyer and Allen (1997) argue that many of work and individual characteristics found to be related to organisational commitment might influence one or more of these perceptions.

Organisational commitment is most probably affected by factors such as type and variety of work, the autonomy involved in the job, the level of responsibility associated with the job, the quality of the social relationship at work, rewards and remuneration, and the opportunities for promotion and career advancement in the company (Riggio 2009, cited in Lumley, Coetzee, Tladinyane, & Ferreira, 2011). Millward-Brown (1996) established that in comparison to 20 other occupational groups, academics in his study were less committed to their organisations. This could be a result of the level of autonomy and support evident in the climate in the universities and colleges as opposed to those of other organisations.

In addition, Meyer and Allen (1997) found evidence that academics' emotional commitment to their universities is as a result of the support they receive from the institutions. McInnis, (1999) and Winefield, Gillespie, Stough, Dua, and Hapuararchchi (2002) found evidence that, on average, academic staff are committed to their organisations while experiencing stressors and strains, that the strongest predictor of staff commitment to the University was trust in senior management. Furthermore, Tytherleigh, Webb, Cooper, and Ricketts, (2005) established that staff of higher education had lower levels of commitment both from and to their organisation.

Olorunsola and Arogundade (2012) investigated organisational climate and academic staff job performance in the federal and state universities in South-West Nigerian universities. The result of the analysis shows that 38(62%) of the respondents felt that their climate in the federal university is open as against 22(37%) that shows negative responses. Only 19(32%) shows positive responses at the state universities against the 41(68%) that shows negative responses. It is thus evident that federal universities in the study area were predominantly open while the state was predominantly close. The result of their study implies that the federal universities climate is better than that of state in areas of communication, innovation and resources. It was also established that the job performance of lecturers in federal and state universities was at a moderate level.

Following from previous studies, Obadara's (2012) study made a comparative analysis of public and private Universities Administration in Nigeria. The researcher sampled 20 public and 20 private universities. The public universities comprised 10 state and 10 federal universities. One hundred (100) respondents which included both teaching and non-teaching staff were selected from each university, which amounted to 4000 staff. The results showed that governance and the availability of resources and its utilization in public and private universities is significantly different which also impacts on the difference in students' academic performance.

Ajayi, (2017) examined the influence of demographic variables of gender and age on the commitment of employees in the Nigerian civil service. Participants were purposively selected from six states in the South-West, Nigeria. The study utilised data obtained through 567 valid questionnaire which contained information on socio-demographic variables such as gender, age, and work related issues. The Analysis of Variance (ANOVA) was used for the data. The result showed that age groups of the civil servants are critical to their commitment in the organisation. The findings indicated that younger and older civil servants reported higher commitments than those within the middle age groups.

Onuoha, and Idemudia, (2018) investigated the role of personal attributes (age, education, job position, organisational tenure) and the perceived glass ceiling on organisational commitment of senior level female employees in public sector organisations. One hundred and fifty-two female workers were conveniently sampled from eight public sector organisations in southwest Nigeria. Results showed significant joint influence of age, education, job position, organisational tenure and perceived glass ceiling on organisational commitment. Perceived glass ceiling and age contributed most to organisational commitment.

Methodology

Design

This study employed a descriptive survey design. This is a multi-site study spread across six states in South-west Nigeria. These states include Oyo, Ogun, Osun, Lagos, Ekiti and Ondo. The selected study sites are functional universities with qualified academics; that is universities that are accredited by the National Universities Commission (NUC) to carry out academic activities.

The universities were then grouped into Federal, State and Private Stratum, after which the proportional stratified sampling was used to identify a proportion of eighteen (18) universities (three federal, four state and eleven private) from a population of thirty-five (35) for selection. The systematic random sampling was thus employed; universities were arranged alphabetically in the federal, state and private category, which then formed the sampling frame. A pre-study visit to the sites indicated that one private university was no longer functional although was still listed on the NUC’s website. Hence, it was removed from the list.

Instruments

The research questionnaire was divided into two sections; Section A is the personal information questionnaire (PIQ) which was used to elicit information on the socio-demographic background of the respondents. The information collected includes participants’ gender, age, marital status, job status (level), job tenure (number of years in present University), number of years in academia, University type and name of University. Section B is a 15-item Organisational Commitment Questionnaire (OCQ) by Mowday, Steers and Porter (1979). Salami (2008) utilised the instrument to examine demographic and psychological factors predicting organisational commitment among industrial workers and found a Cronbach’s alpha 0.86. Similarly, Majekodunmi (2013) utilised the instrument to examine the organisational commitment of the Nigerian Port Authority Workers and found it reliable for use.

Results

(i) Respondents’ Socio-Demographic Characteristics

Table 1: Distribution of Respondents’ Socio-Demographic Characteristics

Variables	Levels	Frequency	Percentage
University Type	Federal	236	44.9
	State	123	23.4
	Private	167	31.7
Total		526	100.0
Job Status	Graduate assist/ Assist lecturer	177	33.7
	Lecturer I/ Lecturer II	232	44.1
	Senior lecturers/Readers/Professors	117	22.2
Total		526	100.0
Length in Service	< 5 years	360	68.4
	5-9 years	123	23.4
	10 years above	43	8.2
Total		526	100
Years in present university	< a year	13	2.5
	1-2 years	86	16.3
	3-4 years	152	28.9
	5 years above	275	52.3
Total		526	100
Gender	Male	321	61.0
	Female	205	39.0
Total		526	100
Marital Status	Single	94	17.9

	Married	421	80.0
	Widowed	11	2.1
Total		526	100
Age Group	25-34yrs	175	33.3
	35-44yrs	273	51.9
	45-54yrs	69	13.1
	55-64yrs	9	1.7
Total		526	100

The results of the demographic characteristics of respondents presented in table 1 showed that on university type, out of the five hundred and twenty-six respondents, two hundred and thirty-six (44.9%) work in federal universities, while one hundred and twenty-three (23.4%) work in state universities and one hundred and sixty-seven (31.7%) work in private universities. The job status section showed that one hundred and seventy-seven (33.7%) are Graduate assistants/Assistant lecturers, two hundred and thirty-two (44.1%) are Lecturers I and II and one hundred and seventeen of the respondents are Senior lecturers/Readers/Professors.

On Length of Service, more than two third (68.4%) of the respondents have spent less than five years in service. Also, one hundred and twenty-three (23.4%) have spent between 5-9 years in service while forty-three respondents (8.2%) have been in service for 10 years and above. Years in present University showed that more than half of the respondents (52.3%) have been at their present universities for 5 years and above, while one hundred and fifty-two (28.9%) have worked at the present universities for 3-4years. Thirteen respondents (2.5%) have been in their present universities for less than a year while eighty-six (16.3%) of the respondents fall in between 1-2 years at the present university.

As presented in table 1, majority of the respondents were females. A high percentage of respondents are males (61.0%) as against females (39.0%). Considering the total sample, there were three hundred and twenty-one (61.0%) males and two hundred and five (39.0%) females. This gender distribution shows a predominance of males over females. The marital status also presented in table 1 showed that there are more married respondents. Out of the five hundred and twenty-six respondents, four hundred and twenty-one (80.0%) were married, while ninety-four (17.9%) were single and never married. No respondent indicated that they were divorced while eleven respondents (2.1%) were widowed.

The age distribution showed that more than half, that is two hundred and seventy-three (51.9%) of respondents falls between 35-44 years. One hundred and seventy-five (33.3%) are 25-34 years, sixty-nine (13.1%) are within 45-54 age bracket while nine (1.7%) are within 55-64 years.

Table 2: Relationship between Socio-demographic variables and Organisational Commitment

Variables	Organisational Commitment		Total	χ^2	Df	Sig.
	High	Low				

University Type	Federal	167 (70.8%)	69 (29.2%)	236 (100.0%)	94.934 ^a	2	.001
	State	59 (48.0%)	64 (52.0%)	123 (100.0%)			
	Private	36 (21.6%)	131 (78.4%)	167 (100.0%)			
	Total	262 (49.8%)	264 (50.2%)	526 (100.0%)			
Job Status	Graduate Assistants/ Assistant Lecturers	79 (44.6%)	98 (55.4%)	177 (100.0%)	2.882 ^a	2	.237
	Lecturers I & II	121 (52.2%)	111 (47.8%)	232 (100.0%)			
	Senior Lecturers/ Readers/Professors	62 (53.0%)	55 (47.0%)	117 (100.0%)			
	Total	262 (49.8%)	264 (50.2%)	526 (100.0%)			
Years in Present University	less than a year	9 (69.2%)	4 (30.8%)	13 (100.0%)	17.198 ^a	3	.001
	1-2 years	26 (30.2%)	60 (69.8%)	86 (100.0%)			
	3-4 years	79 (52.0%)	73 (48.0%)	152 (100.0%)			
	5 years above	148 (53.8%)	127 (46.2%)	275 (100.0%)			
	Total	262 (49.8%)	264 (50.2%)	526 (100.0%)			
Gender	Male	158 (49.2%)	163 (50.8%)	321 (100.0%)	.114 ^a	1	.735
	Female	104 (50.7%)	101 (49.3%)	205 (100.0%)			
	Total	262 (49.2%)	264 (50.8%)	526 (100.0%)			
Marital Status	Single	40 (42.6%)	54 (57.4%)	94 (100.0%)	2.456 ^a	2	.293
	Married	216 (51.3%)	205 (48.7%)	421 (100.0%)			
	Widowed	6 (54.5%)	5 (45.5%)	11 (100.0%)			
	Total	262 (49.8%)	264 (50.2%)	526 (100.0%)			
Age	25-34yrs	71 (40.6%)	104 (59.4%)	175 (100.0%)	9.515 ^a	3	.023
	35-44yrs	148 (54.2%)	125 (45.8%)	273 (100.0%)			
	45-54yrs	37 (53.6%)	32 (46.4%)	69 (100.0%)			
	55-64yrs	6 (66.7%)	3 (33.3%)	9 (100.0%)			
	Total	262 (49.8%)	264 (50.2%)	526 (100.0%)			

The Crosstab Chi-Square Output presented in table 2 shows the relationship between Socio-demographic variables and organisational commitment with the corresponding percentages. Organisational commitment was split into high and low with the mean score. Participants who scored below the mean are adjudged to have low commitment while those above the mean have high commitment.

Table 2 shows that there is a statistical significant association between university type and organisational commitment at $\chi^2 (2) = 94.934, p < 0.05$. Similarly, the result of the association between years in present university and organisational commitment shows that there is a statistical significant association between them at $\chi^2 (3) = 17.198, p < 0.05$. Also, age and organisational commitment are significantly associated at $\chi^2 (3) = 9.515, p < 0.05$.

On the other hand, there is no statistical significant association between job status and organisational commitment at, $\chi^2 (2) = 2.882, p > 0.05$. This means that academic staff are equally committed irrespective of job status. Also, there is no statistical

significant association between gender and organisational commitment at, $\chi^2(1) = 0.114, p > 0.05$. Similarly, the result shows that there is no statistical significant association between marital status and organisational commitment as $\chi^2(2) = 2.456, p > 0.05$.

Discussion and Recommendation

The result reveals that the level of organisational commitment is significantly different based on university type, years in present university and age. The result is in consonant with Popoola (2006) who in his study of records management personnel found that socio-demographic factors of gender, age, marital status, religion, level of education, length of service, among others has bearing on the organisational commitment. Similarly, Onuoha, and Idemudia, (2018) found a significant joint influence of age, education, job position, organisational tenure and perceived glass ceiling on organisational commitment.

Obadara's (2012) finding that governance and the availability of resources and its utilization in public and private universities is significantly different gives credence to the significant university type difference in the present study. Disparity in pay with the private universities paying better than the public universities, availability of resources and governance could be a reason for the present result. Also, the longer people stay in an organisation, the more the strength of their emotional attachment, hence their commitment to the organisation. Similarly, the sense of responsibility increases with age which may then invariably inform their commitment.

The result also suggests that lecturers in different job status, irrespective of their gender and marital status display similar level of organisational commitment. The result is in dissonance with studies that found that socio-demographic variables such as salary, age, gender, marital status, job tenure, job status, education among others to be significantly related to organisational commitment of workers in industrial organisations (Ellemers, Gilder, & Hevvel, 1998; Mannheim, Baruch, & Tal, 1997).

The opportunity to move freely could explain a reason why the result of the study diverges away from previous findings. Academic work is different from what obtains in industrial organisations, in that academic job placement is usually in relation to the academic qualification and publications of the job holder and usually the individual can always move away from one university to the other with little or no restriction. Also, being an academic staff in the society of today commands respect and the prestige it carries is similar to those of doctors and lawyers. In this regard, the prestige associated with the nature of the job is of utmost value and it transcends beyond the status, gender and marital status of the individual job holder, hence the similarities in the organisational commitment across cadre. It can also be explained that the sample the study utilised is different from those of previous studies so a divergence is expected.

The study established that university type, years in present university and age are determinants of the organisational commitment of academic staff, Therefore, it becomes imperative for university management to conduct researches into the nature of the work environment in these university strata in order to understand whether or not employees are encouraged to update their skills in

order to give their best, also whether or not there are opportunities to update knowledge through training, induction, and orientation procedure. As failure to provide facilities that stimulates the work environment makes it impossible for academics to perform their jobs in a non-obstructive way. Emphasis should also be on how to harness employee expectations irrespective of age and what is obtainable in order to sustain employees' commitment to their jobs.

Management should ensure that policies are consistently applied because inconsistency leads to uncertainty, feelings of bias and unfairness. This may automatically lead to dissatisfaction which may then have impact on the sense of belonging to the institution. It is also recommended that Education planners should as part of the moving forward contingency plan embark on researches into the nature of work in academia in order to look for ways of appropriately managing it. The representation of those in the private institutions should also be foremost in their contingency plans. At the heart of that is the representation of each and every one, because together the life of the nation is dependent on what goes on in all the institutions of learning. It is important to maintain equity so that each individual is treated in relation to every other, and not in relation to the power the significant other wields.

Although the study found no job status, gender and marital status difference in the organisational commitment of academics, it is nonetheless important that higher level academics make the workplace conducive for the lower level employees. This may go on to strengthen the relationship and bridge the gap between them by harnessing their overall experiences with the expectations, and this may further impact on other aspects of work behaviour like job satisfaction. Academic planning and management committees can create clear and specific rules as relating to work relationship and sustaining the maximum workload of lower level staff.

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Primary Spinal Germ Cell Tumors: An Unusual Case Analysis

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Abstract: Primary spinal cord germinoma are rare group of tumors. Most commonly seen in thoracic spine and thoracolumbar spine as intramedullary mass. On imaging primary spinal germ cell tumors shows unspecific imaging characteristics, and only few tumors secrete markers. Histopathology examination can give us the specific diagnosis. Here we present a case of a 2-year-old male with intramedullary spinal cord germinoma who presented to our department with history of fall followed by swelling over the back with bowel and bladder incontinence and loss of lower limb strength.

Key Words •germinoma •spinal cord •pediatric •intramedullary tumor

I. INTRODUCTION

Germinal cells of the genital organs and germ cell tumors are similar in histology. In CNS germ cell tumor occur in the pineal or suprasellar regions. They are uncommon in the thalamus, basal ganglia, or ventricles regions. Spinal seeding of a germ cell tumor occurs in the form of drop metastases. Rarely germ cell tumor may be seen in the spinal cord as primary tumor.

Case history:

2 year old boy came with history of fall 15 days back followed by swelling over the back with bowel and bladder incontinence and loss of lower limb strength.

MRI

MRI spine with gadolinium was performed in a Siemens Magnetom Avanto 1.5 Tesla scanner.

The study reveals heterogeneously hyperintense lesion seen on T2/STIR sequences appearing hypointense on T1 involving lower thoracic and lumbar spinal canal extending from T9 to L4 level. Significant widening of the canal noted at this level. Superiorly the lesion is seen encasing and displacing the conus and filum terminale anteriorly. Widening of the neural foramina from T10 to L3 level bilaterally with extension across the foramina into the paraspinal soft tissue. Further lesion seen infiltrating the bilateral psoas muscle upto L3-4 level. Psoas muscle on its entire length shows T2/STIR hyperintensities with heterogeneous post contrast enhancement. The components of the lesion within the psoas muscle indenting the medial aspect of kidney with loss of fat planes. Also there is anterior extension of the lesion in the anterior midline partially encasing aorta and IVC. Posteriorly there is infiltration of paraspinal muscle bilaterally from T10 to L4 level. Patchy T1 hyperintense areas seen in the intracanal components of lesion suggestive of hemorrhage. There is intense heterogeneous enhancement of lesion within the canal and paraspinal components. Also areas of diffusion restriction noted within the lesion. Altered marrow signal intensity appearing hyperintense on T2/STIR noted in the body of from T10-L4 vertebra. Decreased height of body of L1 vertebra with irregularity noted in the end plates suggestive of compression fracture. Liver mildly enlarged with span of 10cm. Lungs shows multiple small (less than 5mm) T2/STIR hyperintense nodules in bilateral lung fields.

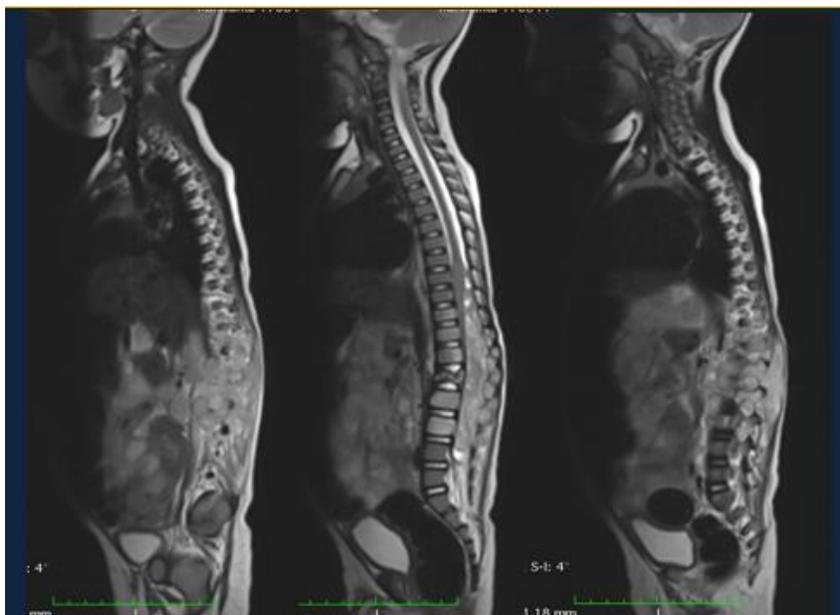


Figure 1:Sagittal T2WI shows heterogeneously hyperintense lesion seen involving lower thoracic and lumbar spinal canal extending from T9 to L4 level.

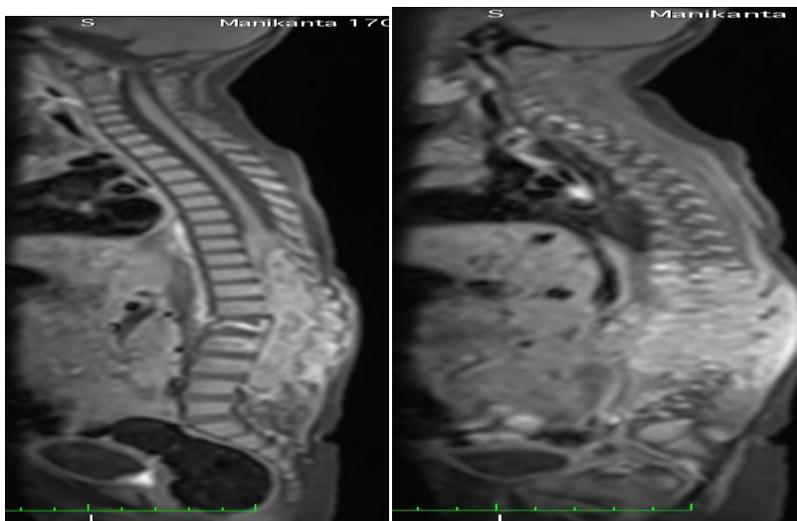


Figure 2:Sagittal post contrast images shows intense heterogeneous enhancement of lesion within the canal and paraspinal components.

Histopathological findings:

Multiple sections studied show skeletal muscle tissue and cystic areas comprising of branching papillary lesion lined by cuboidal epithelium with areas of stratification. The cells have a round to oval nucleus. The small cystic spaces contain the tumor cells. Adjacent to the cysts, plenty of muscle tissue is seen. Areas of necrosis and hemorrhage is seen. Perineural invasion and vascular emboli are also seen. At places sheets of foamy cells having vacuolated cytoplasm is seen. Areas of hemorrhage with plenty of cholesterol clefts are also seen.

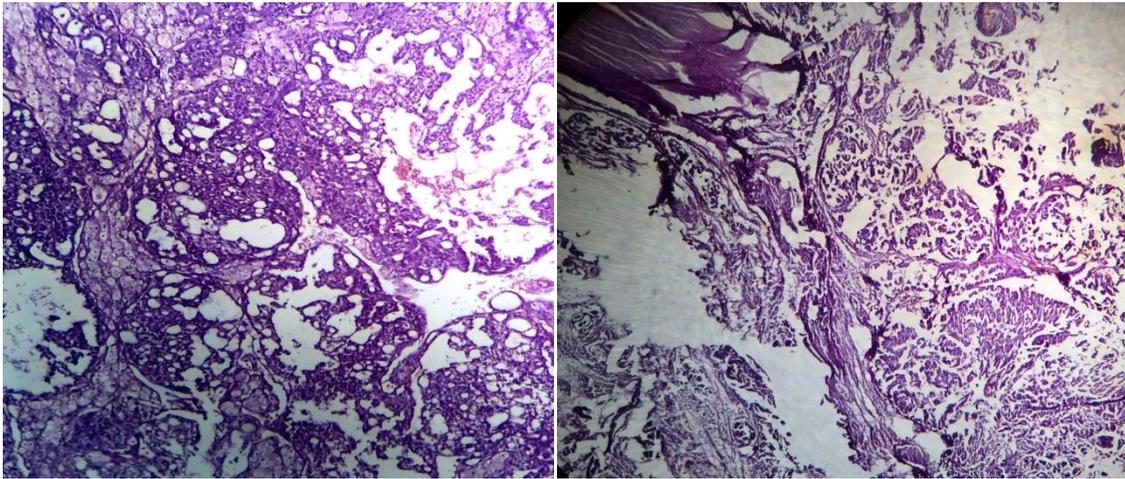


Figure 3: Sections showed skeletal muscle tissue and cystic areas comprising branching papillary lesion lined by cuboidal epithelium with stratification. Nucleus are round to oval with tumor cells. Areas of hemorrhage are also seen.

Discussion:

Thoracic spinal cord is the most common location for spinal germinomas followed by the thoracolumbar area and the lumbar area. These tumours rarely occurs in cervical spinal cord. Primarily seen intramedullary in 75% of the cases. On imaging it is difficult to distinguish primary spinal germ tumors from other spinal neoplasm. Definitive diagnosis can only be made by histological examination. Tumours of germ cell origin (GCT) generally arise in the gonads. Very occasionally, however, they can be encountered as extragonadal primaries involving posterior midline structures in the mediastinal, retroperitoneal or sacrococcygeal regions. Intracranial GCTs spread via the cerebrospinal fluid, causing drop metastases to the spinal cord. A primary GCT originating in the spinal cord, on the other hand, is extremely rare. Other rare primary sites include the nasopharynx and the orbit.

Conclusion:

Though spinal germ cell tumor is a rarity, a high index of suspicion is needed in the presence of rapid neurological deterioration in a radiologically proven spinal cord tumor. Pre-operative biopsy should be done whenever feasible and the neurosurgeon and the oncologist should form a policy of partial resection followed by upfront local radiotherapy and adjuvant chemotherapy.

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Moderating Effect of Political Leadership in Electoral Processes and Political Stability in East Africa Community States

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Abstract

The purpose of the study was to find out the moderating effect of political leadership in electoral processes and political stability in East Africa Community States. This study adopted a quantitative approach of both descriptive and correlation designs. The target population consisted of 123 individuals working within the electoral commissions of different EAC Countries and the EAC Legislative Assembly. Primary data were collected using self-administered questionnaire. The study used primary data, which was collected using questionnaires. The questionnaires were both open and close ended. The study used email, phone calls and meeting procedure with the targeted respondent in EAC Countries and the EAC Legislative Assembly to follow up. Data collected from the field were coded, cleaned and categorized according to questionnaire items. A pilot test was conducted to detect weaknesses in design and instrumentation. The gathered data was analyzed using computer aided IBM Statistical Package for Social Sciences (SPSS) version 21 premium. Both descriptive and inferential statistics was used to analyze the data collected. Descriptive statistics involved computation of mean scores, standard deviation, percentages, cross tabulation and frequency distribution which described the demographic characteristics of the organization and the respondents. Inferential statistics was used to determine the relationships and significance between independent and dependent variable. Correlation and linear regression were used to analyze the data with F-test being applied to the test hypothesis at 5% level of significance. Content analysis was used for the qualitative data. The data was presented using tables, graphs and charts. From this objective, it was hypothesized that there is significant moderating effect of the political leadership on the political stability in East African Community States. The results of this study showed a positive statistically significant relationship between political leadership, hypothesis H04: there is no significant relationship between pre-election phase processes and political stability in the East African Community States was rejected and concluded that pre-election phase processes have a significant effect on political stability. It is notable that the relationship at this stage was not as strong as expected. The researcher attributes this to the fact that before election process it is still young, and the states are at initial stage of implementation of election campaigns and rules.

Keywords: *Political leadership, Political stability, East African Community States.*

1.0 Introduction

A "political leader" refers to persons who occupy important positions in the formal polity such as Presidents, Prime Ministers, Ministers, Governors, Legislators, Party Officials, Local Government Chairmen, Council Members and of course, the local Chiefs. Leadership is at the heart of public sector governance, and it is vital to the overall development of a nation as well as the welfare of the citizens. Research by Kura (2014) showed that the quality of leadership affects the pace of development in any country. Obazee (2014), opined that leadership skills are still required for effective public governance in Africa.

Ngowi (2009) studied the effect of political leadership on economic development in Tanzania and concluded that leadership is the defining factor that shaped the nature and path of economic development in that country. Poor leadership, and the endemic bureaucratic corruption that has characterized public sector governance since independence in 1960, have been blamed for the slow pace of development in key sectors of Africa's economy, especially in the infrastructure sector (Ogbeide,2012).

According to USAID & UKAID (2015). there are some basic principles indicators that can be used to determine political leadership and its effect on democracy in general and electoral systems in particular which are essential: Among them include the following:

All citizens should be given a chance by the leadership have an equal and effective opportunity to make their views known to other citizens; the leadership should give citizens exclusive opportunity to decide how and what matters are placed on the agenda. Policies have to be open to change. These are fulfilled as long as freedom of speech, freedom of association and freedom of press is guaranteed; Every citizen must have an equal and effective opportunity to vote and all votes must be counted as equal (one person one vote); Each member must have equal and effective opportunities for learning about the relevant alternative policies or the policies candidates stand for and their likely consequence; All adult permanent residents should have the full rights of citizens which are defined in the first four criteria. (a) All adults should have the right to vote and the right to stand as candidates; (b) Transparency ensures that the overall electoral process remains open and accessible to external monitoring to guarantee free and fair elections; (c) Elected parties and political leaders should remain accountable and be responsive to the voters. This works in two ways. Governments and presidents should be constantly accountable to the parliament and at election times to the electorate. This means that an electoral system should make sure that bad performing politicians and parties can get voted out and replaced by other parties and politicians.

Leadership is at the heart of public sector governance and political stability and is vital to the overall development of a nation as well as the welfare of the citizens.

Government exists to serve the needs of the public, and good governance exists to ensure that those needs are served efficiently, effectively, and fairly, (Deloitte Global Series, 2012). This means that governance has a lot to do with how authority is exercised in institutions and the traditions of government, which includes the process of bringing government into being and holding it accountable for socio-economic outcomes (Davis, 2011). Good leaders ensure effective public governance which helps to strengthen democracy, promote economic prosperity and social cohesion, and reduce poverty (United Nations, 2009). Good governance must be perceived to solve social problems.

Political stability as determined by specific indicators refers to a qualitative assessment of the political ability in a country to support the needs of its people (Bratton, 2010). Political stability is derived from five sub-indicators, measuring the likelihood of social unrest, the strength of constitutional mechanisms, accountability, international disputes and the likelihood of an antagonistic opposition. Political stability is one of the twenty-two (22) indicators of peace measured by the Global Peace Index. It is an "internal" indicator of peace, meaning it measures peace within a country. Political instability in the governments creates uncertainty for business and investors which may in turn reduce investment and the speed of economic development, poor economic performance and eventual government collapse and political unrest. We find that political instability tends to be persistent, in that the occurrence of frequent government collapses increases the probability of additional collapses.

Political stability is linked to the electoral process as it determines the issues of public accountability and transparency in government procedures, rule of law, and public-sector management are emphasized. This is the restricted view of governance adopted by the (Kapur, 2009). Political instability can be caused by many factors, including conflict between rival political parties, insufficient internal resources and the proximity to other nations in conflict. Political instability may occur when there is a sudden change that

leaves citizens in doubt about their nation's situation and may even lead to general revolt or sporadic mass demonstrations. This means that a country's leadership can be responsible for political instability when they hold onto power for too long amidst opposition or enact controversial legislation. Political instability can also be caused by conflict between two or more ethnic groups within a nation or Community. Some of the documented indicators for political stability as defined by Olorunmola (2016) include the following: The practice of and respect for rule of law and the rights and freedoms of the citizens, low levels of corruption and efficient management of public fund, free and fair elections in the country, low unemployment and a generalized low poverty levels, suppression of opposition parties by the ruling government. When members of the opposition parties are deliberately targeted and prosecuted for no apparent reason, Transparency, respect and tolerance for the views and opinions of others; ethnic prejudices have over the years and clear electoral processes that are adhered to and respected by all consistently.

1.2 Statement of the Problem

Globally, electoral process is an important role in shaping the political stability in any given country. Violating the stipulated code of conduct of the electoral process is dangerous to both the economy and the political stability of a country. This is potential in situations where polls are subject to manipulation or conducted by a biased source hence distortion of poll results. It is well recognized under international law that any limitation placed on freedom of expression must remain within strictly-defined parameters.

For example this is evidenced by the 2007 post-election violence in Kenya that left more than 1,500 Kenyans killed, 1,133 casualties, over 350,000 internally displaced persons, approximately 2,000 refugees, destruction of 117,216 private property and 491 government owned property, around 42,000 houses and many businesses looted and destroyed, gang rapes, and destruction of the railway line (Kioko, 2010). The lessons learnt however did not live long to help Kenya organize free and fair elections in the 2017 presidential elections.

The situation in Burundi has progressively deteriorated since 25 April 2015. According to the armed conflict location and event data set country report on Burundi crisis (2016), the Burundi political conflict reported fatality count of 1,155 between 26 April 2015 and 25 April 2016. At least 690 of the reported dead (or approximately 60%) are civilians. More than 260,000 people have reportedly fled outside Burundi and thousands have disappeared without trace: approximately 137,000 Burundian refugees have crossed into Tanzania, 77,000 into Rwanda, 23,000 into Uganda, and 22,000 into the Democratic Republic of Congo (DRC) (UNHCR, 29 April 2016).

According to the Commonwealth Observer Group report on Uganda Presidential and Parliamentary Elections in 2011 and 2016 respectively a number of irregularities in the electoral processes have consistently been noted and they include; lack of a level playing field; abuse of incumbency, the 'commercialization of politics', the lack of campaign finance regulations; the lack of a Political Parties Code of Conduct; issues with regard to the lack of independence of the Electoral Commission and its poor management of the process.

Quantitative cross-national research on the principal manifestations of political instability coups and civil wars has consistently shown that economic conditions are the best predictors in Africa and other developing regions, (Fearon & Laitin, 2013), (Miguel et al, 2014) and (McGowan, 2014). Although these empirical analyses acknowledge that the weakness of political institutions contribute to the region's volatility, they do not explicitly bring out the factors related to electioneering and leadership positions as possible contributors and the chief strategy used by most African leaders to buy off rivals and reward their followers.

This is attributable to difficulties in operationalization and measurement of indicators of the electoral processes and leadership. From the review it is also worth noting that a few studies have determined the electoral processes.

1.3 Objectives and Hypotheses of Study

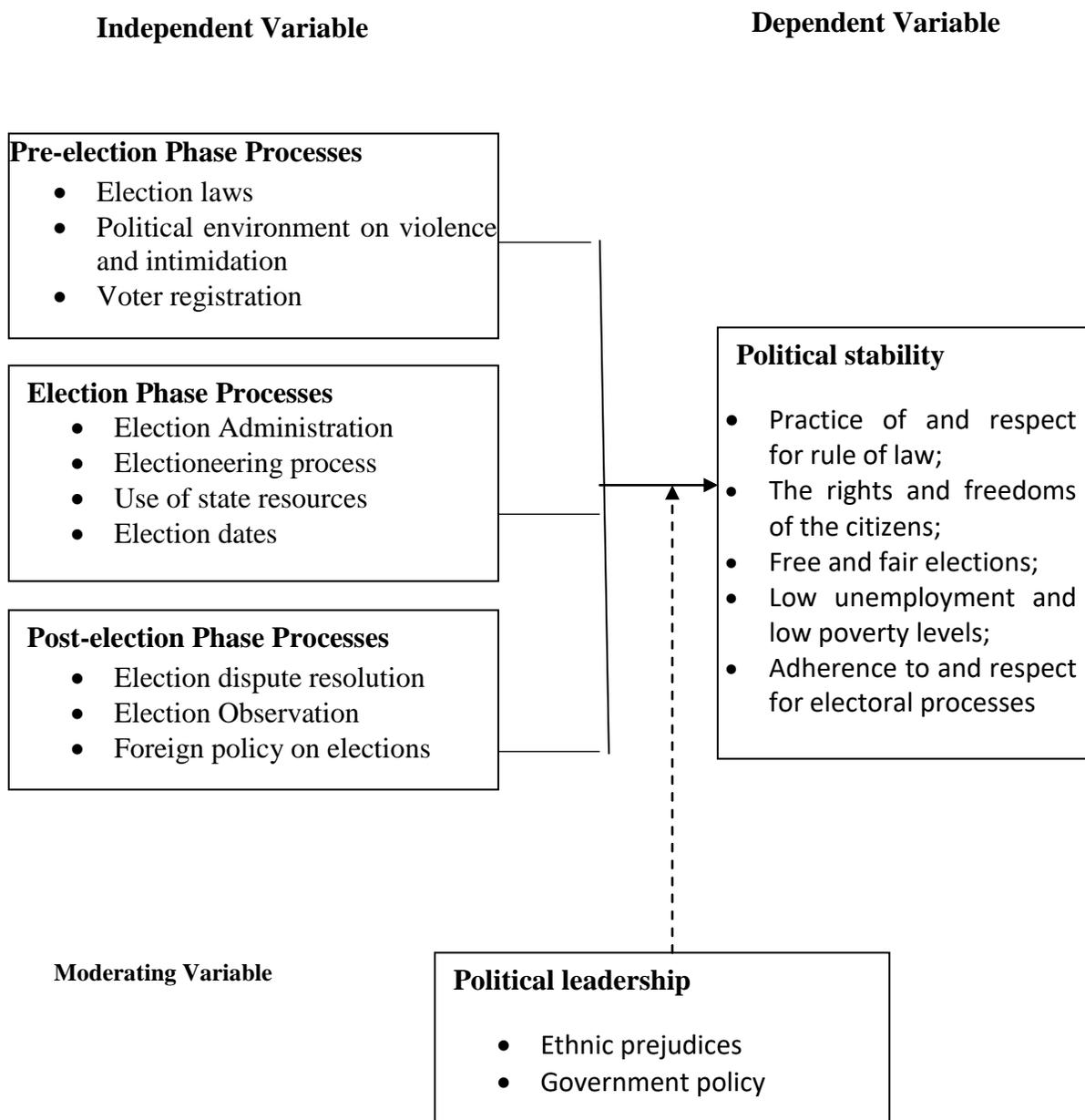
The general objective of the study was to examine the role of political leadership in electoral process and political stability in the East African Community States. Specifically, the study sought to find out the moderating effect of political leadership in electoral processes and political stability in East Africa Community States. In order to address the above objectives, the following null hypotheses were tested.

Ho1: There is no significant moderating effect of the political leadership on the political stability in East African Community States.

H1: There is significant moderating effect of the political leadership on the political stability in East African Community States.

2.1 Conceptual Framework

This study was guided by the relationship between the variables as shown in the conceptual framework (Figure 1).



2.6 Research Gap

The need to enhance democratic participation has been recognized and efforts are currently being sought to incorporate extensive consultation and participation by the widest possible range of consultations that involve politicians, the private sector and civil society (Birch, 2010). The literature review present conflicting findings in electoral processes research and political leadership research. Although policy makers, journalists, and scholars readily employ the concept of patronage in explaining leadership and political outcomes in Africa, relatively little is known about the extent to which the distribution of political power systematically affects political stability. Rather than assert that African leaders are merely venal or myopic in their deployment of resources, the empirical regularities surrounding the use of patronage as an instrument for managing political relations need to be explained from the electoral processes perspective. Quantitative cross-national research on the principal manifestations of political instability coups and civil wars has consistently shown that economic conditions are the best predictors in Africa and other developing regions, (Fearon & Laitin, 2013), (Miguel et al ,2014) and (McGowan, 2014). Although these empirical analyses acknowledge that the weakness of political institutions contribute to the region's volatility, they do not explicitly bring out the factors related to electioneering and leadership positions as possible contributors and the chief strategy used by most African leaders to buy off rivals and reward their followers.

This is attributable to difficulties in operationalization and measurement of indicators of the electoral processes and leadership. From the review it is also worth noting that a few studies have determined the electoral processes. Ironies such as those were identified by Mukandala and Killian (2014) who pointed out that citizens' participation may result in the "consolidation of nation states" as well as an increase in territorial nationalist demagoguery about the need for "non-interference in each other's internal affairs; respect for each and sovereignty issues may be working against all the efforts made towards the integration process. This is because they may work towards 'consolidating' the status quo; thus, promoting a situation that may be the opposite of the ultimate goal of EAC regional political and economic cooperation, which are political federation and political union. Lwaitama (2012) concludes on the extent to which a lot is still required to encourage full participation of all the stakeholders in the EAC integration. One important observation in the harmonization process is the fact that the national constitutions of the different EAC countries do not make much reference to the EAC integration. Similarly, the election manifestoes of political parties hardly addressed the EAC integration in any great detail, if at all. This and other related areas of elections and electoral processes need to be relooked into if the harmonization process is to succeed.

This research sought to bridge the gaps identified above upon reviewing previous scholarly contributions. The study covered objectives that range from determination of the relationship between the pre-election phase processes and political stability in the East Africa Community States; The assessment of the relationship between election phase processes and political stability in the East Africa Community States; the evaluation of the relationship between post-election phase processes and political stability in the East Africa Community States and assessment of the moderating role of political leadership in electoral processes and political stability in East Africa Community States.

3.0 Research methodology

A sample size of 94 respondents was determined using Slovin's formula (1967)

$$n = \frac{N}{1 + N (e)^2}$$

$$n = \frac{123}{1 + 123(0.05)^2} = 94$$

Questionnaires were the main tools for collecting the primary data since the study were concerned with variables that cannot be directly observed such as views, opinions, perceptions and feelings of the respondents which are best collected by this technique (Touliatos & Compton, 2013). Questionnaires provide a high degree of data standardization and adoption of generalized information amongst any population (Schutt, 2015). He further explains that questionnaires are useful in a descriptive survey study where there is need to get information from people quickly and easily in a non-threatening way. The study expected to produce both quantitative and qualitative data. Therefore, both descriptive and inferential statistics were used to analyze the data. Once the questionnaires were received, they were coded and edited for completeness and consistency. The data obtained was cleared and coded then SPSS was used for data analysis using quantitative data analysis as well as qualitative data analysis. The study collected and analyze primary data which was keyed into an excel table, before subjected to meaningful analysis through SPSS Version 21. The process involved the identification and correcting of errors in the data (data cleaning), coding the data and storing it in excel form. Data was coded and analyzed simultaneously using content analysis method. A list of key categories and themes for each variable were generated and this helped to guide the nature of integration needed for the qualitative data processed.

The hypothesis testing was done at 5% level of significance and SPSS was used for this purpose. The data was then presented using frequency distribution tables, bar charts, and pie charts for easier understanding. Regression model was tested on how well it fitted the data. The significance of each independent variable was also tested. Fischer distribution test called F-test was applied; which refers to the ratio between the model mean square divided by the error mean square. F-test was used to test the significance of the overall model at a 95 percent confidence level. The study tested the individual linear regression models for each hypothesis of the form,

$$Y = \alpha + \beta X_i + \mu$$

Multiple regression models attempt to determine whether a group of variables together predict a given dependent variable (Oso & Onen, 2011). A multiple regression model separates each individual variable from the rest allowing each to have its own coefficient describing its relationship to the dependent variable. This model was therefore adopted because the study had more than one variable. A multiple linear regression model was used to test the significance of the influence of the independent variables on the dependent variable. The multiple linear regression model was as laid below:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + M + \mu$$

Where:

Y = Political stability (dependent variable)

α = Constant β_1, \dots, β_3 = Coefficients of independent variables

X_1, \dots, X_4 Values of the various independent (covariates) variables

X_1 = Pre-election phase

X_2 = Election phase

X_3 = Post-election phase

M = Political stability

μ = Error term which is assumed to be normally distributed with mean zero and constant variance.

Analysis of Variance (ANOVA) was also done to establish whether the whole model was a significant fit of the data and therefore formed the tests of significance. ANOVA is a data analysis procedure that is used to determine whether there are significant differences between two or more groups of samples at a selected probability level (Mugenda & Mugenda, 2012). The data was

presented using distribution tables for easier understanding. The p-value for the F-statistic were applied in determining the robustness of the model. The conclusion was based on p-value where if the null hypothesis of the beta was rejected then the overall model was significant and if null hypothesis was accepted the overall model was insignificant. In other words, if the p-value was less than 0.05 then it was concluded that the model was significant and had good predictors of the dependent variable and that the results were not based on chance. If the p-value was greater than 0.05 then the model was not significant and was not used to explain the variations in the dependent variable.

4.0 Multiple Regression Analysis

In interpreting the results of multiple regression analysis, the R squared was used to check how well the model fitted the data. Therefore, it is interesting to know if the independent variables (Pre-election phase processes, Election phase processes, Post-election phase processes) relate to the dependent (political stability). According to Brooks (2011) and Gujarat (2011), hierarchical regression analysis is a statistical procedure of computing regression results of a study where a researcher determines the order of entry of the variables (both predictor and outcome variables). In this regression process, F-tests are used to compute the significance of each added variable (or set of variables) to the explanation reflected in R².

This procedure is an alternative to comparing betas for purposes of assessing the importance of the independents. In more complex forms of hierarchical regression, the model may involve a series of intermediate variables which are dependents with respect to some other independents but are themselves independents with respect to the ultimate dependent. Hierarchical multiple regression may involve a series of regressions for each intermediate as well as for the ultimate dependent. According to Gujarat (2011) use of hierarchical regression has two key advantages, namely; it has less capitalization on chance and; a researcher is assured that hierarchical regression results such as R² are easily interpretable. The multiple regression analysis was consistent with previous studies like Kribat et al., (2013). The data collected was used to fit the proposed regression model;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$ in determining the statistical significance of the three independent variables.

Model of the study

Table 1 shows the model summary of the political leadership in the East African Community States. The study findings indicated that the value of R was 0.884 and the values for R square were 0.781. The value of R which was 0.884 was an indication of a positive linear relationship between the independent variables and the dependent variable political stability in the East African Community States. The adjusted R square was an indication of the explanatory level of the independent variables towards establishing the relationship with the dependent variable which was 78.1%. This means that the three independent variables of the study could explain up to 78.1% of the political stability in the East African Community States. The difference of 21.9% of the political leadership can be said to be contributed to by other factors other than the study variables, Pre-election phase processes, Election phase processes, Post-election phase processes.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.884 ^a	.781	.774	.340598

a. Predictors: (Constant), Pre-election phase processes, Election phase processes, Post-election phase processes.

ANOVA for the Regression model of the study

Table 2 presents the results of the ANOVA for the regression model that was used in the study. The ANOVA indicated an F- value of 105.285 with a P-value of 0.000, which was less than 0.05. This was an indication that the coefficients fitted in the multiple regression were not equal to zero therefore the model was a good fit for the variables that were being tested.

Table 2 ANOVA for the Regression model of the study

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.382	3	12.276	105.285	.000 ^b
	Residual	17.169	52	.116		
	Total	78.551	55			

a. Dependent Variable: Political stability

b. Predictors: (Constant), Pre-election phase processes, Election phase processes, Post-election phase processes.

Coefficients of the study model

The constant term is 0.102 dependent variable when all the independent variables are equal to zero. The constant term has a p-value of 0.915 which is greater than 0.05. This implies that the constant term is insignificant. The multiple regression political leadership on political stability is thus an equation through the origin. If all the independent variables take on the values of zero, there would be zero political stability in East Africa states.

The t statistics helps in determining the relative importance of each variable in the model. As a guide regarding useful predictors, we look for t values well below -0.5 or above +0.5. In this case the significant variable level of the variables was as follows; election phase (0.000 less than P-value 0.05) followed by pre-election phase (0.021), and post-election phase (0.185), respectively

Table 3: Coefficients of the study model

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.102	.946		.108	.915
	Pre-election phase processes (X1)	.116	.009	.444	1.815	.021
	Election phase processes (X2)	.182	.050	1.231	3.616	.000
	Post-election phase processes (X3)	.204	.240	.230	.850	.185

5.1 Conclusion

The objective was to find out the moderating effect of political leadership in electoral processes and political stability in East Africa Community States. The research findings are as presented in chapter four and the following summaries are made in light of the objectives of the study. The following are major key findings of the study. The Study observed that twenty two percent of the beneficiaries the among the respondents claimed that The EAC law and regulation on elections and political leadership are effective.

Respondents outlined various electoral law in utilization of these phases they included; electoral law, political environment on violence and intimidation, voter's education, funding campaign and electoral administration among others. Findings show that most of the respondents were involved in decision making in election phases processes, majority of 52% of the respondents reported to be involved in election phase processes, more than 50% of the respondent were involved to a moderate use of state resources on election phases processes while 40% agreed being involved election phases processes on election disputes. On the other hand, 20% of the respondents agreed to be involved in monitoring and evaluation of election phases. However, most of the key informants noted that participating beneficiaries were not adequately involved in decision making process as most of the international observer reported that Majority of East Africa community (91%) acknowledged that east Africa community state maintain stability on election date.

These conclusions are; resource identification and utilization form the election phases of are successful program. The utilization of these law must directly affect the immediate Moderating Role of Political Leadership and monitoring of election phases. It can therefore be concluded that respondents in the study utilized East Africa Community States in activities that directly and positively impacted on moderating role. Activities like election administration; electioneering engineering, use of state resources, election date election law. It can further be concluded that decision making process of program was not adequately inclusive as observe.

5.2 Recommendations

From the conclusions drawn, the researcher made a number of recommendations which are briefly discussed below;

Recommendation for improvement can be drawn from the study conclusions; Role of political leadership was reported to be persistent in the study area, the government should consider extending the law branch to the rest of the East Africa Community state through screening, supporting of law moderation groups locked out by stringent East Africa Community state program approval procedures in order to ensure that most people are reached out in the program. This will not only expand the coverage but increase the number of people in pre-election phase. The stakeholders should ensure decision making is inclusive in order to capture the needs of the beneficiaries for posterity of the program.

To enhance this, stakeholders should adopt an open-door approach that is decision making process. Research into issues in the program should be embraced in order to beef up on decision making process. To mitigate misappropriation, diversion and siphoning of East Africa Community state pre-election phases the stakeholder should do regular audit on the use of election law. They should further carry out monitoring and evaluation in order to ensure that monies were used for the intended projects. The government should sponsor frequent leadership conferences, seminars and workshops for leaders in order to fully polish their leadership in project management as well as group management skills.

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Examining The Perception of Learners on the Efficiency of National Open University of Nigeria, University E-Learning platform Jigawa State, Nigeria.

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Abstract: There is a need of door learning due to the too much expensive for traveling from one location to another is becoming a challenges, when you're offering an online course you can continues your own schedules without hangings with too much stress around you. National Open University of Nigeria (NOUN) was established to offer an online education to learner's in an organizational setting. Whenever a new technology is deployed, it is necessary to evaluate its success, so as to understand if its' embraced by the users. In this context, this study aimed at Examine the perception of e-learners on the efficiency and reliability of the NOUN e-learning platform from the 'quality' point of view. A descriptive correlation and cross sectional research designs were used in this study. Data were collected from 60 respondents using a survey questionnaire. Findings of the study revealed that there is a moderately significant relationship between System Quality on Continual Usage Intention which indicates that the quality of the platform can affect students to continue to using the system. Also, the findings also indicate that, the e-learners are satisfied with the quality of the Course Content provided on the platform. Therefore, it is necessary for the developers to improve on the System Quality of the NOUN e-learning platform because the more the e-learners perceived the system to be of quality, the more they are likely to use.

KEYWORD: Noun, Examine, E-learning, E-learners, System Quality, Ease of Use,

INTRODUCTION

Online education system is increasing in the Africa and world at large, where by technology is improving. ELearning or virtual learning is education system that not required meeting face to face by using technology. Clark and Mayer (2011) define e-learning as instruction delivered by any technological method intended to promote learning. They is a problems in accessing the education vie the new technology introduced Information and communication tools that are used the users are not well familiar with impact these resources are having on education are rapidly creating new challenges for instructor and learners while learning. Teaching and learning in an e-learning environment happens differently than in the traditional classroom. There is need of e-learning to identify the challenges and consider best practice solutions to ensure instructor and learner success in this new learning environment. Therefore, there are threethings to consider in e-learning environment first is the instructor's, second, the student's and technology that are used.

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The challenges of the new technology is to know how to use the internet and the information technologies that are currently transforming education (Bernard, 2011; Hall, 2013). According to Warschauer (2003) the new methods of education by using technology is marked not only by physical access to computers and connectivity but also by access to the additional resources that allow people to use technology well” (p. 6). (Bernard, 2011) also added that due to the affordability of many information technologies today the current meaning of new technology is changing from having access but to knowing how to use the technologies. According to Rosenberg, Grad and Matear (2013) attitudes towards e-learning echoed by scholars and academics range from neutral to positive. Rhema and Miliszewska (2014); Smith and Hardaker (2010) reflected positive attitudes towards the impact of e-learning while Johnson (2005) stated that greater online teaching has negative impact on performance. Study conducted by Alharbi and Drew (2014) revealed that Perceived Usefulness is the most important factor for students while Perceived Ease of Use is the most important aspect of teachers.

Definition of Quality

Quality can simply be defined as the fitness for use for a specific data set. Data that is appropriate for use with one application may not be fit for use with another (Buckey, 2012).

System Quality

System quality is a measure of an IS from the technical and design perspectives. Thus, perceived system quality can be defined as the users’ evaluation of an IS from the technical and design perspectives. Perceived System Quality has been operationalized in many different ways in the IS literature.

Perceived Usefulness

Described as “the prospective user’s subjective probability that using a specific application system will increase his/her job performance within organizational content”.

Perceived Ease of Use:

Individual’s assessment that technology interaction will be relatively free of cognitive burden, i.e., Ease of Use reflects the facility with which the individual is able to interact with particular software (Fageeh, 2011).

Objectives of the Study

To examine the perception of users (e-learners) on the efficiency of eLearning technology and their certifications of the system quality and content quality.

System Quality, studies the success at technical level. It focuses on the desired characteristics of the information system itself which produces the information. Secondly, Information Quality concentrates on the information produced by the information system. Looking at the third and fourth dimensions respectively, Use and User Satisfaction are measure in other to analyze the interaction of the information products with its recipients. Individual Impact refers to the influence of information product on management decision and on organizational performance (Organizational Impact).

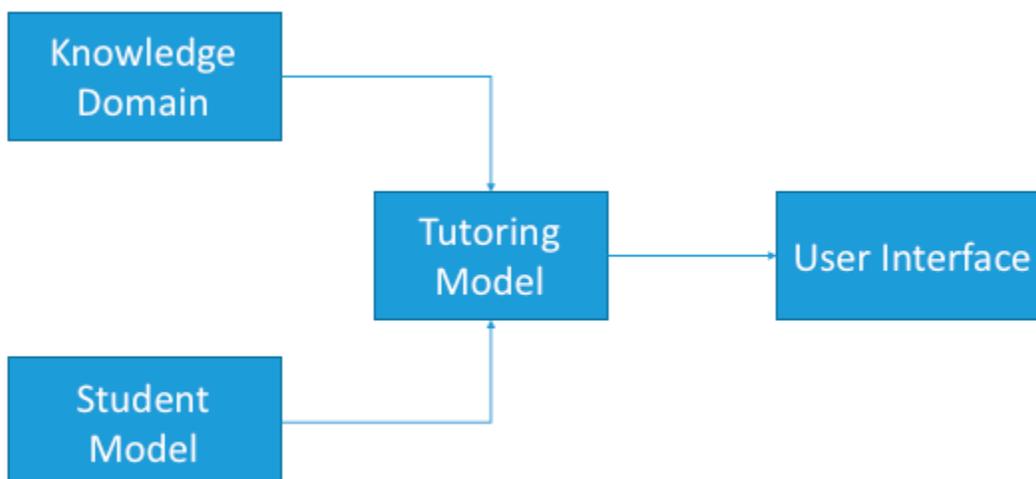


Figure 1: IS success modelSource: Jose Omedes (2016)

Nasser and Zaied (2012) generated a new model for evaluating information systems success (ISS) by applying the concepts of both Technology Accept Model (TAM) and DeLone and McLean updated the IS success model. In their model, they added the following dimensions: Management Support, Training and User Involvement. Management Support refers to the management approval and continues support not only during the IS project implementation but also throughout the operational phase of the system. Training is the level of training an organization's employees undergo with respect to information systems that will have a positive relationship implementation and lastly, User Involvement was defined as a matter of importance and personal relevance that Users attached to a given system. The finding of their study revealed that, Information Quality has a strong significant influence on IS success.

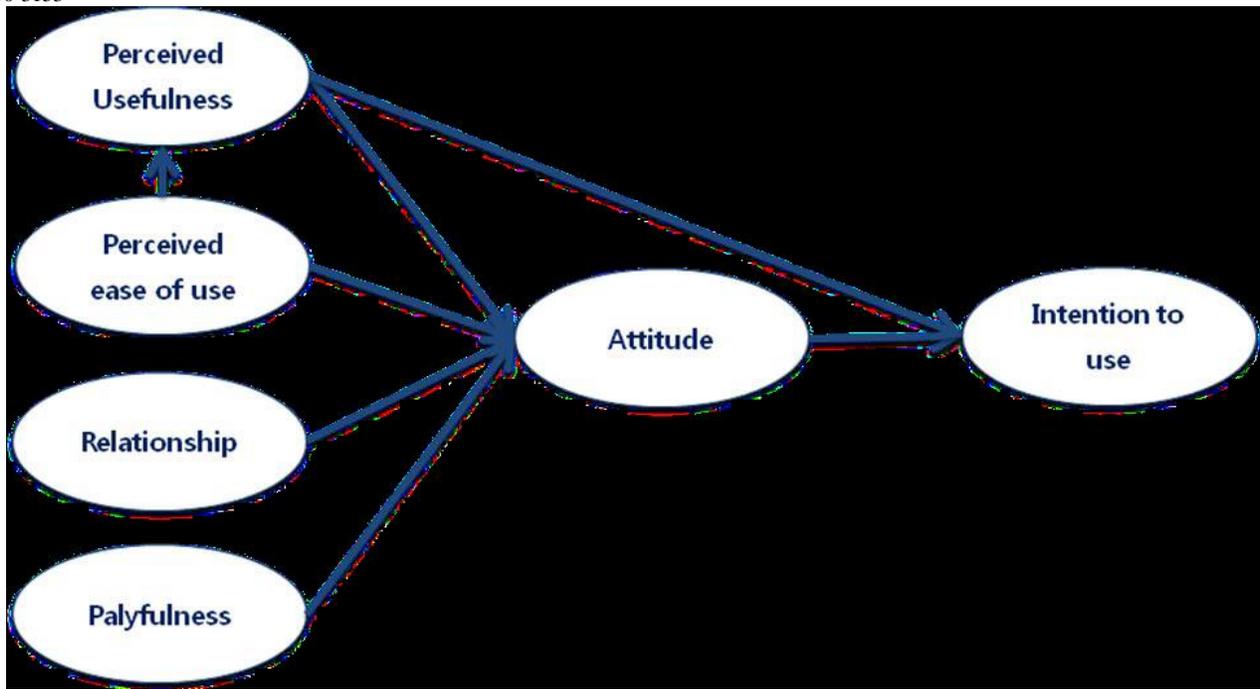


Figure 2: Technology Acceptance Model

Source: Nasser and Zaied (2012)

Acceptance of e-learning involves acceptance of technology, but differs in some key respects as the pedagogical aspects need to be considered. Studies of e-learning technology acceptance have considered Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT) and tested it on either teacher (Nanayakkar, 2007; Yuen & Ma, 2008). These studies provide evidence for centrality of attitudes in acceptance of e-learning. It is found that Perceived Ease of Use is the most important aspect for teachers, while Perceived Usefulness is the most important factor for students (Alharbi and Drew, 2014).

In this model, computer user is determined by behavioral intention that is formed by Perceive Usefulness and Attitude. Use of e-learning environment might be stimulated by two dimensions of motivators: extrinsic (Perceived Usefulness) and intrinsic (User Satisfaction). Perceived Usefulness is described as “the prospective user’s subjective probability that using a specific application system will increase his/her job performance within organizational content”. Perceived Ease of Use is an individual’s assessment that technology interaction will be relatively free of cognitive burden, i.e., Ease of Use reflects the facility with which the individual is able to interact with a particular software artifact (Fageeh, 2011). Studies on e-learners have revealed that Perceived Usefulness positively predicts students’ academic performance and satisfaction. So, Perceive Usefulness and Satisfaction constitute students’ perception.

The re-specified/extended (ISS) model proposes that Perceived Quality as operationalized by the four dimensions of information quality, system quality, service quality, instructor quality have significant association with Perceived Usefulness and User Satisfaction, which in turn have a positive relationship with Continual Usage Intention of e-learning management system. This study adapt and apply the Technology Acceptance Model (TAM) and the Re-Extended Information System Success Model (ISSM) to understand e-learners’ perception about NOUN E-learning system. Failing to meet students’ need may lead to low level of satisfaction and in turn low level of participation. This implies that, students’ perception is linked to improve academic performance as well as continued learning. Behavioral intention refers to the individual’s decision regarding future system use. Use behavior refers to the actual usage of the system.

Understanding why people use or discard computer systems/applications has become one of the most challenging issues in research on information systems. In literature, it is possible to identify various theories that attempt to predict the impact of technology on human behavior such as Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), and Information System Success Model (ISSM). However, this study will focus on Technology Acceptance Model (TAM) and Information System Success Model.

According to Ramayah and Lee (2012) and Lowga (2014), information system success model (ISSM) of Delone and McLean (2003, 2004) has received great attention in Information System (IS) literature and provides a theoretical basis for investigating student's attitudes and continual usage intention of web-based learning management system. Information system model and theories are commonly used in many studies that investigate determinants of the acceptance and usage of e-learning technologies. The first version of the Delone and McLean's (1992) model has six major constructs/dimension of IS success: System Quality, Information Quality, Use, User Satisfaction, Individual Impacts, and Organizational Impacts. Delone and McLean (2003, 2004) further extended the model to include Service Quality as the third quality factor, Intention to Use and Net benefits as new constructs/dimension.

Numerous studies on e-learning have attempted to make modification to the Delone and McLean (2003, 2004) model. For example, Ramayah and Lee (2012) conducted a study base on the extended model of Delone and McLeans (200,2004) IS Success model to examine the role of quality (service quality, information quality and system quality) in influencing use satisfaction and continuing usage of an e-learning system. The result of their study shows that information quality, system quality and service quality were positively related to user satisfaction. In addition, the result also shows that satisfaction, system quality and service quality were positively related to continuance intention.

Also, various studies have been carried out using Technology Acceptance model to describe and measure users' technology acceptance. For example, Suorsa and Eskilsson (2014) uses technology acceptance model (TAM) proposed by Davis (1989) to conduct a study on students' perception and use of learning management system (LMS). Their findings reveal that students' perception of LMS is affected by a number of factors related to social influences, perceived easiness to use and perceived usefulness.

Conceptual Framework of the Study

This study deployed an integrated conceptual framework for Examine e-learners' perception on the efficiency and reliability of NOUN E-learning system based mainly on the Technology Acceptance Model (TAM) and Information System Success Model (ISSM). The main aim of this study is to analyze e-learners' perception on the efficiency and reliability of NOUN E-learning system with selected constructs such as System Quality, Course Content Quality, Perceived Usefulness, Perceived Ease of Use and Continual Usage Intention. It has been suggested that despite the multidimensional and contingent nature of IS success, an attempt should be made to reduce significantly the number of measures used to measure IS success, so that research results can be compared and findings validated (Ramayah and Lee, 2012)

Independent Variables

Dependent Variable

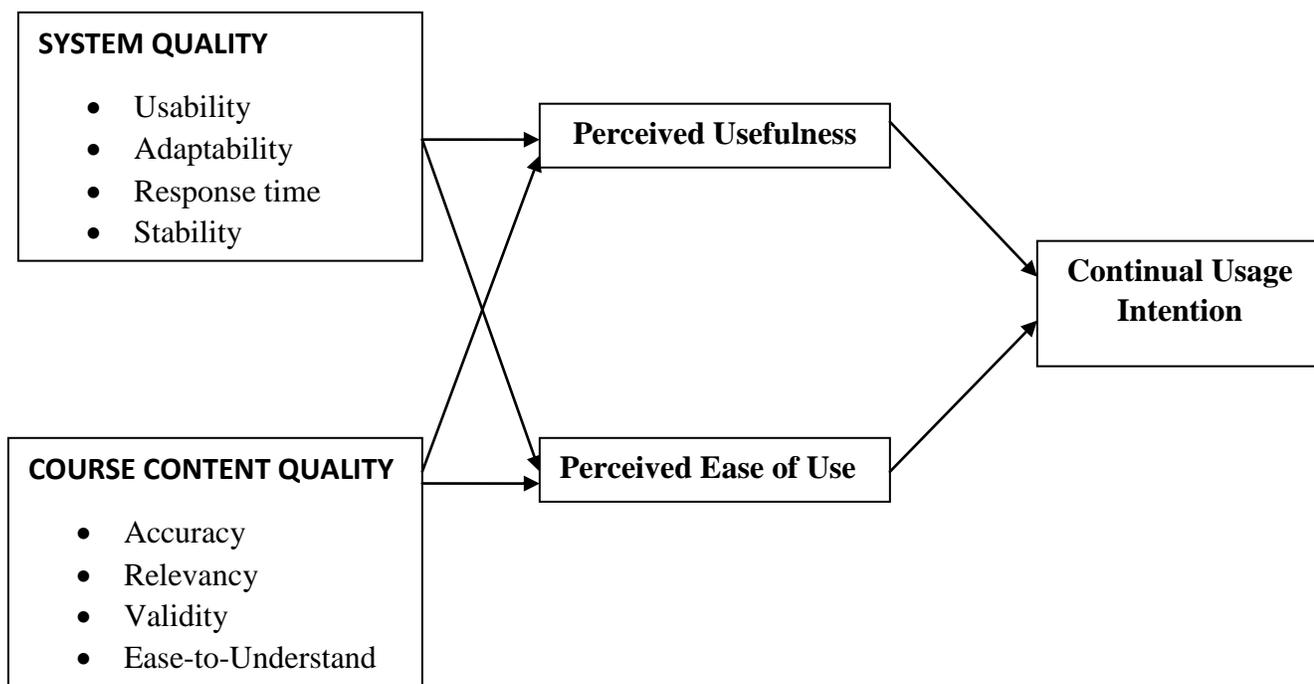


Figure 4: Conceptual Framework of the Study

Source: Researcher.

Adaptability of software system or software architecture: Is a qualitative property of its maintainability and an ability of its components to adapt their functionality, even at runtime, to behavioral and structural changes that occur either internally or externally in their operating environment and in requirement of stakeholders’ objectives (Tarvainen, 2008). In this study adaptability refers to the ability of an e-learning system to accommodate changing requirements of the e-learners when need arise.

Usability is the ease of use of any system. In particular, the usability in e-learning system is the presentation of information and choices in a clear and concise way, a lack of ambiguity and the placement of important items in appropriate areas. Another big concern for usability is that the website is appropriate for all ages and genders (Nielsen, 2003). In this context, usability is the ease of use of the e-learning system by the learners.

Course Content Quality

In this study course content quality refers to the quality of course content delivered through the course management system (Lwoga, 2014). Research demonstrates that course content quality has significant positive effects on user satisfaction of e-learning systems. Thus, the quality of course contents may be important reason for students to perceive the usefulness of e-learning systems and to have higher levels of satisfaction with using e-learning systems. Course content Quality (CCQ) in e-learning systems is the most important quality dimension of e-learning system (Suliman and Faryadi, 2013). Klobas and McGill (2012) added that course content quality is the “suitability of information” for the users’ purpose.

Accuracy is the closeness of results of observations to the true values or values accepted as being true. This implies that observations of most spatial phenomena are usually only considered to estimates of the true value. The difference between observed and true (or

accepted as being true) values indicates the accuracy of the observations (Buckey, 2012). In this study, accuracy is the extent to which the course content of the NOUN e-learning platform is free from error.

Content validity reveals whether an instrument truly reflects the "universe" of items in the subject that the instrument claims to measure (Saleh and Lamkin, 2008). In this context, course content validity is measure of how current is the content of the course material of the NOUN e-learning platform, is it up-to-date and comprehensive.

Ease-to-understand is the simplicity of the course content in terms of understanding by learners (Bourne and Moore, 2003). In this study, ease-to-understand refers to how the course content is clarified for easy understanding of the learners.

METHODOLOGY

Research Design

The researcher in this study used descriptive design to examine the perception of users on the efficiency of Use of NOUN e-learning system.

Also, descriptive correlation was used to determine the relationship between System Quality, Course Content Quality, Perceived Usefulness and Perceived Ease of Use on Continual Usage Intention.

Target Population

The target population of this study are the 100 students, both certificate, undergraduate and post graduate who are currently been enrolled and are been offered courses on the e-learning platform.

Sample Size

The sample size of the study is 60 respondents. The sample size was computed using Slovene's formula.

Sampling Technique

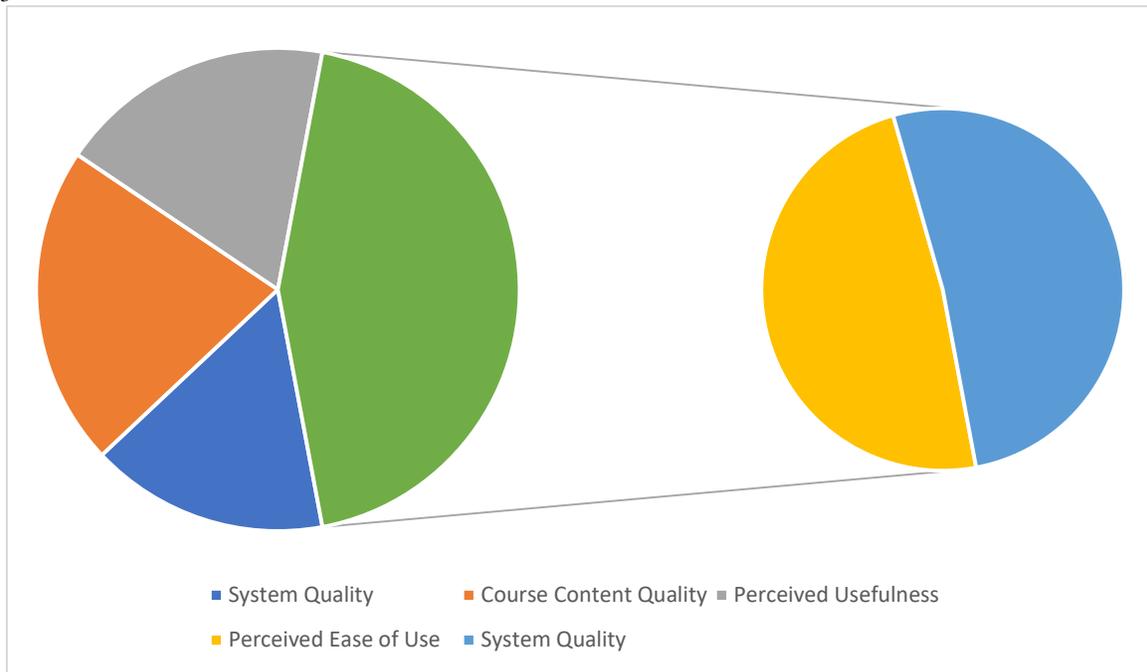
The researcher used purposive sampling technique to select the respondent the sampling was random sampling amongst the target population which gives every members equal chance to participate in the study.

Data Collection Instrument

The data collection instrument for this study is interview which was formulated from the conceptual framework of this study.

Content Validity:

The content validity of the instrument was measured based on each construct in the interview. The content validity index for System Quality, Course Content Quality, Perceived Usefulness, Perceived Ease of Use and Continual Usage Intention are: 0.642, 0.864, 0.746, 0.862 and 0.851 respectively.



Reliability:

The researcher in this study used test re-test method and cronbach's alpha reliability on each construct to ensure the consistency of each item of a construct in the instrument. The following cronbach's alpha: 0.564, 0.773, 0.886, 0.742 and 0.809 were obtained for System Quality, Course Content Quality, Perceived Usefulness, Perceived Ease of Use and Continual Usage Intention. However, the value for System Quality which is 0.564 was used by the research because (Pereira, 2016) stated that, if items of a construct are less than 10, then, the required cronbach's alpha value should be > 0.5 .

Data Analysis

The researcher uses frequencies and percentages to analyze the characteristics/profile of the study participants using statistical package for social science (SPSS IBM V.16.0).

Mean and standard deviation were used to examine the perception of users (e-learners) on the Perceived Usefulness and Perceived Ease of Use of the NOUN e-learning system.

Pearson's linear correlation coefficient (PLCC) was used in this study to examine the relationship between Perceived Usefulness and Perceived Ease of Use on Continual Usage Intention.

Also, Pearson's linear correlation coefficient (PLCC) was used in this study to examine the relationship between System Quality, Course Content Quality, Perceived Usefulness and Perceived Ease of Use on Continual Usage Intention.

DISCUSSION AND FINDINGS

Finding revealed that, the perception of users (e-learners) on Perceived Usefulness and Perceived Ease of Use is very good with an average mean and standard deviation (Mean = 2.8337, Std = 4.34298), (Mean = 2.6630, Std = 3.04082) and learners Perceptions (Mean = 3.4513, Std = 5.23161) respectively.

This shows that, e-learners/users believed that the NOUN e-learning platform needs to be improved for their academic activities. This finding corresponds with the finding of Suorsa and Ekilsson (2014) which revealed that students' perception and use of learning management system depends on social influence perceived easiness to use and perceived usefulness. It also tally with the finding of Eke (2015) and Lee-post (2009) which stated that students recognize that e-learning has become essential for their success.

Learners perception on Perceived Usefulness and Perceived Ease of use			
	Mean	Std. Dv.	Examining
Perceived Usefulness	2.8337	4.34298	Good
Perceived Ease of Use	2.6630	3.04082	Good
Learners Perception	3.4513	5.23161	Very Good

The study found that there is a high positive relationship between Perceived Usefulness and Continual Usage Intention with ($r = 0.8^{**}$, $\text{sig} = 0.1$). It also shows a low positive relationship between Perceived Ease of Use and Continual Usage Intention with ($r = 0.3^{**}$) and ($\text{sig} = 0.1$).

This indicates that, students' perception on Continual Usage Intention is strongly related with Perceived Usefulness. It also shows a moderate significant relationship between Perceived Ease of Use on Continual Usage Intention. This implies that users (e-learners) finds NOUN e-learning platform to be useful to them, so they are willing to continue with the e-learning courses. This has corresponded with the findings (Chris Curran September 2004) which revealed that, Perceived Usefulness is a critical factor that influences students' satisfaction with the e-learning system. They findings also tally with Eke (2015) which revealed that, the best sub set predictor that can be used in modeling a student intention to adopt e-learning includes: attitudes toward e-learning, usefulness of e-learning, ease of use of e-learning, pressure to use e-learning and available resources to use e-learning.

The key factors that determine the Continual Usage Intention of the e-learners are: Course Content Quality. This shows the need to improve on System Quality which in turn will also improve on Perceived Ease of Use of the NOUN e-learning platform. This is the same finding of (Raafat George Saadé and Dennis KiraConcordia University, John Molson School of Business, Montréal, Qc, Canada 2009) which shows that students perceived the relationship of ease use and usefulness as key factors for adapting e-learning, which perceive ease of use will have a positive effect on perceived usefulness. Also, finding of Mbabazi and Ali (2016) indicates that users show positive attitudes towards the use of the e-learning system.

Results of this study show that e-learning is an effective tool in education. Somehow, it has positive effect on the learning process of student. It can actually provide additional and updated knowledge that may not be gained in a classroom-based instruction. The impact of e-learning may be extended to other sectors like in social work. E-learning offers potential benefits for social workers (www.elfs.org.uk). It offers flexibility since anytime and anywhere it can easily be accessed. It also widens accessibility to learning opportunities through access. Information literacy like related facts on social work, writing and presentation skills can be gained. It also brings an improved motivation and engagement through the new things to be learned. Though e-learning, social workers can easily assess, monitor and record their learning progress.

CONCLUSION

The results of this study is encouraging the university to modified they technology to be easy use out of campus and to modified the system to be used with mobile phone and provide hope for the future on technology acceptance and use amongst these youth because majority of the respondents are bachelor students who are mostly age of 25 and below. Most of them are from school of business, Law and art, which is not a technology field, however, they seem to appreciate and enjoy the application of e-learning and educational technology.

The e-learners are very convenient with using the university computer laboratories, their personal PC and mobile phones to access the e-learning platform.

The e-learners believed and understand that the NOUN e-learning platform is very useful for them and it will improve their academic activities as such, they have the intention to continue to NOUN e-learning platform and prefer to use it for all their courses. However, they don't find it easy to use.

RECOMMENDATION

There is need for the management to create awareness about its e-learning system in various departments so as to have a balance of enrollment form various schools and colleges of the institution. And the result show that, the first year students need more awareness, this study shows high turnout and enthusiasm from the students on e-learning.

There is also a need to improve the condition and functionalities of the computers in the university computer labs because finding of the study revealed that the students find it more comfortable to access the platform through the university computer labs.

E-learners are willing to continue to use the NOUN e-learning system for the rest of their courses because they believed that the e-learning system will improve their learning activities. However, they don't find it very easy to use the platform, therefore, there is need to improve the system quality because Perceived Ease of Use is likely have positive or negative effect on their Continual Usage Intention.

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Area Based Traffic Control System

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Abstract- An efficient traffic control system is an important issue to reduce the traffic congestion. In this research, area based traffic control system is implemented for four-way intersection by using image processing techniques. This system is a vehicle-actuated signal type control system such that traffic cycle time can be varied and related to the actual demands by traffic. The CCTV traffic video file at a station in Mandalay is utilized as the input for the image processing. The amount of vehicles bounded on the road is estimated and defined as the traffic area with the numbers of pixels. Depending on sum of the amount of area on both opposite directions, three types of traffic cycle times are determined such as 60 sec, 85 sec and 120 sec respectively. The vehicles areas on the analyzed road are calculated by using contour, moment and area-based calculation image processing algorithms. The experimental results are implemented with the help of OpenCV and simulation of traffic signal timing sequence is tested with Arduino.

Index Terms- Contour, Moment, Area-Based Calculation Algorithm, Traffic Cycle Time, Traffic Timing Signals, Arduino Uno

I. INTRODUCTION

The vision based intelligent traffic management system is a robust framework that manages the on-road traffic flow in real time by estimating traffic density near traffic signals. This system used a simple algorithm to calculate the number of vehicles at various signals on a road to efficiently manage the traffic by controlling signals to avoid congestion and traffic jam [1]. The traffic density estimation and vehicle classification are useful and effective for traffic management systems. The real time video traffic video file was utilized for traffic surveillance system using neural network method [2].

The image captured in the traffic signal is processed and converted into gray scale image then its threshold is calculated based on which the contour has been drawn in order to calculate the number of vehicles present in the image [3]. The system detects vehicles through images instead of using electronic sensors embedded in the pavement. Setting image of an empty road as reference image, the captured images are sequentially matched using image matching. The Prewitt edge detection operator has been carried out and according to percentage of matching traffic light durations can be controlled [4].

Image based traffic control/ management systems are designed as different way to approach. Some of them are inductive loop detection system based traffic control system, microwave radar system based and they are shown in the following **Fig 1** and **Fig 2** respectively. This proposed system is a type of video image based vehicle detection system and this is a sample design shown in **Fig 3**.

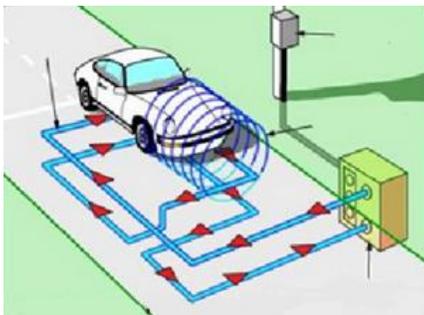


Figure1: Inductive Loop Detection [9]

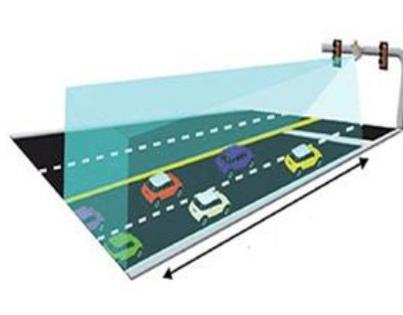


Figure2: Microwave Rader Based [10]

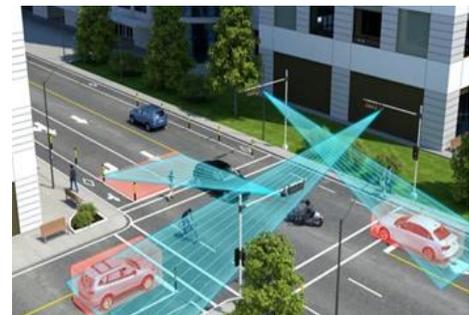


Figure3:Video Image Vehicles Detection [11]

This paper is described the image processing based traffic control system into the following sections. In the first section, the vehicles area on the road is estimated by using image processing algorithms. Depending on the amount of area, the traffic cycle times

are determined in the next section with the timing diagrams. In the final section, the simulation results for traffic signal timing sequences are tested and depicted with the help of Arduino.

II. IMAGE PROCESSING BASED TRAFFIC CONTROL SYSTEM

The block diagram below gives an overview of the traffic control system in **Fig 4**. It also shows how the vehicles area is estimated and the steps of the image processing. The system is mainly described into four steps as the following. The image acquisition and estimation of area are firstly processed. The traffic cycle time to allow for passing the road is defined according to the amount of area. Arduino receive the data how is the duration of traffic cycle time via the serial communication and sent this signal for Red, Green and Yellow traffic signals display system.

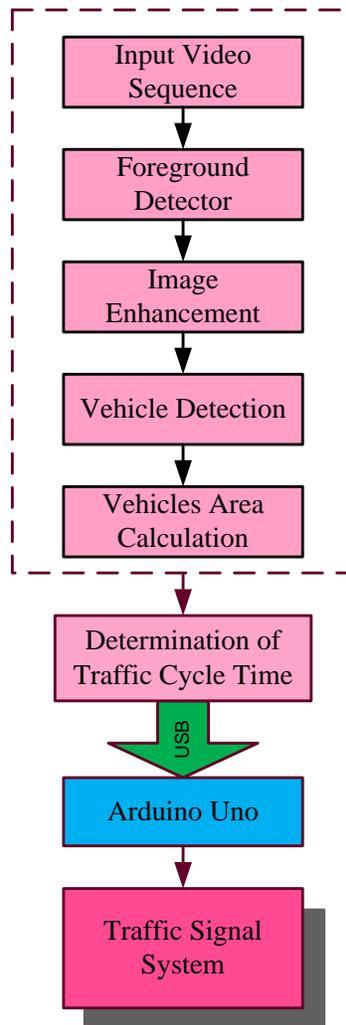


Figure4: Overview of Traffic Control System

III. VEHICLES AREA CALCULATION

Firstly, the images of video camera on the road are captured. And then, background image is subtracted to get the foreground objects. Secondly, image enhancement process is used to detect the vehicles area clearly. Thirdly, the contour, moment and area estimation algorithms can be applied to calculate the area of vehicles bounded on this road. Finally, the vehicle detection is completed by using frame differencing method and also described into the following section.

(1) Capturing Image

CCTV traffic video file is divided into frames and used as the input in the image processing. It is shown in **Fig 5**.

(2) Foreground Detector

Foreground Detector is considered as the most important function; it plays a big role in the filter and detects the ground. In this system, it will take the previous image as the background image and current image, and then make subtraction between those two images.

(3) Image Enhancement

Image enhancement is the process of adjusting digital images so that the results are more suitable for description or further analysis. Morphological operation is carried out for the better resultant images. First step is removing small connected components and objects from binary image by using function specified for this process. Second step, dilation process is for enlarge the detected areas and fill in black areas near borders/perimeters. Third step, the black areas will be enlarged and eat away at the white areas with the help of erosion process.

(4) Vehicle Detection

The vehicle detection is a process to describe the vehicles area in the specified image. In this research, frame difference method is used. This method has less computational complexity, and it is easy to implement; its difference between the current frame and the reference frame. **Fig 6** shows the detection of vehicles on the road.



Figure 5: Capture Image Figure 6: Vehicles Detection

(5) Vehicles Area Calculation

The amount of traffic area is calculated according to the contour area of the vehicles abounded on the lane. After the morphological operations, threshold value is determined for separating the foreground objects from background image. And then the contour algorithms are applied for calculation the density area. Contours are simple curve to join all the continuous points (along the boundary), having same color or intensity [6]. The different features of contours like mass of objects and area of objects, perimeter, centroid and bounding box etc... can calculate from the images. The contour area is measured by the pixel numbers and shown in **Fig.7** and **Fig. 8**.



Figure 7: Contoured Image

Figure 8: Vehicles Area Detection

IV.RESULTS OF VEHICLE AREA CALCULATION

Image processing-based traffic vehicles area detection is implemented by using OpenCV framework. In this research, the traffic video file in a station at the corner of 26th Street and 66th Street in Mandalay is used. The amount of area is calculated according to the contour area of the vehicles abounded on the road. The contour area is measured by the pixel numbers. The frames captured from

video are applied to estimate the numbers of pixels for vehicles area on the road. The status of traffic congestion is depended on the amount of pixels or area of the detected image.

The following experimental results are described for both directions (east and west) of 26th Street. The original images for vehicles and result images of the east are shown in **Fig 9** and **Fig 11**. The images of **Fig 10** and **Fig 12** are processed and estimated for west of 26th Street. The image results for each frame are presented with the amount of pixels numbers.



Figure 9: Image of Street 26(east)



Figure 10: Vehicle Area=58152.5 pixels



Figure 11: Image of Street 26(west)

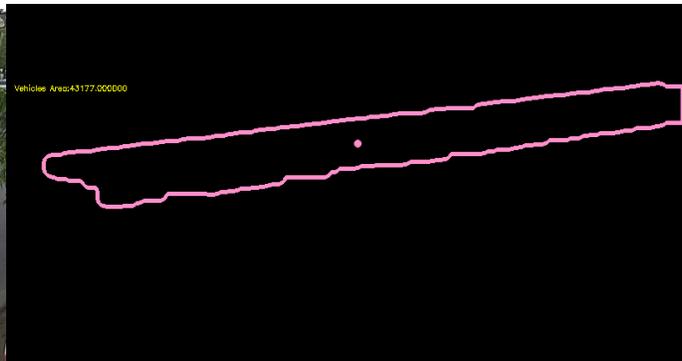


Figure 12: Vehicle Area=43177 pixels

V.DETERMINATION OF AREA BASED TRAFFIC CYCLTE TIMES

The determination of area based traffic cycle time is depended on the pixel number and camera vies on each side of the investigated road. For the east of 26th Street, the maximum pixel number is about 1.5×10^5 pixels at the largest area on the peak hour according to the survey data. It is about 4500 pixels for the west of that street. There is not same maximum pixel number at both streets due to the camera view. The traffic cycle times are divided into three types such as 63 seconds, 85 seconds and 120 seconds respectively and shown in Table I. It is also considered according to the status on both directions of a road. Therefore, the total sum of pixel numbers for both opposite directions of that road determine type of traffic cycle time.

Table I: Area Based Traffic Cycle Time

No	Area Comparison (Pixel Numbers)	Traffic Cycle Time (second)
1	$(A_{east} + A_{west}) \geq (1.5 \times 10^5) + (4500)$	120
2	$(1.5 \times 10^5) + (4500) < (A_{east} + A_{west}) \leq (0.75 \times 10^5) + (2250)$	85
3	$(0.75 \times 10^5) + (2250) > (A_{east} + A_{west}) \geq 0$	63

According to the above the results, the total number of pixels is about $(0.58152 \times 10^5 + 43177 = 101329)$ pixels. The total number of pixel values is in the middle group. Therefore, the traffic cycle time will be the duration of 85 seconds for the road. The traffic light timing diagrams for 85 sec of cycle time is also described in **Fig 13**.

In this proposed phase design, vehicle turning left is considered as priority passing moment. Green time period for this turning left is about 7 second for each cycle times. The yellow light time is also commonly set about 3 seconds at each traffic moment. The green

time of travelling straight through and turning right are mainly considered. In the maximum cycle time of 120 seconds, the green time is taken as 30 seconds for travelling straight and turning right. The green time is lasted for 15 seconds of that phase at 85 seconds cycle time. For 63 seconds cycle time, the green time of 10 seconds is determined for vehicles on the road respectively.

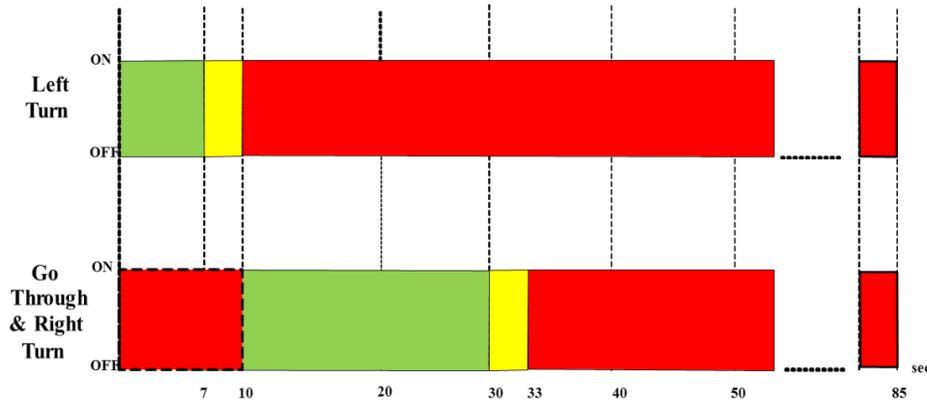


Figure13. Timing Diagram for 85 second Duration

VI. ALGORITHM OF THE PROPOSED SYSTEM

This traffic control system is intended to apply for the four-way intersection. Traffic moment is each possible trajectory of traffic flow. There are three traffic moments such as vehicle turning left, vehicle travelling straight through and vehicles turning right respectively and shown in **Fig 14**.

In the proposed design, cross junction of four roads traffic control system (right side drive) is used and shown in **Fig 15**. In Federal data have shown: 53.1% of crossing-path crashes due to vehicle turning left. On the other hand, case of vehicle turn right is about 5.7% of crossing-path crashes. Therefore, the vehicle turning left is generally unsafe and inefficient while driving. In this type of traffic phase design, this is firstly passed because this search data.

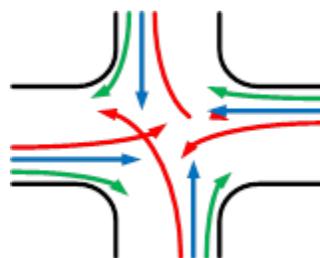


Figure14. Traffic Moment Design

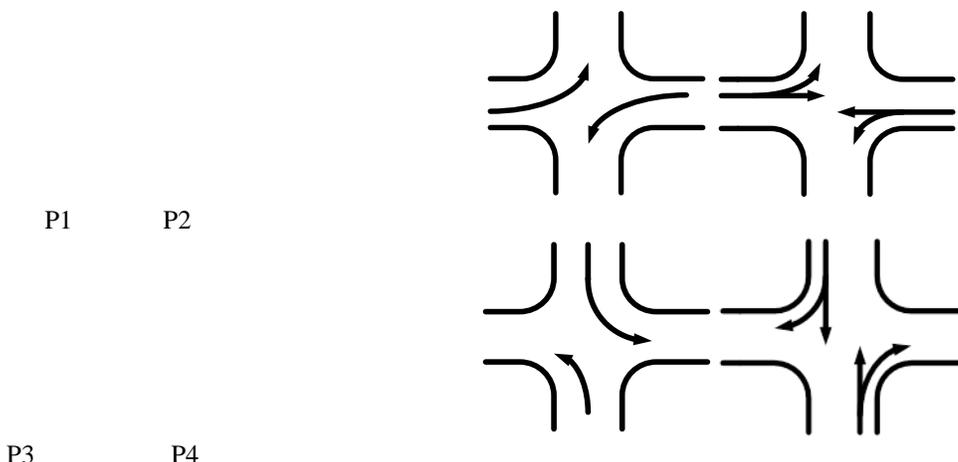


Figure15. Four Phase Signal in Proposed Design

VII. SIMULATION RESULT FOR TRAFFIC SIGNAL SYSTEM

The amount of vehicles area is calculated and then the duration of traffic cycle time is determined from the OpenCV framework. The type of traffic cycle time is sent as the data to the controller board for the traffic signal system. In this research, Arduino Uno board is utilized as the controller for the traffic signal display system. At first, serial data communication to Arduino is established to accept the type of traffic cycle time. Based on the determination of traffic signal duration, Red, Green and Yellow traffic signals are displayed for the passing road. This image result is described into the following **Fig 17**. For the simulation results, the LEDs are used instead of signals and it is shown in **Fig 16**.

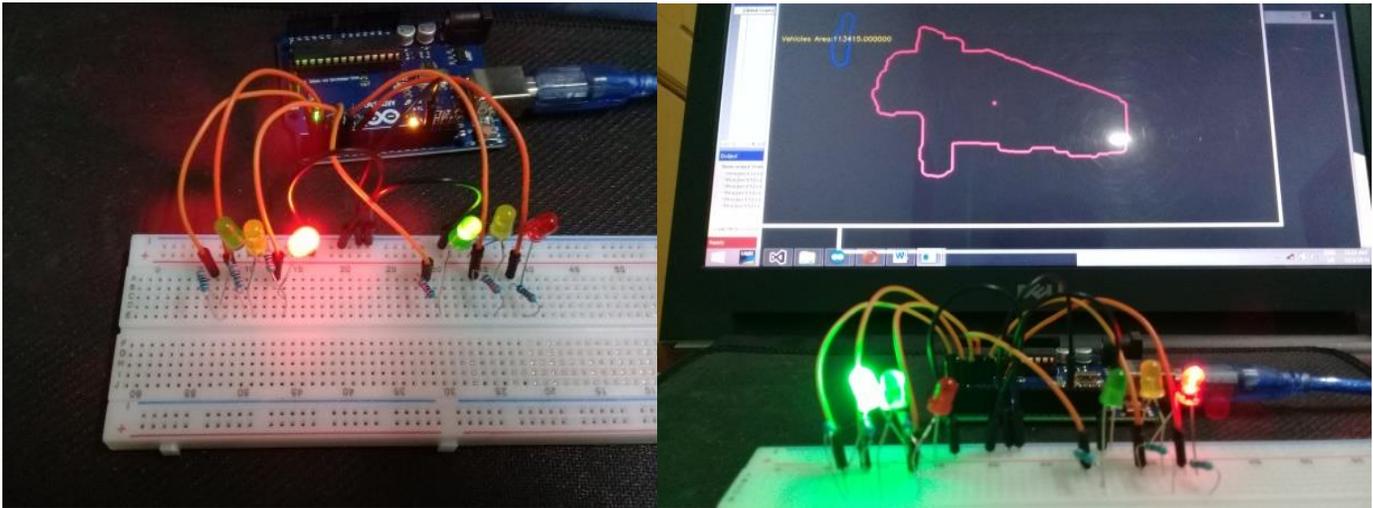


Figure16. Setup for Signal Display Figure17. Traffic Signal Simulation Image Result

II. CONCLUSION

This traffic control system is based on the vision sensor CCTV camera and utilized with image processing techniques. And the experimental and simulation results also had been presented for the analyzed road. Depending on the traffic demand on the road, this system is intelligent and work well effectively. And it is also carried out for saving time of the vehicles at the road in the city. In addition, it is more reducing the waiting time without vehicles on the road. Due to the consideration of both direction areas, it will decrease vehicle abounded time on the road. On the other word, the traffic phase design will also be effective for the four way intersection. Avoiding the same passing time for go through and left turn, it can also be reduced the accidents. As a result, this image processing based intelligent traffic control system can be available that the congestion problems will be effectively reduced at peak hours on the road than other convectional system in Mandalay.

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Fuzzy Based Trajectory Tracking Control of a Mobile Robot

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Abstract- In this research, a differential drive wheeled mobile robot which can automatically track the trajectories was designed by using the fuzzy logic controller. The motion task of the mobile robot is motion through the points. When the user gives the desired point's position (x, y, θ) from PC, the position error and orientation error are derived. The position error and orientation error is sent as input to the fuzzy controller and then the required velocity is given to the motor depending to the position and orientation angle between the start point and desired point. Based on the electrical section, PIC16F887 microcontroller, motor driver, magnetic encoder DC motor and LCD are mainly used. The purpose of the use of driver is to control the rotation of the motors - forward or backward. So, VNH2SP30 driver is used in this system for this purpose. The magnetic encoder is to measure wheel revolution and it can be translated into linear displacement of the wheel. The design procedure consists of the kinematic structure of robot, hardware and software implementation and microcontroller programming. A simulation model of the control system is developed with MATLAB / SIMULINK block diagram. Simulation results of the proposed system are given to approve the effectiveness of the system.

Index Terms- Trajectory Track, Fuzzy Logic Controller, PIC16F887 Microcontroller, DC Motor

I. INTRODUCTION

In the last decade, the main developments in the area of robotics have come through technological breakthroughs in the areas of computing telecommunications, software, and electronic devices. These technologies have facilitated improvements in intelligent sensors, actuators, and planning and decision making units which have significantly increased the capabilities of mobile robots. The latest trend in robotic intelligence is toward imitating life, for instance in evolutionary robots and emotional control robots. Another area of technological challenge for the next decade is the development of micro-robots and nano-robots for medical applications. In order to drive the most suitable feedback controllers for each control system, it is convenient to classify the possible motion tasks: Point-to-point motion, Path following and Trajectory tracking.

An autonomous mobile robot is an intelligent robot that performs a given work with sensors by identifying the surrounded environment and reacts to the condition by itself instead of human. Many studies about autonomous navigation applied to non-holonomic robots focused on the design of a global analytic trajectory, composed of straight segments connected with either tangential circular or symmetric arcs [1]. In the trajectory tracking control, the desired trajectory required by mobile robot is given in graph based on the time relation.

In trajectory tracking control, the desired trajectory required by mobile robot is given in graph based on time relation. Trajectory tracking control is necessary when the robot is asked to arrive at a certain location in a certain time. Various methods have been applied to solve the motion control problems. The various methods are model-based methods and artificial methods those employ fuzzy logic, neural networks, genetic algorithms or hybrid of these approaches. Among these methods, fuzzy logic controller is used to control the various paths and the system maintains a good tracking performance.

Although these methods have been proven to be efficient and provide good short term position estimates, they suffer from unbounded error growth due to the integration of minute measurements to obtain the final estimate [2]. In fact, there is a high demand for mobile robots to use in hard to reach and hazardous areas [3]. This approach involves two steps: first planning a feasible trajectory and second designing a control algorithm to follow this trajectory [4]. This method has a drawback the lack of reactivity. For more reactive navigation, kinematic constraints have been introduced in the spatial representation [5].

The mobile robot mechanism is discussed in section II. The control method of fuzzy logic controller for tracking the mobile robot is explained in section III. The methodology of trajectory tracking mobile robot is described in section IV. After that, the experimental results of Simulation and Hardware experiments are illustrated in section V. The conclusion is described in the last section.

II. TRAJECTORY TRACKING OF MOBILE ROBOT METHODOLOGY

The trajectory tracking of mobile robot system is constructed with switch, motor driver, microcontroller, 12V battery and DC gear motors. **Fig.1** shows the block diagram of motor control for mobile robot trajectory tracking control.

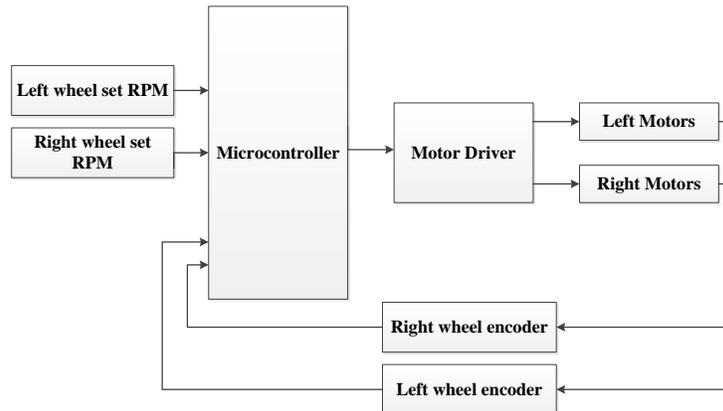


Figure 1: Block diagram of motor control for mobile robot

The coordinates of the vehicle is $q = (x, y, \theta)$, and (x, y) are the position of the wheels (m), and θ is the orientation (heading) of the wheels (rad). The kinematics models of the mobile robot equation are based on the unicycle equation.

$$\dot{x} = V \cos \theta \quad (1)$$

$$\dot{y} = V \sin \theta \quad (2)$$

$$\dot{\theta} = \omega \quad (3)$$

Where, V is the linear velocity (m/sec) and ω is angular velocity (rad/sec). The following equations are used to find the linear velocity and angular velocities.

$$V = \frac{v_l + v_r}{2} \quad (4)$$

$$\omega = \frac{v_l - v_r}{D} \quad (5)$$

Left and right wheel linear velocities (m/sec) are shown in the following:

$$v_r = \frac{2v + \omega l}{2R} \quad (6)$$

$$v_l = \frac{2v - \omega l}{2R}$$

Where, r is radius of the wheels, v_r and v_l are right and left wheel linear velocities, R is the radius of the wheels and the distance between the wheels is D . Error position and orientation can be estimated as follow:

$$E_p = \sqrt{(x_g - x)^2 + (y_g - y)^2} \quad (7)$$

$$\theta_g = \theta_{goal} = \arctan2 \left(\frac{y_g - y}{x_g - x} \right) \quad (8)$$

Error orientation, $e = \theta_g - \theta$

Corrected error, $E_\theta = \arctan2 (\sin (e), \cos (e))$

The kinematic model equation of the mobile robot is given by:

$$q = \begin{pmatrix} \dot{x} \\ \dot{y} \\ \dot{\theta} \end{pmatrix} = \begin{pmatrix} \cos \theta & 0 \\ \sin \theta & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} v \\ \omega \end{pmatrix} \quad (9)$$

A. Hardware Components of Mobile Robot

The components of mobile robot are two DC gear motor with encoder, one caster wheel, VNH2SP30 motor driver, 12V battery and PIC16F887 microcontroller. DC gear motor reduction ratio is 1:45 gearbox and revolution is 12 pulses per revolution of the motor

shaft. Motor driver can control the motors to drive the mobile robot as defined trajectory. In this research, RB0 and RB1 pins of PIC16F887 were used for right motors to rotate forward and track the trajectory. RB2 and RB3 pins were used for left motors. For pulse width modulation (PWM), RC1 and RC2 pins were used to control the motors. **Fig. 2** shows the implementation of mobile robot.

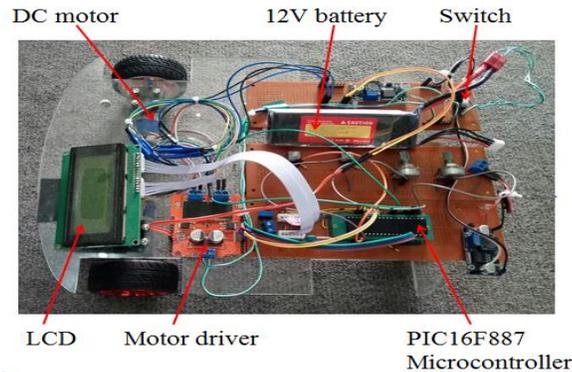


Figure 2: Mobile Robot

B. Communicating with MATLAB Simulink and hardware controller

The set rpm values from workspace are taken and put them into the controller of mobile robot. Controller evaluates the PWM duty cycle % with motor driver circuit. “To instrument” block is used for transferring the left and right duty cycles to the mobile robot. The communication of PIC and MATLAB is serial interface and its buffer size is 512 and baud rate is 115200. The block sample rate is 0.001sec. The travelling record of the mobile robot data is expressed on “Query instrument” block. Its buffer size and baud rate is similar with “To instrument” block.

III. FUZZY LOGIC CONTROLLER

The basic fuzzy logic controller (FLC) structure is shown in **Fig.3**, where FLC is used a supplementary role to enhance the existing control system when the control conditions change. Fuzzy control algorithm is demonstrated for tracking trajectories. The calculation module calculates the error in position and orientation Δx , Δy , $\Delta \theta$ between the actual robot coordinates (x, y) and the coordinates of the trajectory (x_d, y_d, θ_d) at each sample time. After that, the position and angle is generated to be the inputs of Fuzzy controller. To control the system, we assume the two state variables to be $0 \leq v$ (position) ≤ 1 (m/s); $-\pi \leq \theta$ (angle) $\leq \pi$ (rad).

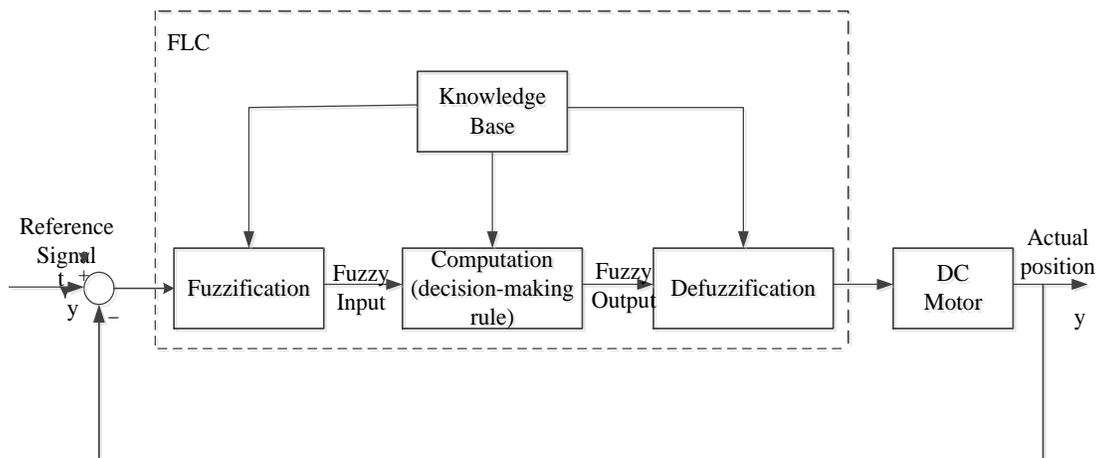


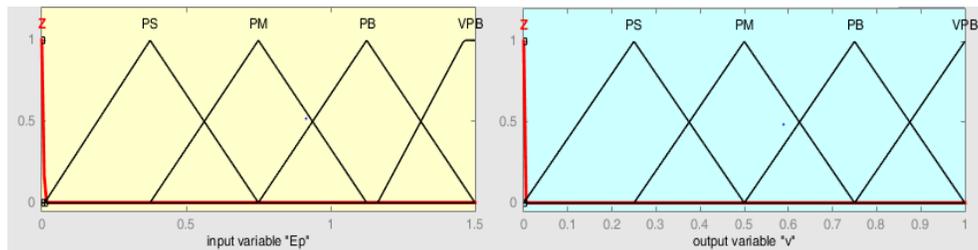
Figure 3: Basic structure of fuzzy logic controller

The knowledge base contains a set of rules which construct the decision-making logic rule table tabulated where 25 rules are used. The label and number of rules can be changed according to project preference. An addition of input and output sets can provide much more accurate results but longer time is needed to run the Simulink.

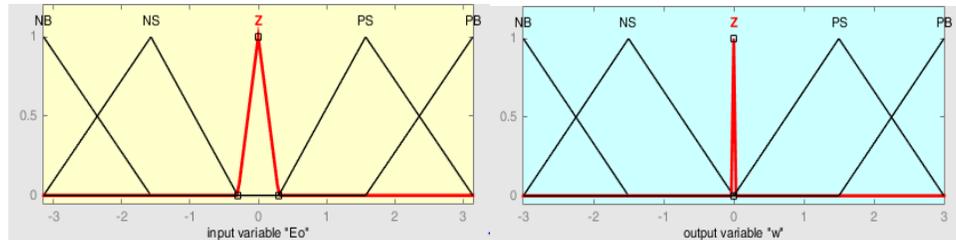
A. Constructing Membership Function

Five membership functions are considered with all are of triangular member. The languages are Zero (Z), Positive Small (PS), Positive Medium (PM), Positive Big (PB), Very Positive Big (VPB) for position and velocity. For orientation and heading angle, Negative Big (NB), Negative Small (NS), Zero (Z), Positive Small (PS), Positive Big (PB) are assigned. The membership functions of

inputs and outputs are shown in **Fig. 4**, where $0 \leq E_p$ (error position) ≤ 1.5 (m); $-\pi \leq E_o$ (error orientation) $\leq \pi$ (deg); $0 \leq v$ (position) ≤ 1 (m/s); $-2 \leq w$ (position) ≤ 2 (rad/s).



(a) Membership function of input variable E_p (b) Membership function of output variable v



(c) Membership function of input variable E_o (d) Membership function of output variable w

Figure 4: Membership functions

B. Fuzzification and Rule Base

The first block inside the controller is fuzzification which converts each piece of input data to degrees of membership by a lookup in one or several membership function. The fuzzification block matches the input data with the conditions of the rules to determine.

In order to satisfy the control objective it is necessary to design a fuzzy logic control for the real velocities of the mobile robot which use linguistic variables in the inputs and outputs. After constructing the stage of membership functions, the table for the rule bases is constructed. The expert system is developed based on the IF- THEN rules as 25 rules to control robot tracking defined trajectory.

If E_p is Z and E_o is NB, Then V is Z and ω is PB. This rules quantifies the position and orientation where the predicted the position and angle of the mobile robot is much larger than the reference position and angle. Therefore, we must decrease V and ω to reduce the position and orientation of robot.

When E_p and E_o are not Z, we design the fuzzy rules as below:

- If E_p is PS and E_o is NB, Then V is PS and ω is PB.
- If E_p is PM and E_o is NB, Then V is PS and ω is PB.
- If E_p is PB and E_o is NS, Then V is PB and ω is PS.
- If E_p is VPB and E_o is PS, Then V is PB and ω is NS.

The fuzzy rules bases for the mobile robot control are described in Table 1.

Table1. Fuzzy rules for the mobile robot control

			E_o				
			NB	NS	Z	PS	PB
E_p	Z	V	Z	Z	Z	Z	Z
		ω	PB	PS	Z	NS	NB
	PS	V	PS	PS	PM	PS	PS
		ω	PB	PB	Z	NB	NB
	PM	V	PS	PM	PM	PM	PS
		ω	PB	PS	Z	NS	NB
	PB	V	PS	PB	PB	PB	PS
		ω	PM	PS	Z	NS	NM
VPB	V	PS	PB	VPB	PB	PS	
	ω	PM	PS	Z	NS	NM	

C. Defuzzification

Considering the real-time characteristics and the complexity of the algorithm, the centroid method is used to defuzzify the output variable. At first, the rule for output which best fits the current situation is chosen. In other words, more certainly that these rules can be applied than the other rules. Then, the output value that has the maximum membership function value is found according to these rules. If there is more than one variable that has the same maximum membership function value, the average of this variable is produced.

IV. DESIGN OF TRAJECTORY TRACKING MOBILE ROBOT

The following Simulation block diagrams are designed for the trajectory tracking of mobile robot. **Fig.5** shows the Simulink block diagram of the various trajectories tracking control system. Simulink block diagram of unicycle is shown in **Fig.6**. In this system, x , y , and θ are calculated based on the linear velocity and angular velocity. And then, left and right set rpm of velocities and duty cycles are evaluated.

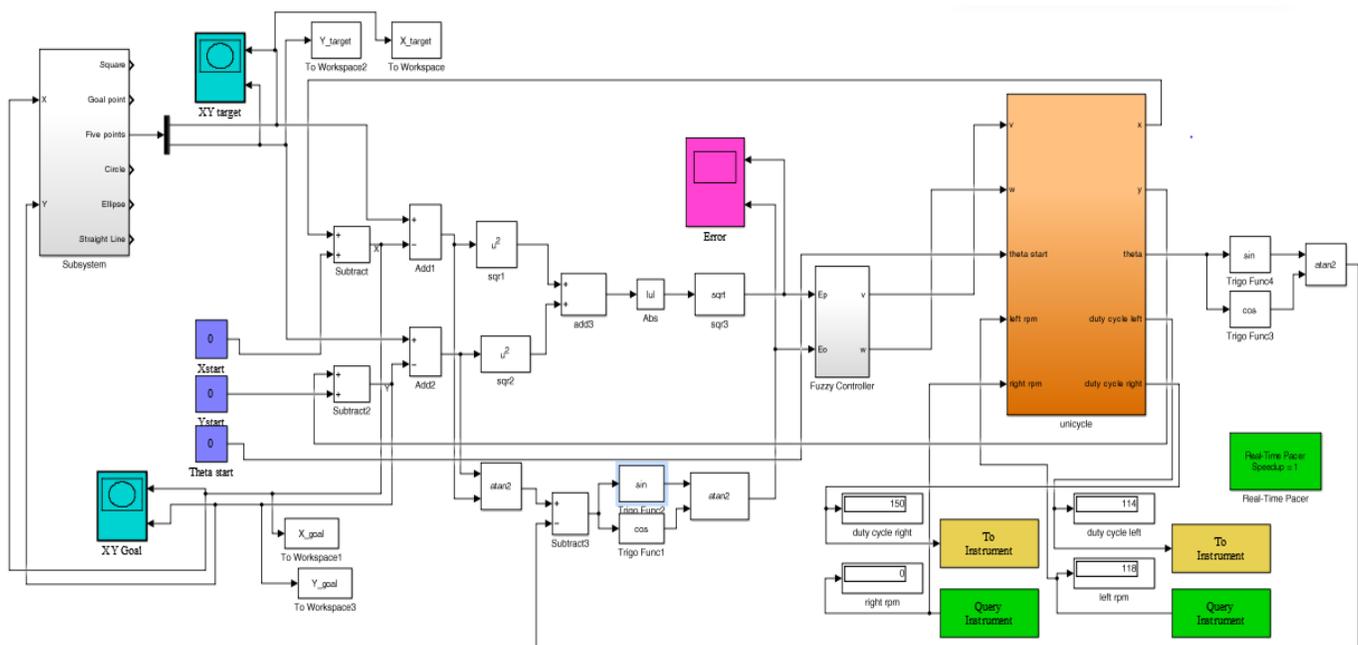


Figure 5: Simulink block diagram of various trajectories tracking

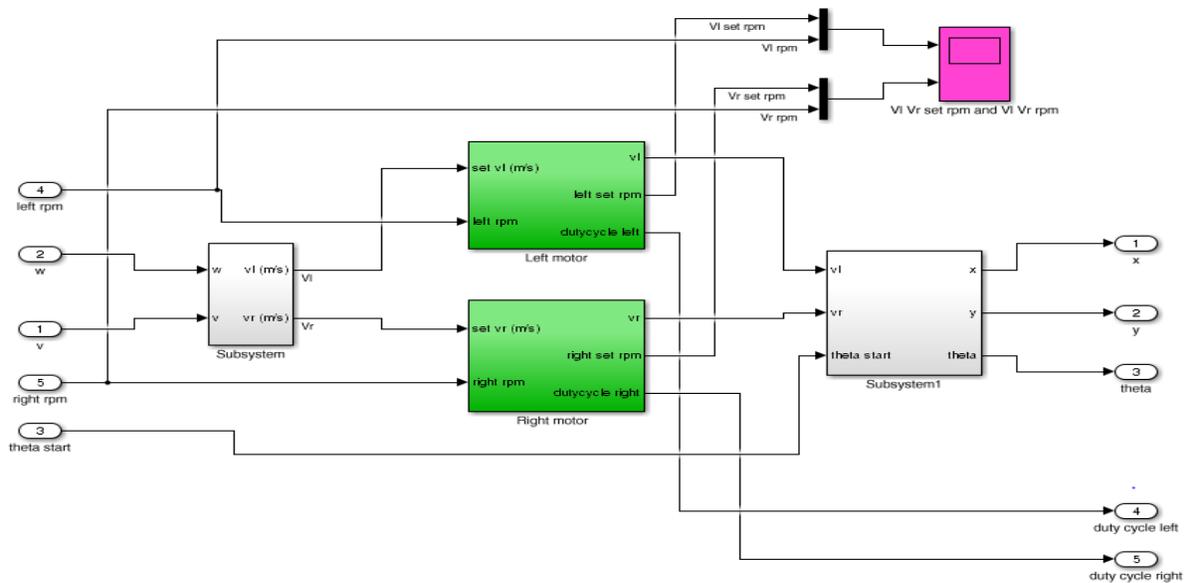


Figure 6: Simulink block diagram of unicycle

V. EXPERIMENTAL RESULTS

A. Simulation Results

For testing the performance of the operation, the following MATLAB simulation was applied. **Fig.7** shows the desired and actual square trajectory tracking of mobile robot. There were a few errors in square trajectory. The mobile robot tracked the outer route of every corner for square trajectory. Error position and orientation of square trajectory is shown in **Fig.8**.

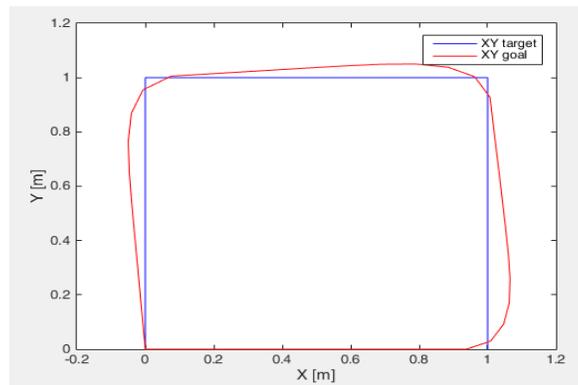


Figure 7: Square trajectory tracking

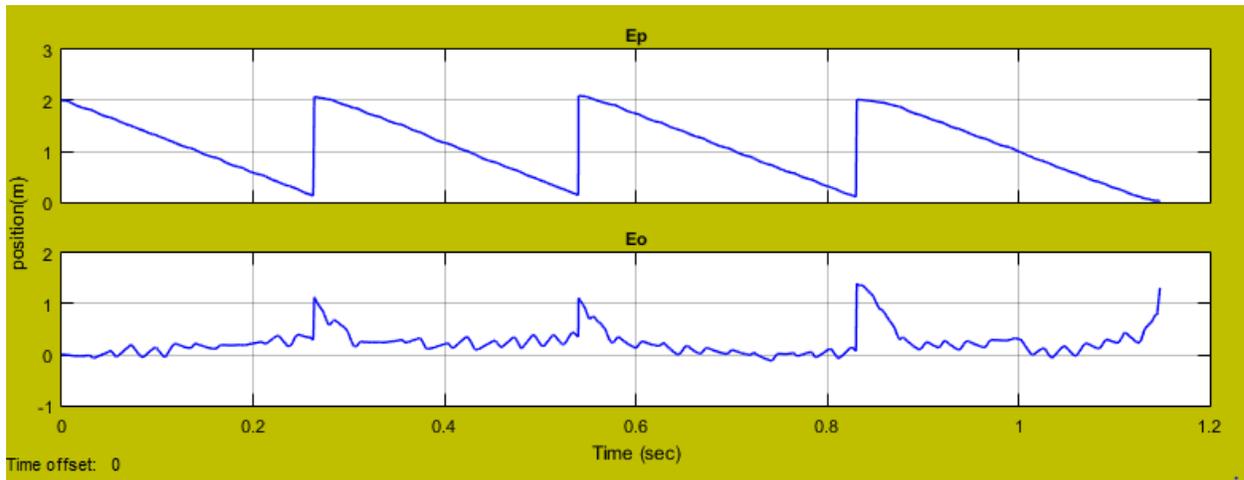


Figure 8: Error position and orientation of square trajectory

The desired and actual 5 points trajectory tracking of mobile robot is shown in **Fig.9**. Error position and orientation of 5 points trajectory is shown in **Fig.10**.

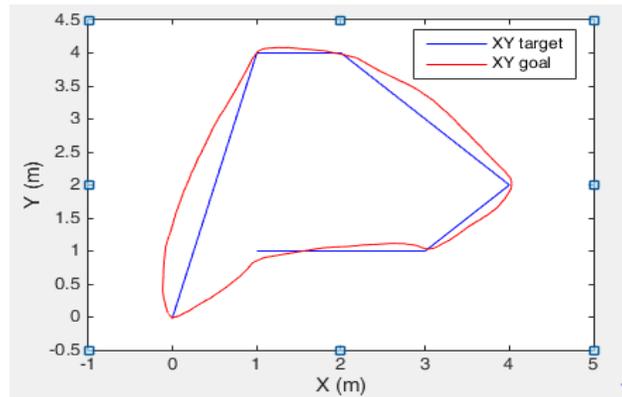


Figure 9: 5 points trajectory tracking

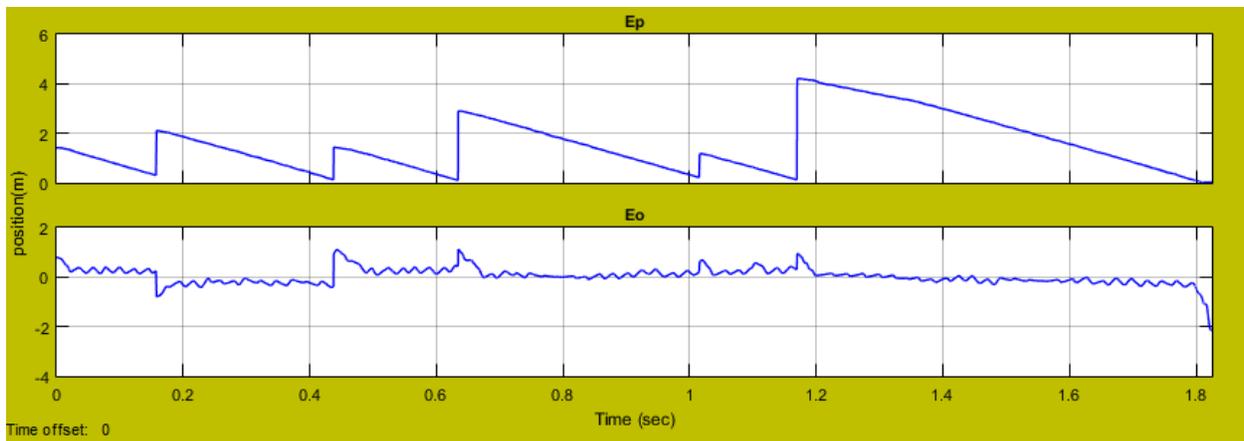


Figure 10: Error position and orientation of 5 points trajectory

B. Hardware Experiment Results

In **Fig.11**, testing $x=2m, y=2m$ square trajectory tracking is shown. **Fig.12** shows the testing 5 points trajectory tracking from starting $x=0$ and $y=0$ points. The mobile robot tracked the outer route of every corner for both trajectories.

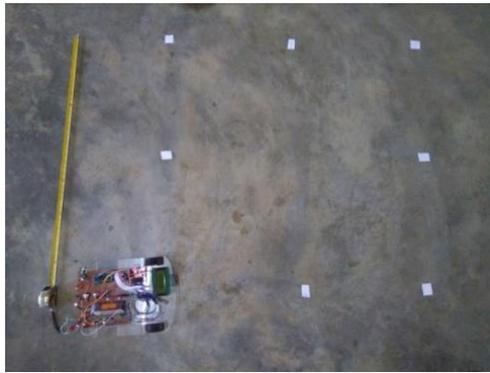


Figure 11: Testing $x=2m$, $y=2m$ square trajectory tracking



Figure 12: Testing 5 point trajectory tracking

VI. CONCLUSION

The distance travelled by the robot was calculated by transforming the number of wheel revolution counted using a magnetic encoder knowing the diameter of the wheel. The position error and angle orientation error in the command speed of the mobile robot, output from the microcontroller, is changed into analog signal fed to the motor driving of the corresponding wheel to fix the position error. The strategy presents a desired performance as it is able to accurately follow the different designed trajectory which makes it desired for the case of working in indoor environment. The simulation results are provided to illustrate the feasibility and effectively of the proposed fuzzy logic controller. It was applied on simulation scheme in purpose to track target trajectory. The results of simulations present that proposed method is suitable to solve the problem of target tracking.

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Important biological activities of papaya peel extracts and their importance in formulation of a low cost fish feed to enhance the skin colour and the healthiness of guppies

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Abstract: Different plant extracts of *Carica papaya* (papaya) peels were investigated for their antioxidant capacity (AOC), antibacterial activity, antidiabetic activity and concentration of carotenoids content. An investigation was carried out to identify the best extraction conditions to obtain a suitable extract that can be used to formulate a fish feed with important bioactivities. Three different papaya peel drying methods and a suitable solvent to use with the maceration technique was tested. According to the UV-Visible spectra of the extracts, the highest percentage of carotenoids was obtained for the ethyl acetate extract of air-dried sample (5.4 µg/mL). According to the Folin-Ciocalteu assay, the highest AOC (22 PGE µg/mg) was displayed by the ethanolic extract of air-dried sample. Highest DPPH radical scavenging activity of 96% was found in the ethanolic extract of oven-dried (50 °C), air-dried and freeze-dried samples. According to disk diffusion assay, the ethanolic extract of the air-dried sample exhibited antibacterial activity against *Pseudomonas aeruginosa*. Highest α-amylase inhibitory activity was obtained for the ethyl acetate extract of air-dried papaya peel (37%). An economic fish feed prepared incorporating 4% of the ethanolic extract of air-dried papaya peels effectively enhanced the skin colour and the healthiness of guppies within a much shorter period of time compared to a commercially available fish feed. This study reveals important bioactivities and a useful application of papaya peel waste. Findings of this research can be used for value addition and efficient management of papaya peel waste.

Keywords: Papaya, Antioxidant, Antibacterial, Antidiabetic, Carotenoids

1. Introduction

With the advancement of screening programmes, exploring the therapeutic potential of edible plant materials has become a wide research area and a promising path for novel applications [1]. There is a high demand towards the naturally isolated bio-active compounds or standardized crude extracts from plant materials over synthetic substances due to their biological, industrial applications and adverse side effects of synthetic drugs [2]. Papaya which belongs to *Caricaceae* family is reported to contain important bioactive ingredients not only in its fruit but also in the other plant parts including leaves, roots, bark, peel, seeds and flesh [3]. It has been reported that papaya is a rich source of protein, fat, fibre, vitamin C, thiamine, riboflavin, niacin, carotene, amino acids, citric and malic acids [4]. In addition, papaya peel contain fibre, phenolic compounds, vitamin C, soluble solids, titratable acidity, and the minerals copper, sulphur, and potassium [5]. The red and the yellow colours of papaya is a result of the presence of pigments such as β-carotene,

violaxanthin, lycopene and some other unresolved pigments [6]. Papaya peel has the antidandruff, skin soothing and moisturizing ability which is important in cosmetic industry [3]. The ability of eliminating intestinal parasites, anti-helminthic and anti-amoebic properties of bioactive compounds found in seeds pave a promising path for new drug discoveries [3]. Additionally, papaya peel waste is generated in many countries throughout the year and proper management of this waste product could gain commercial interest in various industries. Since the annual global average production of papaya is about 10.0 million metric tons [7], it is important to add value to the left over waste materials of papaya fruit which could in turn be commercially beneficial as well as be useful to the environment due to reduction of waste [8]. However, careful consideration has to be put into the extraction conditions used to isolate these valuable natural products in an intact and useful manner. The extraction method is crucial in terms of obtaining intact and high yield of particular compound from the plant materials in order to show its effective biological activities. Therefore, it

is important to optimize the conditions to get maximum of these ingredients in an intact manner via proper extraction without decomposing and economically favourable method as they can be used in other applications [9][10]. The extraction methods and bio activities of papaya peel extracts compared during this study were not analysed before and this type of a bio prospecting analysis on crude extracts before isolation of pure compounds are isolated from crude mixtures will help to provide a prior clue on what sort of properties it possess that can be used to decord problematic issues.

2. Experimental methodology

2.1. Preparation of papaya peel extracts

Peels of papaya which were left behind after consumption were identified to extract the natural products. Natural products were extracted in to three different solvents by maceration after drying the papaya peels via three different drying methods (air drying, oven drying, freeze drying).

2.2. Drying methods of papaya peel samples

Papaya peels were cut in to small pieces and weighed separately. Samples were exposed to air dry [11] for three days, lyophilized [12] for 8 hours using a freeze dryer and exposed to temperatures of 50 °C and 80 °C using a laboratory oven [13] for 3 hours respectively. Each sample was ground in to a coarse powder.

2.3. Extraction of natural products by maceration

Weights of 2 g of each dried samples of papaya peel were separately put in to amber colour bottles containing 10 mL of ethanol, ethyl acetate (EtOAC) and hexane. Each sample was subjected to maceration overnight at 37 °C for overnight. Then samples were filtered and extracts were concentrated with the aid of a rotary evaporator. After the solvent evaporation the extracts were stored in the refrigerator until further use.

2.4. Characterization of the crude plant extracts using photochemical analysis

2.4.1. Thin Layer Chromatography (TLC)

Since all papaya peel extracts were coloured and papaya was reported as a rich source of carotenoids, thin layer chromatograms were developed using petroleum ether: acetone (7:3) as the mobile phase to investigate the existence of the carotenoid pigments in each extracts [14].

2.4.2. UV-Visible spectrometry

The various plant pigments absorb light in overlapping spectral regions depending on their colour. Therefore, the concentration of the carotenoid pigment mixture was calculated using Beer-Lambert law with the maximum absorption at 470 nm using ϵ value as 221 L/g/cm in methanol [15].

2.5. Phytochemical analysis of papaya peel extracts

2.5.1. Test for phenols and tannins

A volume of 500 μ L of each plant extract was added to 1 mL of distilled water. A 5% of solution of FeCl_3 was added drop wise to this mixture and checked for the appearance of a dark green or purple colour which indicates the presence of phenols [9].

2.5.2. Lead acetate test

A volume of 1 mL of each plant extract was dissolved in 1 mL of distilled water. A 1% of lead acetate was added drop wise and checked the appearance of a precipitate [9].

2.5.3. Saponification for saponins

A volume of 1 mL of each plant extract was added to a test tube containing 20 mL of distilled water and was agitated for 15 minutes to check the formation of foams [9].

2.5.4. Test for flavonoids

Diluted NaOH was added to the 1 mL of each plant extract drop wise to check the appearance of the intense yellow colour and then diluted HCl was added to the solution until the yellow colour disappears [9].

2.5.5. Test for steroids and terpenes

A volume of 500 μ L of each plant extract was mixed with 2 mL of conc. H_2SO_4 and 2 mL of chloroform. The development of red colour at the interface indicates the presence of steroids and the development of the reddish brown colour at the interface indicates the presence of the terpenes [9].

2.5.6. Test for alkaloids

Diluted HCl was added to a 500 μ L of each plant extract drop wise and the mixture was stirred and filtered. Hager's reagent (1% picric acid) was added to the filtrate to check the formation of a yellow colour precipitate which indicates the presence of alkaloids [9].

2.5.7. Test for reducing sugar

Few drops of Fehling's solution were added to the 500 μ L of each plant extract and it was then heated to check the formation of brick red colour precipitation [9].

2.6 Antioxidant capacity

2.6.1. Folin-Ciocalteu's method

A volume of 100 μ L of methanolic extract was mixed with 2 mL of 2% (w/v) sodium bicarbonate and was incubated at room temperature for two minutes. Then 0.100 mL of Folin-Ciocalteu reagent was added and was incubated for 30 minutes under dark conditions. Absorbance values were measured at 750 nm. A pyrogallol standard curve was developed using a series of pyrogallol standard solutions in methanol. The antioxidant capacity of each extract was determined in terms of pyrogallol equivalents (PGE) using the pyrogallol standard curve. This protocol was carried out in triplicates for each sample [9], [16].

2.6.2. DPPH radical scavenging assay

Known concentrations of DPPH stock solution and crude extracts were prepared in methanol. Test blank was prepared by mixing 1950 μL of methanol and 50 μL of the extract. Test sample was prepared by mixing 1950 μL of DPPH with 50 μL of extract. After incubating under dark conditions for 30 minutes the absorbance of the test sample was measured against the test blank and the absorbance of the control sample was obtained by measuring the absorbance of the control sample (2 mL of DPPH solution) against the control blank (2 mL of methanol) at 517 nm. All samples were tested in triplicate. The percentage of Radical Scavenging Activity (% RSA) was calculated for each sample using the following equation (1) [11].

$$RSA \% = \frac{Absorbance_{control\ sample} - Absorbance_{test\ sample}}{Absorbance_{control\ sample}} \times 100\% \quad (1)$$

2.7. Antibacterial activity

Disk diffusion assay was carried out against *Bacillus cereus* (ATCC11778), *Staphylococcus aureus* (ATCC 25923), *Salmonella typhimurium* (ATCC 14028) and *Echerichia coli* (ATCC 35218). Negative control was prepared by loading the solvent to dissolve the plant extract and 1 mg/mL gentamycin solution was as the positive control. After 24 hours of incubation at 37 °C, the diameters of the inhibition zones were measured using a vernier caliper. All experiments were carried out in triplicate. Investigation of cytotoxic effects of selected plant extracts.

2.8. Investigation of the antidiabetic activity of the plant extracts using α -amylase inhibitory assay

A volume of 200 μL of each plant extract was placed in a test tube and 200 μL of alpha amylase in 0.02 M phosphate buffer (pH 6.9) was added to each extract. Then the mixture was kept at room temperature for 15 minutes and 1% starch in phosphate buffer was added. Again, the mixture was kept at room temperature for 15 minutes. A volume of 400 μL of 3,5-Dinitrosalicylic acid (DNS) was added to the solution and then the test tube was kept in a boiling water bath for 5 minutes. (DNS solution was prepared by mixing 0.1 g of DNS, 0.16 g of NaOH and 2.99 g of sodium potassium tartarate in 10 ml of phosphate buffer.) The reaction mixture was cooled to room temperature and each was diluted by adding 1 ml of distilled water. This test sample was blanked with the same mixture which was made by adding 400 μL of buffer instead of DNS reagent. Control sample was prepared by making the same mixture but adding acetone instead of plant extract which was the solvent used to dissolve the extractions. Control sample was blanked with the same mixture where 400 μL of buffer used instead of DNS reagent. Absorbance of the test sample and the control sample was measured at 540 nm using a UV- visible spectrophotometer and the percentage inhibition was calculated using following equation (2) [9].

$$\text{Percentage inhibition \%} = \frac{Absorbance_{control\ sample} - Absorbance_{test\ sample}}{Absorbance_{control\ sample}} \times 100\% \quad (2)$$

2.9. Formulation of fish feed using air-dried papaya peel ethanolic extract

Fish feed was formulated using bread crumbs (carbohydrate source), gelatin (protein source and as a binder), ethanolic papaya peel extract (pigments, antioxidant and antibacterial compounds) and corn oil (lipid source). Incorporation of corn oil in to the fish feed has been reported to help in higher retention of pigments in guppies. A clear difference of pigmentation of the body colour to the naked eye is an important criterion when buying ornamental fish by customers, a visual sensory evaluation was carried out to grade the skin coloration of the treated fish groups of this study.

3. Results and discussion

3.1. Investigation of the effect of drying methods and extraction conditions used on papaya peel

3.1.1. Percentage yield of papaya peel extracts

Table 3.1. Percentage yield of papaya peel extracts with different drying methods and solvents.

Drying method	Percentage yield (%)		
	solvent		
	EtOAC	Ethanol	Hexane
Oven dried (50 °C)	0.3	24.3	0.3
Oven dried (80 °C)	0.7	6.2	1.7
Air dried	1.8	11.2	2.4
Freeze dried	0.1	1.5	0.3

Since the quality and the quantity of natural product that are extracted from papaya peels could be dependent on the processing and extraction conditions that are utilized, the yields and bioactivity data for differently obtained extracts were compared (Table 3.1). Highest percentage of yield (24.3%) was obtained for the ethanolic extract of oven-dried (50 °C) papaya peels. Out of the four different drying methods, the lowest percentage yields (less than 2%) were recorded for the freeze dried samples. Ethanolic extract of air-dried sample also showed a significant percentage yield of 11.2%.

3.2 Characterization of the crude plant extracts using photochemical analysis

3.2.1. Thin Layer Chromatography (TLC)

Table 3.2. R_f values of pigments on TLC

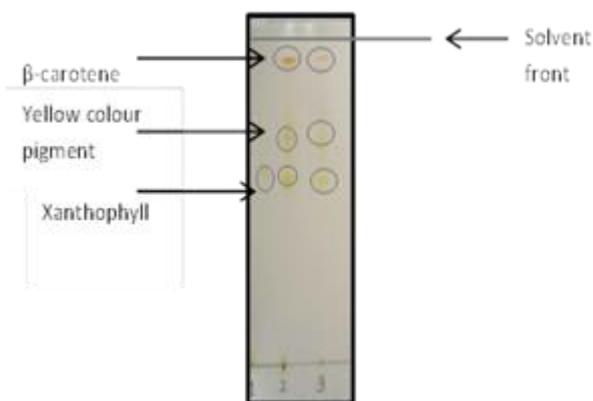


Figure 2.1- A sample thin layer chromatogram of papaya extracts (lane 1- ethanol extract, lane 2- EtOAc extract, lane 3- hexane extract)

Well separated band pattern, colours of bands and variation of R_f values of each extract were different from each other and it proved that different compositions and amounts of pigments in extracts have given rise to the distinctive colours observed. In addition, it was observed that drying method and solvent polarity clearly affects the extraction efficiency of different pigments. However, any of the extracts obtained from freeze drying did not give rise to any significant band pattern with colour spots suggesting that the amounts of pigments in the freeze dried samples was low. Band patterns and colour intensities were also different from solvent to solvent proving the doctrine of "like dissolves like" where polar pigments dissolve more in polar solvents and non-polar pigments prefer to dissolve in non-polar solvents more. However, β - carotene ($R_f = 0.94$), xanthophyll ($R_f = 0.50$), and lycopene ($R_f = 0.81$) which might found in papaya peel having hydrocarbons prefer to dissolve in EtOAc and hexane where the yellowish orange colour bands were observed.

3.2.2. UV-Visible spectrometry

Highest value of 5.2 $\mu\text{g/mL}$ was shown by ethyl acetate extract of air- dried sample. Ethanolic extract was found to contain 2.5 $\mu\text{g/mL}$ of carotenoids (Table 3.3).

Table 3.3. Concentration of carotenoids in papaya peel extracts

Method of drying	Solvent	Concentration of carotenoids ($\mu\text{g/mL}$)			
		Oven dried (50 °C)	Oven dried (80 °C)	Air dried	Freeze dried
Papaya peel	EtoAC	0.2	1.3	5.4	0.2
	Ethanol	0.2	0.9	2.5	0.3
	Hexane	0.6	0.8	1.7	0.0

Band	R_f values obtained	Literature published R_f value [12]
β -carotene	0.94	0.94
Lycopene	-	0.81
Xanthophyll	0.43-0.63	0.50

The concentration of carotenoids of all the extracts was higher for the air-dried samples. The reason for the low carotenoid concentration in oven-dried (50 °C) could be because of the less extractability of carotenoids due to the breaking of protein-carotenoid complexes at low temperatures is significantly low. However, when oven dried at 80 °C method compared with higher concentrations of air-dried extracts, it can be assumed that probably the degradation of pigment prevails than the enhancement of extractability. Negligible amount of carotenoids in the extracts obtained from for the freeze dried samples again suggests the fact that freeze drying method is not a good drying method of extractions of carotenoids.

3.3. Investigation of selected biological activities of the extracts obtained from avocado and papaya waste materials

3.3.1. Antioxidant activity

Table 3.4. Antioxidant capacity (AOC) of papaya peel extracts

Solvent	Antioxidant Capacity-(AOC) (PGE $\mu\text{g/mg}$)			
	Oven dried (50 °C)	Oven dried (80 °C)	Air dried	Freeze dried
EtOAc	5 \pm 2	3 \pm 1	10 \pm 1	2 \pm 0
Ethanol	18 \pm 6	5 \pm 1	22 \pm 2	12 \pm 4
Hexane	5 \pm 4	2 \pm 0	3 \pm 0	1 \pm 0

Table 3.5. Percentage Radical Activity of papaya peel extracts

Highest antioxidant capacity of 22 PGE $\mu\text{g/mg}$ in the Folin-Ciocalteu's assay as well as the highest DPPH radical scavenging activity of 96% was recorded for the ethanolic extract of the air-dried peels whereas the lowest AOC and DPPH radical scavenging activity was shown by the hexane extract of the freeze-dried sample (Table 3.4 and 3.5). Among the tested solvents, ethanol is the best solvent to extract natural antioxidants present in papaya peels compared to other solvents. Furthermore, air drying method

Solvent	Percentage Radical Scavenging Activity (RSA) (%)			
	Oven dried (50 °C)	Oven dried (80 °C)	Air dried	Freeze dried
EtOAc	26 \pm 8	57 \pm 24	92 \pm 27	35 \pm 10
Ethanol	96 \pm 28	44 \pm 13	96 \pm 28	96 \pm 28
Hexane	18 \pm 6	25 \pm 7	55 \pm 16	18 \pm 6

can be considered as the best drying method to retain the best percentage of antioxidant compounds compared to other methods. Therefore, air drying method was selected to prepare the necessary papaya extracts for further investigations since the initial parameters such as the carotenoid content, total AOC and radical scavenging activity were higher for the air dried samples compared to other three drying conditions and air drying could be easier and more economical approach that can be commercially effective during value addition process to these papaya peel.

3.3. Phytochemical analyses of the papaya extracts

Table 3.6. Phytochemical analysis of air-dried papaya extracts

Phytochemical test	solvent		
	Ethanol	EtOAc	Hexane
Tannins and phenols (a) FeCl ₃ test	†	–	–
(b) Lead acetate test	–	–	–
Saponins	†	–	–
Flavonoids	–	–	†
Terpenes and steroids	†	†	†
Alkaloids	–	–	–
Reducing sugars	†	†	–

(†) - positive result - presence of particular phytochemical compound and (–) - negative result - absence of the particular phytochemical compound)

The phytochemical analyses is considered effective in discovering the secondary metabolites present in plants which give rise to bioactive profile of plants. Several different phytochemical tests were carried out to investigate the presence and absence of corresponding bioactive compounds in air dried papaya peel. Ethanoilc extract gives positive results for saponins, tannins or phenols, terpenes or steroids and reducing sugar except for flavonoids and alkaloids. Due to the absence of the most of the phytochemical compounds tested, it can be considered that the differential extraction of plant metabolites depend on the solvent of choice.

3.3.2. Antibacterial activity

Only the ethanolic extract of air-dried papaya peels showed a small inhibition zone against *Pseudomonas aeruginosa*. Even though, the papaya peel extracts tested during this study did not result in significant antibacterial activities against the tested bacterial species, previous studies have reported the inhibitory activity of papaya peel ingredients against *Staphylococcus aureus* [13]. This difference might be due to differences in the extraction process or the regional difference of plant source.

3.4.3. Antidiabetic activity

Table 3.4. Percentage inhibition of α -amylase in papaya peel extracts

Solvent	Percentage inhibition of α - amylase (%)
Ethanol	32 \pm 5
EtOAc	37 \pm 6
Hexane	34 \pm 15

The antidiabetic activity of the air-dried papaya peel extracts was investigated using the α -amylase inhibitory assay. The highest percentage inhibition of α -amylase enzyme that correlates to the antidiabetic activity was obtained for the ethyl acetate extract of papaya peels (37%). (Table 3.7) However, the other papaya extracts also displayed comparable α -amylase inhibition. It has been reported that aqueous extract of papaya unripe fruit has antidiabetic activity[14]. But these moderate antidiabetic activity displayed by the papaya peel extracts could be an additional benefit if these extracts are utilized in food supplements.

3.5. Formulation of a fish feed based on the ethanolic extract of air-dried papaya peels to enhance the skin colour and healthiness of guppies

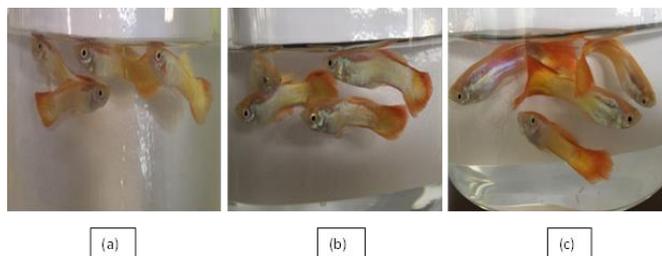


Figure 3.1-Three guppy groups used for the visual sensory evaluation ((a) - Fish group fed with feed 1 (feed with no pigment), (b) - Fish group fed with feed 2 (feed with 2% of extract), (c) - Fish group fed with feed 3(feed with 4% of extract)

Table 3.5. Results of the visual sensory evaluation of the fish fed with different fish feed

The ethanolic air dried papaya peel extract with the higher amount of pigment (2.5 µg/mL) was selected to prepare the fish feed as it showed both high antioxidant (AOC - 22 PGE µg/m and RSA of 96%) and antibacterial activity.

According to the results indicated in Table 3.8, after each fish group was fed with differently formulated feeds for 10 days, it was evident that the feed enriched with the ethanolic papaya peel extract was capable of significantly enhancing the pigmentation and skin colour of guppies. A remarkable percentage of evaluators (99%) agreed that the fish fed with a feed containing either 2% or 4% papaya extract displayed a higher visible enhancement of skin colour than the fish group fed with a feed lacking the papaya extracts (Figure 3.1). These results also suggested that the extent of pigment enhancement clearly depends on the concentration of carotenoids containing extract that was added to their feed.

During the feeding period, a 13% mortality was observed with the fish group fed with the feed lacking any pigment source, whereas, no mortality was observed in the fish groups that were fed with a feed containing the natural papaya pigment extract. This indicates that the incorporation of carotenoid rich papaya peel extract could additionally enhance the healthiness of fish. This could be due to the presence of antioxidant and antibacterial agents in these natural extracts as observed during our tests for different classes of natural products. Formulation of a fish feed using the papaya peel extracts as stated above could be beneficial towards enhancing the skin colour of fish as well as their healthiness.

As previously explained due to the deteriorating effect and higher cost of synthetic pigments, natural colouring agents are being promoted for the formulation of fish feed.[15] Therefore, the fish feed formulated with papaya peel waste could be a great solution for aquaculture as well as for the waste management process of papaya.

Table 3.6. The visual sensory evaluation results for the fish fed with commercial and papaya extract

Statement on the intensity of skin colour of guppies	Percentage of evaluators in agreement (%)
Fish fed with feed 1 (feed with no pigment) has the most intense skin colour	3
Fish fed with feed 2 (feed with 4% of the pigment) has the most intense skin colour	94
Fish fed with feed 3 (commercial fish feed) has the most intense skin colour	3

The newly formulated fish feed based on papaya peel extract was further compared to a commonly available commercial fish feed in Sri Lankan aquaculture market in order to understand its applicability and compatibility in the current competent market. Results of this study are indicated in Table 3.9.

statement about the intensity of skin colour of guppies	Percentage of evaluators in agreement (%)	Mortality percentage (%)
Fish fed with feed 1 (feed with no pigment)has the most intense skin colour	1	13
Fish fed with feed 2 (feed with 2% of the pigment) has the most intense skin colour	9	0
Fish fed with feed 3 (feed with 4% of the pigment) has the most intense skin colour	90	0

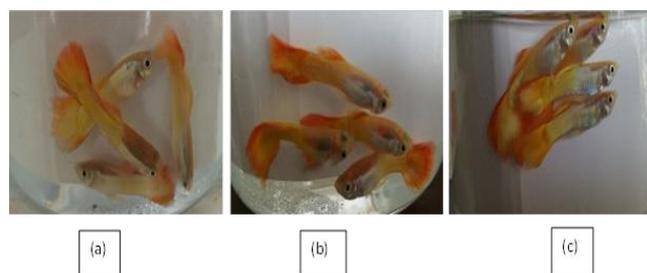


Figure 3.2 - Three guppy groups used for the evaluation assay ((a) - Fish group fed with feed 1(feed with no pigment), (b) - Fish group fed with feed 2 (feed with 4% of extract), Fish group fed with feed 3 (commercial fish feed))

A significant percentage (94%) of the evaluators agreed that there was a clear improvement in the skin colour of the fish group fed with feed 1 that was prepared using the pigment rich papaya peel extract (Figure 5). Only 3% of the evaluators ranked that the fish fed with the commercial feed had the most intense skin colour. This result indicates the effectiveness and the reliability of the of the newly developed papaya peel extract based fish feed towards colour enhancement of ornamental fish in a cost effective manner.

Conclusion

Different drying methods were compared to identify the best method which removes the highest water content with maximum retention of important bioactive components intact. Dried plant materials are easy handle due to prolong storage capability. The chance of bacterial and fungal effect on dried plant parts will be less compared to fresh plant parts and also the removal of excess water concentrates the metabolites inside the cell. Since the extraction was carried out using organic solvents, presence of water can create an immiscibility lowering the extraction efficiency. Air drying methods would be commercially effective and at same time the bioactivity of air-dried extracts were relatively high. Formulation of a low cost fish feed using these important biological activities of papaya peel extracts was succeed to enhance the skin colour and the healthiness of guppies. Pigmentation is one of the important quality attributes of the fish for consumer acceptability. The proper formulation of

food that can ensure the pigmentation and the healthiness of fish is one of the significant requirements in the aquarium fish market. Today, fish feeds are formulated using different types of pigments such as carotenes (synthetic β - carotene), animal based natural carotenoids (shrimp meal, shrimp oil) and plant based natural carotenoids (marigold, sea weed) [15][16]. Due to the chemical residues that remain with synthetic pigments and higher cost associated with fish feed prepared using synthetic carotenoids, use of natural extracts that are rich in carotenoids, antioxidants and antibacterial compounds would be more desirable towards formulation of a fish feed with promising benefits.

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Microbial Analysis and Proximate Composition of Boiled and Fried Local Cheese (WARA)

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Abstract- Fried cheese locally called Wara gets spoiled when attacked by pathogenic bacteria, as a result of poor hygiene practice by the producer and handlers. Wara samples were bought in Ilesha at Atakumosa market square Osun-state. This research was designed to isolate and enumerate microorganisms using standard microbial methods, proximate composition and the nutritional composition of boiled local and fried cheese (wara). Proximate analysis was carried out to determine nutritional composition. *Klebsiella* species and *Esherichia coli* *Staphylococcus epidermidis*, *Bacillus* species, *Escherichia coli*, *Salmonella* species, *Streptococcus* species, *Clostridium* species and *Lactobacillus* species were isolated using standard technique. The highest bacteria count for the fried cheese was 2.1×10^5 cfu/ml the lowest bacterial count was 1.5×10^5 cfu/ml unit highest bacterial count of the boiled local cheese was 4.4×10^5 (cfu/ml), lowest bacterial count was 1.8×10^5 (cfu/ml) while the range of the values was 2.6×10^5 . Fungi isolated were *Penicillium* and *Gymnoase*. Fat content for the boiled cheese has the highest mean value of 44.78 ± 0.028 cfu/ml and Ash had lowest mean value of 2.46 ± 0.014 cfu/ml. The moisture content of fried cheese had the highest mean value 55.32 ± 0.014 while the carbohydrate had the lowest mean value 0.63 ± 0.02 for fried chesse. Fibre content was not detected in both samples. The microbial contamination might generally occur based on lack of standardization, fecal contamination and poor personal hygiene in the production, handling and storage. Therefore, all cheese producers and consumers should take care during processing and storage of the cheese to prevent contamination.

Index Terms- Pathogenic bacteria, Microorganisms, Proximate composition and Microbial methods

I. INTRODUCTION

Cheese (wara) it is a Nigerian soft, white, unsalted and unripened cheese usually processed from cow milk by the Fulani tribes who are mainly cattle rearers in Nigeria (Raheem, 2006; Ogunbanwo *et al.*, 2011). Wara making started with the Fulani's but as a result of their nomadic lifestyle, it spread to other parts of the country including Kwara, Oyo, Ogun, Ondo and the Benin Republic (Raheem, 2006).

It is obtained by coagulating the casein with rennet or similar enzymes in the presence of lactic acid produced by adding microorganisms (Adegoke *et al.*, 1992). However in many cases starter culture are not used as processing condition

are not standardized (Adetunji, 2011). It could also be coagulated with the juice extract of leaf of sochom apple (*Colotropis procer*) or pawpaw). (Augusti, 1996; Adetunji and Alonge, 2009; FAO, 2009).

Cheese is usually stored in its whey and consumed fresh, but this can only last for 3-5 days after which spoilage occurs. It is sometimes fried and used as a meat-substitute in stews and soups, or smoke-dried to enhance its keeping qualities. However, all these increase its shelf life by only a few extra days or few weeks at best (Belewu *et al.*, 2005).

Cheese is made mostly from the milk of cows, buffaloes, sheeps or goats, and it is an important food component in the healthy diet of human's highly nutritious rich food and source of protein, peptides, aminoacids, vitamins, salt, and essential minerals including calcium (Augusti, 1996; Belewu and Aina, 2000). Cheese however, has been shown to have antimicrobial properties that prevent disease, it has been used as drugs for certain infection when common antimicrobial agents failed it had also been found that soft cheese has growth inhibitory activity against common bacteria that caused diarrhoea in South West Nigeria (Ibrahim and Falegan, 2013).

Microorganisms such as *Streptococci*, *Lactobacilli*, Coliform bacteria and some fungi are associated with milk and milk products (Baba *et al.*, 2004; Raheem and Saris, 2009). The consumption of cheese is of utmost public health importance and high consumption rate in Nigeria calls for the periodical examination of cheese produced in different locality.. The study was designed to isolate and identify microorganisms found in both fried and boiled cheese; to determine the proximate composition and assess the best form of cheese for humans consumption.

II. MATERIALS AND METHOD

2.1 Study Area

The cheese sample (Wara) used for this study was purchased from Ilesha West Local Government at Atakumosa market square in Osun state, Nigeria. The market was sited close to the place of the king of the town (Ereja square) on the outskirts of the city of Ilesha. The total population according to 2006 census was 103,555 having the total area as 63 km^2 (24 sq mi) and the coordinate of $7^\circ 39' \text{N } 4^\circ 43' \text{E}$.

2.2 Techniques for preparation of media

2.2.1 Sterilization Technique

The glassware used was thoroughly washed with detergent rinsed with distilled water and air dried. The glassware were wrapped with aluminum foil paper and sterilized in an autoclave at 121°C for 15 minutes.

2.2.2 Collection of Samples

Wara sample processed traditionally by Fulani woman were bought in highly populated location in Ilesha at Atakumosa Market Ilesa Osun State, Nigeria. The Fried cheese was bought into a sterile plastic plate and transported to Microbiology laboratory for analysis within 2 hours of purchase.

III. PREPARATION OF MEDIA

3.1 Nutrient agar: This was prepared according to manufacturer's description. Seven (7g) of nutrient agar powder was weighed and dissolved into 250 ml of distilled water. It was heated to get it homogenized and allowed to change to golden yellow before it was autoclave at 121°C for 15 minutes.

3.2 MacConkey Agar: This was prepared according to manufacturer's description. 14g of MacConkey agar powder was weighed and dissolved in 250ml of distilled water and homogenized using heat to boil. This was then sterilized by autoclaving at 121°C for 15minutes.

3.3 Agar Slant Agar slant were prepared by dispensing 15ml of nutrient agar into different MacCartney bottles. The bottles were placed in a slanting position and allowed medium to gel.

3.4 Serial dilution of Samples Five grams (5g) of the cheese was meshed using the crucible and pestle, serial dilution was done by measuring 9ml of sterile water into first test tube till the tenth test tube. 1ml of the sample was then added into each labeled and properly covered test tube using a sterile syringe. 1ml was then taken from 10⁵ or the fifth test tube into a petridish and gently swirled and allow to set. The petridishes were then incubated at 37°C for 24 hours. After the incubation, the colonies that developed on nutrient agar plate were counted and used to determine the total bacteria count of the sample (cfu/ml). The representative colonies on the plates were sub-cultured on a fresh nutrient agar to obtain a pure culture of isolates. The pure culture was then transformed into nutrient agar slant for biochemical test.

3.5 Isolation and identification of the bacteria

Distinct and well isolated colonies were sub-cultured and examined for various sizes, shapes, colours and texture, a series of tests such as Catalase, Oxidase, Indole, Nitrate reduction, and sugar fermentation were carried out to identify the bacteria according to (Cheesbrough, 2006).

3.6 Isolation of Fungi

Nine point eight gram (9.8g) of Potato Dextrose Agar (PDA) powder added with antibiotics (to inhibit the growth of

bacteria) was dissolved into 250ml of sterile water and autoclaved at 121°C for 15 minutes and allowed to cool before pouring aseptically into the petridishes. The prepared potato dextrose agar (PDA) was aseptically dispensed into the Petri dish containing the sample and swirled gently before cooling. The plate was then incubated in an incubator at 26°C for five (5) days before observation (Onyeagba, 2004).

3.8 Proximate Analysis of Nutritional Composition of Fried Cheese

This refers to the determination of the major constituents of food sample and it is used to assess if a sample is within its normal compositional parameters or somehow been adulterated. This method partitioned nutrient in food sample into six components: ash, crude protein, fat, crude fiber, moisture content, and carbohydrate (FAO, 2008).

IV. RESULT

Table 1: It shows the total bacterial count in fried cheese calculated in colony forming units per ml, the sample four had no bacterial population .

Table 2: Total bacterial load of boiled local cheese (wara) samples calculated in colony forming units per ml, all the sample had bacterial population which varies from sample one till sample five

Table 3: It shows the morphological characteristics and biochemical test of bacteria isolate from boiled local cheese (wara) based on size, texture, colour, opacity, surface, elevation and margin.

Table 4: It shows the morphological characteristics and biochemical test of bacteria isolate from fried local cheese (wara) is based on size, texture, colour, opacity, surface, elevation and margin.

Table 5: It shows the count for fungi isolated in the fried cheese sample. The fungi isolate were: *penicillium* spp and *Gymnoaseus* sp.

Table 6: Proximate analysis showing the nutrition evaluation of cheese, which is based on Moisture content, Fat, Fibre, Crude protein and Carbohydrate.

Table 7: Statistical analysis of proximate composition shows mean Standard deviation, Variance and Coefficient of variation.

Figure 1: Bacterial count in fried cheese which is calculated in colony forming units per ml. .

Figure 2: Bacterial load of local cheese (wara) samples.

Figure 3: The boxplot of the statistical analysis of proximate composition

TABLE 1: Total bacterial load of Fried Cheese (wara) sample

Replicate	Sample 1(Cfu/ml)	Sample 2(Cfu/ml)	Sample 3(Cfu/ml)	Sample 4 (Cfu/ml)
R 1	1×10^5	2×10^5	2×10^5	0
R 2	2×10^5	1×10^5	2×10^5	2×10^5
Mean	1.5×10^5	1.5×10^5	2×10^5	1×10^5
SD	0.70710	0.70710	0	1.41421
CV	47.40	47.140	0	141.421
VAR	0.5	0.5	0	2

Keys:

SD: Standard deviation

VAR: Variance

CV: Coefficient of variance

Table 2: Total bacterial load of boiled local cheese (wara) samples.

Replicate	Sample 1 (Cfu/ml)	Sample 2 (Cfu/ml)	Sample 3 (Cfu/ml)	Sample 4 (Cfu/ml)	Sample 5 (Cfu/ml)	Sample 6 (Cfu/ml)
R1	4.5×10^5	3.3×10^5	2.7×10^5	1.8×10^5	2.1×10^5	1.7×10^5
R2	4.3×10^5	3.7×10^5	3.0×10^5	2.3×10^5	1.5×10^5	2.6×10^5
Mean	4.4×10^5	3.5×10^5	2.85×10^5	2.05×10^5	1.8×10^5	2.15×10^5
SD	1.4142136	2.8284271	2.1213203	3.5355339	4.2426407	6.363961
CV	3.2%	8%	7.4%	17%	24%%	29%
VAR	2	8	4.5	12.5	18	40.5

KEYS:

SD: Standard deviation

CV: Coefficient of variation

VAR: Variance

R1:Replicate 1

R2: Replicate 2

TABLE 3: Morphological characteristics and biochemical test of Bacterial isolates from fried local cheese (wara)

Edge	Colour	Surface	Size	Optical	Spore staining	Gram staining	Methyl red	VP	Indole	Motility	Hydrogen sulphide	Glucose	Sucrose	Probable organism
Round	Cream	Smooth	Small	Translucent	-	-	+	+	-	+		G	G	<i>Klebsiellia</i> spp
Entire	Cream	Smooth	Small	Opaque	-	+	+	+	+	+	-	G	G	<i>Lactobacillus</i> spp
Entire	Cream	Dry smooth	Big	Opaque	-	-	+	-	+	-	-	G	G	<i>Escherichia coli</i>
Round	cream	Dry smooth	Small	Translucent	-	-	+	-	+	-	-	G	G	<i>Salmonella</i> spp

Table 4: Morphological characteristics and biochemical test of bacterial isolates from boiled local cheese (wara)

Probable Organisms	Shape	Size	Texture	Color	Opacity	Edge	Gram stain	Spore stain	Methyl red	catalase	Indole	Motility	VP	H ₂ S	Lactose	Glucose	Sucrose
<i>Bacillus</i> spp	Rod	Small	rough	Cream	opaque	entire	+	+	+	+	+	+	+	-	A	A	A
<i>Streptococcus</i> spp	Cocci	Small	rough	Cream	opaque	entire	+	-	+	+	+	-	-	-	-	A	A
<i>Clostridium</i> spp	Rod	Small	smooth	Yellow	opaque	center	+	+	+	+	+	-	+	+	-	AG	AG
<i>Lactobacillus</i> spp	Cocci	Small	smooth	Cream	opaque	entire	+	-	-	+	-	-	-	+	G	AG	AG

<i>Staphylococcus epidermidis</i>	Cocci	Small	smooth	Cream	opaque	center	+	-	-	+	-	-	+	+	-	AG	AG
<i>Escherichia coli</i>	Rod	Small	rough	Pink	opaque	center	-	-	+	+	+	+	-	-	AG	AG	AG

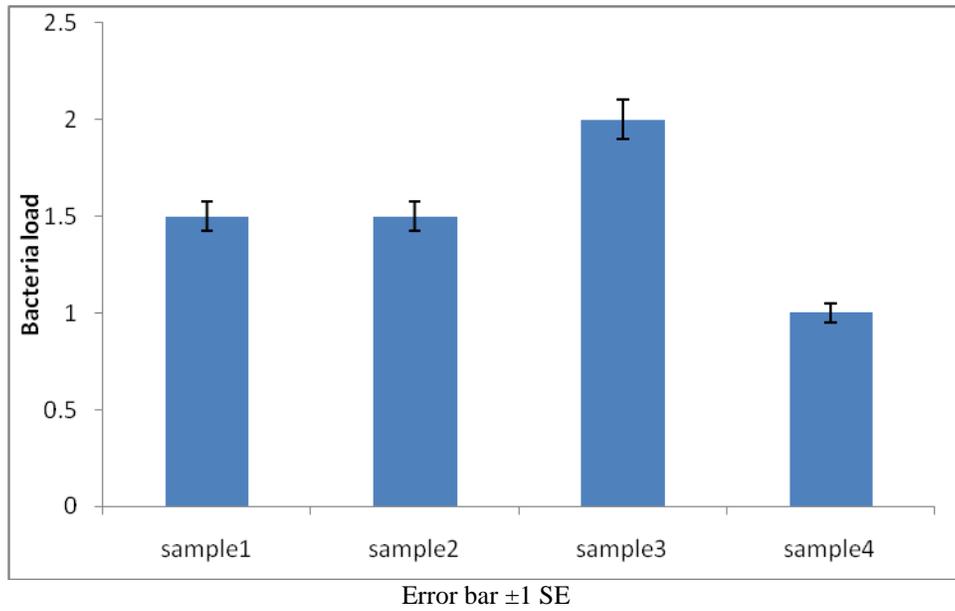
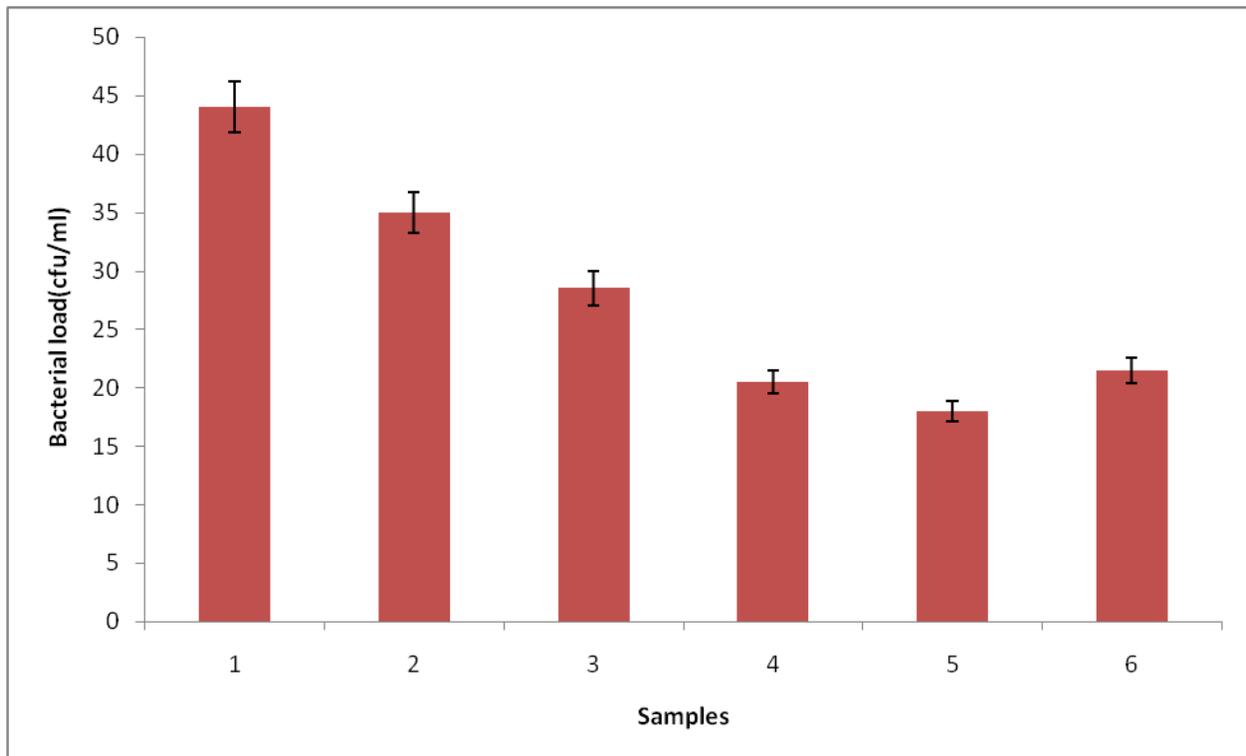


Figure 1: Bacteria count in fried cheese.



Error bar ± 1 SE

Figure 2: Bacterial load of local boiled cheese (wara) samples.

Table 5: Total fungi count in fried cheese (Wara)

Sample	Cfu/ml	Fungi organism
10 ³	6×10 ³	<i>Penicillium</i> spp
10 ⁵	4×10 ⁵	<i>Gymnoase</i> spp

Table 6: Proximate analysis result showing nutritional evaluation in fried cheese

S/N	%Ash	% MC	%CP	%Fat	%Fibre	%CHO
R1	2.45	10.33	21.11	44.8	0	21.31
R2	2.47	10.31	21.1	44.76	0	21.36
Mean	2.46	10.32	21.105	44.78	0	21.335
SD	0.014142	0.014142	0.007071	0.028284	0	0.035355
VAR	0.002	0.002	5E-05	0.008	0	0.0125
CV	0.05749	0.0137	0.335	0.0632	0	0.01657

Sample	2.46±0.014	10.31±0.014	21.1±0.007	44.76±0.02	0	21.36±0.03
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Keys:

MC: Moisture Content
 SD: standard deviation
 VAR: variance
 CV: coefficient of variance
 CP: Crude protein
 CHO: Carbohydrate

Table 7: Statistical analysis of proximate composition in boiled cheese

Replicate	ASH	MC	CP	FAT	FIBRE	CHO
R1	1.16	55.31	18.11	24.78	0	0.64
R2	1.18	55.33	18.12	24.76	0	0.61
Mean	1.17	55.32	18.115	24.77	0	0.625
SD	0.014142	0.014142	0.007071	0.014142	0	0.021213
CV	1.41%	0.03%	0.04%	0.1%	0	3.4%
VAR	0.0002	0.0002	5E-05	0.0002	0	0.00045

Sample	1.17±0.014 ^a	55.32±0.014 ^b	18.2±0.007 ^c	24.8±0.014 ^d	0 ^e	0.63±0.021 ^f
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Data are presented as Mean±SD (n=2) from duplicate determination. Different superscripts in the same column are significantly different (P<0.05).

Keys:

- MC: Moisture content
- CP: Crude protein
- CHO: Carbohydrate
- ND: Not detected

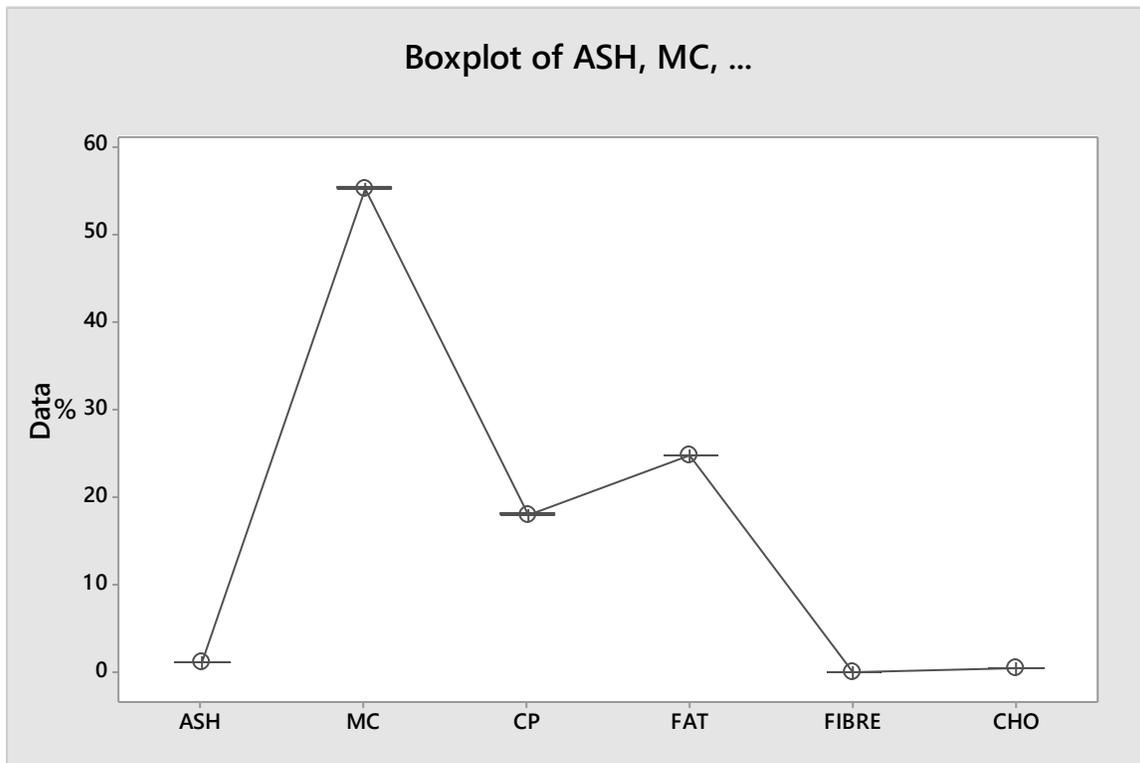


Figure 3: The boxplot of the statistical analysis of proximate composition

V. DISCUSSION AND CONCLUSION

The results obtained from the microbial analysis of fried cheese (wara) show that the products were contaminated with microorganisms of public health concern. The bacterial count in the sample may be a consequence of low level of hygiene maintained during the processing and sale of the products. This includes the handlers, quality of water used and the utensils. During the sale of fried cheese (wara), dirty hands and spoons are dipped into the bowl for product selection by both hawkers and consumers.

The exposure of wara and while they are displayed for sale in bowls can serve as source of contamination. The detection *Klebsiella* spp and *E.coli* in wara may indicates possible faecal contamination because the fulani's do not disinfect the teats and udders prior to milking despite the fact that the cow lies in a muddy barnyard and dirty environment which inevitably contaminate the milk and could increase the microbial load. The

presence of *Staphylococcus epidermidis*, as supported by the study of Ajayi *et al.* (2016) may lead to contamination of food and eventually affects the health of the consumers. The presence of *Bacillus* species which produces several toxins, being isolated in this study probably is an indication of poor hygienic habit of the milker milking the cow. *Clostridium* species isolated which are important cause of diarrhea inhabits the soil and intestinal tract of animals including humans and can cause food intoxication which is congruent to the findings of Ajayi *et al.* (2016). Being enteric bacteria, their presence indicates poor hygienic practices among handlers of wara. Due to the significance of the faecal-oral route transmission for many bacterial food-borne diseases, basic hygienic measures assume a decisive importance in food safety management (Alalade and Adeneye, 2006).

The detection of *Lactobacillus* species isolated from sample show that they are organism used for the production of cheese. *Lactobacillus* species allows the production of gas in lactose, sucrose and glucose Aworh and Egunlety (1985). They are motile, gram positive bacteria which tests positive for

catalase test. The fungal isolates: *Gymnoase* and *Penicillium*, species which were isolated are known as spore formers, which therefore means that they can easily contaminate the dairy products which are usually exposed during processing, storage, and hawking. They are major spoilage organisms of carbohydrate foods (Rhodes and Fletcher, 1966). However, their growth can result in the production and accumulation of mycotoxins which are of public health and economic importance (Burnett and Beuchat, 2001). The nutritional analysis of fried cheese shows that they are of appreciable nutritional status especially in the protein and fat content. The dairy products particularly cheese are good sources of protein. Higher fat content was observed in fried cheese wara. This could be due to vegetable oil used in frying of the cheese.

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The Unconscious Manifestations of the Image of Youth Characters in Phaswane Mpe's *Welcome to Our Hillbrow* (2001) and *NiqMhlongo's After Tears*(2007)

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Abstract: The image of youth characters portrayed in South African literature has traditionally focused on their manifest responses to the political issues of the different moments of the country's history, with little attention on the interiority of the concerned individuals' being. Unlike their counterparts in the apartheid regime, the post-apartheid generation of youth has lived in a supposedly freer environment, yet some have continually exhibited errant behaviour. Guided by the theory of psychoanalysis, this study investigated other possible psychological drives behind such behavior against the background of the prevailing post-apartheid environment of the selected novels. Through their coping mechanisms, dreams and stream of consciousness, we are able to access the characters' unconscious mind. Findings revealed that individuals' actions and behavior exhibited are mainly unconscious expressions of psychic emotions of disappointment, anguish, guilt, regret, and suppressed unpleasant experiences suffered in childhood.

Key Words: *Youth, Post-apartheid, Psychoanalysis, the Unconscious Mind*

Introduction

Youth is a crucial phase of life, a time when decisions made and actions undertaken impact the life of individuals in irreversible ways. Youth are a people still in the course of trying out possibilities in life in order to forge a future for themselves, and the environment they live in largely determines the kind of choices they make (McLeod (2013). This resonates with psychologist Erikson's view about youth as a phase of life during which a young adult, through free role experimentation, may find a niche in some section of his society (Erikson, 1968). In the context of the selected novels, the youth include university students, job seekers, and individuals whose lives are directly affected by the prevailing post-apartheid circumstances. The youth have played a fundamental role in shaping the history of South Africa. Specifically, the struggle for freedom from apartheid was a project of the youth (Gouws, 2016). Their continued

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struggle for restitution and inclusion in the present democratic space remains significant, yet literary representations of the image of the youth characters mainly trace their manifest responses to the political environment over time. As such, there is less critical attention on the psychological impact that the prevailing social-political and economic circumstances have had on the behavior of youth characters. Literary analyses depict the youth as an angry generation, constantly engaging in protest to agitate for change. Their frequent engagement in violence, xenophobia, crime and debauchery can be interpreted not only as indicators of dissatisfaction, but also as pointers to other underlying emotional problems. A psychoanalytic reading of the novels therefore provides the basis for exploring the extent to which the behavior of the youth is a manifestation of their unconscious mind, thereby enhancing a clear understanding of their personality and image.

The Image of the Youth in South African Literature

The youth are a unique group in as far as South Africa's history is concerned. Their role in the fight against apartheid and continued search for justice and equity in the current regime sets them apart. Apartheid policy perpetrated dehumanizing crimes against blacks until 1994 when it was officially abolished (Mattos,2012; Sefoto,2015). However, the question as to whether the constructs of apartheid were eliminated remains an emotive subject to especially the blacks. Apartheid discrimination and oppression formed the basis for youth agitation for change. In recognition of the crucial role played by the youth in the struggle for independence, South Africa commemorates 16th June as Youth Day (Inngs, 2014:414). This is an important date in history when the Soweto Uprising marked the height of youth activism and resilience in the political struggle that resulted in liberation from apartheid. It is worth noting that some of the youth depicted in the novels may not have directly taken part in the struggle, but are descendants of the heroes and are therefore heirs apparent to the 'fruits of the freedom'.

In an analysis of the literary representation of the youth over the different historical periods of South Africa, Nyamnjoh (2004) observes that the achievements made in affirming the integrity and humanity of the oppressed black masses through the struggle seem to have backtracked under the present democratic dispensation in South Africa. Mattos (2012) affirms that the end of apartheid only marked the collapse of legislated identities. While according to Crowell (2012), young and poor blacks make up the majority of South Africa's population, yet they are not being integrated into South Africa's social and economic spheres effectively because of current domestic policies. These arguments imply that even though the transition yielded some progress, numerous challenges have persistently defined the lives of the young people, majority of whom are blacks.

Gouws (2016) avers that the current generation of youth is a reminder of the promises that were not kept, and a community that was not created. This implies that the born-frees, the first generation of children born or growing up after apartheid was outlawed, are not benefiting from the fruits of the struggle, resulting in disillusionment. Poverty, poor quality education, unemployment and the large gap between the rich and the poor has created resentment and anger among the youth in the country, leading to an increase in youth-led protests, violence and crime. It is such marginalization and imbalances in the society that have bred hegemony and violence in the public sphere(Neocosmos,2008; Ramphela,2012).As a result, a number of youth characters have suffered anxiety and psychological conflicts displayed through defense mechanisms and other neurotic behaviour. In extreme cases, youth characters have resorted to acts of self destruction such as suicide, as is the case in Mpe's *Welcome to Our Hillbrow* (2001).

The policy of segregation of homelands during the apartheid regime also created the migrant labour system where most men remained separated from their families. This absence divorced them from actively taking part in the upbringing of their children, resulting in

negative social and economic implications for most families. The children, especially the sons growing up in violent times and without a father figure became a common phenomenon in South Africa (Rakometsi, 2008). In their article, *The Relationship between Individual's Perception and Father's Parenting and Formation of Object Relations and Defense Mechanisms*, Habibi, Nooripour and Fatimeh (2016: p. 66-7) argue that the absence of a father in the early stages of a child's growth hampers their personality development. Affected individuals are likely to suffer low self-esteem and high frequency of anxiety, mistrust and inability to sustain stable relationships in adulthood. The culture of single parenting, prevalent in the selected novels has evidently had a number of psychological effects on the youth, as depicted in Mhlongo's novel *After Tears*(2007) and Mpe's *Welcome to Our Hillbrow*(2001) in which the youth are brought up by struggling single mothers. This does not however underestimate the role played by single mothers in the society, the South African context having its exemption rooted in its distinct history of apartheid.

Post-1994 South African writing is credited for shifting focus from apartheid the system to how its legacy is affecting the now free nation. The post-apartheid writers are equally dwelling more on the interiority of people's ordinary lives, rather than the exterior manifestations of their circumstances, as was the case with protest writing (Ibinga,2004; Fai,2014). In their article, *Conceptualizing 'post-transitional' South African Literature in English*, Mackenzie and Frenkel (2010) acknowledge that South African literary production over the last decade has made significant contributions to issues that are of interest to the youth in the contemporary society. Some of the authors who have highlighted such concerns are NiqMhlogo and PhaswaneMpe. The novels under study have psychological plots in which most events 'happen' within the characters' mind. Mpe's *Welcome to Our Hillbrow* (2001), for example, reads like a reminiscence of the episode of the protagonist's entire life.

In a study that assessed the social formation of post-apartheid South Africa, Rotich, Illieva and Walunywa (2015) also trace the portrayal of youth over different historical periods. They conclude that at the moment, literature mainly captures the frustration at the slow pace of change in South Africa and how the youth, caught up in this, have reacted. Their discussion of Mhlongo's first novel *Dog Eat Dog* (2004) describes youth who are excited in the optimism of independence, but are sooner given to acts of protest, violence and immorality. However, their analysis does not delve into the interiority of the characters' unconscious mind for other possible psychological explanations to such behavior.

The democratic government is under criticism for failing to effectively dismantle the apartheid policies that have continued to haunt the blacks, such as those that deny them quality and affordable education. In the view of Remphele, "Verwoerd continues to triumph from his grave." (Ramphele, 2012:173). This indicates that the segregationist education policies founded by Verwoerd still determine the lives of the present generation of youth. Mhlongo's *After Tears* depicts a number of youth who are school drop-outs, and have taken to drug abuse, alcoholism and crime. The protagonist, Bafana (whose name denotes the young people), opts out of the university after losing interest in his academics and failing in the examinations.

The foregoing discussions point to the fact that the aspects that determine the behavior of the youth characters in the post-apartheid set-up are as numerous as they are ambiguous. In the view of Adamu (2016), the young generation is confronted with a limitation of humanity whose main cause is yet to be clearly established. Adamu observes that earlier, rebellion and violence had a justification: the struggle for liberation and equality, but at the moment, the cause remains ambiguous. Ambiguity here indicates a lack of clarity in as far as the motivation behind the behavior of the youth is concerned. Similarly, Seekings (1996:115-116) suggests that attention be shifted from the 'youth problem' to the actual causes of the problems facing the youth. On the same note, Ndebele (1988) advocates

for an investigation into the characters' interior manifestations of behavior, which, therefore calls for a shift of focus from the manifest responses of characters to the interiority of their unconscious actions.

Psychoanalysis explains external human behavior as a manifestation of the subconscious. According to Tyson (2006), psychoanalysis touches our most private being and reveals us to ourselves and to the world. Corey (2013) explains that characters who have experienced emotional turmoil suffer personality problems such as mistrust of others, fear of intimacy and inability to sustain meaningful relationships. This study mainly delves into the characters' private lives through their thought processes exhibited in their coping mechanisms, dreams and stream of consciousness. The concept of premeditated suicide is treated as a response undertaken by characters who cannot naturally alleviate their internal conflicts through the psychological coping mechanisms.

Theory and Methodology

This study is guided by the theory of psychoanalysis, with specific focus on Erikson's psychosocial concept and Freud's theory of personality. Psychoanalysis recognizes that childhood experiences influence the functioning of individuals in their later life (Freud, 2010), and offers explanations on why individuals react differently to circumstances around them (Friedman & Schustack, 2011). Psychoanalysis theory also provides guidelines for analyzing the human mind and understanding the behavior of individuals. Erikson's psychosocial concept incorporates cultural and social aspects into Freud's biological theory. He draws a relationship between one's self-concept and the role of socio-cultural environment in personality development (Schwartz, 2001). Psychosocial theory explains how the social relationships and an individual's environment influence their actions and behavior (Erikson, 1968).

Freud explains that the mind is divided into three psychical segments: conscious, pre-conscious and unconscious (Tyson, 1999). The unconscious being the storehouse of past experiences, emotions, fears, desires and wishes, as well as unresolved conflicts, most of which we do not want to remember for the fear of being overwhelmed by them (Tyson, 2006). To Freud, the unconscious is the substantially greater part of the human mind whose content is not easily accessible, but can be inferred from an individual's behaviour.

Psychoanalysis also explains defense mechanisms as ways in which we unconsciously repress the unpleasant and painful experiences from our conscious mind to alleviate anxiety. Without the defense mechanisms, the conscious mind would be much more vulnerable to negatively charged emotional input such as loss, fear, anxiety, guilt and sadness (Feist & Feist, 2003). It is worth noting that defense mechanisms do not effectively provide relief to traumatic experiences in all individuals. In extreme cases, trauma annihilates the sense of continuity, making affected persons to resort to self-destructive behavior such as suicide (Van der Kolk & McFarlane (1998: 494). This study interrogates the aspect of self-destructiveness by suicide in Mpe's novel *Welcome to Our Hillbrow*.

Another aspect of the theory of psychoanalysis that applies to this study concerns dreams. Dreams are a window to the unconscious mind, representing the condensed version of some of our thoughts, wishes and life experiences. According to Freud, we express unconscious contents of our mind through dreams, jokes and slips of the tongue (Tyson, 2006).

Psychoanalytic criticism therefore allows the researcher to gain understanding of the youth characters' behavior by investigating their psyche and actions in the prevailing post-apartheid circumstances of the selected novels.

This study adopted analytical research design. This was significant in aiding the researcher to review literature, collect and analyze qualitative data from the selected texts. Primary qualitative data was collected through textual analysis of the selected novels:

NiqMhlongo's *After Tears* and Phaswane Mpe's *Welcome to our Hillbrow*. Secondary data was collected mainly through reading of relevant literary journals, articles, books and other publications in the libraries and on the internet.

Qualitative content analysis technique was employed in data analysis. This is appropriate whenever a researcher intends to make interpretation of meaning from a book, and it enables one to gather information about how characters make sense of their world in the texts (McKee, 2004). Content analysis involves reading the texts to identify the relevant themes through analysis of stylistic devices of narrative such as the overt and discreet meaning of authorial comments, statements by characters and descriptions of the characters (Krippendorff, 2004). Commonly occurring themes, aspects of characterization and style that cut across the selected texts were identified and analyzed.

DISCUSSION

The psychoanalytic premise that external human behavior is a manifestation of the subconscious is key to the analysis of characters' behavior in this section. This study first looks at the coping mechanisms employed by the youth characters in Mhlongo's novel *After Tears* (2007), it then examines the aspect of self destructive behavior through suicide in Mpe's *Welcome to Our Hillbrow* (2001). The dream episodes and stream of consciousness are later assessed.

1.1 Coping Mechanisms in NiqMhlongo's *After Tears*

The defense mechanisms that youth characters have unconsciously employed to play out their conflicted, repressed emotions and to alleviate anxiety include: avoidance, reaction formation, projection and rationalization.

Mhlongo's novel *After Tears* (2007) depicts a university student, Bafana, whose failure and eventual drop-out from the university sink him deep in guilt, regret and self incrimination. Guilt is a product of intra-psycho conflict between the Id and the Superego as a result of the Ego's failure to regulate the demands of the Id and societal expectations. When guilt sets in, an individual experiences emotional turmoil characterized by feelings of anguish and inferiority. Coming from a deprived family background, failure becomes quite costly for Bafana to bear. He is caught up in a complex emotional dilemma on whether to confess or remain secretive about his failure. This leaves his life oscillating between lies and regrets. To alleviate the anxiety that comes with this, he unconsciously employs coping mechanisms, as discussed below:

i. Avoidance

Avoidance entails staying away from people or situations that are likely to make us anxious, especially when being close to them stirs up some unconscious repressed experiences or emotions. A person therefore finds it more relieving to opt out or stay away from situations or people that cause them anxiety. However, this only provides temporary escape from the problem but is not in itself a solution. In *After Tears*, Bafana leaves Cape Town after learning that he has failed in his examinations. He confesses that everything he had earlier found beautiful in the city had all of a sudden turned ugly. He leaves for home :Chiawelo in Johannesburg (Mhlongo, 2007, p.7). When the truth about his failure and the ploy of a secret marriage to a girlfriend, Vee is discovered, Bafana is unable to withstand the guilt. Upon being busted by his mother, the shame and embarrassment is so overwhelming that he leaves for Diepsloot on what he refers to as a self imposed exile. He further severs links with all friends and family members. This would give him the much needed space to candidly reconnect with the self. He says, "Feelings of failure, guilt and exposure battled furiously in my head. I needed to escape it all as quickly as possible. I needed to escape Mama and sis Zinhle and Vee" (Mhlongo, 2007, p.215). He gets this escape by moving away from home and cutting links with all relatives and friends. In a flashback, he reflects on all the drama that his

life has been, and confesses of how his troubled mind wandered over everything that had happened to him (p.216). This experience grants him a unique opportunity to learn his life lesson:

I had convinced myself that I didn't deserve to suffer any more. ... Through the window, I stared out into the fading light, thinking of my bad fortune, which was unquestionably well deserved...No one had been able to track me down...as I had changed my cell phone number.

(Mhlongo,2007: 216-217)

In this case, avoidance provides Bafana temporary escape from embarrassment, and a moment of reflection, but not a solution to the cause of his anxieties. His mind remains shuttling between guilt and self incrimination, which are forms of self punishment inflicted by his superego. The life of deception has not served him reprieve as he expected. He has instead been suffering psychological trauma and guilt, which have gnawed his mind and soul to the point of making him resolve that he did not deserve to suffer any more.

ii. Reaction Formation

Reaction formation refers to conversion of dangerous thoughts, feelings and impulses into their opposites such that the actions and conscious feelings exhibited are the opposite of what is buried in the unconscious. In *After Tears* during a visit that Bafana makes with his mother to Advocate Ngwenya's office, Bafana not only regrets having allowed himself to fail in his examinations but also admits that he was jealous of this man who had successfully gone through education and become an advocate. But he carefully conceals his envy, and what he exhibits from the outside is respect and admiration for the lawyer. He narrates:

It was difficult to penetrate Mama's mind as she hadn't uttered a single word all morning, but her silence was becoming oppressive, sending my mind on a long journey across all the great opportunities that I had wasted by failing my degree. ...I saw a piece of paper that had been pinned to the wooden door of Mr. Ngwenya's office. It had his name typed on it, as well as the word *Associate*. Out of nowhere jealousy went through me like a sword. (Mhlongo, 2007: 70)

Here, Bafana reveals how he is struck with jealousy at Lawyer Ngwenya's success. Coincidentally, this happens when Mama's silence is already torturing Bafana's mind with feelings of guilt and regret. From a psychoanalytic perspective, guilt and regret are punishment by the Superego for our unpleasant actions. Even though Bafana expresses admiration and respect outwardly, he is jealous on the inside, and mentally troubled by the reminder of his past failure and inability to be successful in life, and to live to his mother's expectations. The Superego, governed by morality, quests for perfection and morality. Our conscience makes up the superego. The superego is also related to psychological rewards and punishments; the rewards including feelings of self-love, while punishment include feelings of guilt, shame, remorse and inferiority (Feist & Feist, 2009; Corey, 2013, p.65). Bafana's past failure has deprived him of self-love, his conscience is clouded in guilt and regret. It is interesting how, through reaction formation, he feigns admiration and respect for the lawyer he is jealous of.

iii. Projection

This is a defense mechanism whereby people conveniently see their own unpleasant actions and weaknesses in others in order to avoid a negative evaluation of themselves (Tyson,2006). In Mhlongo's *After Tears*, Bafana is confronted with a painful reality: he has

failed in his university examinations. Bitterness and guilt torture his mind, and whenever this happened, he projected on his uncle Nyawana and his friends. He finds negative description for their personality. At the bus stop where they have come to receive him, Bafana's haughty attitude reveals in his description of his uncle and company:

...I couldn't help but see Uncle Nyawana...flashing his dirty teeth at me....Dilika had been my teacher at Progress High School. He couldn't seem to bring himself to begin a sentence without saying, "read my lips", a phrase that had quickly become his nickname...PP was a notorious carjacker in Soweto and his name alone carried terror in the township. His neck and both his arms were covered with grotesque tattoos of a praying mantis, a lion and a gun... As soon as he saw me, my uncle tucked his wooden crutches under his arms and limped towards me with a smile...He smelled of a combination of sweat, booze and cigarettes.

(Mhlongo,2007:11)

This description reveals Bafana's loathsome attitude towards uncle Nyawana and the other friends, which he camouflaged by treating them well. On arrival from the city, Bafana has brought his uncle a T-shirt, and even buys him and his friends a drink, not out of concern but to fend them off. He says, "To stop them from arguing, I bought a bottle of J&B whisky at the Dakar bottle store next to the parking lot." (Mhlongo, 2007, p.13) This repulsion is motivated by the emotional conflict within.

That Bafana kept PP, Uncle Nyawana and the other people's company without betraying his contempt for them is dangerous. He distracts our attention such that we forget his failure and only have the negative images of those around him in our mind. Disappointment, guilt and bitterness within motivated this hatred.

iv. Rationalization

This occurs when an individual unconsciously gives themselves a false explanation of their behavior. One creates logical explanations for their action, which are not the true reasons for their engagement in such behavior (Freud, 2010). In *After Tears*, Bafana seems to rationalize his guile lifestyle when he blames his ways on his mother's strictness, and his uncle's fallacy that alcohol offered solace to a desolate soul. He says:

I was sure that I couldn't continue to stay with Mama. I had slowly come to realize that Mama was very strict and I was sure that if I stayed much longer with her in Naturena, she would discover that I had failed my degree. I missed Uncle Nyawana and the freedom I had enjoyed at our house in Chi... At least he had had time...to teach me that alcohol and dagga were a wonderful way to transcend unhappiness...Although I was not a great fun of jazz, the music was easing my mind, allowing me to think clearly about my situation...(Mhlongo, 2007:178-179)

In Freudian sense, rationalization occurs when one does not realize they are lying. It comes out here that Bafana is unconsciously evading the truth. His inability to surrender to Mama's principles of discipline makes him to term her as too strict. The leeway he enjoys around his uncle, whom he secretly hates, does not add any tangible value to his life, yet he uses it to justify the fact that he had to leave and stay away from home. He also reveals his indulgence in alcohol and drugs, which are Id driven pleasures.

It comes out that in *After Tears*, the main character's emotions are unconsciously expressed through defense mechanisms when confronted with unpleasant experiences. The psychological defense mechanisms keep Bafana's mind healthy by attenuating negative emotions. Defense mechanisms help us maintain emotional homeostasis. However, when this fails, we slide into emotional turmoil

and acts of self destruction. This is what happens to Mpe's protagonist Refentse in *Welcome to Our Hillbrow*, who, for the lack of an alternative way for venting his anger and frustrations, plunges in depression that ends in suicide.

1.2 Premeditated Suicide in Mpe's *Welcome to Our Hillbrow*

Mpe's novel *Welcome to Our Hillbrow* is a reflection of Refentse's life, told from the second person perspective. In direct addresses to Refentse, the narrator reveals to us the contents of both his (narrator) and Refentse's mind. We therefore get to know Refentse's fears, wishes, worries, pressures, and childhood memories, some of which drive him to depression and self destruction. Psychodynamic concepts of suicidal behavior include self-directed aggression, object loss, ego functioning disturbance, and pathological object relations (Freud, 1910). In *Mourning and Melancholia* (1917), Freud avers that loss, loneliness, self-contempt, rage, feelings of abandonment and anguish are some of the intolerable psychic states that are suicide inviting, and that suicide is mainly as a result of hostility turned inward.

In *Welcome to Our Hillbrow*, Refentse encounters pressure from his mother as well as the people of his home village Tiragalong. Their unrealistic expectations of Refentse make him have a strained relationship with them. The narrator reveals that Refentse also nursed feelings of frustration, guilt and bitterness that bottled within. Being an introvert, he does not share matters of his private life with other people. Some of the friends and relatives he happens to be close to are, unfortunately, the cause of his troubles. His attempts to vent out through writing are neither fruitful (Mpe, 2001:59), as he dies before completing his short story. For relief from the emotional conflicts, Refentse tries to find escape in suicide, as the narrator tells in his 'address' to Refentse:

Love. Betrayal. Seduction. Suicide. It was such things as these that you might have written about. Refentse, child of Tiragalong and Hillbrow, had you not chosen to exit prematurely from this world of trials. You know what a seductive subject suicide can be. Because when it seduced you, you found nothing in life to pull you away from the seduction. You had quarreled with your mother because you insisted on being in love with Lerato...

And since love, friendship and motherhood did not provide any possibility for sanctuary in your hour of need, you began to look increasingly at the positive sides of suicide. You looked until you found them. Relief was the sum total of the benefits you discovered. Relief from the pressure to succeed, with the weight of Tiragalong's expectations on your back. Relief from the constant financial strains and burdens. From the unending disappointments of life etched on your brain, with your mother, friend and lover as some of their embodiments. And relief too from your nagging sense of guilt over your own betrayal with Bohlale...

(Mpe, 2001, pp.38-40)

This indicates that Refentse was emotionally weighed down by a wide range of issues: a disappointing love relationship, unmet expectations from mother and village-mates, betrayal by friend Sammy, guilt from his illicit affair with Sammy's lover, and financial strain. The anxiety brought about by these burdens and lack of someone to confide in, all make Refentse to lose interest in life. He nurses these painful emotions for some time before resorting to end his life. This shows in the manner he becomes lonely, moody and melancholic. Suicide is viewed as an escape from a painful reality (Tyson, 2006). In the novel, the narrator reveals how Refentse's failure to vent out built up to his tragic end. He could not confide in those close to him because they were the source of his frustrations:

There were no outlets for your bottled-up feelings. You rarely discussed your private life with other people, and those to whom you might have confided your troubles were the very ones who were the source of your pain. With so much on your mind, suicide and relief could only be synonymous attractions...Refilwe could not know any differently, because you confided nothing in her. So she had no idea of the conflicts you were going through (Mpe, 2001,p.41)

That Refilwe and other people close to Refentse had no idea of the emotional turmoil he suffered is because, besides being introverted, he had managed to conceal his bitter emotions through reaction formation, such that he appeared happy from the outside. Reaction formation is a defense mechanism in which a character displays the opposite of their inner feelings (McLeod, 2013). Having been the first person from Tiragalong to obtain a Master of Arts degree at the University of Witwatersrand, to become a lecturer and a prospective writer, the people around him therefore only saw a self-actualized man (Mpe, 2001: 41). This is the opposite of what he suffered from within. Refentse was haunted by guilt and emotional turmoil which robbed him of the peace within.

Refentse's suicide leads to an unfortunate chain of other premature deaths in the novel. These include Refentse's own mother, and Lerato. Refentse's mother is killed by the violent villagers on suspicion that he bewitched Refentse, while Lerato commits suicide due to her guilt of betrayal. Freud explains that intra-psychic conflict arises when a weak Ego is unable to regulate the unrealistic impulses of the Id and the Superego, resulting to feelings of anguish and guilt (Feist & Feist, 2006). The psychological torture within Lerato's mind, brought about by blackmail contributes to her self destruction.

Freud believed that our (unpleasant) childhood experiences were mainly responsible for our behaviour in adulthood (Tyson, 1999). This plays out in Refentse's case. We learn that he liked the song *See the World through the Eyes of a Child* because it filled him with nostalgic memories of his childhood. Memories he hasn't quite forgotten of rejection, loneliness and which in turn planted in him the fear of rejection even in adulthood. It is this very song Refentse plays just before he kills himself (Mpe,2001: 84).

This reminder of violent childhood and rejection can be closely associated with the South African atmosphere in the late '80s and early '90s that marked the height of widespread protests and youth agitation for change. This was a moment characterized by uprisings, killings and broken families. In the view of Rotich et al. (2015:138), the youth were growing up in extremely violent spaces, with missing father figures, which negatively affected most sons. This song, which Refentse often played, reminded him of such painful repressed childhood memories. This also explains why Refentse preferred solitude and kept his confidential matters to himself. The narrator makes no mention about Refentse's father, leaving us to conclude that he was brought up by a single mother. This may also explain his fear of rejection and loss, solitude, as well as his frequent emotional shifts to melancholy.

When Refentse's friend Sammy turns out to be a traitor, Refentse loses trust in him, and in all people around him. Mistrust of people is a personality problem that stems from painful past occurrences, especially when the Ego has not effectively blocked such experiences from becoming conscious. Refentse loses interest in life, and suffers low self esteem and guilt. His superego therefore punishes his conscience, and blinds him from finding any reason worth living for. He sinks into psychic depression before committing suicide. Psychic depression is demonstrated in the episodes of stream of consciousness through which the author further reveals the contents of Refentse's mind.

Mpe, however, indicates that suicide is no permanent solution to the problems the youth face. The author creatively presents a rare scene in heaven where Refentse's mind is in more turmoil than it was while he lived on earth(Mpe,2001, p 79). The explosion of the skull may symbolically mean Refentse's 'death' in the afterlife, which denies him the chance to find the anticipated sanctuary for his emotional conflicts in heaven. Freud explains that some individuals find escape from societal pressures and internal conflicts in

suicide. But the author's revelation here that Refentse has no afterlife peace even in 'Heaven' could be his way of challenging the young people to find working alternatives to the challenges they encounter in life rather than opting for suicide. Suicide is therefore not the end of (a miserable) life as it is traditionally viewed. Instead, it is transition to an afterlife, which becomes a moment for retrospection and divine retribution.

2. The Dream Motif

Freud's explains that it is through dreams that the unconscious is made conscious (Kirton-Els, 2013: 58). Freud believed that dreams are the main pathways to the unconscious. Some dreams also turn out to be fulfillments of individuals' wishes (McLeod, 2013). The subject matter of a dream, when interpreted, can also often reveal the traumatic experiences of an individual's past, which if not addressed effectively, can cause damage to one's psyche (Kirton-Els,2013: pp 65-7).

In this study, the youth characters encounter episodes of dreams that mainly relate to their day-to-day life experiences and interactions with immediate family members as well as close friends. The dreams turn out to be mainly re-enactments of their fears and anxieties. In Mhlongo's *After Tears*, Bafana narrates to his uncle Nyawana a dream he had encountered the previous night. Although the uncle wants to interpret the details of the dream for the betting game gains, the dream reflects one of the secrets Bafana kept from his mother: that he smoked. He says that in his dream, "Mama caught me smoking cigarette and she scolded me,...she called me a pig and broke my cigarette into pieces." (Mhlongo,2007,pp.41-2). Earlier in the story, Bafana had disclosed that only his uncle suspected that he indulged in drugs and drinking, and he wouldn't want his mother to know this (Mhlongo,2007,p.19). Through this dream, Bafana expresses one of his fears, of what Mama would do if she discovered that he smoked and drunk secretly. Concealing this from Mama subjects Bafana to numerous anxious moments. The happenings in the dream relate to what actually happens when Mama eventually discovers Bafana's failure in examinations, and his secret wedding plan. Mama angrily scolds, slaps, then disowns him (Mhlongo, p 214-215).

The dream therefore foreshadows what later happens to Bafana, and vindicates his fears. The pig symbol in the dream is representative of the dirty and evil life Bafana had taken to, making him rife in guilt, given the extent his mother had sacrificed to ensure he obtained education. The mess of his life at this point is characterized by Id driven behavior of indulgence in drugs and alcohol, opportunistic relationship with the Zimbabwean woman Vee, and keeping hopeless male company. This is definitely not what Mama expected of Bafana. By 'breaking the cigarette into pieces', Mama intends to put an end to Bafana's unacceptable behavior.

In another instance Bafana dreams of being mauled by his uncle's dog Verwoerd, while the rest of his family members and friends laugh at him instead of coming to his rescue. He narrates:

The whisky had freed me from the tension in my mind and, before the train reached Ladysmith, I fell asleep and dreamt of my uncle and his dog, Verwoerd. Verwoerd was trying to maul me, just as he had the first day I had come back to Chi from UCT, while my uncle, Mama, Sis Zinhle, PP, Zero, Dilika, Vee, Bunju, Nina and Baba Mfundisi stood around laughing.

(Mhlongo, 2007, pp.217-18)

Bafana encounters this dream while on his way to Johannesburg, on a 'self-imposed exile'. He had been overwhelmed by embarrassment when his mother, relatives and the friends he mentions in the dream discovered that he had actually been living a lie. The dream is therefore a revelation of what was in Bafana's subconscious. It mirrors the entire drama that his life has been. The revelation only sets Bafana free from the burden of keeping the secret, but he has to contend with managing the truth and the manner in which it will henceforth determine his relationship with those around him, especially his mother. Having had to take whisky to free himself from the tension in his mind is an indication that Bafana's guilty conscience had thrown him into deeper conflict within. The act of being mauled by Verwoerd, his uncle's dog, symbolize the punishment he was destined to face as a consequence of failure in his education and the ensuing deceit. In his own words, "I stared out into the fading evening light, thinking of my fortune, which was unquestionably well deserved,"(Mhlongo,2007,p217).

Being mauled by Verwoerd also symbolically indicates that Bafana (and other youth in the society) is a victim of the Bantu Education policies, implying that his future is condemned to oblivion. The Bantu Education system was laid down by Hendrik Verwoerd, the architect of apartheid was geared towards ensuring that the poor blacks provided cheap labour and continued to occupy subordinate places in the society (Rakometsi, 2008:60). Some formerly white universities that offered quality education have, to this day, remained too expensive for ordinary blacks to afford. In the view of Galiomee (2012:71), the ANC leadership has furthered Verwoerd's policy by keeping the black youth poor, uneducated and deprived. This further explains why a number of youth in the novel *After Tears* are school drop-outs, with dimmed futures. Relegating the name Verwoerd to their dog is one of the people's ways of expressing their mortal dread for the apartheid architect and the policies he initiated that have persistently scarred their lives to date.

In an instance of dream in Mpe's *Welcome to Our Hillbrow*, a young man, Molori, experiences nightmares related to fearful superstitious beliefs that a witchdoctor had planted in his mind. Having been made to believe that his close cousin Piet had bewitched him, Molori experiences fear and anxiety whenever the cousin's image crosses his mind. In the dream episode, the suspected cousin assumes the image of a snake and threatens to maul Molori. His scary dream is related thus:

On the night following their strengthening, Molori could hardly sleep. Every time sleep encroached upon him he would see, in his dreams, a huge snake squeezing itself into his room through a tiny space between the door and the floor. The space was so tiny that no snake of any size, let alone such a big one, could ever hope to go through. Yet this one managed. Molori would wake with a start each time, just before it poured its venom into his heels through its bright fangs. He would imagine that the snake was Piet. Or Piet's mother. Or both, merged into one, the way things are possible in Dreamland...(Mpe, 2001, p77-78)

This dream is a manifestation of Molori's fear, suppressed in his unconscious mind. He believes that his cousin could have destroyed him were it not for the witchdoctor's revelation and protection, and that the 'strengthening' is what saves him from the snake's venom in the dream. But unfortunately, Molori's fear of death drives him to organize for innocent Piet's murder, a further indication that the anxiety was so deeply embedded in his mind, that no amount of the witchdoctor's assurance and medicine would guarantee him full security.

However, in a bid to prove wrong beliefs in witchcraft, the author exonerates Piet and his mother from Molori's suspicion. That Molori encountered such a nightmare just after the visit to the witchdoctor illustrates the vulnerability of the youth to the cultural beliefs of witchcraft and superstition in which the practitioners blackmail gullible members of the society. The result being intensified

enmity and conflict among family members, and the society at large. In Molori's case, Piet and his mother are victimized and punished on baseless falsehood.

These instances of dreams expose the characters' fears, wishes and emotions buried deep in their unconscious mind.

3. Stream of Consciousness

Stream of consciousness technique is a narrative mode that seeks to portray an individual's point of view by giving the written equivalent of the character's thought processes, in connection to his or her actions. The technique involves a continuous flow of sense perceptions, thoughts, feelings and memories in the human mind, usually in an unpunctuated or disjointed form of interior monologue. Authors employ stream of consciousness to represent the flow of sensations and ideas, and to add to the depth of character portrayal (Hurley, 1998).

In *Welcome to Our Hillbrow*, Mpe takes us through the mental turmoil the protagonist finds himself in, just before committing suicide, and later when in 'Heaven'. When Refentse finds his girlfriend Lerato and friend Sammy in their treacherous act, the narrator tells us of how the shock discovery caused Refentse's mind to sink in melancholy. The narrator tells us that Refentse sat alone on his twentieth-floor balcony, immersed in gloomy thoughts about love, friendship and the whole purpose of living. We are then taken to Refentse's thought flow:

And when you finally come to this part of your journey that ends in the blank wall of suicide...with the spinning of cars the prostitution drug use and misuse the grime and crime...the Department of Home Affairs moving from downtown Johannesburg into Braamfontein and *Makwerekwere* drifting into and out of Hillbrow and Berea having split into Berea from Hillbrow according to many xenophobic South Africans and their glamorizing media and into Braamfontein to sort out their refugee affairs and the streets...Overflowing with *Makwerekwere* come to pursue green pastures after hearing that the new president Rolihlala Mandela welcomes guests and visitors... (Mpe, 2001: 25-26)

This gives us the flow of thoughts in Refentse's mind, the stream of issues that plagued his society, and which he remained preoccupied with, including: infiltration of foreigners to the country and its attendant effects, violence, immorality, crime in Hillbrow, and xenophobia. In the view of Loncar-Vujnovic (2012), stream of consciousness technique attempts to portray the remote, preconscious state that exists before the mind organizes sensations. These post-apartheid socio-cultural issues not only corrode his subconscious, but also stubbornly revolve in Refentse's mind as he dies.

The narrator takes us through another episode of Refentse's stream of consciousness, when he has died and joined the novel's heaven where he re-lives his life in retrospection (Mpe, 2001: 61), in which Refentse's mind veers to his favorite song, the reminder of his painful, repressed childhood experiences. He emotionally links this to the strained relationships he had with Lerato, Bohlale, Refilwe and his own mother, which depressed him to the point of committing suicide. Psychoanalysis attributes inability to sustain meaningful relationships in adult life to troubled childhood. This manifests in Refentse's experience. The narrator then winds it up with the refrain, "If you were still alive now, Refentse...all of this that you have heard seen heard about felt smelt believed disbelieved shirked embraced brewing in your consciousness would still find chilling haunting echoes in the simple words... Welcome to our Hillbrow..." (Mpe, 2001: 62). The refrain, 'Welcome to our Hillbrow' is symbolic in the sense that Refentse had no moral justification of 'punishing' his perceived culprits by committing suicide, since he himself had sinned in more or less the same way. In the author's view, we all belong to 'our' Hillbrow in one way or the other, as a result of moral deprivation.

The last instance of stream of consciousness takes us to another young woman's unconscious mind. Refilwe had not only propagated xenophobic hatred against perceived foreigners, she had also fueled rumours about Refentse's death in a manner that enabled her to exact revenge. The narrator evinces an accusatory tone that makes us withhold our sympathy for the dying Refilwe. While in England, she realizes that she is infected with HIV/AIDS. She has to return home to die. She's well aware of Tiragalong's 'linguistic chisels' and 'human microscopes', and the manner in which these were going to exacerbate her situation through negative rumours. The narrator takes us through her stream of thought (Mpe,2001:113) through which Refilwe's most profound fears and regrets are revealed. She is ironically a victim of prejudices that she herself participated in perpetrating against innocent individuals. The author makes Refilwe's own conscience to punish her, long before Tiragalong people's gossips consume her away. Her stay in Oxford subjects her to nativism, alienation of a different kind. This makes her remorseful about the xenophobic prejudice she had exacted on innocent victims such as Lerato. The stream of consciousness indicates that Refilwe has her turn to experience the psychological pain of alienation, denigration based on prejudice and xenophobia. This affords her moments of introspection, and remorse. The author's point here is that humanity should transmute our imaginary boundaries of ethnicity, race or nationality, into brotherhood. Through this instance of stream of consciousness, the readers are equally involved in Refilwe's psychological journey of emotional transition; we reflect the past with her, empathize with her victims in Hillbrow/Tiragalong and those discriminated in Oxford, and to a greater extent, take sides with the narrator when Refilwe is made to atone for her sins.

The young individuals in these instances are experiencing emotional conflict and mental turmoil. As such, the unpunctuated prose in the stream of consciousness technique can be interpreted mainly as representations of their troubled state of the mind.

4. Conclusion

Significant aspects of the behavior of the youth characters are dominated by repressed, unconscious impulses including unpleasant childhood memories, missing fathers, hostile relationships, unfulfilled wishes and trauma. Both Bafana and Refentse have no contact with their fathers in their early (and later) stages of development and this has negatively impacted on their behavior as young adults.

The two authors have employed various techniques that enable us understand the characters' unconscious behavior by examining their thoughts and actions through defense mechanisms, dreams, and stream of consciousness. These have revealed the protagonists' unconscious contents of the mind. It therefore comes out that characters' actions are expressions of frustrations, guilt, regrets as well as repressed emotions that stem from interactions with their immediate social, cultural and economic environment. The techniques employed also evince varied emotional responses from the reader such that we are actively involved in the characters' interiority and circumstances, rather than remaining as passive consumers of the stories of their lives.

In *After Tears*, the various coping mechanisms enable Bafana to alleviate the anxiety that stressed his mind due to failure and the attempt to hide the truth from his mother. The stream of consciousness technique in *Welcome to Our Hillbrow* helps us to understand Refentse's cause of melancholy and mental turmoil. The sources of the depression he sinks in before committing suicide are also revealed: painful childhood experiences and rejection. It also shows the extent to which the socio-cultural issues of the time such as xenophobia, marginalization, poverty and social relationships, sank deep in the minds of individual youth characters, determining their behaviour.

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Technology readiness aspect of E-government in Developing country: A case study of Jordan municipalities

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Abstract: The aim of this study is to identify the technological related factors impacting the readiness of the people in the Jordan to adopt E-government at the municipality level. To this end, through using extended form of technology acceptance model (TAM) a research framework was conceptualized that resulted in the identification of eight factors influencing E-Readiness of people in the Jordan. Those eight factors included perceived ease of usefulness (PEOU), perceived usefulness (PU), compatibility, trust, social influence, cultural influence, voluntarism and facilitating conditions. 200 responses were collected from the people in the Jordan through using online survey. Findings of the survey were further subjected to simple regression analysis in which all the factors were found to be positively associated with the intended factors such as adoption of e-Government. In the light of these findings it has been suggested to the Jordanian government to increase public awareness about the benefits of using e-Government through using social and cultural means.

Keywords— E-government; E-Readiness; Municipalities; Jordan

I. INTRODUCTION

Technological developments of the past three decades have resulted in making e-Government principle focus of governments across the globe (Kassen, 2014). Defined as the way of delivering public services to citizens, clients, partners and employees of the state in a cost effective manner through improved transparency and cross the board accountability (Leach, 2014). There lies material benefits for adopting e-Government such as adoption of mobile tax payment system by the government of Tanzania in 2013 resulted in 56.66% increase in the tax collection to 4.7bn Tanzanian Shillings as compare to 3bn Tanzanian shilling in the previous year (The World Bank, 2017). Similarly, thanks to the US aid Philippian government launched similar type of tax collection system in 2014 to assist businesses taxes in their own convenience through using portable communication devices (Leach, 2014). Apart from merely increasing government revenue, e-Government initiative has also been identified for providing wider benefits such as improving quality of services deliveries, initiating decentralization (Prybutok et al., 2008) promoting accountability (Elbahnasawy, 2014) and increases effectiveness of the government programs (Nica and Potcovaru, 2015). It is these advantages of adopting e-Government that various plethora of researches have been focused on evaluating readiness of both government and general public in both emerging and developed nations and at individual industry and organizational level (Samara and Raven, 2014; Choi et al., 2016; Hung et al., 2014; Alghamdi et al., 2014; Kiberu et al., 2017; Multhu et al., 2016; Srivastava and Panigrahi, 2016; Waheduzzaman and Miah, 2015). In

all these studies research on the implication of technological factors for the e-Readiness of general public, clients, government officials and partners have been given significance among all other factors. For instance, Waheduzzaman and Miah (2015) while investing the e-Government readiness from the perspective of developing country although emphasise on assessing the readiness of all stakeholders but asserted that factor such as technological acceptance plays significant role in it. Similarly, while attempting to predict the e-Readiness of 308 manufacturing firms in the Cairo, Egypt Aboelmaged (2014) used technological, organizational and environmental (TOE) model however technological determinants such as availability of infrastructure, competence of general public and public officials, perceived expected benefits of using the technology are the key challenges that overshadows environmental and organizational challenges. Basically, in the eyes of Aboelmaged (2014) once a firm overcomes technological barriers other barriers would automatically follow the suit. Thus, present research through involving both general public and municipality officials in the Jordan in the research will attempt to identify the e-Readiness of Jordanian municipalities from the perspective of technological factor.

Rest of this paper is organized as follows: next section will provide detailed background to the topic such as definition of e-Readiness and significance of assessing technological factor of the e-Readiness and set the research framework and set the research hypothesis. Subsequent section will provide methodology used for this study that includes the case study context of the present research and identification of the method that will be used to test the set research hypothesis. Afterwards, collected data will be presented followed by statistical analysis and overall discussion of the research. Finally, conclusion will summarize the key contribution and further scope of this research.

Literature review

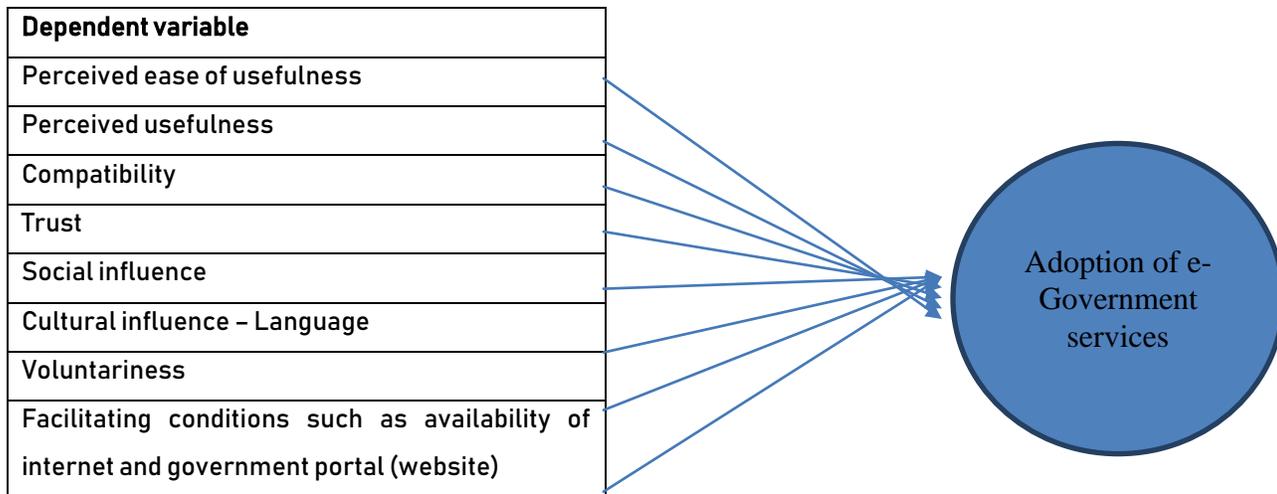
The term e-Readiness is defined as the ability of people to use technology to go around their daily life (Ilgaz and Gulbahar, 2015). There are various advantages of offering technological solution to the problems of general public that includes 24/7 availability of services, quick procedure, stopping corruption, giving control back to the people, avoidance of time and bureaucratic hurdles and better overall transparency (Zawaideh, 2017). In the recognition of these advantages, Jordanian government started e-Government program in the country during 2000 with the consent of His Majesty King Abdullah II (Zawaideh, 2017). The aim of the e-Government initiative in the Jordan is not only to improve efficiency and accuracy of the delivery of services but also to decrease the amount of time and cost for completing the transaction. To this end, government portal has been established under the supervision of the Ministry of Information and Communication Technology (MOICT) that provides 49 different services to the general public including tax filling, issuing of different licences such as driving licence and etc., and other services. However, until now e-Government initiative has only been introduced in municipality of the capital city "Amman" and rest of the municipalities are still waiting for their turn hence makes the case for assessing the e-Readiness of the Jordanian municipalities.

Despite of the high level interest taken by the government, adoption of e-Government, its adoption among general public is low. For instance, in their study on the adoption of e-Government in the Jordan from the social perspective Alomari et al (2009) concluded that factors such as trust in relation to the security and privacy of the information, lack of education, lack of accessibility and overall negative attitude towards using technology are the key reasons of the lack of adoption of e-Government by the general public in the country. Similarly, in their pursuit of studying the e-Government strategy and plans of the Jordanian government, Majdalawi et al (2015) while acknowledged that Jordan is the regional leader in whole of the Arab world when it comes to implementing e-Government however future of this initiatives lies in preparing e-Readiness of

general public such as encouraging people to use technological means of using public services even if that means cultural change.

Theoretical foundation for the assessment of factors influencing adoption of e-Government in Jordan has been set on the basis of the proposition of the technology acceptance model (TAM) proposed by Davis et al (1989). The key proposition of the TAM model is that it recognizes user’s attitude towards technology plays significant role in their acceptance of it for use, thus the more positive attitude people have towards technology the more willing they will be to adopt it. To this end, TAM propose two factors such as perceived ease of use (PEOU) and perceived usefulness (PU) of the technology among the minds of people directly impacts the attitude of people’s adoption of technology. While PU refers to the belief of individuals that use of certain technology will increase their performance. On the other hand, PEOU states the extent to which people belief that certain technology is going to be easy to use. Several authors (Rauniar et al., 2014; Marangunić and Granić, 2015) have acknowledged the significance of TAM for assessing the adoption of technology and it has also been used to identify issues concerning the acceptance of e-Government in past studies (Mahadeo, 2009; Zawaideh, 2017). However, TAM has been criticized for ignoring other factors such as availability of information, awareness level, cultural influence and etc (Tarhini et al., 2015). It is due to this criticism of the TAM model that various authors (Pikkarainen et al., 2004; Mahadeo, 2009; Zawaideh, 2017) used extended form of TAM model in their studies to identify user’s acceptance of technology. Similarly, research framework in this study has been drawn on the basis of the factors identified Mahadeo (2009) and Zawaideh (2017) for influencing adoption of e-Government by the people in Jordan and in general as shown in the figure 1 below.

Figure 1: Research Framework



Hypothesis

Perceived usefulness

In the context of Jordanian municipalities it is assumed that technology will establish ease for the common people to access the public services hence it is concerned as the key determinant of the technology acceptance (Davis et al., 1989). Thu, based on the proposition of the reviewed literature above first hypothesis of this research is as follows:

Hypothesis: Positive perception of people about the perceived usefulness (PU) of the e-Government leads to positive attitude towards adoption of technology

Perceived ease of use (PEOU)

This factor will aim to identify the extent to which people in the Jordan think about the extent of the efforts that they will have to put towards establishing understanding of the use of e-Government portal. In other words, this factor will identify the ease with which people in Jordan believe that e-Government is easier to use. Thus, second hypothesis of this study is as follows:

Hypothesis₂: Positive attitude towards ease of usefulness (EOU) of the e-Government services leads to positive attitude towards adoption of technology

Compatibility

Mahadeo (2009) defined compatibility as the extent to which technological innovation such as e-Government is perceived by the Jordanian people to be consistent with their existing values, experiences and needs. To this end, it has been argued by Agarwal and Prasad (1998) that the adoption of technology by people is influenced by the extent to which individuals are accustomed to work, therefore third hypothesis of this study is as follows:

Hypothesis₃: Perception of the compatibility of the E-Government will have positive impact on the EOU

Trust

Trust in the context of this study means the perceived confidence of the people in the reliability and validity of the using e-Government services. Among all other factors influencing the adoption of e-Government most of them found trust to be the most significant factor that is prohibiting adoption of e-Government by people (Carter et al., 2016; Al-Hujran et al., 2015; Alomari, 2014). Thus fourth hypothesis if this research is as follows:

Hypothesis₄: The higher the trust of people on E-Government services the higher the adoption of technology

Social influence

This factor directly impacts the agreeableness traits of the people for instance determinant of the social influence on the people tends to be the degree to which people attempts to be flexible to meet the others expectations (Melone, 1990). To this end, in their study Moon (2002) on the evolution of e-Government in municipalities also found that social influence plays an integral role in encouraging people towards adopting technology or e-Government in the case of the current study. Furthermore, social influence has also been recognized for impacting personal attitude of the people towards e-Government and is usually considered to be based upon the extent of personal innovativeness of the people. However, it is important to mention here that innovation tends to create uncertainty and people living in the Arab world such as Jordan tends to avoid uncertainty (Hofstede, 1997). Thus, social influence through impacting people's attitude determine their readiness towards adopting technology henceforth fifth hypothesis of this research is as follows:

Hypothesis₅: Positive social influence increases adoption of E-Government services

Cultural influence

Hofstede (1997) presented his cultural dimension theory on the basis of the postulation that culture shapes the individual behaviour that varies country to country. Hofstede (1991) through using the factors of his cultural dimension theory identified that people in the Arab world such as Jordan tends to be highly influenced by the uncertainty avoidance that prohibits their inclination towards using technology or innovation. Furthermore, countries in the Middle East are also highly influenced by the high power distance and collectivism characteristics that means that seniors in the society or organizations tends to highly influence the behaviour of the subordinates, therefore usage of e-Government by the common people in the Jordan would highly rely on the perception and attitude of the senior citizens, celeb or hierarchy in the household (Rees and Athakhri, 2008). Furthermore, cultural factors that impacts e-Government adoption can be categorized at both national and organizational level however since this study is focused at the municipalities in the Jordan at the national level thus national level factors such as language will be used to determine the readiness of the Jordanian people towards adopting e-Government. Therefore, sixth hypothesis of this study is as follows:

Hypothesis₆: Cultural factors such as language has a direct positive impact on the adoption of E-Government services

Voluntarism

This factor is defined as the extent to which adoption of technology is perceived as voluntary by the people (Brown et al., 2002). Furthermore, voluntarism has also been found to influence PEOU of people since it reflects the conscious public perception towards acceptance of e-Government in instead of a decision made at an unconscious level. On the other hand, since voluntarism require intended behaviour it has been found that failure of public adoption of e-Government depends upon their commitment (Zawaideh, 2017). Since, e-Government at the Jordanian municipalities will be implemented on a compulsory basis hence justifies the investigation of user's perception of the voluntarism on the e-Government services hence following hypothesis will be tested:

Hypothesis₇: Voluntary adoption of E-Government services leads to positive behaviour towards technology

Infrastructure

Availability of infrastructure for the implementation e-Government lies under the umbrella of overall facilitating factors such as availability of facilities at both organizational and technical level to support the running of the overall system (Mahadeo, 2009). Past researchers such as Alghamdi et al (2014) and Kiberu et al (2017) and others have identified infrastructural availability such as internet connection and government website portal as an imminent determinants of the adoption of the e-Government, this following hypothesis has been set:

Hypothesis₈: Availability of infrastructure such as Internet connection and government website increases chances of adoption of E-Government services

Methodology

Aim of this study is to identify the e-Readiness of Jordanian municipalities from the perspective of technological factor. To this end, through using an extended form of TAM a research framework has been produced (see figure 1 above) that identifies eight dependent variables upon which adoption of e-Government (Independent variables) relies.

An online survey was conducted through using likert-style questionnaire based on five factors such as strongly agree, agree, neither agree or disagree, disagree and strongly disagree were used. Participants of the survey came from all walks of life. In total participants were presented with 19 statements. In total 215 responses were collected of which 200 were usable hence 93% response rate was recorded.

Data analysis

Simple regression analysis will be used to test the variables of the identified in the research framework. The independent variables includesPEOU, PU, compatibility, trust, social influence, cultural influence, voluntarism and facilitating conditions. On the other hand, independent variable is set as the intention of the people to adopt e-Government.

Results

Table 1 below represents the results of the demographics of the research participants. Specifically, it shows that participants were consisted of mostly young people since 84% of the participants were in the age group of 18 to 35 years of age. Furthermore, it also shows almost evenly distributed population gender and income wise. Most significant aspect of the demographic factor is that 76% of the population of the research have been found to daily users of the internet however use of the same for government services spears to be small. Finally, evenly distributed population in rural and urban areas were found.

Table (1) frequency and percent for demographic variable

Variable	Classification	Frequency	Percent %
Age	18 – 25 year	32	16
	25 – 30 year	72	36
	30 – 35 year	64	32
	35 – 40 year	16	8
	45 year or above	16	8
Gender	Male	88	44
	Female	112	56
Income	Less than 500 JD	56	28
	500 – 1000 JD	64	32
	1000 – 1500 JD	64	32
	More than 1500 JD	16	8
Experience	Daily user	152	76

	Weekly user	48	24
Usage of E-government	Never used	88	44
	Used occasionally	112	56
Location	Rural	104	52
	Urban	96	48

Mean and standard deviation for each factor and each item

Factor one: Perceived ease of use

Table (2): means and standard deviations for each item by Perceived ease of use level

No.	Statement	Mean	SD	Order
1	I have access to personal computer	3.13	1.49	Moderate
2	I am comfortable at using computer and internet technology	3.87	1.46	High
3	I find it difficult to find information on government website	3.22	1.04	Moderate
Total		3.41	1.19	Moderate

Results in the table (2) means and standard deviations of the all domain, where the means ranged between (3.13 – 3.87) compared with the total instrument mean for the domain (3.41). The item (2) "I am comfortable at using computer and internet technology." ranked first with a mean and standard deviation (M=3.87, SD= 1.46) compared with the total instrument mean and the standard deviation. The item (1) "I have access to personal computer" ranked On the third and last reached a mean (3.13) and the standard deviation was (1.49) compared with the mean and standard deviation of the total instrument.

Factor two: Perceived usefulness

Table (3): means and standard deviations for each item by Perceived usefulness level

No.	Statement	Mean	SD	Order
1	E-Government would make it easier to access to public services	3.04	.82	Moderate
2	I will comply with my legal obligation more easily if they are available on internet	2.70	.97	Moderate
Total		2.87	.69	Moderate

Table (3) above shows means and standard deviations of the all domain, where the means ranged between (2.70 – 3.04) compared with the total instrument mean for the domain (2.87). the item (3.04) "E-Government would make it easier to access to public services." ranked first with a mean and standard deviation (M=3.04, SD= 0.82) compared with the total instrument mean and the standard deviation. The item (2) "I will comply with my legal obligation more easily if they are available on internet" ranked On the second and last reached a mean (2.70) and the standard deviation was (0.97) compared with the mean and standard deviation of the total instrument.

Factor Three: Facilitating factors

Table (4): means and standard deviations for each item by Facilitating factors level

No.	Statement	Mean	SD	Order
1	Internet is easily accessible in my locality	3.61	1.08	Moderate

2	I would use e-government if internet connection is available in my locality	3.12	1.45	Moderate
3	Government portals are not easily accessible or lack information	3.82	1.47	High
Total		2.91	1.42	Moderate

Table (4) means and standard deviations of the all domain, where the means ranged between (3.12 – 3.82) compared with the total instrument mean for the domain (2.91). the item (3) " Government portals are not easily accessible or lack information. " ranked first with a mean and standard deviation (M=3.82, SD= 1.47) compared with the total instrument mean and the standard deviation. The item (2) " I would use e-government if internet connection is available in my locality " ranked On the third and last reached a mean (3.12) and the standard deviation was (1.45) compared with the mean and standard deviation of the total instrument.

Factor Four: Trust

Table (5): means and standard deviations for each item by Trust level

No.	Statement	Mean	SD	Order
1	I feel secure while using internet for transaction purpose	3.29	.99	Moderate
2	I feel confident that use of government website will not result in infringing my privacy	2.94	.75	Moderate
3	I am aware of the benefits of using E-Government	2.88	.99	Moderate
Total		3.04	.63	Moderate

Table (5) means and standard deviations of the all domain, where the means ranged between (2.88 – 3.29) compared with the total instrument mean for the domain (3.04). The item (1) "I feel secure while using internet for transaction purpose." ranked first with a mean and standard deviation (M=3.29, SD= 0.99) compared with the total instrument mean and the standard deviation. The item (3) " I am aware of the benefits of using E-Government " ranked On the third and last reached a mean (2.88) and the standard deviation was (0.99) compared with the mean and standard deviation of the total instrument.

Factor Five: Social influence

Table (6): means and standard deviations for each item by Social influence level

No.	Statement	Mean	SD	Order
1	People in my society considers e-Government an innovative factor	3.76	.90	High
2	There is a rising trend in the society to use internet for conducting daily routine business	3.12	1.45	Moderate
Total		3.44	.83	Moderate

Table (6) means and standard deviations of the all domain, where the means ranged between (3.12 – 3.76) compared with the total instrument mean for the domain (3.44). the item (3.76) " People in my society considers e-Government an innovative factor." ranked first with a mean and standard deviation (M=3.76, SD= 0.90) compared with the total instrument mean and the standard deviation. The item (2) "There is a rising trend in the society to use internet for conducting daily routine business" ranked on the second and last reached a mean (3.12) and the standard deviation was (3.12) compared with the mean and standard deviation of the total instrument.

Factor six: Voluntariness

Table (7): means and standard deviations for each item by Voluntariness level

No.	Statement	Mean	SD	Order
1	I feel using e-Government services should be considered optional	3.82	1.47	High
2	Use of e-Government voluntary would enhance intention to use the services	3.29	.99	Moderate
Total		3.56	1.13	Moderate

Table (7) means and standard deviations of the all domain, where the means ranged between (3.29 – 3.82) compared with the total instrument mean for the domain (3.56). the item (1) " I feel using e-Government services should be considered optional. " ranked first with a mean and standard deviation (M=3.82, SD= 1.47) compared with the total instrument mean and the standard deviation. The item (2) " Use of e-Government voluntary would enhance intention to use the services " ranked On the second and last reached a mean (3.29) and the standard deviation was (0.99) compared with the mean and standard deviation of the total instrument.

Factor seven: Compatibility

Table (8): means and standard deviations for each item by Compatibility level

No.	Statement	Mean	SD	Order
1	Use of e-Government is compatible with the way I would like to do things	2.94	.75	Moderate
2	Use of e-Government services fits into the style of my work	2.88	.99	Moderate
Total		2.91	.71	Moderate

Table (8) means and standard deviations of the all domain, where the means ranged between (2.88 – 2.94) compared with the total instrument mean for the domain (2.91). the item (1) " Use of e-Government is compatible with the way I would like to do things. " ranked first with a mean and standard deviation (M=2.94, SD= 0.75) compared with the total instrument mean and the standard deviation. The item (2) "Use of e-Government services fits into the style of my work "ranked on the second and last reached a mean (2.88) and the standard deviation was (0.99) compared with the mean and standard deviation of the total instrument.

Factor Eight: Cultural influence – Language

Table (9): means and standard deviations for each item by Cultural influence – Language level

No.	Statement	Mean	SD	Order
1	I would use e-Government services if it is made available in Arabic language	3.76	.90	High
2	I find it difficult to use e-Government as government website is not available in Arabic	3.82	1.47	High
Total		3.79	.92	High

Table (9) means and standard deviations of the all domain, where the means ranged between (3.76 – 3.82) compared with the total instrument mean for the domain (3.79). the item (2) " I find it difficult to use e-Government as government website is not available in Arabic. " ranked first with a mean and standard deviation (M=3.82, SD= 1.47) compared with the total instrument mean and the standard deviation. The item (1) " I would use e-Government services if it is made available in Arabic language " ranked On the second and last reached a mean (3.76) and the standard deviation was (0.90) compared with the mean and standard deviation of the total instrument.

Testing hypothesis:

Hypothesis: Positive attitude towards ease of usefulness (EOU) of the E-Government services leads to positive attitude towards adoption of technology

To test hypothesis, simple linear regression analysis has been used, table (10) show that.

Table (10) simple linear regression analysis to examine the impact of ease of usefulness on e-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β_0	β_i	T	Sig.T
Ease of usefulness	.487	.237	6.518	.019	.973	.513	2.553	.019

Table (10) shows the impact of ease of usefulness on e-Government services leads to positive attitude towards adoption of technology. Then the results of the statistical analysis showed the presence of statistically significant impact of ease of usefulness on e-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.487) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R² has reached (0.237%), which means that the value of 23.7% of changes in the e-Government services leads to positive attitude towards adoption of technology. From changes in the ease of usefulness, and confirms this conclusion F value calculated, which amounted to (6.518), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of ease of usefulness on e-Government services leads to positive attitude towards adoption of technology (0.513), which means that changes in e-Government services leads to positive attitude towards adoption of technology resulting from changes in the ease of usefulness value (0.513).

Hypothesis₂: Positive perception of people about the perceived usefulness (PU) of the e-Government leads to positive attitude towards adoption of technology

To test hypothesis, we can use simple linear regression analysis, table (11) show that.

Table (11) simple linear regression analysis to examine the impact of perceived usefulness on e-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β ₀	β _i	T	Sig.T
perceived usefulness	.448	.201	5.281	.032	.399	.809	2.298	.032

Table (11) shows the impact of Perceived usefulness on e-Government services leads to positive attitude towards adoption of technology. then the results of the statistical analysis showed the presence of statistically significant impact of perceived usefulness on e-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.448) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R² has reached (0.201%), which means that the value of 20.1% of changes in the e-Government services leads to positive attitude towards adoption of technology. from changes in the perceived usefulness, and confirms this conclusion F value calculated, which amounted to (5.281), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of perceived usefulness on e-Government services leads to positive attitude towards adoption of technology (0.809), which means that changes e-Government services leads to positive attitude towards adoption of technology resulting from changes in the perceived usefulness value (0.809).

Hypothesis₃: Perception of the compatibility of the E-Government will have positive impact on the EOU.

To test hypothesis, we can use simple linear regression analysis, table (12) show that.

Table (12) simple linear regression analysis to examine the impact of compatibility on E-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β ₀	β _i	T	Sig.T
Compatibility	.981	.962	529.626	.000	.203	.864	23.014	.000

Table (12) shows the impact of compatibility on e-Government services leads to positive attitude towards adoption of technology. Then the results of the statistical analysis showed the presence of statistically significant impact of compatibility on e-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.981) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R² has reached (0.962%), which means that the value of 96.2% of changes in the E-Government services leads to positive attitude towards adoption of technology. from changes in the compatibility, and confirms this conclusion F value calculated, which amounted to (529.626), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of compatibility on e-Government services leads to positive attitude towards adoption of

technology (0.864), which means that changes E-Government services leads to positive attitude towards adoption of technology resulting from changes in the compatibility value (0.864).

Hypothesis₄: The higher the trust of people on E-Government services the higher the adoption of technology

To test hypothesis, we can use simple linear regression analysis, table (13) show that.

Table (13) simple linear regression analysis to examine the impact of trust on E-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β_0	β_i	T	Sig.T
Trust	.883	.779	52.870	.000	.021	1.089	7.271	.000

Table (13) shows the impact of trust on E-Government services leads to positive attitude towards adoption of technology. then the results of the statistical analysis showed the presence of statistically significant impact of trust on e-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.883) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R² has reached (0.779%), which means that the value of 77.9% of changes in the E-Government services leads to positive attitude towards adoption of technology. from changes in the trust, and confirms this conclusion F value calculated, which amounted to (52.870), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of trust on E-Government services leads to positive attitude towards adoption of technology (1.089), which means that changes e-Government services leads to positive attitude towards adoption of technology resulting from changes in the trust value (1.089).

Hypothesis₅: Positive social influence increases adoption of E-Government services

To test hypothesis, we can use simple linear regression analysis, table (14) show that.

Table (14) simple linear regression analysis to examine the impact of social influence on E-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β_0	β_i	T	Sig.T
social influence	.859	.738	42.298	.000	.537	.812	6.504	.000

Table (14) shows the impact of social influence on E-Government services leads to positive attitude towards adoption of technology. Then the results of the statistical analysis showed the presence of statistically significant impact of social influence on E-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.859) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R² has reached (0.738%), which means that the value of 73.8% of changes in the E-Government services leads to positive attitude towards adoption of technology. from changes in the social influence, and confirms this conclusion F value calculated, which amounted to (42.298), which function

at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of social influence on e-Government services leads to positive attitude towards adoption of technology (0.812), which means that changes E-Government services leads to positive attitude towards adoption of technology resulting from changes in the social influence value (0.812).

Hypothesis₆: Cultural factors such as language has a direct positive impact on the adoption of E-Government services

To test hypothesis, we can use simple linear regression analysis, table (15) show that.

Table (15) simple linear regression analysis to examine the impact of Cultural factors such as language on E-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β_0	β_i	T	Sig.T
Cultural factors such as language	.928	.861	93.125	.000	1.048	.642	9.650	.000

Table (15) shows the impact of Cultural factors such as language on E-Government services leads to positive attitude towards adoption of technology. then the results of the statistical analysis showed the presence of statistically significant impact of Cultural factors such as language on e-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.928) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R² has reached (0.861%), which means that the value of 86.1% of changes in the E-Government services leads to positive attitude towards adoption of technology. from changes in the Cultural factors such as language, and confirms this conclusion F value calculated, which amounted to (93.125), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of Cultural factors such as language on E-Government services leads to positive attitude towards adoption of technology (0.642), which means that changes E-Government services leads to positive attitude towards adoption of technology resulting from changes in the Cultural factors such as language value (0.642).

Hypothesis₇: Voluntary adoption of E-Government services leads to positive behaviour towards technology

To test hypothesis, we can use simple linear regression analysis, table (16) show that.

Table (16) simple linear regression analysis to examine the impact of Voluntary such as language on e-Government services leads to positive attitude towards adoption of technology.

Variable	R	R ²	F	Sig.F	β_0	β_i	T	Sig.T
Voluntary	.679	.461	12.848	.003	1.161	.745	3.584	.003

Table (16) shows the impact of Voluntary on E-Government services leads to positive attitude towards adoption of technology. then the results of the statistical analysis showed the presence of statistically significant impact of Voluntary on

E-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.679) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R^2 has reached (0.461%), which means that the value of 46.1% of changes in the E-Government services leads to positive attitude towards adoption of technology. from changes in the Voluntary, and confirms this conclusion F value calculated, which amounted to (12.848), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of Voluntary on e-Government services leads to positive attitude towards adoption of technology (0.745), which means that changes e-Government services leads to positive attitude towards adoption of technology resulting from changes in the Voluntary value (0.745).

Hypothesis₈: Availability of infrastructure such as internet connection and government website increases chances of adoption of E-Government services

To test hypothesis, we can use simple linear regression analysis, table (17) show that.

Table (17) simple linear regression analysis to examine the impact of Availability of infrastructure such as language on e-Government services leads to positive attitude towards adoption of technology.

Variable	R	R^2	F	Sig.F	β_0	β_i	T	Sig.T
Availability of infrastructure	.874	.765	48.729	.000	.512	.743	6.981	.000

Table (17) shows the impact of Availability of infrastructure on e-Government services leads to positive attitude towards adoption of technology. Then the results of the statistical analysis showed the presence of statistically significant impact of availability of infrastructure on E-Government services leads to positive attitude towards adoption of technology, with a correlation coefficient R (0.874) at the level of significance ($\alpha \leq 0.05$). The coefficient of determination R^2 has reached (0.765%), which means that the value of 76.5% of changes in the e-Government services leads to positive attitude towards adoption of technology. from changes in the Availability of infrastructure, and confirms this conclusion F value calculated, which amounted to (48.729), which function at the level of significance ($\alpha \leq 0.05$). This confirms that the regression statistically significant, and a statistically significant impact of Availability of infrastructure on e-Government services leads to positive attitude towards adoption of technology (0.743), which means that changes e-Government services leads to positive attitude towards adoption of technology resulting from changes in the Availability of infrastructure value (0.743).

Discussion

This study investigated the technological readiness of the people in the Jordan to adopt e-Government initiative. To this end, framework was constructed that through extended on the factors identified by the TAM for influencing the consumer's adoption of e-Government. Investigated factors included PEOU, PU, compatibility, trust, social influence, cultural influence, voluntarism and facilitating conditions.

Positive relation between the PEOU, PU, compatibility and voluntarism and adoption of e-Government shows that Jordanians would happily adopt e-Government provided that they are made to believe that it will make them to easily use the public services as compare to the quality of service that they get without e-Government integration. Thus, the key to increase readiness of the people in the Jordan to adopt e-Government is to increase their awareness about the advantages of using the electronic platform as also suggested by Zawaideh (2017). To this end, Zawaideh (2017) suggested usage of social media platform since there is a rising trend among Jordanians towards using Internet as figure rose to 6.3 million by the end of 2016 (Ghazal, 2016). Another key to the successful implementation of the e-Government at the municipality level would be to increase public trust on using technology for the transactional purpose. These findings have also been supported by Jabir et al (2012) who in their study found that although number of people using internet in the Jordan are increasing however thanks to eluded subjective norms such as threat of online fraud and stigma of theft being attached to using technology for transactional purposes means that usage of internet for transactional purpose in the Jordan would remain low unless people are educated on the security issues surrounding the usage of internet for transaction making purpose. To this end, there is a need for using social and cultural factors so that internet could be made less fearful among people. For instance, in this research both cultural and social influences have been found to have direct positive relation with the intention of people to use e-Government thus there is a need to create cultural readiness among Jordanian people to accept e-Government. Finally, availability of infrastructure has also been found to be positively influencing the people's intentions to use e-Government.

Although above findings have added to the current literature through further validating the constructs that could be damaging the readiness of the Jordanian people to adopt e-Government however key limitation of this study lies in the sample size and lack of segmentation. For instance, not only sample size was merely 200 but also segmentation could not be made possible since survey was conducted online hence it is not possible to identify the extent of readiness of people to adopt e-Government at different municipality levels in the Jordan. However, factors brought forward by this study can be used as future lines of research and could provide better comprehension ability for both practitioners and academics.

Conclusion

This study has brought forth the key implications that could impact the e-Government initiative of the Jordanian government. It has identified key to success of the e-Government initiative in the Jordan is to overcome the fear of people about using internet for transactional purpose, to this end it has been proposed to increase people awareness about the benefits of using e-Government through using cultural and social influences.

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“Pick And Write”: Learning through PicLits

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Abstract—21st century educational pedagogy emboldens the facilitation of learning with a range of digital technologies. Integration of technology encourages and provides opportunities for learners to think critically and creatively. Thus, language teaching is also employing initiatives to be part of the technological advancement especially in teaching ESL. In line to that, emergence of various digital tools requires educators to identify the suitability and acceptance among the learners to ensure the effectiveness of the integration. Therefore, this study aims to investigate the students’s acceptance of using *Piclits* as a digital tool to help them enhance their writing skill. Hence, this study employed a survey design distributed to 32 Year 4 pupils in a primary school in Selangor. Data were gathered using a questionnaire containing 10 items to obtain perceptions from the respondents on the usage of Piclits. The collected data were then analysed and reported using frequencies and percentages. The analysis of the questionnaire survey reflected most of the pupils having a positive feedback on integrating Piclits in their writing activity. The findings would be beneficial to ESL language teachers as it could be an added resource to assist them in teaching the writing skill and encourage pupil’s interest towards getting them to write. However, it is suggested that teachers may also look into error correction feedback while using this tool as a means of enhancing writing skills among students.

Index Terms- digital tools, writing skills, Pic-Lits, acceptance

I. INTRODUCTION

Technology advancement is making a storm globally across various areas especially in education field. Integration of technological tools in teaching and learning has been quite encouraging. Technological approach promotes in building learner’s competency to function effectively in the modern era of technology advancement and globalization. [1]

The importance of technology based learning in teaching and learning practices has also been highlighted by the Malaysian Ministry of Education through Malaysian National Education Blueprint (2013-2025). In the drive to become a developed nation and create globally competent individuals to meet the 21st century skills, integration of ICT in education is crucial.

Lately, most educators in the country are taking up the challenge to be innovative in their teaching and learning so that they stay relevant to the students. Therefore, in order to create a 21st century learning environment two main criteria needs to be looked upon, which are the availability of the technological facilities and also the adaptation of digital tools by teachers in classroom teaching and learning practices. [2]

In completion of primary education, students are required to sit for a national examination at the end of primary schooling which is known as the *Ujian Pencapaian Sekolah Rendah (UPSR)*. Students are tested on 4 core subjects with total of 6 examination papers to be answered. With regards to the English subject examination, students are required to answer English Paper 1 and Paper 2 under the latest introduction of *Ujian Pencapaian Sekolah Rendah (UPSR) English Examination* format in 2016. AsIen (2017) claims that it is even a bigger nightmare for the pupils, including the teachers as the English papers were now divided into two papers (English Paper 1 and English Paper 2). This is due to the rising concerns among teachers in overcoming student’s difficulties in writing skills such as forming correct sentences. Moreover, the papers are evaluated majorly on writing component which requires students to be able to master the writing skills in order to perform. Therefore it is crucial that pupils grasp the skill rather well to score excellently during the years in upper primary level. In order for them to write a whole composition they need to be guided step by step beforehand. At the same time, by integrating technology in early stages would enhance student’s interest towards building their writing skill. As mentioned by Harmer [3] who pinpoints that as educators “we need to build up creative writing bit by bit starting with phrases and sentences before expecting whole compositions.”

In recent times, various technological tools are being developed and created which teachers could employ in their teaching and learning. Although there are several tools available, not all tools would be applicable for the learners. Ghavifekr in [4] stated that learner’s familiarity towards technology would be an extra boost for learners to utilize them. In fact, Higgins et al.[1] states that discussions on integrating technology in teaching and learning process are now moving towards recognizing the suitable technology tool that could be used for particular educational reasons. It is also suggested that educators need to ensure the suitability and interest of the applied technological tool in order to utilize them effectively. Only a few studies are being

conducted to investigate the reach of specific technological tools in enhancing learning interest especially in language learning.[5]It is also stated that more research needs to be conducted to get insights of the technology utilization in enhancing the writing skills as a minimal number of studies were reported. [5]

As mentioned before, the effectiveness of employing tools such as web based technology relies on the suitability and the acceptance the learners too. Thus, this study is intends to identify the acceptance level among upper primary students in using Pic-Lits as a medium to improve their writing skills.

II. LITERATURE REVIEW

A. Using Digital Tools in Language Learning

Many studies have highlighted the positive impact of using technological tools to strengthen writing skills among ESL learners.[5],[6],[7], [8] [9]

Assimilating digital tools such as Web technologies allows students to be independent learners where they become more interactive and attentive. This indirectly lessens the reliance on teachers and encourages independent learning.[5]In a study conducted by Hiradhar [10] found that technology based language learning increased learner's performance in writing even in the tertiary level.

A study by Bal, [11]found that in school reading and writing showed negative results among middle school students whereas out of school reading and writing through digital tools showed positive impact. This shows students are positive towards integrating technology in learning. Another research by Ramdani[12] found "Voki" a digital tool utilization in an English classroom improved the speaking skills among secondary school students drastically. Technology enhanced learning seem to take a strong stand in cultivating students interest in learning especially when it comes to learning English as a second language.

Usage of digital tools especially in writing skills provides a few advantages such as elimination of poor handwriting, opportunity for learners to correct quickly and its visibility encourages collaborative learning. [3] This provides a new outlook at learning the skill especially in this era of meeting the 21st century skills rather than practicing the conventional route of teaching writing.

B. Teaching Writing Skills

Among the language skills present, writing skill has been extensively observed as a significant skill in the Teaching and Learning of the English language especially among upper Primary students. This attention could be due to the prominent role of the writing skill in the Ujian Pencapaian Sekolah Rendah (UPSR) which is the sole compulsory National examination in the primary level. English assessment under this examination offers two separate papers which tests students on various forms

of writing genres. Therefore, teaching of writing skills has been receiving a great attention.

Although the teaching of writing is exam driven, writing plays a crucial role in encouraging the comprehension and critical thinking which is part of literacy.[8, 9]Writing is a challenging skill as it requires high level of linguistics ability as well as grammatical capability too. On the other hand, [8] mentioned that it could also be challenging for students to be engaged in writing lessons if, it is conducted in a traditional approach.

The Technology Acceptance Model (TAM) used in this present study was mainly adopted from Lee et al. [14], which was adapted from Davis (1989). The reason for using this framework is because this is the most widely used framework in investigating students' acceptance on technology tools used in the classroom (Bakar & Bidin 2014; Boonsiritomachai & Pitchayadejanant 2018; Cigdem et al. 2016; Elmén 2013; Lee et al. 2005; Park 2009). In this study three constructs are adapted to study the student's acceptance in using Pic-lits in writing. TAM is a suitable medium that could be conducted to obtain students perception of using technology in the learning practices. [5]

C. Pic-Lits for Teaching Writing

To date, pictures are being a prominent part of daily life through applications such as Instagram, Facebook and smart gadgets cameras across ages.[15]Pic-Lits is a creative site featuring attractive photographs to inspire students to match them with words selected from the word bank or added free style. It is a fun, engaging and an interactive way to improve literacy via writing. As the saying goes, a picture is worth a thousand words. Presence of visual aids as a tool to support the teaching and learning process has been in practice for a long time. Visual aids can be useful intermediate for students in learning certain vocabulary or sentences structures and further enhance the learner's mastery of the skill.[16]

The integration of Pic-Lits in a language class is intended to encourage and provide an engaging strategy to pupils in the upper primary to write through photographs and word banks digitally instead of traditional pencil and paper practice. Research on human brain processes have revealed that images are processed much faster than it does for words. In fact, pictures tend to stay longer in the long term memory as compared to texts. [16]

Apart from writing sentences, this digital web based tool could also be used for studying literature. Pic-lits were among the suggested digital tool that could be used by learners to practice visual literature writing by integrating pictures with words [17]. The visual images shown inspires the students to get creative. At the same time, Pic-Lits was also used as a tool to scaffold students writing skills in writing workshops as it is a freely accessible site yet being user friendly as well. [18]

III. METHODOLOGY

A. Participants

The participants of this study were Year Four students at a primary school in Shah Alam. The students were chosen randomly by the teacher. The students have a lower English proficiency based on their first semester examination results. The students will sit for their Ujian Penilaian Sekolah Rendah (UPSR), a national level examination in two years' time. In this examination, English will be tested mainly in two skills, which are Reading and Writing.

B. Instrument

A questionnaire on student's acceptance on using PICLITS in ESL classroom was distributed to the students. The administered questionnaire in this study was to investigate students' acceptance on using Piclits as a digital tool to enhance writing skills. The questionnaire was adapted from Davis (1989) and [14]. The questionnaire was translated into the Malay Language as the respondents are in primary school and still at the beginners level of proficiency. To make sure students understand well, the teacher was present to provide assistance and explanation to students who are unclear with the items. The items were measured on three-points Likert scale ranging from 1 to 3 (1 = Yes, 2 = I'm not sure, 3 = No).

The Technology Acceptance Model (TAM) in the present study was mainly adopted from [14], which was adapted from Davis (1989). The reason for using this framework is because this is the most widely used framework in investigating students' acceptance on technology tools used in the classroom (Bakar & Bidin 2014; Boonsiritomachai & Pitchayadejanant 2018; Cigdem et al. 2016; Elmén 2013; Lee et al. 2005; Park 2009).

C. Procedure

Students were exposed to Piclits during English lessons prior to the distribution of the questionnaires. Students were able to have hands-on activities using Piclits during the lessons. The questionnaire was distributed to the students to investigate respondents' acceptance on using Piclits in their writing class.

D. Data Analysis.

The data was analysed manually by using the frequency counts as the researcher only wanted to conduct a study to investigate students' acceptance on Piclits.

IV. FINDINGS AND DISCUSSIONS

Fig. 1. As According to figure 1, majority of the respondents answered "Yes" for three out of four items under Ease of Use. 79% respondents answered yes for the overall ease of use. According to figure 1, respondents believe that it is easy to use Piclits. Ease of use is important because that the performance benefits of usage are out-weighed by the effort of using the application (Davis 1989). As the respondents are year 4 primary students, it is vital to investigate whether or not their perceive Piclits as easy to be used as it can contribute to their stress and anxiety in learning English.

Fig 1.1 Ease Of Use

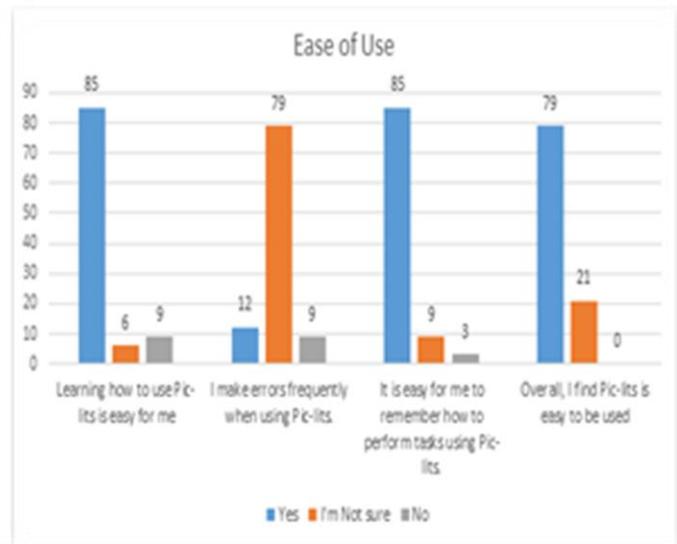


Fig. 2. Around 88% respondents believe that Piclits is useful in their English learning process. This is because, pictures can grab the attention of some people who have less interest in reading, for example. (Elmén 2013). Pictures and videos are also found to help with the understanding of L2 materials better than just verbal instruction. (Mueller 1980). Therefore, Piclits can be considered as a suitable tool to attract this type of students as reading and writing are interconnected and can be learned together, instead of in segregation. (Calhoun & Calhoun 1999)

Fig 2 Usefulness

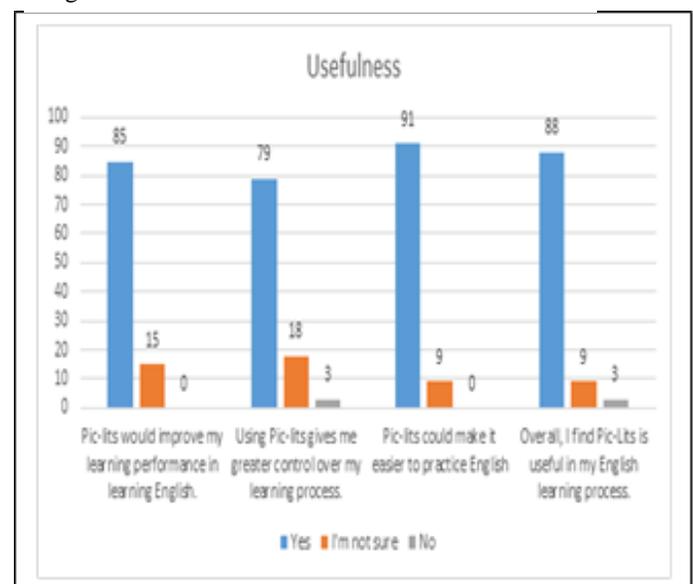


Fig. 3 Perceived Enjoyment

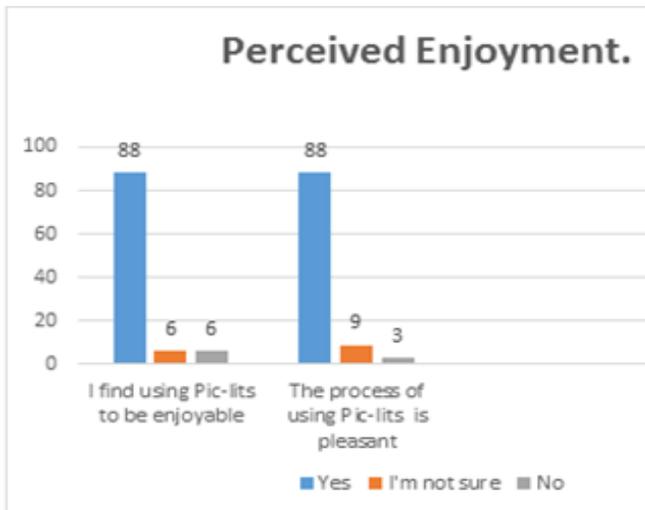


Fig. 3. 88% of the respondents believe that using Piclist is enjoyable and pleasant. This couldn't be argued as recent statistics have shown that the primary use of the Internet for students and youth is for fun and enjoyment (Lee et al. 2005). Teachers have to take advantage on this matter as there are a lot of teaching tools that can be found in the internet that suits students' needs in the 21st century learning. Students nowadays interact better with interactive learning instead of the traditional classroom environment. One of the way is using web-based learning. The development of web-based learning environment promotes learning and thinking such as synthesis thinking, conceptual thinking, application thinking and critical thinking, promoting potential of the brain, enhancing expert mental models and creative thinking (Kanjug & Chaijaroen 2012). Piclits is considered a suitable web-based learning tools as it can be used widely through a different range of level, as mentioned in Bloom's Taxonomy. Therefore, teachers not only can use it to develop students' full potential in writing, students can fully enjoy their learning process as they can explore and have fun at the same time.

Overall, almost all items have a high percentage of positive feedback from respondent. Only one item under Ease of Use where 79 percent of the respondents are not sure whether or not they make errors frequently while using Piclits. This may be because the teacher was focusing more on exposing Piclits to the students and therefore have minimal intervention on students' errors during the lesson.

V. CONCLUSION

The emergence of information technologies is changing how students write. (Whithouse 2005). Therefore, educators need to step up to the trend in order to attract student's interest and attention. Hence, digital tools such as Piclits could be a best option as it goes hand in hand with what teachers need today, a tool that can connect with students and at the same time provide a learning experience.

This study contributes to the knowledge on the investigation of students' acceptance towards using web-based learning. In this study,

students enjoyed and believed that Piclits could be a potential tool to be used in line with 21st century approach. This study also contributes to the debate on teachers' trust on primary students' readiness on technology-based lesson in class. Most teachers are skeptical that primary school students have short attention span and need extensive supervision when internet is being used. During this research however, students were very focused and engaged in the lesson.

It is necessary to point out that this research was conducted in a short period of time and on a small number of respondents. The respondents were chosen randomly and therefore their proficiency level could not be determined in this study.

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Female Students' Orientation and Mobility In Kgatleng District In Botswana

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Abstract- The purpose of this study was to investigate the orientation and mobility of female students with visual impairment at two secondary schools in Kgatleng District in Botswana. The following research questions guided the study: How is the mobility of female students with visual impairment in the schools? How do female students with visual impairment interact to access different places in various environments? What factors enable or hinder the mobility of students with visual impairment? The study utilized a sample of six participants (four female students and two teachers) drawn from a total population of nineteen people; eleven teachers (11) and eight students(8) from the two schools. Interviews and observation were used to collect data which was thematically analysed. The study concluded that the absence of orientation and mobility instruction, femininity within the student factors and lack of public awareness on the importance of the life skills are the hindrances to the mobility of students with visual impairment that inevitably result in students' total dependence on peers for their mobility. The study therefore makes recommendations to change the predicament of the students in the schools.

Key words: Botswana, female students, orientation and mobility, visual impairment

Introduction.

During the University of Botswana's community service provision at inclusive mainstream schools in Kgatleng District, in Botswana, it was observed that all female students with visual impairment were being sight guided. They were totally dependent on their

peers for their mobility. The interest to investigate female students' orientation and mobility skills at the institutions in the area developed hence this study. The study, therefore, explores the orientation and mobility of female students with visual impairment at the schools in reference.

Orientation and Mobility

Autonomous movement and travel for people with visual impairment in any setting require two abilities that are symbiotic and correspondingly significant. Before moving from one place to another, a person with visual impairment needs to be environmentally aware of the space around him. Wiener, Welsh and Blasch(2010) refer to this process as orientation; the process of using all the body's senses to establish one's position and relationship to all other significant objects in the environment. In this case, one develops mental images of physical spaces, specific locations, geographical areas, or travel routes. The cognitive maps are updated as the individual perceives novel data and develops expanded concepts of the areas.

When one is well informed and aware of the ecological lay out, one can, through the process of mobility, confidently, safely and efficiently move from one place to the other. Orientation and mobility (O&M), is therefore a professional field dealing with systematic techniques by which individuals who are blind or who have low vision orient themselves to home, school, and community environments and move about independently (Fazz & Barlow, 2017).Orientation and mobility skills are, therefore, important life skills that are inextricably interrelated, interdependent and the two should therefore be integrated in a fluid manner. Both are reliant on precise perceptions resulting from the effective

interpretation of sensual clues into meaningful mobility information (Wiener et al, 2010).

Benefits of orientation and mobility

Orientation and mobility has significant benefits to people with visual impairment.

In qualitative studies reviewed, (Wiggett-Barnard & Steel, 2008; Hocken, 2011; Griffin-Shirley & Bozeman, 2016), the use of mobility skills and various mobility aids bring psychological and social benefits that include enhanced self-confidence, better sense of protection, improved mental well-being, life satisfaction and acceptance of visual impairment. Other studies have reported that utilization of orientation and mobility aids and skills promote social facilitation by improving community participation, perceived social integration and social contacts (Camp, 2000; Long & Giudice, 2010; Wiener, Welsh & Blasch, 2010). In addition, the practice helps students remain orientated to given environments as a consequence, students are more confident, remain focused in their education and daily activities. When students are proficient in orientation and mobility, they become well informed of their environments. This leads to their independent mobility and consequently, being economically advantaged (Thabyak, 2017).

Instructional strategies in orientation and mobility

Itinerant and centre based programmes are the primary models of providing O & M services (Holbrook, Kamei-Hannan & McCarthy, 2017). Usually, instructional strategies may be guided by theories like theories of guided learning, unguided learning, discovery learning and Gardner's theory of multiple intelligences to mention but a few (Wiener, et al, 2010). It is common to integrate theories during the execution of instructions. Specialists do not often stick to the norm because students have different sensory abilities, levels of instruction, needs and develop ambulatory skills in similar but different ways. Generally, mobility training is on one to one basis and is dependent on the level, degree of impairment and environmental requirements among others.

Central to the instructional strategies to use is the knowledge of the necessary skill areas for students with visual impairment to participate in orientation and mobility programmes. The skill areas include attention, sensory integration, behaviour, concept development, generalisation, problem solving, social

skills, orientation strategies and mobility techniques (Holbrook, et al, 2017). Normally, an O & M curriculum is varied and teaches skills that are used throughout the students' lives. The O & M specialist teaches formal O & M skills and collaborates with other members of the educational team to promote safe and efficient travel for students with visual impairment. Part of the learning is through natural learning which occurs along routes that are part of the student's daily routine as he/she learns to attend to relevant environmental features along the route that enable him to maintain his/her line of travel, make changes in direction when needed, apply specific cane techniques at appropriate times, and eventually reaches his/her desired destination (Guth, et al, 2010). It is important that O & M specialists provide students with opportunities to familiarize themselves with diverse environments using various mobility aids because practice is the basis of distinct variances in skilled performance of tasks with substantial motor requirements. Practice can be made more effective with thoughtful consideration of the principles of learning. Students complete a sequence of steps as they learn any skill, and instruction should vary according to the stage of learning

Holbrook et al (2017) posit that the mobility aids may be low tech or high tech; this is dependent on the economic capability of a given country. The long cane remains the principal mobility device the students with visual impairments use for travelling across a wide range of environments. Students should be taught how to use it very well. Alongside the devices, students need to be taken through most of the essential aspects such as eccentric viewing, visual modeling, scanning, spatial updating, cognitive mapping, point of information and many others (Long & Giudice, 2010; Jacobson, 2013). In line with some theories that support O & M training, cognizant of the occurrence of natural learning should be taken as students construct their own knowledge through social milieu.

Acceptance of the orientation and mobility rationale

Orientation and mobility, as an entity, is one of the unique skills identified as a related educational service in the 1997 regulations governing the implementation of Individuals with Disabilities Education Act (IDEA) (IDEA, 2004; Holbrook, Kamei-Hannan & McCarthy, 2017). Related services

are supportive services required to assist a person with visual impairment to be independent, productive, self-reliant, improve the quality of life or alleviate the inconveniences in life (Chitey, 2017). The related services to be offered to a student are determined by assessment results. Every student is subjected to formal or informal assessment depending on the prevailing situation. Orientation and mobility, being one of the related services, follows a similar procedure. Students are offered orientation and mobility training based on their needs as may be stipulated in the assessment report or based on the decision/observations of the orientation and mobility specialist. It is of great importance and beneficial to the student if the rationale for orientation and mobility is accepted. After assessment that determines eligibility for inclusive education services, (Heward, 2014), a student, in the company of caretakers, is guided through the assessment report and agreement is reached on whether the O & M rationale is accepted. A student needs to make an informed decision on the matter that binds all the parties.

Theoretically, Davis (1989) posit the Acceptance Model (AM) helps in accepting and using a program. The model, developed from the theory of reasoned action, clarifies user acceptance of a given exercise basing on the perceptions of the student. It offers a basis with which one traces how external variables influence belief, perception, and intention to continue with the exercise. This model could help in explaining and predicting the behavior of the client in orientation and mobility. Davis (1989) and Bandura (1997) are of the view that the model suggests that self-efficacy determines a student's intention to utilize orientation and mobility techniques. In this case a client is given to understand that the use of orientation and mobility techniques would greatly enhance his or her mobility.

The feminist theory

The Feminist Theory has numerous variants that include liberal, radical, socialist, cultural, feminism, womanist and Marxism hence the differing views about gender equality (Bem, 1993). There is, however, concordance on the views of core feminism that all humans are equal and, as a consequence, all people should have the same educational and work opportunities (Pheko, Dioka & Batsalelwang, 2018). In this respect, both female and male students are expected to be taught orientation and mobility

techniques because their common humanity supersedes their procreative differentiation. If female and male students are not different, then they should not be treated differently under the law, they should all be taught orientation and mobility, (Wiener et al, 2010), because gender is now understood to be a social status, a personal identity, and a set of relationships across all humanity. Syllogistically, both female and male students are expected to independently, safely and efficiently move from one place to the other. The paucity of research on orientation and mobility in Botswana and observation of female students being dependent on sighted guides for their mobility influenced the decision to investigate the mobility of female students at the schools. The following research questions guided the research:

1. How is the mobility of female students with visual impairment in the schools?
2. How do female students with visual impairment interact to access different places in various environments?
3. What factors enable or hinder the mobility of students with visual impairment?

Methodology

This study adopted an interpretative phenomenological analysis (IPA) paradigm because the study is based on individual students' life experiences and the chosen paradigm has systematic commitment to the exploration of personal lived experiences (Tomkins, 2017). In addition, the objective of IPA is the understanding of lived individual experiences and the exploration of the manner in which the individual female students with visual impairments make sense of their personal orientation and mobility experiences. The qualitative research approach was used since this type of approach adapts to an interpretative phenomenological true-to-life methodology to the world (Babbie, 2012; Denzin & Lincoln, 2017). In other words, it is a process of intensive inquiry with a goal of in-depth understanding of a social or human problem from multiple perspectives. This means that qualitative investigators study aspects in natural settings, attempting to make sense of or interpret phenomena in terms of the meanings participants bring to them.

The specialist special education teachers for learners with visual impairment and female learners

with visual impairment at two secondary schools in Kgatlang District were the population of the study. The selection of the schools was guided by the fact that they are the only secondary schools that enroll students who are totally blind in the district and country as a whole. The sample, which was purposefully chosen, comprised of four female students with visual impairment and two specialist special education teachers (one female and one male). The participants were selected because they were thought to be well-informed about the topic that was being investigated. The inclusion criteria for students was that they must have been at one of the two schools for at least six months and they must be female with no light perception while for teachers to be included, they needed to have a minimum of three years' teaching experience as special education teachers at either of the two schools.

Data collection

In the process of data collection, researchers took cognisance of biases that could compromise the quality of the findings. Bracketing and recording information actually observed or verbatim quotes characterized the collection of data. Data collection from six participants (five females and one male) was done with the help of unstructured interview guides and observation. The type of interview guide was chosen to allow participants to openly share their lived experiences with regards to mobility techniques without necessarily restricting them to specified questions. In addition, (Ritchie, Lewis, Nicholls & Ormston, 2014), in-depth interviews allow personal histories and experiences to be understood as well as different viewpoints to be heard. Non participant observation of students' mobility techniques was done over a period of two weeks. This was meant to allow students to routinely move from one place to another without being conscious of the observation exercise. Field notes were written down without being noticed.

Data analysis

Research questions guided data analysis and it was done alongside data collection in line with Rubin and Babbie's (2011) assertion that data analysis begins the moment one sets foot in the field. Researchers corroborated the data through cross-checking data from unstructured interviews and observation. This was meant to search for recurring themes in the data. The writing embraced a descriptive style of writing so that the finest experiences of students' mobility could

be captured and direct quotes included when relevant. It was critical for the qualitative researchers to ensure that data analysis accurately corroborates the opinions and experiences of the study participants.

Ethical consideration

Ethical issues regarding permission to conduct the research were formally done as well as issues of participants consenting to their involvement following explanations that helped them understand the purpose of the study. Anonymity, privacy, volunteering, withdrawal and choice to answer some questions or were all addressed before the start of the study.

Findings

Integration of data collected from interview sessions and observations of female students with visual impairment yielded a number of themes.

Poor mobility

From the observations conducted in the school, the students have poor mobility. Four of the eight female students (including the four students who did not take part in the research) observed generally showed peculiar walking steps and gait. One student stoops her head while another irregularly shakes her head from side to side. When a student moved from one desk to another or to a water point within close proximity, it was a spectacle. The two special education teachers interviewed confirmed that it was a serious challenge to help female students because of the norm. Female students in the study schools were known to be heavily dependent on others and care less about their independent mobility hence their poor mobility.

Physical environment

The physical environments of the schools for the students have corridors that are bordered by deep dangerous trenches for students with visual impairment. There were no hand rails observed anywhere in the two schools to help students in their mobility. The route to the hostels for female students at one of the two sites was blocked as the home economics department where it passes through has been fenced for security reasons. Students have to jump trenches using alternative routes to go to their hostels.

Overprotection

One of the pillars for the immediate past long term vision for Botswana is being a compassionate and caring nation (Republic of Botswana, 1997). Botswana exercise the value in many ways that

include caring for the needy. This act results in over protection which denies the students with visual impairment an opportunity to at least naturally teach themselves. Two of the interviewed students shared that just like at school, family members do not allow them to do anything at their homes and are normally confined to their rooms. This makes them to even fail to ask for guidance over the location of a particular place if they wanted to go there by themselves.

Personal identity

Three out of the four students with visual impairment interviewed expressed concern on how the public would perceive them moving around with the help of white canes. They were of the views that their use of the canes would make the public identify them by their devices.

I do understand that mobility techniques can benefit me but I cannot imagine my becoming the centre of attraction bumping into obstacles. Everyone else could just be focusing their eyes on me. In the end, people may identify me as a white cane lady. I would not want that.

Similarly, two other students stated that they would rather play a low profile by being quietly sight guided around instead of attracting everyone's attention when there is an incident. One exemplified that in one of the schools she attended; she was referred to as a four eyed girl for using sun glasses. That was some kind of stigmatizing on the part of the student and vowed to remain out of the spot light to make sure nothing of that sought is experienced again.

Personal beauty

All the four students interviewed were concerned about their personal beauty. They shared that being presentable comes first as ladies. They would not, consequently, want to appear clumsy when using some of the orientation and mobility techniques:

Using lower and upper body protective techniques in public as though one is driving an imaginary car is not appealing for a lady. Just like if I am carrying a rigid white cane and I am in the bus what happens? Just attracting unnecessary attention. If I fall down and bruise my face or arms as a lady, that would be a disaster, men would avoid me, ...hahaha... (laughs).

Restricting socialization

The four students interviewed are of the view that orientation and mobility leaves them isolated. The students feel secure, confident and loved in the company of fellow students. As long as their peers are around, they would rather be together chatting and helping one another in so many ways. Students indicated that they lead lives like any other person and need peers for various reasons. One student stated that:

I depend on my peers and others in the school. It is difficult for me to show that I do not need the assistance of my peers then the next moment I need their help. It is better I am with them whenever they are available.

Acceptance of the rationale for orientation and mobility

The students had different experiences and onsets of visual impairments. Two of the respondents have congenital blindness while the other two adventitiously acquired the visual impairment. The ones who have had the impairment from childhood were knowledgeable about the importance of orientation and mobility and have rudiments of O & M having been taught at reception years ago. Currently, all the students stated that they have not had any talk on why they need to learn the techniques of O & M.

Absence of orientation and mobility instruction

Observations conducted over a period of two weeks witnessed no mobility instruction of any sought. Interviews of the two specialist teachers confirmed that orientation and mobility was not conducted because school management over loaded special education teachers with high teaching loads. One of the two teachers interviewed stated that:

Mobility instruction is trick in the sense that neither the students nor the school authorities value the exercise. As a life skill, it would not appear on the time table with other academic subjects. Arrangements with students need to be made for the instruction to be done outside school teaching time.

One of the two specialist teachers emotionally suggested that negligence was coming from higher authorities for failing to provide directional leadership. The respondent stressed that he (and other

special education teachers) were not certified orientation and mobility instructors and as a consequence, they have limits on how far they can go in terms of instructing the learners in the discipline. Besides, little was being done to facilitate the practice in schools as priority is given to traditional academic subjects.

Discussion

This study was guided mainly by the three research questions that include: How is the mobility of female students with visual impairment in the schools in Kgatleng District in Botswana? How do female students with visual impairment interact to access different places in various environments? What factors enable or hinder the mobility of students with visual impairment? This section, therefore, discusses the findings synonymous with the research questions.

Orientation and mobility is a rare and unique life skill of some significant magnitude whose benefits to people with visual impairment need not be over emphasized. The non-instruction of students in the discipline is a serious anomaly as it denies students an important aspect that has lifelong consequences. The obtaining situation is degenerating as Habulezi (2016) had reported some orientation and mobility instruction at one of the schools. The practice is contrary to the tenets of Botswana's Vision 2036 that seek to emphasis empowering all citizens through education with production to attain prosperity for all (Republic of Botswana, 2016). The knowledge of the essence of orientation and mobility is of profound importance because knowledge is power. Guth et al (2014) advise that teachers should, at whatever level, instruct students in foundational knowledge and provide them with experiences that are a requirement for the orientation and mobility processes. For this to be successful, students must be motivated to feel encouraged as this may help them mentally and physically display the much needed basic readiness. The key is to guide students on the need to embrace the O & M rationale and willingly put in practice mobility skills taught or naturally acquired (Wiener et al, 2010).

The roots of the poor mobility of students lie deep within the socialization desires of female students with visual impairment to always prefer to be in the company of peers (Cooper, 2006). The students need to know that peers in their lives will not be there forever. At some point in time, each one of them will

be on their own and meet the wrath of this land. Therefore, students with visual impairment must be helped to balance up and take practical priorities that have positive bearing in their lives (Thabyak, 2017). The practical skills theoretically on offer meant to equip all Batswana are worthwhile and need to be implemented and taken advantage of. Even in the absence of mobility instruction, natural learning can be an option and students are teachers on their own who can build on their experiences or solicit for information from other students about their environment. Griffin-Shirley and Bozeman (2016) posit that direct experience is the most important source of self-confidence because the high self-confidence it instills helps a student successfully attempt a similar activity in future.

The practice of over protection signifies a general lack of public awareness and education regarding orientation and mobility. This is aggravated by female students' resistance and illusion of the use of O & M techniques and devices to avoid looking fun or clumsy. The foregoing is synonymous with one feminist view that woman is defined mainly through her appearance which she would always want to cultivate because her looks to some extent determine the confidence, social status and consciousness of self as it is believed that beauty carries a premium (Anderson & Petrie, 2006; Thanuskodi, 2013).

At a school that has students with visual impairment, Thabyak (2017) advocates for the construction and maintenance of learning environments which are physically and psychologically conducive for every student so that opportunities are fair and equitable to all regardless of the gender or socio-economic statuses of the students. To the contrary, the physical environments of the two schools where the study took place are not appropriate for the practice of orientation and mobility. Corridors are bordered by dangerous deep trenches that are a danger to students with visual impairment. There are only two secondary schools at the moment in the country that cater for students who are totally blind and situations of this nature are least expected considering the government's commitment to providing the best possible service to all its citizens (Republic of Botswana, 2015).

Conclusion

Orientation and mobility is an extremely important life skill because it provides techniques and

skills that promote safety and independence in the lives of people with visual impairment. Despite its importance, its instruction to students with visual impairment is non-existent at the schools of the study. It is clear that the absence of orientation and mobility instruction, femininity within the student factors and lack of public awareness on the importance of the life skills are the hindrances to the mobility of students with visual impairment that inevitably result in students' total dependence on peers for their mobility.

Recommendations

Botswana has ambitious aspirations of prospering its citizens through education and empowerment. To attain the set targets, top management in charge of inclusive education in the Department of Special Support Services should rise to the occasion and facilitate quality inclusive educational services. The public should importantly

be educated on the need to provide students with opportunities to practice orientation and mobility techniques and skills. Government should also construct and maintain learning environments which are physically and psychologically conducive for the independent mobility of students with visual impairment. There is need, too, to find a way of motivating the female folk to intrinsically engage in the O & M exercise either through counseling or some other way. Traceable floor strips could be made on the floors to key school areas to simplify students' navigation.

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An Analysis of the University of Jos Remedial Students' Achievement in Physics (2007-2010)

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Abstract

The achievement of students in Physics in Nigeria has been generally poor as compared to other subjects. This study was initiated to analyze the achievement of University of Jos remedial students in Physics and to establish the factors that lead to the poor achievement. A descriptive survey research design was adopted for the study. The target population was all the remedial students and lecturers for 2007/2008, 2008/2009 and 2009/2010 sessions. Simple random sampling technique was used to select 200 respondents; this includes 198 remedial science students offering physics and 2 lecturers for 2009/2010 session. Two instruments were used for data collection: A questionnaire titled "Remedial Physics Students' Achievement Scale" (RPSAS) consisting seven (7) items in a likert scale format, and students results for three consecutive years namely 2007/2008, 2008/2009, and 2009/2010. Split-half technique using Spearman Brown Prophecy formula was used to check the reliability ($r = 0.80$) of the questionnaire and experts from the faculty of education validated the instrument. Two research questions and one hypothesis guided the study. Data collected were analyzed using descriptive statistics of mean and standard deviations to answer the research questions while the research hypothesis was tested using inferential statistic of Analysis of Covariance (ANCOVA). The finding shows that there is low achievement in physics compare to other subjects offered at remedial level and the contributing factors are large class size and teaching method among others. It was recommended that Physics teachers should employ student centred methods/strategies to improve the achievement level in Physics.

Keywords; Factors, Achievement, Physics, and Remedial

Introduction

To transit from one level of education to the other, students have to undergo selection or achievement tests or examinations to determine their academic suitability for the level they are transiting into (Suwa, 2013). In most of the public schools in Nigeria written test symbolized by question paper, and oral examination remains one of the most significant tool of assessment, but in sciences other measures of assessment like practical examinations are also used.

The achievement of students in any of these examinations determines their placement in the next level of education. In Nigeria, to transit from secondary level of education to the tertiary level, students are required to take public examinations from West African Examination Council (WAEC), National Examination Council (NECO), and/or Joint Admission Matriculation Board (JAMB) to enable them gain entry to tertiary institutions.

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The entry requirement of most tertiary institutions is at least five (5) credits and above in English, Mathematics and three (3) other subjects depending on the discipline the student wants to enrol for (Danjem, 2018). Students that want to study science courses are required to have at least credit pass in Physics, Chemistry, Biology or any of the science related subjects. Physics plays an important role in all the natural sciences (Weidner & Brown, 2018). Physics is a major requirement for courses such as medicine, engineering or any of the sciences because physics is regarded as the bedrock of sciences.

Physics is the study of matter and energy and their interaction. The study of physics is very important because it generates/creates basic knowledge needed for technological advancement. Physics is an essential part of the educational system and of an advanced society (Samy, 2015). Physics is perceived to be a difficult course because of the abstract nature of some of the concepts (Adeyemo, 2010). As a result of the difficulty of studying physics many students fail the subject. Results from external examinations have shown the extent of poor achievement of students in physics in Nigeria (Asikhia, 2010; WAEC, 2012) see Table 1. It is understandable that many students will simply choose less challenging subjects at school.

Table 1: Students' enrolment and achievement in May/June WAEC in physics (2008–2012)

Year	Total entry	% Credit pass (A1-C6)	% Fail (D7-F9)
2008	105,256	43.60	56.40
2009	158,952	46.40	53.60
2010	149,983	53.40	46.60
2011	253,199	31.06	68.94
2012	253,058	34.46	65.54

Source: Statistics Section; West African Examination Council (WAEC) National Office, Lagos, Nigeria.

Some of the factors responsible for this low achievement are poor background of students in Physics, high students' ratio compare to the number of lecturer, teaching/learning methods, poor entry ability of students (Emmanuel, 2013; Mekonnen, 2014; WAEC chief examiners' report on Physics, 2015). Some tertiary institutions introduced remedial programmes to enable students remedy deficiencies in any of the five subject required by those institutions to enable the students gain admission into 100 level to study their course of choice.

Remedial is a programme assigned to assist students in order to achieve expected competencies in core academic skills. Post secondary remedial education is a large and growing segment of higher education in Nigeria. It provide opportunities to rectify disparities generated in secondary education and helps the participants to acquire the minimum skills deemed necessary for functional participation in the higher education.

University of Jos remedial science department was established 1979 in the faculty of natural science with the aim of providing teaching facilities for remedying the deficiencies of secondary school education, with particular reference to science based subjects in preparatory for university admission. Any candidates who wish to study at the University of Jos remedial Science department is required to posses WASC/SSCE/NECO/GCE 'O' Level result(s) or its equivalent in the following Subjects: Mathematics or Further Mathematics, English Language, Chemistry, Physics and either Biology or Agric Science or Geography or Technical Drawing or Fine Art to be eligible for admission. The Pre-Degree Science course is strictly for science students who want to study Medicine, Pharmacy, Nursing, Medical Lab Science, Biochemistry, SLT or any single honourdegree course in faculty of natural sciences and other science disciplines.

Students at this level are made to offer five (5) subjects from the selected seven core science subjects, in line with the National Policy on Education (Federal Ministry of Education, 2008). They are allowed to take four core subjects as English Languages, Mathematics, Chemistry and Physics with an option from Biology, Technical Drawing, and Geography depending on the course they intend to study after remedial programme. Physics is one of the core subjects offered in University of Jos remedial science department and a subject of interest in this research work. Despite the remedial given to students on physics, students results still shows low achievement in Physics, this necessitated the need for this study.

Statement of the Problem

In spite of all the advantages derived and the recognition given to physics as one of the core science subjects and as a pivot to technological and economic development, there is however low achievement in students' achievement in Nigeria. The phenomenon of low achievement among Physics students in Nigeria is a matter that has become a source of worry to successive governments and major stakeholders in the education sector in the country.

Over the years, many students that sat for the May/ June and November/December West African Examinations Council (WAEC) and National Examination Council (NECO) recorded mass failure in Physics. From Table 1, the highest percentage passed (A1-C6) in WAEC (May/June) from 2007 to 2010 for Physics was 53.4%; this implies that more than 46% of students failed (D7-F9) each year for five (5) consecutive years.

If the persistent poor achievement of students in physics is not addressed, students will find it difficult to gain admission into tertiary level of education to study science related courses. The persistent decline in students' performance in public examinations is not only frustrating to the students and parents, it also affects the technological advancement of the county.

The problem has to a large extent been attributed to high students' ratio compare to the number of lecturer, teaching/learning methods, and poor entry ability of students. e.t.c. during the 2009/2010 academic section, remedial sciences in University of Jos recorded 1062 students running two sections concurrently. This implies that a teacher lectures about 531 students at a time with the help of public address system. This study hopes to analyze the achievement level of remedial students in physics compared to other subjects, and also determine the factor(s) responsible for achievement in physics.

Objective of the Study

The objective of the study is to analyze the University of Jos remedial students' achievement in physics (2007-2010). Specifically, the study sought to determine:

1. the achievement level of university of Jos remedial students in Physics from 2007-2010,
2. the factors responsible for remedial students' achievement in Physics, and
3. the mean scores obtained by remedial students in physics and compared with their mean scores in other subjects offered at remedial level.

Two research questions was raised to guide the study

1. What is the achievement level of university of Jos remedial students in Physics from 2007-2010? and
2. What are the factors responsible for remedial students' achievement in Physics?

One null hypothesis was formulated to guide the study at 0.05 level of significant

1. There is no significant difference between the University of Jos remedial students' mean achievement in Physics and their mean achievement in other subjects offered at remedial science department

Method

The study employed descriptive survey research design in analyzing data for the purpose of this research work. The population comprises 1050 students for 2007/2008 section, 819 students for 2008/2009 section, 1062 students for 2009/2010 section and 32 lecturers were used for the purpose of this study. Simple random sampling was used to select 200 respondents; this includes 198 remedial science students offering physics and 2 lecturers.

Two instruments were used for data collection:

1. A questionnaire titled "Remedial Physics Students' Achievement Scale" (RPSAS) consisting seven (7) items placed alongside the response format Strongly Agreed (SA), Agreed (A), Disagreed (D), and Strongly Disagreed (SD). The weightings of the response were SA = 4, A = 3, SD = 2, and SD = 1. The bench mark of 2.5 was chosen as basis for agreement or disagreement for each item. The instrument was validated by expert in science and technology education in University of Jos. Fifty copies were trial tested on students who are not part of the study; data collected were analyzed with spearman prophecy method to determine the reliability of 0.80.
2. Students results for three consecutive years namely 2007/2008, 2008/2009, and 2009/2010.

The mean score, percentages, and standard deviations (S.D) were used to answer the research questions while the research hypotheses was tested using inferential statistic of Analysis of Covariance (ANCOVA) formulated to guide the study.

Results and Discussion

Research Question 1

What is the achievement level of university of Jos remedial students in Physics from 2007-2010?

Table 2: Summary of achievement level of remedial science students' in physics in University of Jos.

S/No	Session	No. of Students	Mean	Percentage
1.	2007/2008	1050	43.52	43.52
2.	2008/2009	819	46.31	46.31
3.	2009/2010	1062	46.18	46.18
Average mean/percentage			45.34	45.34

Table 2 shows a meanachievement of 43.52 for 2007/2008 session, a mean achievement of 46.31 for 2008/20098 session, and a mean achievement of 46.18 for 2009/2010 session. The achievement level of the University of Jos students for three consecutive

years is found to be 45.34 percent. The mean scores for all the sessions can be rated as 'D' which is below average. The low achievement of students in Physics confirmed with WACE Chief Examiner's Report (2015) and Asikhia (2010). According to Adeyomo (2010), Physics is perceived to be a difficult course because of the abstract nature of some of the concepts. As a result of the difficulty of studying physics many students fail the subject. This low achievement has been traced to many factors which were answered in research question 2.

Research Question 2

What are the factors responsible for remedial students' achievement in Physics?

Table 3: Analysis of the factors responsible for remedial students' achievement in Physics.

S/No	Statements	Means	S.D	Decision
1.	Large classes	3.85	0.49	Agree
2.	Poor background of students in physics	3.46	0.91	Agree
3.	Teaching method	3.69	0.60	Agree
4.	Overload of work for lecturers	2.56	1.05	Agree
5.	Links between class lecture and practical activities	3.30	0.83	Agree
6.	Students participation during lecture	3.08	0.85	Agree
7.	Entering ability of student	3.04	0.96	Agree
Sectional means/std. deviation		3.28	0.81	Agree

Table 3 shows that the respondents agreed with all the listed statements on the factors affecting University of Jos remedial students' achievement in Physics, none was found to be the negative. The overall mean for the items in respect to the respondents from table 3 was 3.28 which indicate that all the factors listed affects students' achievement in Physics.

Large class sizes has the highest mean of 3.85, meaning that it's the most serious factor affecting students' achievement in Physics at remedial level. This is evidence from the fact that under the three sessions under investigation was overpopulated. In 2007/2008 section, there were 1050 students; 2008/2009 session, 819; and 1062 students for 2009/2010 session which is far higher than the speculated student-teacher ratio in the National Policy on Education (2004). The finding agrees with Edomwonyi-Out and Aavaa (2011) who identified class size as a major hindrance for effective teaching and learning. It disagrees with Owoeye and Yara (2011), who found no significant effect of class size on achievement.

Other factors such as poor background of students in physics, teaching method, overload of work for lecturers, links between class lecture and practical activities, students' participation during lecture, and entering ability of students also affect students' achievement in Physics. While other factors cannot be ignored, teaching method greatly affects students' achievement in Physics. Due to large class size, many lecturers use the lecture teaching method which is teachers' centred not minding its suitability. Studies have shown that if teaching-learning strategies are improved, achievement can be enhanced (Elvis, 2014; Raimond, 2012). Research studies also emphasized that teachers should shift the present emphasis on learning facts to the use of effective critical thinking as the primary tool for learning. The objectives of physics include fostering conceptual understanding and development of several important cognitive, psychomotor, attitudinal and affective abilities. Therefore, teaching and learning of

physics is inadequate unless students gain a significant “hands-on-minds-on” experience which can only be achieved with the use of student centred method.

Hypothesis

There is no significant difference between the University of Jos remedial students’ mean achievement in Physics and their mean achievement in other subjects offered at remedial science department.

Table 4: Summary of the Analysis of Variance at alpha level of 0.05

Session/Mean	Phy	Eng	Maths	Chem	Bio	TD	Geo	F _{cal}	F _{critica}	Decision
2007/2008	43.52	46.67	42.89	45.09	43.78	47.22	44.08	16.82	2.10	Rejected
2008/2009	46.31	54.10	39.56	46.55	53.43	51.21	59.69	96.18	2.10	Rejected
2009/2010	46.18	48.37	44.08	43.52	47.87	43.87	54.03	17.98	2.10	Rejected

Table 4 shows the summary of the Analysis of covariance at alpha level of 0.05 for three sessions, F_{cal} was greater than F_{tab} for the three sessions. Therefore, the null hypothesis was rejected. Hence, there is significant difference between the University of Jos students’ mean achievement in Physics and their mean achievement in other subjects offered at remedial level.

Conclusion

Based on the finding, this study concludes that:

1. Remedial science students in University of Jos have low achievement in Physics.
2. Large class size, poor background of students in physics, teaching method, overload of work for lecturers, links between class lecture and practical activities, students participation during lecture, and entering ability of students are the factors that affects students achievement in Physics.
3. The mean score of students varies from one subject to the other.

Recommendation

Based on the findings, the following recommendations were made:

1. Physics teachers should employ student centred methods/strategies to improve the achievement level in Physics.
2. The factors affecting students’ achievement in Physics should be looked into by relevant authorities and strategize ways to combat them.

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Farmers Participatory Evaluations and Selection of Bread Wheat (*Triticum aestivum*. L) Varieties in Cheha District, Gurage Zone, Ethiopia.

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Abstract- In participatory varietal selection farmers have the opportunity to select varieties of their own preference based on selection criteria in their own fields. In the present experiment, eight released bread wheat varieties were tested in 2016/17 main cropping season at YeYefereziye research site which is located in Cheha district of Gurage zone, Ethiopia. The objective of the experiment was to identify bread wheat variety by participating the farmers using their own criteria. Pair-wise ranking result performed by farmers showed that Alidoro is top ranked and first selected variety followed by ETBW5879 and Millan. According to direct matrix ranking technique, grain yield and disease resistance were very important criteria for selection of bread wheat variety by the farmers. Statistically, the analysis of variance showed that the genotypes differed highly significantly ($p \leq 0.01$) in spike length, plant height, spikes per spike, days to heading and days to maturity. Genotypes differed significantly ($p \leq 0.05$) in above ground biomass and grain filling period. This study can confirmed that, PVS is a practicable and more reliable approach for generating, disseminating and popularization of bread wheat technologies to the end user farmers. Therefore, variety Alidoro was selected for seed multiplication and dissemination, due to its grain yielding ability and disease resistance as compared to the other tested genotypes.

Index Terms- PVS, Bread Wheat, Alidoro

I. INTRODUCTION

Bread wheat (*Triticum aestivum* L.) has originated from natural hybrids of three diploid wild progenitors native to the Middle East. These are *T. monococcum*, *T. tauschii* (syn. *Aegilops squarosa*) and *Aegilops speltoides* (Lelley 1976; Ribaut *et al.*, 2001). It is an annual cool season cereal crop but it can grow in a wide range of environments around the world. Its production is highly concentrated between the latitudes of 30° and 60° N, and 27° to 40° S (Heyne, 1987), and within the temperature range of 30°C to 32°C. Wheat can grow best on well-drained soil from sea level to about 3000 masl. In Ethiopia, wheat is an introduced crop, although its time of introduction is immemorial (Hailu, 1991).

Moreover, the bread wheat process, which began some ten thousand years ago, involved the following major steps. Wild einkorn *T. urartu* crossed spontaneously with *Aegilops speltoides* (Goat grass 1) to produce Wild Emmer *T. dicoccoides*; further hybridizations with another *Aegilops* (*A. taushi*), gave rise to Spelt (*T. spelta*) and early forms of Durum Wheat (cultivated emmer); Bread Wheat finally evolved through years of cultivation in the southern Caspian plains. This evolution was accelerated by an expanding geographical range of cultivation and by human selection, and had produced bread wheat as early as the sixth millennium BC. Modern varieties are selections caused by natural mutation starting with emmer wheat up to husk less modern wheat. Cytological and cytogenetic evidences showed that wheat consists of diploid, tetraploid and hexaploid (two, four and six sets of chromosomes respectively) species with a basic chromosome set of $x=7$. Three genomes designated as A, B (G), and D was involved in the formation of the polyploidy series (Feldmann, 2001). *T. urartu* and *Aegilops squarosa* (syn. *Triticum tauschii*) are the diploid progenitors of the A and D genomes, respectively. It is believed that *T. monococcum* naturally hybridized with the yet unknown B-genome donor to give rise to the tetraploid emmer group. Emmer wheat in turn hybridized with *Ae. Squarosa* and a spontaneous chromosome doubling of the triploid resulted in the formation of hexaploid wheat (Feldmann, 2001).

Wheat provides more nourishment for the people of the world than any other crop, and provides the nutrition for the greater part of the world population. The world wheat market production is 727.2 million tons, the market supply is 905.9 million tons, world wheat market utilization is 703.8 million tons, world wheat trade market is 151 million tons and wheat market ending stocks is 198.6 million tons (FAOSTAT, 2015).

The objective of any breeding program is to develop genotypes with high productivity, and to achieve this goal selection is a prerequisite. Selection is an integral part of breeding programs for the development of desirable genotypes. Yield is the product of several yield contributing characters; therefore, selection for high yield requires an integrated approach. The nature of yield and yield contributing traits are highly variable and significantly modified by external factors. The effectiveness of selection depends on the amount of variability present in the genetic material for grain yield and

related traits. Hence, estimation of variability is of prime importance (Johnson *et al.*, 1955b).

Wheat in Ethiopia is an important cereal crop; it ranks fourth in total area coverage and production next to teff, maize and sorghum. Around 4.23 million tons of wheat is produced on an area of 1.7 million ha and about 4.6 million farmers were involved. Oromia, Amhara, SNNP and Tigray are the major wheat producing regions in the country with the area coverage of 875641.45, 529609.63, 137294.72 and 108865.39 ha respectively. Furthermore, 86314 farmers were involved with area coverage of 14778.01 ha in Gurage Zone and more specifically 11 kebeles are wheat growing with area coverage of 7000 ha of land in cheha wereda in 2014 main production season (CSA, 2014).

The production, productivity, and expansion of wheat has been limited. This are attributed to lack of alternative improved varieties for the different wheat growing agro-ecological zones, unavailability of sufficient and poor quality seed and poor agronomic practices which are among the technical constraints and pose great research challenges to come up with appropriate technological solutions for resource poor farmers. Diseases (Rusts, fusarium, spetoria, spot bloch), pest, poor soil fertility, new epidemics, climate change and other long term evolutionary effects are also the constraints of wheat production (EIAR, 2010).

In participatory varietal selection (PVS) farmers select finished or nearly finished products (released cultivars, varieties in advanced stages of testing, and advanced non-segregating lines) from plant breeding programs in their own fields (Muchow *et al.*, 1994). A very important advantage of PVS is that the adoption of new cultivars is much faster than under the formal crop improvement and also the spread of varieties from farmer-to-farmer through the local seed system, guaranteeing a further good adoption (Bellon and Reeves, 2002).

According to Sperling *et al.* (2001), participatory crop improvement may have many advantages, such as increased and stable crop productivity, faster release and adoption of varieties, better understanding farmers' criteria for variety selection, enhanced biodiversity, increased cost effectiveness, facilitated

farmers learning and empowerment. Farmers have a broad knowledge base on their environments, crops and cropping systems built up over many years and do experiments by their own and generate innovations, even though they lack control treatment for comparison and statistical tools to test the hypothesis (Bänziger *et al.*, 2000). In many situations, formal seed supply has been unable to meet farmers' need, due to its limited supply capacity, a focus confined to only a few crops and varieties, or because it supplies inappropriate varieties for a specific locality.

The dependency of farmers on a single crop variety could be due to lack of participatory variety selection activities at cooperative level and no link with technology generating research institutes to have access for varietal choice (unpublished base line survey from LSB South, 2010). Wheat seed has huge problem both in supply and quality (Gezahagn, 2008). As a result farmers are paying more for poor quality seed and traveling long distance to acquire seed of improved varieties suited for their locality, and most of Ethiopian farmers grow their own saved seeds of the local varieties.

Previously in the study area, less priority was given to farmers for varietal choice to select and multiply variety of their own preference based on their own selection criteria. A possible option for addressing this constraint is increasing varietal portfolios through participatory variety selection and mobilizing farmers to produce good quality seed of the improved varieties suited for their environment and seed marketing at local levels. Therefore, this study was conducted with the objectives of:

1. To identify farmers' preference and selection criteria for bread wheat varieties
2. To select best performed bread wheat variety/ies based on farmers' preference

II. MATERIALS AND METHOD

3.1. Site Description

The experiment was conducted in Yefereziye Kebele situated in Cheha District, Gurage Zone of SNNPR.\

Table 1. Location, descriptions and weather condition of the testing site.

Site	Annual Temperature (°C)		Annual Rainfall (mm)	Location	Altitude
	Max	Min			
YeYefereziye	24.37	10.2	1336.8	08.14794N & 037.91896E	1980

3.2. Experimental Materials

Experimental materials were comprised of eight bread wheat varieties released from different agricultural research center.

Table 2. List of the varieties, source center and year of release

	Name of Variety	Source	Year of Release
1	UTQUE96/3/PYN/BAU//MILLAN	Sinana	2014
2	ETBW 5879	Kulumsa	2014

3	Hoggana	Kulumsa	2011
4	Hulluka	Kulumsa	2012
5	Mekelle-4	Mekelle	2013
6	Mekelle-2	Mekelle	2011
7	Alidoro	Holleta	2007
8	Digelu	Kulumsa	2005

3.3. Experimental Design and Field Management Practices

The varieties were sown in early July 2016 main cropping season. The experiment was conducted using mother-baby methodology approach. Randomized complete block design (RCBD) was used with three replications. The mother trail was conducted at the main testing site whereas the baby trials were conducted at three selected farmers' field under their own cultural practices. Thus, each farmer's field was considered as replication. The varieties were randomized in each replicated field. plot size was 9m² (3mx3m) and seeds were sown at spacing of 20 cm between rows. Distance of 1m and 0.5m was left between each block and each plot, respectively.

Fertilizers (both Urea and NPS) was applied at the rate of 150 and 100 kg/ha respectively, full dose of P₂O₅ and half dose of N was applied at the time of planting and the remaining half dose of N at the time of tillering. Seed was sown at the rate of 150Kg/ha. Seed and fertilizer was drilled uniformly by hand. The experimental field was kept clean from weeds through hand weeding.

3.4. Data collection

Data was collected on the following attributes from the central 12 rows in each plot.

1. Days to heading (DTH): recorded as the number of days from sowing to the stage where 75% of the spikes have fully emerged.

2. Days to maturity (DTM): The number of days from sowing to the stage when 90% of the plants in a plot have reached physiological maturity.

3. Grain filling period (GFP): recorded as the number of days from heading to maturity.

4. Grain yield (GY): Grain yield in grams obtained from the central four rows of each plot was converted to kilograms per hectare at moisture content of 12.5%.

5. 1000-kernel weight (TKW): Weight of 1000 seeds in gram.

6. Above Ground Biomass (AGB): The total above ground parts of plants in the four central rows was harvested and weighed in grams

7. Harvest index (HI): On a plot basis, the ratio of dried grain weight to the dried above ground biomass weight multiplied by 100

Additionally, Ten plants were randomly selected from the 12 central rows for recording the following growth and yield components of bread wheat varieties:

1. Tillers/plant (TPP): The average number of tillers per plant

2. Plant height (PHT): The average height from ground level to the tip of the spike in cm.

3. Kernels per spike (KPS): The average number of kernels per spike

4. Spikelet per spike (SkPS): The average number of spikelet's per spike.

5. Spike length (SL): The average spike length from its base to the tip in cm.

6. Spikes per plant (SPP): The average number fertile spikes per plant including tillers.

3.5. Participatory Varietal Selection

3.5.1. Farmers' evaluation of bread wheat varieties

Farmers have evaluated bread wheat genotypes based on their selection criteria. Farmers' awareness creation was done before the field evaluation started. Farmer's field evaluation day for varietal selection was organized at different growth stages of the bread wheat crop. These are at the growth stages (which includes the vegetative, flowering and maturity stage) and at harvesting period for evaluating bread wheat varieties for yield, seed color, spike length, number of seeds per spike. 30 famers were selected and used to held the focus group discussion (FGD).

The varieties were ranked based on both direct matrix ranking and pair-wise ranking techniques. Farmers interest in that each criterion was ranked from 1 to 5 (5 = excellent, 4 = very good, 3 = good, 2 = poor and 1 = very poor). The ranking procedure was explained to participating farmers and the final ranking was done on consensus where differences were resolved through discussion (De Boef and Thijssen, 2007). Similar methodology has been used by Alebachew (2012) and Seifu et al. (2018) on wheat participatory varietal evaluation. In direct matrix ranking farmers have given rating of importance (a relative weight) of a selection criterion ranked from 1 to 3 (3= very important, 2= important and 1= less important) and rating performance of a variety for each traits of interest (selection criteria) was given based on their level of importance on the basis of common agreement of evaluators'. The score of each variety was multiplied by the relative weight of a given character to get the final result and then added with the results of other characters to find out the total score of a given variety and their ranks (Seifu et al., 2018). In the case of pair-wise ranking the varieties were compared and ranked pair-wise (Alebachew, 2012).

3.6. Data Analysis

The data recorded was subjected to analysis of variance (ANOVA) using the statistical analysis software (SAS version 9.2) package for the following statistical procedures.

3.6.1. Analysis of variance

The analysis of variance was conducted using randomized complete block design (RCBD). Both direct matrix ranking and pair-wise ranking from the mother trail was calculated. Least significant difference (LSD) test was used to compare means at 5% probability level.

ANOVA model

ANOVA of randomized complete block design was computed using the following mathematical model:

$$Y_{ij} = \mu + r_j + g_i + \varepsilon_{ij},$$

Where: Y_{ij} = the observed value of the trait Y for the i^{th} genotype in j^{th} replication

μ = the general mean of trait Y

r_j = the effect of j^{th} replication

g_i = the effect of i^{th} genotypes and

ε_{ij} = the experimental error associated with the trait y for the i^{th} genotype in j^{th} replication.

Least significant Difference (LSD) and coefficient of variation in percent (CV in %) was computed for all characters using the statistical procedure described by Gomez and Gomez (1984).

$$LSD = \alpha (2\sigma^2 e/r)^{1/2}$$

$CV\% = [(\sigma^2 e)^{1/2} / \bar{x}] \times 100$ where, α = t- value at 5% and 1% probability level.

III. RESULT AND DISCUSSION

4.1. Range and mean of characters

The analysis of variance (ANOVA) revealed that the parameters; spike length, plant height, spikelet per spike, days to heading and days to maturity were highly significantly different ($p < 0.01$), whereas the parameters; above ground biomass and grain filling period were significantly different ($p < 0.05$). However, spike per plant, kernels per spike, grain yield, harvest index and thousand kernel weight were not significantly different (Table 2).

The highest spike length (9.15cm) was recorded from Alidoro variety whereas the lowest (6.28cm) was obtained from Hoggana. The highest plant height (84.88cm) was obtained from Alidoro whereas the lowest (66.57cm) was recorded from Mekelle 4. This indicates that Alidoro is the tallest variety and Mekelle 4 is the shortest as compared to all tested varieties. However, this result disagree with the report of Fanos and Tadeos, 2017 who reported non-significant difference among wheat varieties on plant height. The maximum value for spikelet per spike was recorded from Millan whereas the minimum value (6.30) was recorded from Mekele 4 (Table 1). The maximum number of tiller per plant (7.27) was recorded from Hoggana which was in statistical parity with Millan, ETBW 5879, Huluka and Mekelle 2 whereas the minimum number (5.77) was recorded from Mekelle 4. This result was in agreement with Asaye *et al.*, 2013 who reported significant difference among wheat varieties at Womberma district.

The highest value for spikelet per spike (19.50) was recorded from Alidoro whereas the lowest value (14.37) was obtained from Millan. The maximum days to heading (45) was recorded from Digelu whereas the minimum days to heading (27.67) was recorded from Mekelle 2. This indicates that from the tested varieties Digelu took short period of time to reach heading stage whereas Mekelle 2 took prolonged period of time. The maximum period for maturity (94) was recorded from Digelu whereas the minimum days to maturity (71.67) was recorded from Mekelle 2 (Table 1). His result is in agreement

with the study of Fanos and Tadeos, 2017 who reported significant difference of wheat varieties for the parameter days to maturity. This showed that Mekelle 2 was early maturing whereas Digelu was late maturing variety compared to the other tested varieties.

The maximum above ground biomass yield (5592.60g) was recorded from Alidoro whereas the minimum (2259.30g) was recorded from Mekelle 4. This indicates that Alidoro had the highest above ground biomass yield compared to the other tested varieties. The maximum period for grain filling (53.67) was recorded from Alidoro whereas the minimum period (40.67) was recorded from Mekelle 4 which was not statistically different with Mekelle 2. The shortest grain filling period recorded from Mekelle 2 might be due to the shortest period required by same variety to reach to heading stage.

Table.3 The mean performance of bread wheat varieties for different characters for the mother trail at Yefereziye

Genotype	SL	SPP	PH	TPP	SPKPS	KPS	GY	AGB	HI	TKW	DH	DM	GFP
MILLAN	8.29	7.70	75.99	7.13	14.37	47.73	1777.80	3592.60	0.49	45.00	35.00	77.33	42.33
ETBW 5879	7.62	7.53	70.11	7.00	14.73	51.53	2740.70	4814.80	0.58	45.00	36.00	82.00	46.00
Hoggana	7.45	7.70	74.78	7.27	14.93	48.60	2333.30	4444.40	0.53	43.33	41.00	89.33	48.33
Hulluka	7.77	7.00	71.28	6.47	15.73	54.63	2481.50	4814.80	0.51	43.33	33.00	81.67	48.67
Mekelle-4	8.27	6.3	66.57	5.77	16.6	48.47	1037.10	2259.30	0.41	41.67	33.67	74.33	40.67
Mekelle-2	8.31	6.8	73.73	6.30	15.13	47.70	2074.10	4074.10	0.50	43.33	27.67	71.67	44.00
Alidoro	9.15	6.43	84.88	5.83	19.50	61.73	2888.90	5592.60	0.51	45.00	35.67	89.33	53.67
Digelu	6.28	6.47	81.28	5.97	14.23	46.27	1740.70	2666.70	0.65	45.00	45.00	94.00	49.00
CV %	6.57	15.74	5.60	17.25	7.50	13.62	31.24	29.02	14.05	6.14	5.69	3.8475	7.5625
LSD 0.05	0.91	1.93	7.34	1.95	2.05	12.12	1167.50	2049.00	0.13	4.73	3.57	5.5559	6.1693
Mean	7.89	6.99	74.83	6.47	15.65	50.83	2134.27	4032.41	0.52	43.96	35.88	82.46	46.58
Range	9.15- 6.28	7.70- 6.30	84.88- 66.57	7.27- 5.77	19.50- 14.23	61.73- 46.27	2888.90- 1037.10	5592.60- 2259.30	0.65- 0.41	45.00- 41.67	45.00- 27.67	94.00- 71.67	53.67- 40.67

SL= spike length, SPP=spikelet per spike, PH= plant height, TPP= tiller per plant, SPKPS= spikelet per spike, KPS= kernel per spike, GY= grain yield, AGB= above ground biomass, HI= harvest index, TKW= thousand kernel weight, DH= days to heading, DM= days to maturity, GFP= grain filling period

3.2. Analysis of Variance

The analysis of variance for different characters of bread wheat at Yefereziye is presented in Table 2. Genotypes differed highly significantly ($p \leq 0.01$) for spike length, plant height, spikes per spike, days to heading and days to maturity. Genotypes differed significant ($p \leq 0.05$) for above ground biomass and grain filling period. However, no significant difference was observed in tiller per plant, kernel per spike, grain yield, harvest index and thousand kernel weight. Khan (2013), observed non-significant differences among bread wheat genotypes for days to maturity, spike length, fertile tillers, spikelet per spike, grain per spike and grain yield per plot in which is similar with some of the traits with the present study.

Table. 4 Analysis of variance (ANOVA) for 13 bread wheat characters at Yefereziye site

Source	Rep (df=2)	SS gen	MS of gen (df=7)	Error (df=14)
Spike length	1.97	14.77	2.11**	2.08
Spike per plant	9.19	7.20	1.028 ^{NS}	1.21
Plant height	376.60	745.10	106.44**	17.56
Tillers/plant	19.08	7.61	1.088 ^{NS}	1.24
Spikelet per spike	2.79	63.02	9.00**	1.38
Kernels per spike	30.60	553.83	79.12 ^{NS}	47.93
Grain yield	551399.3	7760317.64	1108617 ^{NS}	444441.60
Above ground biomass	2293735	27098274.30	3871182*	1368978.00
Harvest index	0.000954	0.10	0.01478 ^{NS}	0.01
Thousand kernel weight	7.29	32.29	4.613095 ^{NS}	7.29
Days to Heading	18.88	572.63	81.80**	4.16
Days to maturity	26.54	1311.96	187.42**	10.07
Grain filling period	13.79	370.50	52.93*	12.41

Estimated range and mean is presented in (Tables 3) for the mother trail at Yefereziye. Wide ranges were recorded for grain yield, above ground biomass and days to heading. Based on the mean separation, the highest grain yield (2889.90kg/ha) was recorded from Alidoro, while the lowest yield (1037.10 kg/ha) was obtained from Mekele 4.

The mean spike length of 7.89 with the range of 6.28-9.15, the mean spike per plant of 6.99 with the range of 6.30-7.70. The mean plant height 74.83 with the range of 66.57-84.88, the mean tiller per plant of 6.47 with the range of 5.77-7.27 and the mean spikelet per spike of 15.65 with the range of 14.23-19.50 were recorded. Moreover the mean kernel per spike of 50.83 with the range of 46.27-61.73, the mean grain yield of 2134.27 with the range of 1037.10-2888.90 and the mean above ground biomass of 4032.41 with the range of 2259.30-5592.60 were recorded. The mean harvest index of 0.52 with the range of 0.41-0.65, the mean thousand kernel weight of 43.96 with the range 41.67-45.00, the mean days to heading of 35.88 with range of 27.67-45.00, the mean days to maturity of 82.46 with the range of 71.67-94.00 and the mean grain filling period of 46.58 with the range of 40.67-53.67 were recorded.

3.3. Pair-wise ranking of bread wheat varieties

In pair-wise ranking each variety was compared in pair based up on farmers bread wheat selection criteria presented in (Table 6). The selected variety in pair comparison was counted and recorded as total score (Table 5).

Pair-wise ranking performed by group of farmers at Yefereziye indicated that Alidoro, ETBW 5879 and Millan varieties had scored a total of 7, 6 and 5 values, respectively. However, the varieties Digelu, Huluka and Mekele 4 had scored 1, 1 and 0 values, respectively (Table 3). Thus, pair wise ranking result performed by farmers showed that Alidoro is top ranked and first selected variety followed by ETBW5879, and Millan. However, the varieties Mekele 4, Digelu and Huluka were the least ranked and selected by the farmers. Because this variety was susceptible to disease and they were low yielder compared to the other tested varieties.

3.4. Direct matrix ranking of bread wheat varieties

From the bread wheat selection criteria listed in table 4, grain yield and disease resistance were proposed as very important for selection of bread wheat variety by the farmers

(Table 4). This result is in agreement with varietal selection of rice reported by Sangay *et al* (2010) and wheat varietal selection reported by Alebachew (2012). Disease resistance was the other most important criteria for selection of bread wheat varieties, this is because stem rust, leaf rust and yellow rust is becoming a major threat in the study area, and the area becoming hot spot for the mentioned wheat diseases due to favorable environmental condition for disease occurrence.

Tillering capacity and spike length were important criteria for selection of bread wheat varieties by the farmers. Because they do have valuable contribution for yield increment and for an increase in biomass yield. This is in harmony with increasing tillering capacity succinct with high yield of grain and biomass yield. In addition to this, seed color, seed size, seed uniformity and market value were also ranked as an important criteria for selection of bread wheat varieties by the farmers. However, plant height was given lower rank and is the least criteria for selection of bread wheat varieties by the farmers (Table 4).

Farmers were made to identify and select the best bread wheat varieties for their agro-ecology. Farmers participatory variety selection (PVS) have significant contribution in increasing the option of wheat varieties for the farmers and to select the best one for an increase in yield and productivity of wheat. However, farmers did not have the opportunity for variety choice in the study area. This approach also coincides with the research finding of Sangay and Mahesh (2010), regarding participatory variety selection for increasing rice varietal diversity and Alebachew (2012) for wheat varietal selection.

Generally, according to direct matrix ranking technique for selection of bread wheat varieties, Alidoro was selected at the first place with total score of 87, which was followed by ETBW5879, Millan, Mekelle 2, Hoggana, Huluka and Digelu with a total score of 85, 79, 72, 71, 59, 53 and ranked as 2nd, 3rd, 4th, 5th, 6th and 7th, respectively (Table 4). However, Mekelle 4 was the least selected variety by the farmers due to the fact that it is highly affected by disease.

Table 5. Pair-wise ranking of bread wheat varieties by group of farmers at Yefereziye

Varieties	ETBW 58 79	Millan	Mekele 4	Huluka	Alidoro	Hoggana	Mekele 2	Digelu
ETBW 5879								
Millan	ETBW 5879							
Mekele 4	ETBW 5879	Millan						
Huluka	ETBW 5879	Millan	Huluka					
Alidoro	Alidoro	Alidoro	Alidoro	Alidoro				
Hoggana	ETBW 5879	Millan	Hoggana	Hoggana	Alidoro			
Mekele 2	ETBW 5879	Millan	Mekele 2	Mekele 2	Alidoro	Mekele 2		
Digelu	ETBW 5879	Millan	Digelu	Huluka	Alidoro	Hoggana	Mekele 2	
Total Score	6	5	0	1	7	3	4	1

Table 6. Direct matrix ranking of bread wheat varieties by group of farmers' at Yefereziye

Selection criteria	Relative weight	ETBW 5879	Millan	Mekele 4	Huluka	Alidoro	Hoggana	Mekele 2	Digelu
Grain yield	3	(15)5	(12)4	(3)1	(9)3	(15)5	(12)4	(12)4	(9)3
Spike length	2	(6)3	(6)3	(2)1	(6)3	(10)5	(6)3	(6)3	(6)3
Plant height	1	(3)3	(3)3	(2)2	(4)4	(5)5	(3)3	(4)4	(3)3
Tillering capacity	2	(8)4	(6)3	(2)1	(6)3	(10)5	(6)3	(6)3	(6)3
Disease resistance	3	(15)5	(12)4	(3)1	(12)4	(15)5	(12)4	(12)4	(3)1
Seed color	2	(10)5	(10)5	(4)2	(4)2	(6)3	(8)4	(8)4	(6)3
Seed size	2	(8)4	(10)5	(4)2	(6)3	(10)5	(8)4	(8)4	(4)2
Market value	2	(10)5	(10)5	(6)3	(4)2	(6)3	(8)4	(8)4	(8)4
Seed uniformity	2	(10)5	(10)5	(6)3	(8)4	(10)5	(8)4	(8)4	(8)4
Total score		85	79	32	59	87	71	72	53
Rank		2	3	8	6	1	5	4	7

Note: Total number of Participants (Farmers) are 30 (male=20, female=10)

Rating of performance of a variety for a selection criteria: 5=excellent, 4=very good, 3=good, 2=poor, and 1=very poor. Relative weight of a selection criteria: 3=Very important, 2=Important 1=less important

In pair wise ranking at Yefereziye, Alidoro, Millan and ETBW5879 were considered as best varieties, whereas Digelu, Huluka and Mekele 4 were the least preferred varieties by farmers (Table 3). According to direct matrix ranking at Yefereziye, Alidoro, ETBW 5879 and Millan varieties were considered as best followed by Mekele 2, Hoggana and Huluka. However, Mekele 4 and Digelu varieties were the least preferred ones because of their less resistance to diseases (Table 4).

Grain yield and disease resistance were proposed as very important criteria as indicated in (Table 4). Grain yield was considered as the most selection criteria for each bread wheat varieties and this is also in agreement with varietal selection of rice reported by Sangay *et al* (2010) and Alebachew (2012) for wheat varietal selection. The second most important selection criteria was disease resistance because stem and leaf rust is becoming a major threat in most wheat growing areas including the study area. Especially, cheha wereda is a hot spot area for various diseases which is related to the warm and humid weather condition of the environments. In view of this disease resistance was important selection criteria that were suggested by farmers.

Tillering capacity and spike length were ranked as one of important criteria that would have valuable contribution for yield. This is in harmony with increasing tillering capacity succinct with high potential of yield and biomass. Seed color, seed size, market value and seed uniformity also were ranked as one of important criteria. However, plant height was given lower rank by farmers.

As described above farmers were able to identify and select the best wheat varieties for their agro-ecology. From the research finding the approach of PVS have significant contribution in increasing the option of wheat varieties because farmers did not have choice of variety before. This approach also coincides with the research finding of Sangay and Mahesh, (2010), regarding participatory variety selection for increasing rice varietal diversity and Alebachew (2012) for wheat varietal selection.

IV. CONCLUSION

South nation, nationality people region especially Cheha, Ezha, Gumer and Sodo districts are potential for wheat production in Ethiopia. However, due to lack of promising released wheat varieties for those areas the farmers were not able to obtain varietal options. In the last few years, a number of promising wheat varieties were released but not reached to farmers. In order to tackle this problem, it is imperative to evaluate the performance of bread wheat varieties in the highland ecosystems with involvement of farmers in the varietal selection for sustainable technology dissemination and faster adoption of improved varieties.

Accordingly, eight released bread wheat varieties were tested at Yefereziye research site which is located in Cheha district, Gurage zone. With the objective of to identify appropriate and farmer preferred bread wheat varieties

under participatory variety selection trials using farmers' selection criteria. The analysis of variance showed that genotypes differed highly significantly ($p \leq 0.01$) at Yefereziye in spike length, plant height, spikes per spike, days to heading and days to maturity. Genotypes differed significantly ($p \leq 0.05$) in above ground biomass and grain filling period. However, genotypes did not differed significantly for tiller per plant, kernel per spike, grain yield, harvest index and thousand kernel weight.

In pair wise and direct matrix ranking result performed by farmers showed that Alidoro is top ranked and first selected variety followed by ETBW5879, and Millan. Grain yield and disease resistance were proposed as very important for selection of bread wheat variety by the farmers. Generally, the approach of PVS is the most practical and reliable way for bread wheat technology generation, popularization and dissemination.

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CONFLICT OF INTEREST

There is no conflict of interest between the authors or anybody else

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Effects of Agricultural Education on Subsistence Farmers' Crop Production in Ogba/Egbema/Ndoni Local Government Area Rivers State.

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Abstract

The study examined "Effects of Agricultural Education on Subsistence Farmers' Crop Production in Ogba/Egbema/Ndoni Local Government Area of Rivers State". The objectives were to determine the impacts of agricultural education on crop production; ascertain the influence of agricultural education on crop farmers' adoption of innovation and determine the factors that hinder agricultural education from making maximum effect on subsistence farmers in Ogba/Egbema/Ndoni L.G.A. The study adopted a descriptive survey design. A simple random sampling technique was used to select sixty-two (62) female farmers and forty (40) male farmers in Ogba/Egbema/Ndoni L.G.A, resulting to a total sample size of one hundred and two (102) crop farmers. Data was collected using a well structured questionnaire designed in Likert 5 point rating scale of agreement. Data was analyzed using mean standard deviation with acceptance means value of ≥ 3.00 while z-test was used to test the hypothesis at 0.05% level of significance. Findings from the study revealed that agricultural education enhances crop farmers' productivity, exposes farmers to agricultural technology, agricultural education increases local food availability among others. Also, creates awareness of improved crop varieties before they are adopted, provides adequate information concerning new innovation, adoption of innovation depends fully on the level of interaction between the change agents and the farmers amongst others. Lastly, the study found that, failure of first trials, lack of resources to obtain the new innovation, affixed with ancient method of farming and others are factors that hinder agricultural education from making maximum impact on crop farmers adoption in the study area. The study therefore recommends that government and NGOs should encourage agricultural education and its extension officers to carryout effective and adequate agricultural programme to develop farmers' decision making skills, regular extension visits should be extended to rural farmers and adequate awareness should be created to improve farmers' inputs.

Keywords; Effect. Agricultural, Education, Farmers, Subsistence, Crop, Production.

Introduction

Agricultural Education is a type of vocational education designed to develop knowledge, skills and constructive attitudes in farmers to improve his quality and sustainable food production that will be sufficient for domestic

and export use. Vocational education in Agriculture contributes to the development of farmers on the ability to solve problem efficiently especially one relating to the farmer's farm. It a vocational platform where farmers acquire relevant knowledge and updated development in agriculture; gives room for their interaction with partners in agro business and other relevant institutions, at the same time assists them to develop their own technical organizational and managerial skills and practice (Christopols, 2010).

In the formal context, Edwards (2008) described agricultural education is the teaching of agriculture, natural resources, and land management through hands on experience and guidance to prepare students for level jobs or for further education to prepare them for advanced agricultural jobs. Amadi and Lazarus (2017) also have it that Agricultural education is generally focused on producing seasoned skilled manpower that will shape and develop agricultural industries around the world.

A large number of rural population are into farming hence educational programmes aimed at increasing their skills in different agro-allied disciplines and equipping them with the tools they need to combat hunger and poverty in their communities, would surely make a remarkable difference in the rural economy. Indeed, successful agricultural education and programmes stand to benefit both the farmers and the entire populace through food sufficiency and security. As noted by Jena (2015), farmer education programme will;

- a. Increase local food availability
- b. Increase sustainability of agricultural practices
- c. Increase farmers income

A survey conducted by World Bank to ascertain the impact of farmers education and their agricultural efficiency in low income countries found that farmers with basic education were 8.77 more productive than farmers with no education attainment (Gasperini, 2000). It suggests from the finding of World Bank that the educational level of farmers have positive impact on their productivity. In a related development a study conducted in Napal on the effects of education on agriculture disclosed that education enhances agricultural productivity, primarily by improving farmer's decision-making ability and secondarily by enhancing their technical efficiency. Justine (2010) observed that an innovation to be adopted must pass through process of

adoption which involves awareness, interest, evaluation, trial and then adoption, and these are done through agricultural education

Through agricultural education, farmers acquire knowledge and literacy that helps them apply new techniques in farming, administer fertilizer effectively and being able to manage pests and diseases easily, which could positively impact crop yield. According to Appleton & Balihuta, (2006) agricultural literacy enables farmers to understand instruction on inputs such as chemical fertilizers and pesticides among others. A study conducted in Nepal, India by Pudasari (2003) discovered that agricultural education facilitates farmers' productivity significantly by improving their ability to make decision concerning the selection and the combination of inputs for better output. According to the study, there are basically three major ways which agricultural education enhances farmer's productivity; improvement in farmer's ability to obtain, understand and utilize new input, and improvement in overall managerial ability. Moreover in the study of Asadullah and Rahman (2012) it was found that agricultural education has positive impacts on farmers' rice yield due to the skills of literacy and numeracy that gives farmers better understanding of agricultural issues..According to Adams (2001) rural farmers' adoption of innovations was found to be dependent on the level of interaction between the change agents and the farmers.

Farmer cannot do well in terms of productivity when they do not have the basic knowledge in agricultural production. It then becomes a thing of necessity that farmers should be taught in the field on techniques and skills in farming. Habito, (2003) in a study of the development of an adult farmer education program, reported that tremendous technological lag has hampered the efforts to enhance the development of agriculture. This lag, he observed was reflected in the widespread low average yields of crops and the recurrent shortages in staple food despite generally favourable conditions of soil and climate.

As a means to rectify the situation, he recommended the following:

1. A reorientation of the philosophy, objectives and guiding principles of the agricultural education program with a view to giving a heavy emphasis to the vocational agriculture education of adult farmers;

2. Institution of adult farmer instruction in all farming communities as an integral part of the community school's educational program;
3. A content in-service-training of agricultural teachers towards effective adult education.

Crop farmers; undoubtedly face a lot of challenges in their cultivation process which ranges from low yield, pest and diseases, poor weather, nutritional imbalance poor sanitation and health. These factors come together to affect the socio-economic and philological state of the farmer Deekor and Nnodim (2006) stated that one major functions of agricultural education is to provide adequate information concerning new innovation which will help the farmers to solve their problems through adoption. Yet majority of the subsistence crop farmers do not find agricultural education needful for their cultivation process. Silva and Broekel (2015) opined that lack of resources to adopt new innovation, compatibility, complexity of new innovation and environment are major barriers to adopt new innovations of agriculture by subsistence farmers. Stunding&Zilberman, (1999) has it that, socio-psychological traits of farmers such as their age, educational attainment, income, family size, tenure status, credit use, value system, and beliefs are positively related to adoption. In other words, farmers with without the factors mentioned are likely to have problems of adopting new innovation. Similar to technology adoption, the characteristics of technologies, such as relative advantage, complexity, divisibility, and compatibility affect their diffusion (OECD, 2001).

Purpose of the study

The main purpose of the study was to determine the effects of agricultural education on subsistence farmers' crop production in Ogba/Egbema/Ndoni Local Government Area Rivers State. In specific terms, the study sought to

1. Examine the impact of Agricultural Education in Crop Production in Ogba/Egbema/Ndoni LGA.
2. Ascertain the influence of agricultural education on farmers' adoption of innovation in crop production in Ogba/Egbema/Ndoni LGA
3. Determine the factors that hinder agricultural education from making maximum effect on subsistence farmers in Ogba/Egbema/Ndoni L.G.A?

Research Questions

1. What are the impacts of Agricultural Education in Crop Production in Ogba/Egbema/Ndoni L.G.A?
2. What are the influences of agricultural education on farmers' adoption of innovation in crop production in Ogba/Egbema/Ndoni L.G.A?
3. What are the factors that hinder agricultural education from making maximum effect on subsistence farmers in Ogba/Egbema/Ndoni L.G.A?

Hypotheses

Hypothesis 1: There is no significant different in mean response of female and male crop farmers on impact of agricultural education on farmers' crop yield in Ogba/Egbema/Ndoni

Hypothesis 2: There is no significant different in mean response of female and male crop farmers on influence of agric education on farmers' adoption of innovation in crop production.

Hypothesis 3: There is no significant difference in the mean response of male and female farmers on the factors that hinder agricultural education from making maximum effect on subsistence farmers.

Methodology

The study was carried out in Rivers State. The state is bounded on the South by the Atlantic Ocean, by the North Imo and Abia State, by the East Akwa-Ibom and by the West Bayelsa and Delta state. This region was chosen as there are large areas in the state where majority are rural farmers on a subsistence level. The study used a descriptive survey study to seek the opinion of the farmers on the impact of agricultural education on farmers' crop production in Ogab/Egbema/Ndoni Local Government Area. The population of the study comprise of all crop farmers in Ogba/Egbema/Ndoni Local Government Area in Rivers State. A random sampling technique was used where 62 rural female crop farmers were chosen and 40 male farmers were randomly selected making a total of one hundred and two respondents as the sample size. A structured questionnaire designed in Likert-point rating scale of agreement and a complementary interview was used for the illiterate farmers' data collection. Data gathered were analyzed using mean and standard deviation with acceptance score of ≥ 3.00 while the hypotheses were tested using z-test at 0.05% level of significance.

RESULT AND DISCUSSION

Research Question 1: What are the impacts of Agricultural Education on Crop yields in Ogba/Egbema/Ndoni LGA?

Table 1; Mean Response of Female and Male Crop Farmers on impacts of Agricultural Education in Crop Production in Ogba/Egbema/Ndoni LGA.

S/N	Statements	Female n = 62			Male n = 40		
		\bar{X}	SD ₁	Decision	\bar{X}_2	SD ₂	Decision
1.	Enhances farmers productivity	3.85	0.60	Agreed	3.63	1.06	Agreed
2.	Exposes farmers to Agricultural Technology	4.00	0.77	Agreed	3.73	1.08	Agreed
3.	It enhances farmers livelihood	3.63	0.52	Agreed	3.48	0.88	Agreed
4.	It helps farmers adopt modernized farming techniques	3.40	0.87	Agreed	3.88	0.62	Agreed
5.	Increases local food availability	3.19	0.76	Agreed	3.10	1.01	Agreed
6.	Increases farmers' income	4.19	0.94	Agreed	4.43	0.71	Agreed
7.	Increases sustainability of agricultural practice	3.63	1.21	Agreed	4.43	0.71	Agreed
8.	Ability to take decision concerning the selection of input	4.05	1.31	Agreed	3.98	0.07	Agreed
9.	Ability to obtain, understand and utilize new input and improvement in overall managerial ability	3.89	1.07	Agreed	3.38	1.75	Agreed
10.	Improves farmers knowledge to adopt and implement basic instruction on agricultural production	4.32	1.19	Agreed	3.90	1.12	Agreed
11.	Increases food security	3.98	0.49	Agreed	3.45	0.52	Agreed
12.	Improves the cultivation of disease free crop	3.50	1.24	Agreed	3.25	1.04	Agreed
13.	popularizes varieties of crop species	4.00	1.60	Agreed	3.93	1.22	Agreed
14.	Enhances farmers' knowledge in crop production	3.66	1.76	Agreed	3.63	1.04	Agreed
	Grand Mean	3.81	1.02		3.73	0.92	

Table 1 presents respondents mean responses on the impact of Agricultural Education in Crop Production in Ogba/Egbema/Ndoni L.G.A. Based on the mean decision rule, the study shows the agreement of the respondents with the presented items; agricultural education enhances crop farmers' productivity (3.85 & 3.63), exposes farmers to agricultural technology, (4.00 & 3.73), agricultural education enhances farmers' livelihood (3.63 &

3.48), helps farmers adopt modernized farming techniques with ease (3.40 & 3.88). Also, agricultural education increases local food availability (3.19 & 3.10), agricultural education increases farmers' income (4.19 & 4.43), and increases farmers' sustainability of agricultural practices (3.63 & 4.43). Furthermore, Agricultural education helps in the; ability to take decision concerning the selection of farm input (4.05 & 3.98); ability to obtain, understand and utilize new input and improvement in overall managerial ability (3.89 & 3.38), Improvement of farmers knowledge to adopt and implement basic instruction on agricultural production (4.32 & 3.90), and increase food security (3.98 & 3.45). Moreso, the respondents agreed that agricultural education improve the cultivation of disease free crop species (3.50 & 3.25), popularizes varieties of crop species (4.00 & 3.93) and enhances farmers knowledge in crop production (3.66 & 3.69). This finding is consistent with Adesoji (2009) who reported that agricultural education support and encourages crop farmers to enhance their productivity. It is also in conformity with Iwo (2012) who opined that agricultural education helps the farmers to apply new techniques of farming, administer fertilizers effectively. Leonard (2014) also supported by noting that farmer's education programme will increase farmers' income and sustainability of agricultural practices.

Research Question 2: What are the influences of agricultural education on farmers' adoption of innovation in crop production in Ogba/Egbema/Ndoni L.G.A?

Table 2: Mean Response of female and male crop farmers on influence of agricultural education on farmers' adoption of innovation in crop production in Ogba/Egbema/Ndoni LGA.

S/N	Items	Female n = 62			Male n = 40		
		\bar{X}	SD ₁	Decision	\bar{X}_2	SD ₂	Decision
1.	Agricultural education creates awareness of improved crop varieties before it's adopted.	3.79	1.79	Agreed	3.83	1.20	Agreed
2.	Agricultural education provide adequate information concerning new innovations	3.68	1.04	Agreed	3.78	1.19	Agreed
3.	Adoption of innovations depend fully on the level of interaction between the change agents and the farmers	3.39	0.84	Agreed	3.60	1.19	Agreed
4.	Agricultural education	3.24	0.95	Agreed	3.88	0.87	Agreed

	patiently proves the workability of new innovation to laggard farmers.						
5.	Agricultural education provides technical know-how on the new innovation.	3.94	1.04	Agreed	4.05	1.14	Agreed
6.	The speed in which an innovation is adopted depends on information sent out by the extension agents.	3.94	0.86	Agreed	4.18	0.76	Agreed
7.	Agricultural education agents demand penny from farmers before introducing new innovation.	1.04	0.53	Disagree	1.04	0.50	Disagreed
8.	Agricultural education provides farmers with opportunity to obtain improved varieties effortlessly	3.20	0.80	Agreed	3.24	0.66	Agreed
	Grand Mean	3.28	0.98		3.45	0.94	

Field study, 2018.

Table 2 shows the female and male farmers responses on the influence of agricultural education on farmers' adoption of innovation in crop production in Ogba/Egbema/Ndoni LGA. Based on the mean acceptance of value of 3.00, the farmers showed agreement that agricultural education creates awareness of improved crop varieties before they are adopted (3.73 & 3.83), provides adequate information concerning new innovation (3.68 & 3.78), adoption of innovation depends fully on the level of interaction between the change agents and the farmers (3.69 & 3.60). Moreover, farmers agreed that adoption of innovation is achievable through agricultural education (3.24 & 3.88), agricultural education provides knowledge of new technologies and their application (3.94 & 4.05), the speed in which an innovation is adopted depends on the information sent out by the extension agents (3.24 & 3.18). Lastly, farmers also supported that agricultural education provides farmers with opportunity to obtain improved varieties effortlessly (3.20 & 3.24), and agricultural extension officers' visit to farmers helps and encourages farmers to adopt new innovation (4.25 & 3.73). Whereas, the farmers disagreed that agricultural education agents demands penny from them before introducing new agricultural innovations. The findings obtained is in agreement with Deekor and Nnodim (2006) who stated that one major

function of agricultural education is to provide adequate information concerning new innovation which will help the farmers to solve problems through adoption. Also Crawford (2006) has it that the central aim of agricultural education has been to increase availability of seeds. This is also inline with Justina (2010) who observed that for innovation to be adopted awareness must be created. Adam (2001) supported the findings by stating that rural farmers' adoption of innovations was found to be dependents on the level of interaction between the change agents and the farmers. The study conforms with Diederren (2003) and Paul *et al* (2003) who stated in their respective research that the extent to which farmers utilize available technology and the speed by which they do so depends on the information given out by the extension agents.

Research Question 3: What are the factors that hinder agricultural education from making maximum effect on subsistence farmers in Ogba/Egbema/Ndoni L.G.A?

Table 3: Mean response of female and male farmers on the factors that hinders agricultural education from making maximum effect on subsistence farmers.

S/N	ITEMS	Female =62			Male=40		
		\bar{X}_1	SD ₁	Decision	\bar{X}_2	SD ₂	Decision
1	Fear of failure for trial for the first time.	3.67	0.87	Agreed	3.33	1.02	Agreed
2.	Affixed with the ancient medium of crop production	4.01	0.69	Agreed	3.90	0.74	Agreed
3.	Lack of substantial proves.	3.54	0.83	Agreed	3.43	1.09	Agreed
4.	Little or equivalency difference in the old and new innovation	3.44	0.64	Agreed	3.75	0.86	Agreed
5.	Lack of resources to obtain the new innovation	3.76	0.78	Agreed	3.88	0.69	Agreed
6.	Lack of interest in the new innovation because of its irrelevance to the area	3.62	0.66	Agreed	3.39	0.76	Agreed
7	Lack of appropriate interpretation of message to the unlearned farmers.	3.12	0.72	Agreed	3.18	0.73	Agreed

8.	The possible disadvantages of new innovation	3.34	0.92	Agreed	3.69	0.85	Agreed
9.	Inconsistency of agricultural education agents.	3.50	0.77	Agreed	3.46	0.68	Agreed
10.	Climatic/ environmental factors	3.22	0.81	Agreed	3.37	0.72	Agreed
Grand Mean and S.D		3.52	0.77		3.54	0.81	

Field Survey, 2018.

Table 3, shows the responses of both female and male subsistence crop farmers on the factors that hinder agricultural education from making maximum effect on subsistence farmers. Based on the acceptance mean value of 3.00, farmers agreed with all the enlisted items in the table as the some of the factors that hinders agricultural education from maximum impact on subsistence farmers. This finding is in line with Silva and Broekel (2015) who observed that lack of resources to adopt new innovation, compatibility, complexity of new innovation and environment are major barrier to adopt new innovations of agriculture. Stunding&Zilberman, (1999) also affirmed that Socio-psychological traits of farmers such as their age, educational attainment, income, family size, tenure status, credit use, value system, and beliefs are positively related to adoption. Similar to technology adoption, the characteristics of technologies, such as relative advantage, complexity, divisibility, and compatibility affect their diffusion (OECD, 2001)

Testing Hypotheses

Hypothesis 1: There is no significant different in mean response of female and male crop farmers on impact of agricultural education on farmers' crop yield in Ogba/Egbama/Ndoni.

Table 4: Z-test analysis on mean response of male and female crop farmers on impact of agricultural education on farmers' crop yield in Ogba/Egbama/Ndoni L.G.A.

Category	N	\bar{X}	SD	Sig. Level	Z-cal	Z-crit	Decision
Female	62	3.81	1.02	0.05	0.42	1.96	Accepted

Male	40	3.73	0.92
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Table 1 presents the z-test analysis on mean response of male and female crop farmers on impact of agricultural education on farmers’ crop yield in Ogba/Egbema/Ndoni L.G.A. the table shows that the z-cal value of 0.42 is less than that of z-critical value of 1.96. therefore, the hypothesis which states that there is no significant different in mean response of female and male crop farmers on impact of agricultural education on farmers’ crop yield in Ogba/Egbema/Ndoniwas accepted.

Hypothesis 2: There is no significant different in mean response of female and male crop farmers on influence of agric education on farmers’ adoption of innovation in crop production. **Table 5: Z-test analysis on the mean response of male and female crop farmers on influence of agricultural education on farmers’ adoption of innovation in crop production.**

Category	N	\bar{X}	SD	Sig. Level	Z-cal	Z-crit	Decision
Female	62	3.28	0.98				
				0.05	0.87	1.96	Accepted
Male	40	3.45	0.94				

Table 5 presents z-test analysis on mean response of male and female crop farmers on influence of agricultural education on farmers’ adoption of innovation in crop production. At an alpha level of significant 0.05 %, Z-cal value of 0.87 was obtained while the z-crit value of 1.96. The hypothesis which states that there is no significant difference in the mean response of male and female crop farmers on influence of agricultural education on farmers’ adoption of innovation in crop production thus accepted.

Hypothesis 3: There is no significant difference in the mean response of male and female farmers on the factors that hinder agricultural education from making maximum effect on subsistence farmers.

Table 6; Z-test analysis on the mean response of crop farmers on factors that hinder agricultural education from making maximum effect on subsistence farmers.

Category	N	\bar{X}	SD	Sig. Level	Z-cal	Z-crit	Decision
Female	62	3.52	0.77	0.05	0.13	1.96	Accepted
Male	40	3.54	0.81				

The table shows the z-test analysis of **mean response of crop farmers on** factors that hinder agricultural education from making maximum effect on subsistence farmers. **Since the z-calculated value of 0.13 obtained was less than the z-critical value of 1.96, therefore the hypothesis which states that** there is no significant difference in the mean response of male and female farmers on the factors that hinder agricultural education from making maximum effect on subsistence farmers was accepted.

Conclusion

This study concludes that agricultural educations instill significant confidence and belief in farmers. It helps farmers adopt modernized farming techniques with ease. Support and encourage farmers to enhance productivity, translates the findings of the research institutes to farmers through extension personnel, send the agricultural challenges of farmers to the research institutes. It also enhances the livelihood of farmers by transferring research based knowledge to the agricultural sectors, influences farmers to adopt new innovations and ensures improved productivity in all gamuts of agricultural practices.

It was also concluded that agricultural education helps in creating awareness of improved crop varieties before its adoption, it provides adequate information concerning the new innovation,also in case of laggard farmers, Agricultural education patiently proves the workability of new innovation through the use of proven individuals who might have adopted the new innovation among others.

Lastly, the study revealed that the factors hindering agricultural education from maximum impact on subsistence crop farmers include, the climatic and environmental factors, inconsistency of the extension agents, fear of first trials, lack of resources, fixation with ancient methods of crop cultivation among others.

Recommendations

1. Effective and adequate agricultural policies and programmes should be developed for farmers while urgently addressing the negative factors that hinder crop farmers' growth and improvement in crop production in the area.
2. Fostering farmers' education at all levels to ensure farmers improvement in inputs in crop production.
3. Government at all levels and private support fund is necessary to enhance crop production skills and development among farmers in the area.
4. Extension agents in the state should be properly trained and provided with all necessary technological packages required to teach and guide crop farmers on crop production.
5. Government should provide soft loans to these farmers, so as to facilitate adoption of improved management practices thereby improving good crop supply and ensuring food security.
6. Farmers should organize themselves into cooperative groups so as to facilitate loan procurement.

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The Chances Analysis as Support in Evaluating New Ideas in Entrepreneurial Business

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Abstract: One of the generally accepted indicators of the achieved economic development of one country and quality the life of its inhabitants represents the Gross Domestic Product expressed per capita, expressed in US dollars, taking into account the relative value of purchasing power of the national currency. It was precisely this indicator that served to categorize countries, by methodology World Economic Forum, according to the level of economic development of: highly developed countries, the countries of the middle level of development and the country of lower development. The categorization of countries has been made based on the dominant factor of the impact on GDP growth. Therefore, countries whose GDP growth is based on innovation (Innovation-driven), more efficient using production factors (Efficiency-driven), and the increased engagement of factors of production (Factor-driven). It was precisely the creation of this kind of indicators that made it possible to compare national economies respecting the same starting points. Precisely the ambient entrepreneurial conditions are the basic generator of support to entrepreneurial ventures.

Key words: economic, product, development, categorization, factors

Introduction

The development and availability of these elements is strongly reflected both on the motives of entrepreneurial behavior and on the scope and structure of the entrepreneurial process. Recognized by the GEM (Global Entrepreneurship Monitor) research, the framework of entrepreneurial conditions, as an upgrade of the general economic environment, with established interrelationships with certain forms of entrepreneurial activity, treats the imprisonment as the basic and initial impulse of entrepreneurial behavior. Entrepreneurial ventures are believed to be initiated by those individuals who believe that they possess adequate knowledge, skills, and a certain level of motivation to express an entrepreneurial initiative. However, in addition to these elements, the ability to see opportunities is also necessary. So, first of all national economic conditions influence the creation of business opportunities for entrepreneurs while they are direct entrepreneurial conditions put in the function of supporting entrepreneurs for the exploitation of the observed opportunities based on support through developed elements of direct enterprise frameworks such as the availability of entrepreneurial capital, government programs and policies, entrepreneurial education and training, physical infrastructure, etc. Entrepreneurship is seen as a process, recognizing the existence of all its phases from conceptualization to the end of the entrepreneurial venture, opens the possibility of implementing various support programs for the start-up and development of entrepreneurial ventures. Namely, the portion of the entrepreneurial process enables the consideration of concrete and specific problems as well as the necessary knowledge and skills for successful overcoming of a certain stage of the entrepreneurial process. The paper presents several approaches to the entrepreneurial process.

Previous entrepreneurship researches

Entrepreneurs who are in the phase of gathering resources (financial, human, material) and who are made certain financial investments but did not reach the payout stage at the same time for a period of three months, are considered to be emerging enterprising or enterprising entrepreneurs. Entrepreneurs who have paid off earnings for more than three months and less than forty-two months are counted in the category of owner-manager of new enterprises. Together, these two groups constitute the total entrepreneurial activity whose business endeavors are in the early stages of the process. Unlike their entrepreneurs who have paid salaries for more than three years in continuity have been presented as owners of existing enterprises whose business has lost all the elements of the new entrepreneurial endeavor. Interconnection and conditionality of entrepreneurial behavior and motive for starting entrepreneurial endeavors are so expressed that it is possible to talk about the matter that deserves an evaluation of the most complex and essential performance to achieve business success. Finding a secret the attitude of the behavior and motives of participants in the entrepreneurial process is a decisive step on the road achieving success. Certainly, motives as the guiding principle of every entrepreneur are subject to change, as is the case with behavior, in line with the change in the influence of external and internal factors. Given the ambient conditions, these two crucial concepts, experiencing transformations, which confirms their mutual conditionality and cause-and-relationship relationship? When it comes to entrepreneurship, there is no uniquely accepted definition in scientific literature. Scott & Venkataraman (2000) see entrepreneurship as a space within which an individual invests research effort in identifying chances and opportunities, with the goal of creating a new product or services in accordance with the requirements and needs of consumers. Such a product can be profitable exploited with a wide range of effects that it contributes to. Entrepreneurship can be defined as a process of value creation by collecting available resources for the purpose of exploiting profitable opportunities (Stevenson et al., 1990). Some authors view entrepreneurship as unity three elements: innovation, risk taking and proactivity (Covin & Slevin, 1989; Zahra 1993). The above-mentioned claim, in its research, confirmed Tang et al. (2009) stating that the behavior of the entrepreneur was shaped by the influence of the three elements. It is indisputable that Schumpeter is the first economist to link entrepreneurs with economic flows, which is free from the prevailing approach to comparative statistics and recognized the economy as a self-transforming system with an entrepreneur as an agent of change (Schumpeter, 1934). Schumpeter presents entrepreneurs as innovators creating conditions for gaining profits by creating temporary monopolies through organizational and technological ones innovation. With their activities they constantly disturb the existing state of balance that prefer existing business actors by compelling them to react to emerging threats. This process of "creative destruction" manifests itself in the improvement of productivity and consequently greater economic growth (Schumpeter, 1947). This approach has been enhanced and developed beyond by Baumol (2002) developed a new growth theory with the explicit role of Schumpeter entrepreneur as a transformer of knowledge into the economic knowledge and significant participants in economic growth. Within the available literature contribution Entrepreneurship to economic growth is more important in its later stages when growth is based on knowledge, as opposed to the early stages of economic development that is characterized the increased intensity of exploitation of production factors (Acs & Naude, 2013). In addition to economic innovations that stimulate entrepreneurship, their role is equally important when it comes to creating jobs through self-employment and creating small businesses (Barth et al., 2006). Consequently, the influence of entrepreneurship is directed towards the economic development of a country. Through the development of innovation, employment and other positive effects, many authors see entrepreneurship as an extremely important mechanism for influencing economic development (Schumpeter 1934; Acs & Audretsch 1988). According to the aforementioned authors, this would mean that in countries with the lowest degree of economic development whose economic activity is dominantly oriented to the exploitation of natural resources, it is necessary to focus the main focus on improving the basic conditions of economic development, such as government stability, infrastructure, primary education, and health care.

Basic conditions for supporting entrepreneurial behavior

American economist and winner of the Nobel Prize Solow (1956) in his work, based on Analysis of the time series in the period from 1909 to 1949 found that the growth was non-agricultural production caused by 7/8 technological changes, while the influence of capital is evident in the amount from 1/8. By introducing new technologies in the production process it is possible to achieve it economic growth and development with an unchanged or even smaller amount of work, engaged raw materials, materials, etc. The precondition for sustainable development, the advancement of society and economic growth is in new technologies. Of course, the stimulation of R & D and scientific research activities it is located in an institutional setting that simultaneously in the interactive relationship with entrepreneurs creates the basis for economic growth. Some authors in their research unambiguously confirm that the quality of the institutional environment influences the creation of an economic one growth (Acemoglu et al., 2001; Rodrik et al., 2004) A stimulating business environment requires involvement of all relevant institutions and decision makers during its construction. A stimulating, stable and predictable business environment is basic medium and long-term business planning factor. How to Invest in Projects in the form of starting up business ventures and developing existing business, they appreciate the concepts mid-term and long-term planning, building a stable business environment in many ways determines key business performance indicators. Reducing business risk can be achieved through the stability of one country's political institutions. Through the stability of the Government of the country, a predictable political and business environment is created that provides new investment cycles. The significance of the political system has been highlighted through its participation in the formation and determination of the country's credit rating, which in large part affects the interest rates on which the state and the economy will borrow in the future from international institutions. The creation of the global market, whose existence we are witnessing today, has been greatly assisted technological achievements and their constant progress and development. The emergence of internet technologies, the creation of a global network, has led to a faster flow of information and the connection of physically distant geographic spaces. The interaction of the company with consumers through the use of new technologies within their business is the most visible in the service sector. As a possibility of simultaneous improvement of the company's performance and creation of customer satisfaction, the use of self-service technologies is imposed. These technologies are recognized as the generator of transformations of business processes in the last two decades (Bitner et al., 2010). Their use reduces the cost of labor, increases productivity and improves the organization's performance. Consumers are now available through multiple channels and flexible time frames (Meuter et al., 2000). The techniques and tools of self-service technologies that companies use can be identified as mobile kiosks, internet usage, interactive voice command, mobile services. The largest role and responsibility in creating a business environment belongs to the Government of one country. Through their policies and programs, the Government's actions are directed in several directions: improvement of the regulatory environment, offering entrepreneurs financial assistance simplifying bureaucracy, improving the cognitive environment by providing transfer of knowledge and skills for doing business, improving the normative environment by improving the social perception of the entrepreneurial sector. Significant contribution of government institutions is also reflected in ensuring the availability of financial resources during all stages of development of entrepreneurial venture. In addition to securing financial resources distributed through ministries, local and regional agencies, funds, the governments of the countries seek to develop a domestic or regional capital market for the exclusive development of the sector of small and medium enterprises and entrepreneurs. Entrepreneurship is a process based on creativity, proactivity, innovation, risk taking, development and implementation of projects, all in the function of achieving targeted targets. This process is based primarily on the ability of an individual to transfer his ideas into concrete actions. As the process is based on an entrepreneur's abilities, it is necessary to include in the process of consideration his knowledge and skills on which the entire process is based. Acquired knowledge through a formal and non-formal education process forms the basis of the entrepreneur's ability to start a business venture.

Entrepreneurial education

Investments in the field of entrepreneurial education have very positive effects on the entrepreneurial sector. Functional cooperation with the economy and successful transfer of technologies requires the construction of certain capacities. It is necessary for the University to create an entrepreneurial climate within the institution and at the same time activate its own entrepreneurial capacities. At the same time, raising the University's capacity for cooperation with the economy as well as creating significant incentives for the activities of scientific and research personnel in cooperation with the economy are activities of importance for ensuring successful cooperation and linking the economy with the Universities, which can be largely determined by the absorption capacities of academic knowledge within business entities. After identification of possibilities, in the framework of cooperation with the economy, through the University the technology transfer office, the question arises of defining its founding structure and licensing strategies, which differ in the level of autonomy of the centers and the possibilities of commercialization of technologies. The establishment of technology transfer centers can take several forms: traditional University structures, non-profit research organizations and a profit-oriented center of associated private capital (Markman et al., 2005). After the completion of the research and development project and the provision of patented technology, the technology and knowledge transfer offices are provided with the possibility of commercialization through one of several licensing strategies, such as: licensing in return for future research sponsorships, licensing in the form of equity participation and licensing for cash. The positive aspects of these types of licensing represent the fact of providing conditions for the development of future research development projects. Transfer technology through university offices for transfer of knowledge and technology from there is an undoubted influence on the formation of new ones and the development of current entrepreneurial ventures. Through research sponsored by the industry, consulting services, licensing technologies as well as active participation in the process of development of the same university office confirm their role in strengthening entrepreneurial activity and initiative. With the help of the adopted organizational structure of the offices, various adopted strategies for technology transfer and cooperation with the economy, they are undoubtedly one of the main factors influencing the regional development and economic growth of the economies of individual countries.

The chances analysis as support in evaluating new ideas in entrepreneurial business

In the modern business environment, the role and importance of entrepreneurial firms is becoming more and more important. Their business is significantly facilitated by the aforementioned trends, as they are deleted borders between large and small business systems, as well as borders between countries. Entrepreneurial economy is based on positive effects generated by entrepreneurial firms - a large number of new products and ideas, entrepreneurial firms exert pressure to large bureaucratic organizations towards greater efficiency and innovation, and the provision of larger ones opportunities for minorities that do not fit into the corporate value system. Precondition of each company business is planning. Planning is done with each sector of the company individually. In this sense, we can distinguish the planning of sales, procurement, finance or personnel. A key place in the planning process belongs to financial planning. The basic result of financial planning is a budget that we define as an income and expense plan for the next, usually a one-year period. Planning approaches can be: strategic and operational. Strategic planning is focused on defining objectives and strategy based on the previously defined vision and mission of the enterprise. Strategic planning has a longer time horizon and a much wider scope, given that it tangles the entire enterprise. Operational planning specifies the general goals and ways of achieving them through planned and daily decisions. Operational planning results in two types of planning decisions: one-time use (business plan, project, program) and for permanent use (policies, procedure-procedures, rules). Spontaneous decision-making without a planned component can jeopardize the efficient business process, especially in complex companies with a large number of decision

points. Planning is an active and repetitive process, which is closely related to the control process. The aforementioned processes can be simplified and summarized through four bases of activity group: diagnosis of the current state, defining goals, identifying incentives and constraints, and determining actions. The next phase of the planning process is envisioning the environment and identifying important incentives(chances analysis) and limitations (hazards) in the environment. Chances are the trends in the environment that need to be used. Dangers are trends in an environment whose effects we want to minimize or, possibly, completely eliminate. It is relatively easy to identify chances and hazards in the present moment. It is much more difficult to identify trends that will be current in the future. Researching and anticipating the future is the essence of the prediction process. The goals of the company are defined more clearly and clearly after the diagnosis of the current state and identifying opportunities and hazards in the environment. Without clearly defined goals, they can not be precisely define other planning decisions. Very often entrepreneurs avoid clearnessexplicit definition of goals due to lack of confidence or ignoranceenvironments and specific business elements. The problems encountered do not have to be a priori negative occurrence in business. The task of the planner is to turn some problems into opportunities, the exploitation of which can be raised to a higher level.In this sense, reactive and proactive entrepreneurs can be distinguished. Reactive entrepreneurs react only when they have to, when certain problems are already occurring, and the actions taken are aimed at mitigating the already incurred damage. Proactive entrepreneurs are not only responding to problems that arise in the company, but also trying to anticipate future developments in the company environment and to advance their decisions in advance. In addition, these entrepreneurs are brave enough to create trends in the environment of the company, which will impose their competitors. In short, reactive entrepreneurs only react to the problems ("gas fires"), while proactive entrepreneurs solve problems, but also create new opportunities. The next phase of the planning process is envisioning the environment and identifying important incentives (chances) and limitations (hazards) in the environment. Chances are the trends in the environment that need to be used. Dangers are trends in an environment whose effects we want to minimize or, possibly, completely eliminate. It is relatively easy to identify the chances and dangers of the present moment. It is much more difficult to identify trends that will be current in the future. Researching and anticipating the future of performancesThe essence of the prediction process. Since many goals and indicators can be set at the same time, entrepreneurs do not follow each individual item but manage by exception by focusing only on priorities. By entering the conversion tracking stage, the control function is activated. Planning and control are two phases that are constantly intertwined and it is very difficult to indicate where one phase begins, and the other stops.

Conclusion

The development of new ideas is of great importance for entrepreneurs in a global environment. In order for ideas to develop, it is necessary for entrepreneurs to use experiences and methods that contribute to a better understanding of all chances for improving their business, and in this way, they can help them analyze the chances. That the chance analysis will give positive results it needs to be a comprehensive part of the business planning process. Chances are the trends in the environment that need to be used. In the process of analyzing opportunities and planning for entrepreneurs, they can help others' experiences as well as research at the state level, whereby a barrier that exists is reduced or eliminated. Through research sponsored by the industry, consulting services, licensing technologies as well as active participation in the process of development of the same university office confirm their role in strengthening entrepreneurial activity and initiative.

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An Overview of Microorganism in Waste Management and Control

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Abstract- Analysis of Microbial action in waste management and control involves the use of diverse microorganisms such as protozoa, Algae, Bacteria, Fungi and Viruses that involved in waste management and then followed by waste categorization and characterization; Domestic waste, Agricultural waste, Electronic waste and scrap metals, Industrial waste and medical waste. The strategies identified for waste management include: Composting, Landfills, Waste water treatment and microorganism as well as primary treatment, secondary treatment and bioremediation. Finally, it has been find out that microorganisms are used to remedy environmental problems or waste management and control as part of recent advancement in biotechnology known as bioremediation.

Index Terms- overview, microorganism, waste, management, control, bioremediation, treatment

I. INTRODUCTION

Anthropogenic factors (economic and social activities of man) leads to the generation of large quantities of waste which exit in solid, liquid or gaseous forms. Appropriate management of waste is fundamental activity of social and health importance in human communities. The management of waste involves a variety of activities ranging from collection to transportation, recycling, reuse, salvage and final burial/disposal of un-recycle material. Proper waste management led to a cleaner and safer environment and improved health and welfare of people (Richflood International LTD, 2009).

Empirical studies and practical experiences have shown the ability of geographical information system (GIS) and remote sensing (RS) technologies in this process (De widar 2002); (Eihoz 2006); (Eiselt 2007); (Gemitzi et al., 2007); (Kontos et al., 2003); (Kwarteng and Al-Enezi, 2004); (Tarhan 2005); and (Vuppala et al., 2006). However, non-available open site are managed in accordance with national standards regulating waste disposal (Nie et al., 2004) and (Wang Nie, 2001).

Method of waste disposal dated from ancient times, and sanitary sewers, landfills have been found in the ruins of the pre-historic cities of Crete and the ancient Assyrian cities. Storm-water sewers build by the Romans are still in service today. Although the primary function of these was drainage, the Roman practice of dumping refuse in the streets caused significant

quantity of organic matter to be carried along with rain water runoff. Toward the end of the middle ages, below ground privy vaults and, later, cesspools were developed. When these containers become full, sanitation workers removed the deposit at the owners' expense. The wastes were used as fertilizer at nearby farms or were dumped into watercourses or onto vacant land.

A few centuries later, there was renewed construction of storm sewers, mostly in the form of open channels or street gutters. At the first, disposing of any waste in these sewers was forbidden, but by the 19th century it was recognized that community health could be improved by discharging human waste into the storm sewers for rapid removal. Development of municipal water-supply systems and household plumbing brought about flush toilets and the beginning of modern sewer systems. Despite reservation that sanitary sewer systems wasted resources, posed health hazards, and were expensive, many cities built them; by 1910 there were about 25,000 miles of sewer lines in the United States.

At the beginning of 20th century, a few cities and industries began to recognize that the discharge of the sewage directly into the streams caused health problems, and this led to the construction of water treatment facilities. At about the same time, the septic tank was introduced as a means of treating domestic sewage from individual households both in suburban and rural areas. Because of the abundance of diluting water and the presence of sizeable social and economic problems during the first half of the 20th century, few municipalities and industries provided wastewater treatment (Ghose et al., 2006); (Kontos et al., 2003); (Kwarteng and Al-Enezi, 2004); (Tar 2005).

II. DIVERSITY OF MICROBES INVOLVED IN WASTE MANAGEMENT

Like any collection of microbes, microbes found in waste water can be arranged in major group's base on certain traits. Microorganisms share some basic features with each other of their kind. The major groups of microorganisms are protozoa, fungi, algae, and bacteria. Viruses, while not consider to be living have some characteristic of living cells; they can also be found in waste water and when in contact with human and ingest can cause disease. Viruses are studied much like microorganisms (Pelczar et al., 1993).

III. WASTE CHARACTERIZATION/CATEGORIZATION

Domestic Waste

Domestic waste form a large volume of waste generated both in rural and urban areas. Dumpsites are majority characterized by these. In general, the data followed trends that have been recorded globally in which the highest per capita waste is generated by the high income earners while the lowest rate is recorded among the lower income groups. Some of the food/vegetable waste can be reduced by composting to produce manure/fertilizer for agriculture or digested to yield biogas which serve as a source of energy, all of which are achieved by the action of microorganisms (Iranzo, 2001); (Garbisu 1999).

Agricultural Waste

This is common in the rural areas where there are vast lands for poultry farming. The wastes generated are used as organic manure in farm land to boost production of crops.

Electronic Waste and Scrap Metals

These are waste majority generated around and found in automobile repairers shops. The metal components are usually sold as scraps. Electronic waste generated in Africa more especially old end of life handsets, television sets, refrigerators, computer parts etc. Alternatively, if there are refurbishing centers more advanced than what is locally practiced and/or recycling centers, these is perceived to reduces the waste stream (Iranzo, 2001); (Garbisu, 1999).

Industrial Waste

These are generated by industries. Studies conducted by World Bank (1995) shows that 30% of solid wastes are generated from the industrial sectors.

Medical Waste

Medical waste in most hospitals and medical centers are not given any special treatment. Rather, they are mixed with municipal waste. Medical waste is not treated before disposal. Analysis of collected medical waste shows that there are syringes and needles, bandages, nylons, bottles, packaging materials, papers, metals, plastics, human faeces, clothes, food and vegetables as well as leather and rubber. The typical practice is to dig up pits, into which medical waste is dumped. When the pits are filled up, they covered with earth. The unlined pit exposes and increases the risk of ground water contamination (Garbisu, 1999), (Edil, 2003).

IV. STRATEGIES INVOLVED IN WASTE MANAGEMENT PRACTICES (WASTE HANDLING):

Composting

The composition of waste is analyzed using several physical, chemical and biological measurements. The most common analysis include the management of solids, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and Ph. The solid wastes include dissolved and suspended solids. Dissolved solid are the materials that will pass through a filter paper, and suspended solid are those that do not. The suspended solid are further divided into settle able and non -settle able

solids. All these classes of solids can be divided into volatile or fixed solids, the volatile solids generally being organic materials and fixed solids being inorganic or mineral matter (Kontos et al., 2003).

Composting operation of solid wastes include preparing refuse and degrading organic matter by aerobic microorganisms. Refuse is presorted, to remove materials that might have salvage value or can't be composted, and is ground up to improve the efficiency of the decomposition process. The refuse is place in long piles on the ground or deposited in mechanical systems, where it is degraded biologically to humus with a total nitrogen, phosphorus and potassium content of 1 to 3 percent, depending on the material being composted. After about three weeks, the product is ready for curing, blending with additives, bagging and marketing (Kontos et al., 2003).

The concentration of organic matter is measured by the BOD and COD analysis. The BOD is the amount of oxygen used over a five- day period by microorganisms as they decompose the organic matter in sewage at a temperature of 20C (68 F). Similarly, the COD is the amount of oxygen required to oxidize the organic matter by use of dichromate in an acid solution and to convert it to carbon dioxide and water. The value of COD is always higher than that of BOD, because many organic substances can be oxidized chemically but cannot be oxidize biologically. BOD is used to test the strength of untreated and treated municipal and biodegradable industrial wastewaters. COD is used to test the strength of wastewater that either not biodegradable or contains compound that inhibit the activities of microorganisms. The pH analysis is a measure of the acidity of wastewater sample (see Acids and Bases). The typical values of solids and BOD for domestic wastewater are given in the accompanying table. The organic matter in typical domestic sewage is approximately 50% carbohydrates, 40% protein and 10% fat; the pH can range from 6.8 to 8.0.

Types of solid	Solids mg/liter			BOD	COD
	Fixed	Volatile	Total	Mg/liter	Mg/liter
Suspended	70	175	245	110	108
Settle able	45	100	145	50	42
Non-settle able	25	75	100	60	66
Observed	210	210	420	30	42
Total	280	385	665	140	150

The composition of industrial waste cannot be readily characterized by typical range of values because it make up depends on the type of manufacturing process involved.

Landfills

Sanitary landfills is the cheapest satisfactory means of disposal of solid waste, but only if suitable land is within economic range of the sources of wastes; typically, collection and transportation account for 70% of total cost of solid waste management. In modern landfills, refuse is spread in thin layers, each of which is compacted by a bulldozer before the next is spread. When about 3 m (about 10 ft.) of refuse has been laid down, it is covered by a thin layer of earth, which is also compacted. Pollution of surface and ground water is minimized

by lining and contouring the fill, compacting and planting the cover, selecting proper soil, diverting upland drainage, and placing wastes in sites not subject to flooding or high ground water levels. Gases are generated in landfills through anaerobic decomposition of organic solid waste by microorganisms (anaerobic bacteria). If a significant amount of methane is present, it may be explosive; proper venting eliminates this problem (Iranzo, 2001); (Garbisu, 1999); (Edil, 2003).

Waste water (Sewage) Treatment and Microorganisms

Waste water originate mainly from Domestic, industrial, groundwater and meteorological sources and these form of wastewater are commonly refers to as domestic sewage, industrial waste, infiltration, and storm-water drainage, respectively.

Domestic sewage results from peoples' day to day activities, such as bathing, body elimination, food preparation, and recreation, averaging about 227 liters (about 6 gallons) per person daily. The quantity and character of industrial wastewater is highly varied, depending on the type of industry, the management of its water usage, and the degree of treatment the waste water receives before it's discharged. A steel mill, for, example, might discharge anywhere from 5700 to 151,000 liters (about 1500 to 40,000 gallons) per ton of steel manufactured. Less water is needed if recycling is practiced. The processes involved in municipal wastewater treatment plants are usually classified as being part of primary, secondary, or tertiary treatment (Iranzo, 2001); (Garbisu, 1999).

Primary Treatment

The wastewater that enters a treatment plant contains debris that might clog or damage the pumps and machinery. Such materials are removed by screens or vertical bars, and the debris is burned or buried after manual or mechanical removal. The wastewater then pass through a comminutor (grinder), where leaves and other organic materials are reduced in size for efficient treatment and removal later (Iranzo, 2001); (Garbisu, 1999); (Green, 1995).

Sedimentation

With grit removed, the waste water passes into a sedimentation tank, in which organic metals settle out and are drawn off for disposal. The process of sedimentation can remove about 20 to 40 percent of the BOD and 40 to 60 percent of the suspended solids. The rate of sedimentation is increased in some industrial waste-treatment stations by incorporating processes called chemical coagulation and flocculation in the sedimentation tank. Coagulation is the process of adding chemicals such as aluminum sulfate, ferric chloride, or polyelectrolytes to the wastewater; this causes the surface characteristics of the suspended solids to be altered so that they attached to one another and precipitate. Flocculation causes the suspended solids to coalesce. Coagulation and flocculation can remove more than 80% of suspended solids (Green, 1995).

Digestion

Digestion is a microbial process that converts the chemically complex organic sludge to methane, carbon dioxide, and an inoffensive humanlike material. Their actions occur in a

closed tank or digester that is anaerobic that is, devoid of oxygen. The conversion takes place through a series of reactions. First the solid matter is made soluble by enzymes, and then the substance is fermented by a group of acid-producing bacteria, reducing it to simple organic acids. The organic acid are then converted to methane and carbon dioxide by bacteria. Thickened sludge is heated and added as continuously as possible to the digester, where it remains for 10 to 30 days and is decomposed. Digestion reduced organic matter by 45 to 60 percent (Green, 1995).

Drying

Digested sludge is placed on sand beds for air drying. Percolation into the sand and evaporation are the chief processes involved in dewatering process. Air drying requires dry, relatively warm weather for greatest efficiency, and some plants have a greenhouse-like structure to shelter the sand beds. Dried sludge in most cases is used as a soil conditioner; sometimes it is used as a fertilizer of its 2% nitrogen and 1% phosphorus content.

Secondary Treatment

Having removed 40 to 60 percent suspended solids and 20 to 40 percent of the BOD in primary treatment by physical means, the secondary treatment biologically reduces the organic material that remains in the liquid stream. Usually the microbial process employed are aerobic that is, microorganisms functioning in the presence of dissolved oxygen, secondary treatment actually involve harnessing and accelerating nature's process of waste disposal. Aerobic bacteria in the presence of oxygen convert organic matter to stable forms such as carbon dioxide, water, nitrate, and phosphate, as well as other organic materials. The production of new organic matter is an indirect result of biological treatment processes, and this matter must be removed before the wastewater is discharge into receiving stream.

Several alternative processes are also available in secondary treatment, including a trickling filter, activated sludge, and lagoons (Heritage, 1996); (Hans, 1995).

Trickling Filter

In this process, a waste stream is distributed intermittently over a bed or column of some type of porous medium. A gelatinous film of microorganisms coat the medium and functions as the removing agent. The organic matter in the waste stream is absorbed by microbial film and converted to carbon dioxide and water. The trickling-filter process, when processed by sedimentation, can remove about 85% of BOD entering the plant (Heritage, 1996); (Hans, 1995).

Activated Sludge

This is an aerobic process in which gelatinous sludge particles are suspended in an aeration tank and supplied with oxygen. The activated-sludge particles, known as floc, are composed of millions of actively growing bacteria bound together by a gelatinous slime. Organic matter is absorbed by the floc and converted it to aerobic products. The reduction of BOD fluctuates between 60 to 85 percent. An important companion unit in an plant using activated sludge or a trickling filter is the

secondary clarifier, which separates bacteria from the liquid stream before discharge. (Heritage, 1996); (Hans, 1995).

Septic Tank

A sewage treatment process commonly used to treat domestic waste is the septic tank: a concrete, cinder block or metal tank where the solid settle and the floatable materials rise. The partly clarified liquid stream flow from a submerged outlet into subsurface rock-filled trenches through which the waste water can flow and percolate into the soil where it is oxidized aerobically, the floating matter and settle solids can be held from six months to several years, during which they are decomposed aerobically by microorganisms (aerobes).

Bioremediation

Bioremediation refers to the use of microorganisms, especially bacteria, to return the elements in toxic chemicals to their natural cycles in nature. It may provide an inexpensive and effective method of environmental cleanup, which is one of the major challenges facing human society today (Pelczar and Chan, 1993).

Bioremediation has helped in cleaning up oil spills, pesticides, and other toxic materials. For example, accidents involving huge oil tankers regularly results in large spills that pollute coastlines and harm wildlife. Bacteria and other microorganisms can convert the toxic materials in crude oil to harmless products such as CO₂. Adding fertilizers that contain nitrogen, phosphorus and oxygen to the polluted areas which promotes the multiplication of bacteria already present in the environment and speeds the cleanup process (Pelczar and Chan, 1993).

Effect of Microorganisms on Petroleum Pollutants

Hydrocarbon degradation by microorganisms is a natural manifestation of the carbon cycle. (Sheilds and Malcolm, 1996). Hydrocarbon pollutant becomes the focus of remediation efforts when they occur in excessively high concentration, prove toxic or are recalcitrant to existing bacterial degradation process. Intrinsic bioremediation therefore, defines the fate of most environmental chemicals whether natural or anthropogenic, through chemical modification such as halogenation; a great deal of efforts has gone into creating classes of hydrocarbons that are more environmentally stable than their unmodified analogs. The recalcitrance of these compounds has led to the attempt to determine why the organisms normally responsible for carbon cycle fail when challenged by certain pollutants.

V. CONCLUSION

The ultimate fate of all living matter is death and subsequent decay of dead organisms known as degradation, by the action of microbes on the dead organism. This is a natural

phenomenon in nature, which has been effectively manipulated by biotechnologist in recent scientific advancements, and harnessed to accelerate the degradation of pollutants; backed up by optional conditions for metabolic activities. This whole concept is what is known as waste management. It simply refers to the revitalization of polluted environments to their natural conditions or at least close to it. The first step of waste management is waste reduction. Therefore, it is essential to minimize the quality of waste generated.

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Strategies of Funds Management for National Cohesion and Global Competitiveness in Universities in Rivers State

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Abstract- The study examined strategies of funds management for national cohesion and global competitiveness in universities in Rivers State. Two research questions were answered. The study adopted a descriptive survey research design. The population of the study comprised three hundred (300) non-academic staff from the three universities in Rivers State. A stratified random sampling technique was used to select 160 non-academic staff representing 53% drawn from the total population of 300 non-academic staff across the three universities in Rivers State. The research instrument used for the study was a self constructed item questionnaire titled: Strategies for Fund Management in Universities Questionnaire (SFMUQ), scoring was done on a modified 4 likert points of Strongly Agree, Agree, Disagree and Strongly Disagree. Test-retest technique was used to determine the reliability of the study. Reliability index of 0.83 was realized using Pearson Product Moment Correlation Coefficient which is high, reliable and adequate for the study. It was found among other things that prudent management of funds is a sine-qua non for achieving global competitiveness and national cohesion in universities in Rivers State, financial autonomy, planning and timely disbursement of funds serve as a panacea for achieving national cohesion and global competitiveness in universities in Rivers State. Based on the findings, it was recommended that university administrators in Rivers State should cultivate a culture of financial prudence to avoid mismanagement of funds, adequate financial autonomy should be given to the universities in Rivers State to boost their revenue base for national cohesion and global competitiveness.

Index Terms- Strategies of funds management, national cohesion and global competitiveness, Universities in Rivers State

I. INTRODUCTION

Education is widely accepted as a major instrument for promoting socio-economic, political and cultural development for global competitiveness. Universities educate future leaders and develop the high-level technical capacities that underpin economic growth and development (Odekunle, 2001). Accordingly, Ibekun (2016) opined that the main purpose and relevance of university education is the provision of much needed manpower to accelerate the socio-economic development of the nation. University education is regarded as an instrument of social change, a panacea for national cohesion and global competitiveness.

To collaborate these assertions, national Policy on Education (2004) outlined the goals of the university education to include among others;

- a) Contribute to national development through high level relevant manpower training.
- b) Development and inculcation of proper values for the survival of the individual and society.
- c) Develop the intellectual capability of individuals to understand and appreciate their local and external environments.
- d) Acquire both physical and intellectual skills which will enable individuals to be self-relevant and useful members of the society.
- e) Promote and encourage scholarship and community service,
- f) Forge and cement national unity
- g) Promote national and international understanding and interaction.

Considering the importance of university education, there is the need for mapping out strategies for funds management to enhance national cohesion and global competitiveness. Therefore, effective and efficient achievement of educational objectives is heavily dependent on the availability of resources, the quality of the available resources and the efficiency in the management of the available funds. Ebong (2006), stated that for university education system in Nigeria to provide quality education, the country needs efficient

fund management in the schools. This is the responsibility of the school administrators who know that effective utilization of funds is very crucial in the operation of the university system in order to achieve its set goals.

In funding of university system, Ebong and Afangideh (2010), noted that fund are needed for the payment of staff salaries (teaching and non-teaching), procurement of instructional materials, transportation cost of running schools, creation of new building and maintenance of existing ones. However, Maduagwu (2006) decry that funds have not been adequate for running the schools. Maduagwu's view must have been grafted in Enaohwo (1990), whom when he stated that, the most independent challenge in educational development is shortage of funds. Individuals cannot afford the type of education they want for their children yet government cannot do much because of poor revenue base.

Following from Enaohwo (1990), as cited in Maduagwu (2006), it can be conveniently concluded that since government subvention has not been enough over the years, there is need for strategies for fund management in the university system in order to sustain national cohesion and global competitiveness.

What is required is that both the Federal, State Government and stakeholders should adopt strategies for fund management in the university system especially universities in Rivers State. Based on the result of the findings of Afangideh (2010) and Nwile (2008), some of the strategies to be adopted to enhance fund management for national cohesion and global competitiveness in our university system especially in Rivers State include financial autonomy, planning as an administrative tool and other alternative sources of funding.

II. STATEMENT OF PROBLEM

Education plays vital role in the development of any nation ranging from national cohesion to global competitiveness. Education is an agent which transforms the destiny of man and its society. The wealth and vitality of a nation rest upon the development of its people. Thus, the amount of fund allocated for universities has not been effectively manage over the years weather they are from federal or state government and have degenerated to chronic issues of underfunding of our university which hamper teaching, learning and research which serves as the objectives of the university system.

The university administrators blame the government for underfunding and the government sblame the university administrators of misappropriation, embezzlement, wrong settings of priorities and division of funds allocated to the universities. The university system is yet to justify the huge fund allocated to it. As a result of this, university education is in a great down turn, especially in Rivers State, and the question is why? Despite federal and state governments' subvention to the three universities in Rivers State learning conditions, accommodation of both students and staff, classroom block, researchers' grants, lecturers' remunerations are still in bad shape. Hence the researcher of this study is concerned about strategies of fund management for national cohesion and global competitiveness in the three universities in Rivers State to address the long awaiting issues of chronic underfunding in the university system especially now that the country is experiencing economy difficulties as a result of drop in oil receipt which is the major source of income to federal and state government.

III. AIM AND OBJECTIVES OF THE STUDY

The aim of this study is to find out strategies of funds management for national cohesion and global competitiveness in universities in Rivers State. The specific objectives are to;

1. Examine the use of financial autonomy for fund management for national cohesion and global competitiveness in universities in Rivers State.
2. Examine planning as administrative tool for fund management for national cohesion and global competitiveness in universities in Rivers State.

IV. RESEARCH QUESTIONS

The study is guided by the following research questions.

1. In what ways has financial autonomy been used for fund management for national cohesion and global competitiveness in universities in Rivers State?
2. In what ways has planning as administrative tool been used for fund management for national cohesion and global competitiveness in universities in Rivers State?

V. REVIEW OF RELATED LITERATURE

THEORETICAL FRAMEWORK

The theoretical position of this study is anchored on the African political economy model of education funding popularized by Aina (2007). The theory states that different structures in the society (including the economic, social and political structures, together with the value, believe system interact with one another and they are interdependent. Aina (2007) opined that the model focuses on how

political and economic forces shapes the context, in which Nigeria universities carry out their functions of teaching and research. It helps to explain the realities of the specific political, economy and social depression, structural adjustment and the debt burden, political instability, reduction in government subvention, all impact in a special way on the educational system. Aina (2007); stated that borrowing from the Marxian tradition, the economic factor provides the axis around which all movement occur. In order to improve the funding of education programmes in Nigeria, some important elements within the social system are identified. These are the external structures (government and policies) and internal structures. In the opinion of Afangideh (2005), the external structures represent the financial autonomy and administrative commitment variables. From the explanations above, the theory is suitable for the study.

CONCEPTUAL REVIEW

FINANCIAL AUTONOMY FOR EFFECTIVE FUND MANAGEMENT

Financial autonomy refers to a university which exercises independent control over its day to day operations, funds from government or generated, internally and its curriculum design. Autonomy is generally associated with universities, institutions and implies that sponsoring (federal or state) does not have control over or dictates in matters of universities especially in its funds management. The university system enjoyed relative measures of financial autonomy, they were left to function with zero interference from both the federal and state government. The university system were allowed to organize their own entrance examinations and selection of candidates for admissions without government or its agencies interference. Not more lecturers are employed by the governing council of various universities when the need arises. Members of the governing council are selected from those who have idea of higher education administration. The university system were adequately funded Onwuka (2004), cited in Wali (2007). Financial autonomy of universities in Rivers State cannot be over-emphasized as it serves as a panacea for national cohesion and global competitiveness.

PLANNING AS ADMINISTRATIVE TOOL FOR FUNDING

Agabi (1999) noted that planning is a systematic process by which a given society consciously and in a rational manner, decides the course of action and pattern the growth and development of the university education towards national cohesion and global competitiveness. Planning is systematic because its set of actions are so operationally linked they have to be carried out in sequential order to enhance or achieve optimal result. In view of Agabi (1999), university management in Rivers State are to set priorities in a systematic manner that will ex-ray all the expected project that sources of revenue. Setting of priorities will always avoid wastage and cut down on abundant projects in the three universities in Rivers State.

Planning is a decision making process because it involves deciding courses of action in university growth and development, the decision includes determining educational policies, goals, priorities, objectives targets, programmes, projects and choices to be pursued (Agabi, 1999).

Nwosu (2006), noted that planning is the objectives and goals of the national development effort, estimating and mobilizing the various domestic and foreign resources, skills and allocating them to those specific uses which seen likely to make the greatest contributions to achieve the national objectives.

VI. METHODOLOGY

This study was carried out using descriptive survey research design which is ex-post facto in nature. The target population of the study comprised three hundred (300) non academic staff from the three universities in Rivers State. A stratified random sampling technique was used to select 160 non academic staff representing 53% drawn from the total population of 300 s non- academic staff across the three universities in Rivers State. The research instrument used for the study was a self constructed 10 item questionnaire titled: Strategies for Effective Fund Management in Universities Questionnaire (SFMUQ). Scoring was done on a modified 4 likert points of Strongly Agree, Agree, Disagree and Strongly Disagree. Test-retest technique was used to determine the reliability of the study. Reliability index of 0.83 was realized using Pearson Product Moment Correlation Coefficient which is high, reliable and adequate for the study. The instrument was administered personally by the researcher and all the copies distributed were retrieved without loss. Frequency tables, percentage and mean scores were used to answer the research questions and the mean above 2.5 was seen as agreed while below 2.5 were seen as disagreed. Data collected was computed, analyzed using frequency table, mean and ranking system. The scores above 2.5 were accepted while those below 2.5 were rejected in the final analysis. The weighted mean is as follow:

SA = 4 points, A = 3 points, D = 2 points, SD = 1 point

$$4+3+2+1 = \frac{10}{4} = 2.5$$

VII. RESULTS

Research Question 1: In what ways has financial autonomy been used for fund management for national cohesion and global competitiveness in universities in Rivers State?

S/No	Questionnaire items	SA	A	D	SD	Total	Mean	Ranking
1.	University that have control of admission procedures can raise funds for running university administration for national cohesion	80	40	30	10	510	3.2	3 rd
2.	University that are given autonomy to raise funds can improve their revenue base for global competitiveness	70	50	25	15	495	3.0	4 th
3.	University that operates consultants service can get more fund for the implementation of project for national cohesion	100	30	20	10	540	3.4	1 st
4.	University that is in charge of funds for employment of its staff can raise fund for easy payment of salaries for global competitiveness	60	80	12	3	512	3.21	2 nd
5.	Charges fees for the provision of facilities can improve their financial base for global competitiveness	50	70	22	18	472	2.95	5 th

From the table above, all the items 1, 2, 3, 4, and 5 had criterion mean of 2.5 and above and were all accepted in the final analysis. The respondents agreed that control of admission procedures, given autonomy to raise funds, consultancy services, taking charge of funds for employment of its staff and charges of fees for the provision of facilities are some of the ways financial autonomy has been used for fund management for national cohesion and global competitiveness in universities in Rivers State.

Research Question 2: In what ways has planning as administrative tool been used for fund management for national cohesion and global competitiveness in universities in Rivers State?

S/No	Questionnaire items	SA	A	D	SD	Total	Mean	Ranking
6.	Timely release of funds to universities is capable of improving the revenue base	60	50	35	15	475	2.96	2 nd
7.	Appropriate sanction for administrators found wanting as a measure to avoid embezzlement of fund	50	70	22	18	472	2.95	3 rd
8.	Judicious use of funds allocated to universities is capable of leading to effective fund management	72	38	30	20	282	3.0	1 st
9.	External and internal audit in the universities to serve a strategies for effective fund management	65	35	32	28	457	2.8	4 th
10.	Employment of administrators can be enhanced through years of experience	40	50	45	25	425	2.6	5 th

From the data above, all the items 8, 6, 7, 9 and 10 with mean of 3.9, 2.96, 2.95, 2.8 and 2.6 respectively were accepted because their weighted mean was above 2.5. the respondents agreed that timely release of fund to universities, appropriate sanction for administrators found wanting, judicious use of funds, external and internal audit in the universities and employment of administrators based on the years of experience are some of the ways planning as administrative tool been used for fund management for national cohesion and global competitiveness in universities in Rivers State.

VIII. DISCUSSION OF FINDINGS

In research question 1, the ways financial autonomy has been used for fund management for national cohesion and global competitiveness in universities in Rivers State, it was generally accepted that university can raise funds for running university administration for national cohesion, university that are given autonomy to raise funds can improve their revenue base for global competitiveness, university that operates consultants services can get more fund for the implementation of project for national cohesion, university that is in charge of funds for employment of its staff can raise fund for easy payment of salaries for global competitiveness and university that charges fees for the provision of facilities can improve their financial base for global competitiveness. This finding agrees with Bema (2014) who posited that the achievement of educational goals is the function of adequate financial autonomy and funding support through the yearly budgetary allocation by the Rivers State government through minister of education.

In research question 2, the ways planning as administrative tool been used for fund management for national cohesion an global competitiveness include the followings, timely release of funds to university is capable of improving the revenue base, appropriate sanction for administrators found wanting as a measure to avoid embezzlement of fund, judicious use of funds allocated to universities is capable of leading to effective fund management, external and internal audit in the universities serve as strategies for effective fund management and employment of administrators can be enhance through years of experience. This is supported by Nwosu (2006) who noted that planning is the objectives and goals of the national development effort, estimating and mobilizing the various domestic and foreign resources, skills and allocating them to those specific uses which seen likely to make the greatest contributions to achieved the national objectives.

IX. CONCLUSION

Based on the findings of this study, the paper concluded that effective fund management is a sine qua non for achieving national cohesion and global competitiveness in universities in Rivers State. Hence there is need for financial autonomy and timely release of funds to universities in order to enhance their revenue base for national cohesion and global competitiveness.

X. RECOMMENDATIONS

Based on the conclusion and as well as the findings of the study, the following recommendations were made for implementation.

1. Adequate financial autonomy should be given to the universities in Rivers State to boost their revenue base for national cohesion and global competitiveness.
2. University administrators in Rivers State should cultivate a culture of financial prudence to avoid mismanagement of funds allocated to them.
3. Government and other stakeholders in education such as Banks, multinational corporations should through in-service training organize seminars, workshops, conferences to the university administrators in Rivers State to update them on fund accounting principles.

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Computer Repair Servicing in the Municipality of Victoria and Liliw Laguna, Philippines

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Abstract- An Extension Service on Computer Servicing as implemented by the College of Engineering of Laguna State Polytechnic University, Santa Cruz Campus in the community of Victoria and Liliw Laguna is described in this paper.

The purpose of the extension service is to comply with the goal of the extension program to further strengthen research and community extension as the major functions of the university and to intensify the organization of community extension programs and services that are relevant and responsive to the needs of depressed communities in the Province of Laguna, through these, the attainment of the University's vision of transforming lives and communities by imparting knowledge of the faculty member as well the students through technology transfer.

Participants was assessed in terms of the knowledge and attitude being developed, skills they have learned throughout the training, the aspiration being introduced as a desired to more rigorous work, and finally assessed the economic status of each individuals, that after the training, an enormous changes in their lives happened.

Index Terms- Computer Repair Servicing, Transforming Lives and Communities, Extension and Training Services, Victoria and Liliw, laguna.

I. INTRODUCTION

The Laguna State Polytechnic University's (LSPU) Extension and Community Services, envisions developing socially aware, sensitive and responsive members of Laguna community through active involvement in community extension, service learning, and outreach activities towards community development. The extension services continue to discover and rediscover innovations to realize the relevant and responsive strategies, programs, services, and projects through participatory and transformational approach responsively transforming vision and mission of the extension services to the community.

As a result of Participatory Rural Appraisal (PRA), the need for technology transfer through Computer Repair servicing training was established for the community of Victoria and Liliw Laguna, bringing up trainees such as professionals and non-professionals, as well as out - of school- youth.

Computer technicians are in high demand. With an increasing number of computers used in both the home and workplace, there is a significant and ever growing demand for people to install, maintain and repair both hardware and software. While many computer courses teach programming, surprisingly

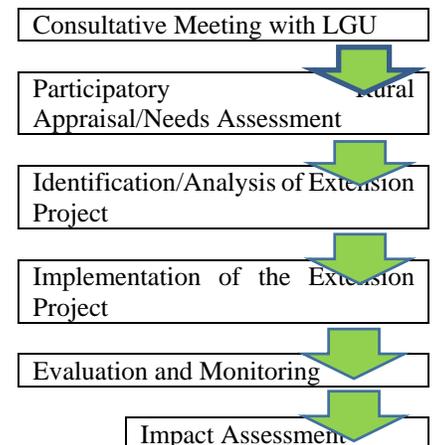
few provide the type of training needed to be a competent and effective technician.

In this training the participants are provided an introduction to servicing computers. It develops a **broad and general understanding of repair and maintenance procedures** that can be used at work or home, and in doing so provides a good starting point for anyone seeking a career in **computer servicing**.

II. METHODOLOGY

The training is designed to develop knowledge, skills, and attitudes of a computer service technician in accordance with industry standards. It covers basic and common competencies such as installing, maintaining, configuring, and diagnosing computer systems and networks. Considering also the opportunity in landing a job, a computer technician is in demand in the industry to date.

The following procedures were done in the conduct of the program starting from a consultative meeting with the Local Government Unit of Victoria and Liliw Laguna. Thru these a participatory rural appraisal was initiated by the faculty of engineering who also serve as the social development worker. After a thorough analysis and identification of the extension program, implementation comes next, where training was conducted. For the evaluation and monitoring of the training, as well as the impact assessment, the LSPU group of social development worker and the LGU worked hand in hand in the determination and assessment of the training to each participants of the program.



The activities and the learning outcomes of each topic discussed in the Computer Repair Servicing

Lessons discussed in the course Computer Servicing	
Activity	Learning Outcomes
The computer workshop	Tools (a basic tool kit, more advanced requirements), soldering, workshop layout, workshop management, customer relations, etc.
Computer and workshop safety	Understanding electricity, workshop safety procedures, staff safety, avoiding computer damage, circuits, measuring electricity-current, voltage, resistance, ohm's law, etc.
System components	Identifying different hardware components (e.g. CPU, socket, Motherboard, I/O card, Parallel and Serial ports, IDE drive, etc).
Different Systems & Basic Disassembly	Identifying and removing specific parts from a computer, distinguishing between different types of PC, disassembly procedure.
Peripherals	How to assemble peripherals (e.g. mouse, printer, modem) for a computer system
System Assembly	Procedure for assembly/installation of main components.
Installation of software	Installing different software programs in computers, in accordance with manuals
Computer Maintenance	An introduction - preventative and routine maintenance procedures
Troubleshooting	An introduction - determining an error, hard disk problems, viruses, motherboard battery, bugs, other common errors and their remedies, when to call a specialist.

For each of the topic covered, the trainees/ participants are first exposed to the basic concept. Moving from the basic grasp of the module, the operating principles and its practical applications are then discussed and explored in great depth. Series of hands-on activities was conducted to facilitate the learning. Demonstration was also conducted and explanations was given to lead the participants into active engagement in the learning process. Participant then perform practical activities for each individual module.

III. RESULTS AND DISCUSSION

Feedbacks eventually used to assess and improve the programs. Hence, the university contributes to the development of the partner communities and at the same time the values and valuable learning through university's exposure to partner

communities play a vital role in the significant development of the Laguna community.

The following variables and its corresponding indicators was used to measure the impact of Computer Servicing training to the participants.

Mean and Standard Deviation of Impact Assessment of Computer Servicing training in terms of Knowledge

Indicators	Mean	Standard Deviation	Remark
The course content was simple and understandable.	3.73	0.50	Strongly Agree
The illustrations, videos and interactions were used in the right level.	3.61	0.51	Strongly Agree
I could navigate the module very easily	3.21	0.43	Agree
The course content was appropriate and was presented in a structure manner	3.44	0.55	Strongly Agree
The duration of the course was just right.	3.82	0.59	Strongly Agree
The course has improved my knowledge on the computer hardware servicing	3.60	0.57	Strongly Agree
Composite Mean	3.56		Strongly Agree

Impact assessment of Computer Servicing training in terms of knowledge was 3.73 (SD=0.50) if the course content was simple and understandable, 3.61 (SD=0.51) if the illustration, videos and interactions were used in the right level, 3.21 (SD=0.43) for the easy navigation of module, 3.44 (SD=0.55) if the course content was appropriate and was presented in a structure manner, 3.82 (SD=0.55) if the duration of the course was just right and 3.60 (SD=0.57) if the course has improved their knowledge on the computer hardware servicing.

The overall mean rating of 3.56 manifest respondents' agreement that the impact assessment on Computer servicing training in terms of knowledge was found out to be strongly agree. The responses appear to be homogeneous as shown by the small values of standard deviations.

Thomas, (2010) knowledge gain in different trainings can be define into two further matters and to be taken into consideration, namely the degree of certainty and the degree of precision. All knowledge is more or less uncertain and more or less vague. These are, in a sense, opposing characters: vague knowledge has more likelihood of truth than precise knowledge, but is less useful. One of the aims of training is to increase precision without diminishing certainty. But the knowledge must include some propositions that are rather vague and some that are only rather probable. It is important, however, to indicate vagueness and uncertainty where they are present, and therefore, knowledge in school as well as in some training is very important in an individual most especially in today's kind of living. It is a

big help in order to be updated in the technology where our society is facing.

Mean and Standard Deviation on the Assessment of Computer Servicing training in terms of Attitude

Indicators	Mean	Standard Deviation	Remark
Extent to which the training program brought out the change in my techniques	4.22	0.64	Strongly Agree
Extent to which training program brought out the change in my behavior	4.44	0.61	Strongly Agree
Extent to which I am satisfied with what I am doing	3.81	0.53	Strongly Agree
Extent to which training program brought out motivation for continuous learning	3.50	0.41	Strongly Agree
Assisted me to develop skills in interacting with individuals with disabilities	3.81	0.59	Strongly Agree
Been worthwhile	3.84	0.64	Strongly Agree
Was tailored to meet my learning style (the way I learn best)	3.82	0.51	Strongly Agree
Composite Mean	3.92		Strongly Agree

Impact assessment of Computer Servicing training in terms of attitude was 4.22 (SD=0.64) if the training program brought out the change in their techniques, 4.44 (SD=0.61) if the training program brought out the change in their behavior, 3.81 (SD=0.53) if they are satisfied with what they are doing, 3.50 (SD=0.41) if the training program brought out motivation for continuous learning, 3.81 (SD=0.59) if the training assisted them to develop skills in interacting with individuals with disabilities, 3.84 (SD=0.64) if they feel they become worthwhile and 3.82 (SD=0.51) if the training was tailored to meet the learning style of the participants.

Howard, (2011), the power of awareness keeps growing when the attitude is to look within to detect the patterns of resistance and fears and negativity in inner space. One cannot achieve a strong awareness overnight, it takes time attitude towards life decides the experience of it. The attitude of looking to learn is the most powerful attitude to carry since it allows for an inherently positive experience of life.

Mean and Standard Deviation on the Assessment of Computer Servicing training in terms of Skills

Indicators	Mean	Standard Deviation	Remark
I can open a computer case.	4.14	0.68	Strongly Agree
I can connect the mouse, keyboard and monitor	4.11	0.57	Strongly Agree
I can apply occupational health & safety precautions	3.71	0.47	Strongly Agree
I can remove the system fan and can detach the power supply from system unit.	3.55	0.55	Strongly Agree
I know how to remove the RAM from the mother board, and install the power supply.	3.72	0.59	Strongly Agree
I know how to install the mother board and the internal drives in a system unit.	3.53	0.56	Strongly Agree
I know how to attach RAM in the memory socket and install CD/DVD drives.	3.22	0.41	Agree
Composite Mean	3.71		Strongly Agree

Impact assessment of computer servicing training in terms of skills was 4.14 (SD=0.68) in opening a computer case, 4.11 (SD=0.57) in connecting the mouse, keyboard and monitor, 3.71 (SD=0.47), if the trainees can apply occupational health and safety precautions, 3.55 (SD=0.55), if they can remove the system fan and can detach the power supply from system unit, 3.72 (SD=0.6=59) in knowing how to remove the RAM from the mother board, and install the power supply, 3.53 (SD=0.56) if they can install the mother board and internal drives in a system unit, and 3.22 (SD=0.41), if know to attach RAM in the memory socket and install CD/DVD drives.

Samuel, (2015) speaking, writing and listening are so important in the role of computer learning, and one can certainly learn how to achieve good communication in the workplace through the computer servicing courses. Without strong listening skills, computer technicians would not be able to gain a good understanding of changes that need to be made to a project and problem solving becomes much more difficult.

Lance, (2013), a good computer servicing learner, notice that the hardware skills will help out with a lot of your drawing work. While most of the work will be done digitally, hand-drawing is still considered a valuable skill in the architectural and

engineering industry. To many employers, the ability to draw represents your creative process and demonstrates raw talent.

Mean and Standard Deviation on the Assessment of Computer Servicing training in terms of Aspiration

Indicators	Mean	Standard Deviation	Remark
Extent to which training meet may expectations.	4.00	0.62	Strongly Agree
Extent to which training helps me in my future career	3.75	0.59	Strongly Agree
Opportunity provided to implement the skills learned.	3.66	0.55	Strongly Agree
Relevance of the training to the current pursued job	4.51	0.47	Strongly Agree
Training helped in getting awareness of the latest trends in software & hardware field	3.52	0.54	Strongly Agree
Opportunity of sharing information	3.51	0.57	Strongly Agree
Help me improve the quality of life of the people I support.	3.72	0.58	Strongly Agree
Inspired me to begin or continue my career as a direct support professionals	3.72	0.60	Strongly Agree
Prepared me to complete my specific job responsibilities	3.11	0.45	Strongly Agree
Composite Mean	3.72		Strongly Agree

Impact assessment of computer Servicing training in terms of aspiration was 4.00 (SD=0.62), for which the training helps in the future career, 3.75 (SD=0.59) for the opportunity provided to implement the skills learned, 3.66 (SD=0.55), if the training is relevant to the current job, 4.51 (SD=0.47), if the training helped in getting awareness of the latest trends in software & hardware field , 3.52 (SD=0.54) if there was an opportunity of sharing information, 3.51 (SD=0.57) if the training helped improve the quality of life of the people they are supporting, 3.72 (SD=0.60) if the training inspired to begin or continue a career as a direct support professionals and 3.11 (SD=0.45), if the training prepare to a complete specific job responsibilities.

The overall mean rating of 3.72 manifest respondents' agreement that the impact assessment on computer servicing training in terms of aspiration was found out to be strongly agree. The responses appear to be homogeneous as shown by the small values of standard deviations.

Mean and Standard Deviation on the Assessment of Computer Servicing training in terms of Economic Status

Indicators	Mean	Standard Deviation	Remark
Meeting daily household challenges	4.04	0.61	Strongly Agree
Increased in wages & probability of remaining in employment	3.71	0.51	Strongly Agree
Access healthcare	3.40	0.42	Agree
Pay for education of my children	3.32	0.47	Agree
Acquire more assets	3.56	0.55	Strongly Agree
Generating empowerment for women.	4.06	0.60	Strongly Agree
Participating meaningfully in community activities	3.09	0.35	Agree
Providing access with entrepreneurial training	3.43	0.48	Agree
Contribute to develop client's capacities in managing business	3.41	0.54	Agree
Opportunity to work abroad	3.65	0.57	Strongly Agree
Composite Mean	3.56		Strongly Agree

Impact assessment of Computer Servicing training in terms of economic status was 4.04 (SD=0.61), for which the training helps in meeting their daily household challenges, 3.40 (SD=0.42) for which, because of training their wages was increased & the probability of remaining in employment, 3.32 (SD=0.47), for which they can now access healthcare for their family, 3.56 (SD=0.55), for which they can now pay for the education of their children, 4.06 (SD=0.60) for which they can now generate empowerment for women , 3.09 (SD=0.35) where they can participate meaningfully in community activities , 3.43 (SD=0.48) for the provision of access with entrepreneurial training, 3.41 (SD=0.54) for which contribute to develop client's capacities in managing business, and 3.65 (SD=0.57) for which the training can help the training to work abroad.

Shamim, (2011) in his study compared learners' socio-economic status of the group of trainees in electronics class where scores in the most recent public examination. He found that learners in the higher income bracket consistently outperformed learners in the lower income bracket. He suggested that the positive correlation of high family income with students' higher levels of proficiency may be attributed to their earlier education in private medium schools compared to students in the lower income bracket.

Aikens & Barbarin (2016) recognized in the process of their investigation that children from low socio-economic environments acquire language skills more slowly, exhibit delayed letter recognition and phonological awareness, and are at risk for reading difficulties.

Computer servicing training was given by the College of Engineering of Laguna State Polytechnic University does not confined for those students who are professional but given the opportunity for the out-of-school youth, as well as the non-professionals who wants to acquire skills and knowledge in Auto-Cad in order to help uplift the economic status of the participants in order to transform lives and communities into a more productive individual.

IV. CONCLUSION

As a higher education institution, the university brings to bear in its extension/ outreach/ service learning programs its expertise in instruction and research. These programs, however, are not a one- way traffic. They are implemented as a result of researches conducted and concepts taught in the classroom. As the university extends its expertise with the partner communities, feedbacks are generated from the stakeholders.

Computer servicing training being offered by the colleges and universities as an extension program to its neighboring communities could be a continuous program that can help the individual to embrace the new trends in technology without enrolling to the formal school. This endeavor given by the educators in the extension service should be realized by the Local Government Unit, for which they will be the middleman in every training provision by the school community.

V. RECOMMENDATIONS

As the over-all coordinating body of the various community extension activities that are initiated by the different sectors of the Laguna community, the community and extension services of LSPU should:

- Participate in constructive and relevant social and technical activities in the promotion of skills training that will the community to uplift their lives.
- .Creation of such extension services to the community should be promoted in active cooperation by the Local Government Unit for an easy access of the trainees.
- Encourage volunteerism among the sectors of the Laguna community for the noble and worthwhile extension activities thereby cultivating the same spirit in the client partner communities.

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Relationship between Exposure to Mass Media and Aggressive Behavior among Adolescents in Secondary Schools

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Abstract

Media has brought about a major transformation in the way people think. It has given people an excellent platform to present themselves before the world and contribute in their own way to the changing world scenario. However, mass media obviously has effects on school children, more specifically, the violent content that are aired in the television or cinemas. It is observed that children believe what they see in the media than in what happens in the real life. School children who watch too many fights in the television or read pornographic materials on the internet begin to develop certain characters that affect the people around them negatively. Students' behavior is an issue that has been and continues to remain in school settings. The most common types of discipline cases in schools include drug abuse, school strikes, stealing, fighting, bullying and sneaking from school. To date, these behavioral cases have continued to be reported in secondary schools amongst students, but without a solution. This calls for the researcher to investigate what is influencing students' behavior negatively. Could these increased changes in students' behavior be as a result of increased and unlimited exposure to mass media? Bungoma Central in Kenya, the focus of the study comprises of both boys' and girls' secondary schools signifying an adequate number of adolescent population. All forms of deviant behavior and social vices like rape, theft, bullying, drug abuse and all kinds of pervasive sexual behaviors have been observed and is invariably constituting a serious concern to the institutions and the Government of Kenya.

Key words: mass media, aggressive behavior, adolescents

Introduction

Mass media refers to diversified media technologies that are intended to reach a large audience by mass communication such as radio, film and television (Todd, 2009). Media violence points to visual portrayals of acts of physical aggression by one human against another (Steven, 2010). Violence has always been an ingredient of children's adventure. What is critical is the dominance and extreme it has reached. Violence in the media has become common place affair. Todd (2009) observed that movies, television and video games pose such a serious threat to children and teenagers who are exposed to negative effects of violence and potential harm of media violence as one of the most debatable public issues which has obvious social and political backgrounds. Various forms of media have assumed central roles in people's daily lives (Gentile, 2009). Children all over the world are exposed to increasingly higher doses of aggressive images in the media (Steven, 2010). The researcher goes on to say that exposure to violence in media represents a significant risk to the health of children and adolescents.

The amount of violence on television is on the rise. The average child sees 12,000 violent acts on television annually including many depictions of murder and rape. More than 1000 studies confirm that exposure to heavy doses of television violence increases aggressive behavior, particularly in boys. Children from minority and immigrant groups, emotionally disturbed, children with learning disabilities, abused children by parents, children from distressed families are more vulnerable to violence on television. Physicians

who see a child with a history of aggressive behavior should inquire about the children's exposure to violence portrayed on television (Sonu, 2011)

Although shootings in schools around the world periodically prompt politicians and the general public to focus their attention on the influence of media violence, the medical community has been concerned with this issue since the 1950s (Centre for Media and Child Health, 2009). This is because media violence seriously damages children's imagination about moral values, ethics, loyalty, friendship, security or even justice (Centre for Media and Child Health, 2009). Media can contribute to an aggressive culture for example; people who are already aggressive use the media as a further continuation of their beliefs and attitudes, which in turn are reinforced through media contents. Many children are surrounded by an environment where 'real' and media experience both support the view that violence is natural (Espejo, 2008). The impact of media violence can primarily be explained by the fact that aggressive behavior is systematically rewarded more than conciliatory ways of coping with one's life. It is often presented as gracious, thrilling and interpreted as a good problem solver in a variety of situations (Federal Communication Commission, 2009).

Children learn best by observing behavior then trying it. The consequences of their behavioural attempts influence whether they repeat the behavior. All violent media can teach specific violent behaviors, the circumstances when such behavior appears appropriate, attitudes and beliefs about such behavior. In this way, behavioral scripts are learned and store in memory. What most of the programmes they see and hear send the false notion that in every conflict there has to be a winner and a loser, thus making them believe that violence is a successful means of resolving conflicts. After viewing many violent scenes they become desensitized to the real world violence. They cannot easily tell the difference between real life and fantasy that the violent images portray on television. Parents can reduce the negative influence of media on young people by limiting and monitoring the programs the children watch. They should also teach the value of inner beauty, value of self worth and alternatives to violence (Kimani, 2014).

More recently, cable systems, video cassette recorders and video games have increased exposure. Not long before introduction of television in America households, there occurred a dramatic increase in violent crime (Huesman & Taylor, 2003). The most common argument is that children imitate the violence they see on television. The process of imitation is emphasized by Social Learning Theory opined by Bandura (1983). According to Bushman and Anderson (2009) children who view televised media violence are more likely to have increased feelings of hostility, decreased emotional response to the portrayal of violence and injury that lead to violent behavior through imitation. There are many questions whether television violence results in more aggressive or deviant behavior and if such behavior is likely to lead to criminal behavior, desensitization to violence, nightmares and fear of being harmed (Zimmerman, 2008).

Recent studies by Steven (2010) have indicated that even seemingly the most benign programs on television such as cartoon are filled with violence. In the researcher's exploration on the impact of publicized mass murders followed by the killer's suicide and suicide rate, state that analysis of mass murder & suicides that was covered in two or more television news networks found that coverage was associated with a significant increase in suicides in the real world. He concluded that violence in the media influence human behavior in a negative manner. Video games provide an ideal environment in which to learn violence and use many of the strategies that are most effective for learning. They place the player in the role of the aggressor and reward him or her for successful violent behavior. Rather than merely observing only part of violent interaction (such as occurs in television violence), video games allow the player to rehearse an entire behavioral script, from provocation, to choosing to respond violently, to resolution of the conflict. Children and adolescents want to play them repeatedly and for long periods of time to improve their scores and advance to higher levels. Media like television, radio and internet increase an overall awareness of the masses.

To some extent, media is responsible for generating negative feelings among those exposed to it. An early exposure to bold or violent films has a deep impact on young minds. If children are bombarded with fight sequence, rape scenes, suicide and murders, they are bound to leave a scar on the impressionable minds. According to Manali Oak (2012) bombarding only the bad can affect anyone at least at the sub-conscious level. An early exposure to bold or violent films, books, publishing adult content and news portraying ugly social practices has a deep impact on young minds. Huesmann and Taylor (2006), assert that media violence poses a threat to public health in as much as it leads to an increase in real world violence and aggression. Research shows that fictional television and film violence contributes to both short term and long term increase in aggression and violence in young viewers. Television news violence also contributes to increased violence, principally in the form of imitative suicides and acts of aggression. Video games are clearly capable of producing an increase in aggression and violence in the short term.

The relationship between media violence and real world violence and aggression are moderated by the nature of media content characteristics and social influences on the individual exposed to that content. Viewing so much violent news on television can encourage an imitative behavior (Anderson et al., 2003). Video games were blamed for the Columbine shootings, but many people did not consider how much this event was publicized and how that may have impacted the increase in youth violence afterwards. Television stories of a well known person's suicide could increase the likelihood that other people will take their own lives as well (Anderson et al., 2003). Musitu, Estevez and Emler (2007) found that video games are destructive because in them the player assumes the role of virtual aggressor. These researchers say that television and movie violence can affect subsequent displays of aggression by modeling and glorifying violence, triggering aggressive impulses in some people and decreasing feelings of empathy. The esteem that is accorded to personalities who are violent, aggressive and destructive appeals to adolescents as they would want to be held in high esteem by their peers (Strasberger, 2009). This mismatch of violence and heroism misinforms the teenagers who then imitate their heroes. Therefore, if a child bludgeons another child to death with a wrench or shoots a classmate, it is the violent televised programs that they watch which are to blame (Andrea, 2007).

Incidents of television violence are believed to be increasing (American Academy of Pediatrics, 2009). Some youths may see the publicity of a school shooting as exciting and an opportunity for infamy. Headlines in the press such as 'Two Gunmen at Colorado School reportedly kill up to 23 before dying in a siege' are sensational. Such stories of aggression by two adolescent learners from Columbine high school who were armed with guns and explosives killing 23 fellow learners and a teacher before taking their lives could encourage learners to carry weapons and be aggressive (Murray, 2008). Data indicates that children and adolescents prefer violent games. Playing these video games allows young people to practice violence (Okume & Tanimur, 2009). Several studies have demonstrated that teenagers who play violent video games are more likely to engage in aggressive behavior and violence than all children who play non-violent video games are more likely to engage in aggressive behavior and violence than all children who play non-violent video games (McCannon, 2009).

Hundreds of studies have been conducted in recent years evaluating the effects of violence in the media. The results are alarming. Some of them prove strongly that media violence can lead to criminal behavior and many sociologists and psychologists have concluded that violence in television media impacts viewers in a negative manner (Strasberger, 2009). For example, modern super heroes from action movies do a lot of shooting and leave scores of dead bodies in the streets, showing no care about the laws or responsibility hence giving a bad example to juveniles. Following what they can observe in the media, teenagers are motivated to get involved into brutal activities as forming gangs, bullying, rampage (Hoton, 2009).

A study carried out in a peaceful environment like Canada or a certain high crime neighborhoods in Brazil to war Zones in Angola or Tajikistan, confirmed the dominant role of television in the everyday lives of children around the globe. There is therefore, a significant relationship between time spent watching television during early ages and the subsequent implication in violent behaviours during adolescence. Generally, experiments have demonstrated that exposing people especially children and youth to violent behavior on film and television increases the likelihood that they will behave aggressively immediately afterwards compared to those who view the non-violent clip (Centre for Media and Child Health, 2009). According to Dill (2007) the deleterious effects of exposure to media violence are likely to accumulate (via learning) within the individual with repeated exposure. This researcher says that effects of a single exposure can add significant amounts of aggression and violence to society. In recent longitudinal studies it has been revealed that as little as 3 months, high exposure to violent video games increases physical aggression (Carnagey, 2007). Other longitudinal studies conducted in Germany and Finland has revealed similar effects across two years. On the other hand, there is evidence that pro-social video games can increase pro social attitudes and behavior (Rideout, 2007). All violent media can teach specific violent behaviours, the circumstances when such behaviours seem appropriate and useful, and attitudes and beliefs about such behavior.

Kirsh (2011) researched on the impact of publicized mass murders followed by the killer's suicide in USA and found that violence in mass media influences human behavior negatively. Studies conducted by Steve (2010) and Huesmann and Taylor (2006) on media and violence had produced similar results. The findings of these studies strongly suggest that violence in the media influences human behavior in a negative manner. In news publication by KSBW (2016), the use of social media application Ogle' has been identified as a conduit for high school students making violent threats anonymously in the California State schools. This review however did not take into account any collection of primary data which the current research adopted. Secondly, the above researches took place within developed Countries hence their findings may not be consistent within the local context. More so, the studies failed to take into account the adolescent students as the unit of analysis.

Two major meta-analytic reviews were published in the 1990s. Wood (1991) examined 28 research reports on children and adolescents exposed to media violence and subsequently observed in unconstrained social interactions. The authors concluded that exposure to media violence increases aggressive interactions with strangers, class mates and friends. Content analysis of movies in Stout and Hillary (2010) study revealed the disturbing fact that one of eight Hollywood films depicts a rape. Although there are studies on College age subjects exposed to erotica and violent erotic showing them to be less sympathetic to actual rape victims, for obvious reasons, there are no such studies on children. However, it is clear from content analysis of television and movies that children are routinely being exposed to such violence on regular basis from early ages. Available and accessed local literature has not focused on the influence of mass media on adolescents' aggression, the present study sought to fill the gap by focusing on how mass media influences students' relationships with parents and teachers with whom they interact frequently (Kang, Cecilia, 2012).

Chen, Ho and Lwin, (2016) conducted a meta-analysis of factors predicting cyber bullying perpetration and victimization in China among the youths and found out that the frequency of social media usage had the highest influence on cyber bullying and violent acts among youths. A study by Udris (2014) on cyber bullying among Japanese high school students found out that, students had a tendency to cling onto social media sites and this seems to have contributed significantly to cyber bullying. Studies have shown a positive correlation between video games and violent behavior during childhood and adolescence. In a Japanese study of fifth and sixth graders, a positive correlation was found between the amount of time spent playing video games and later physical aggression (Herzfeld, 2004). Adolescent children spend up to 40 hrs per week using some type of media such as computers, video games, systems and television. Parents however do not check the ratings of the video games that their children play (Anderson & Bushmen, 2001). It is important that parents pay close attention to those ratings, due to the fact that the most heavily marketed and consumed games are those with violence (Herzfeld, 2004). All the above information illustrates the positive correlation between violent video games and increased violence.

Most of the studies conducted Huesmann, (2007) however, have been short term and have not looked at aggressive behavior of children over their lifespan into adolescence and adulthood. A longitudinal study analyzed television view at age 6- 10 and compared to adult aggressive behavior 15 years later. It concluded that there was a strong association between viewing violent television at younger age and the likelihood of aggressive behaviours occurring into adulthood. Results showed that behavior considered to be violent was more prevalent in males than it was in the females of the study (Rowell, 2003). According to Ogidefa (2008) detailed information on youth problem behavior is lacking in Africa and this is attributed to the absence of reliable data. However, some of the African Countries such as Tanzania, Namibia and South Africa are beginning to collect information to map future trends. Nevertheless there is evidence of increasing law-breaking among young people. He further argued that victimization surveys in several Countries, as well as qualitative observations, suggest law-breaking behavior among young people (12- 25 years) in terms of violent behavior, drug-related and gang activity offences is increasing in developing Countries at a much higher rate than in the developed countries.

A study undertaken by Centre for Justice and Crime Prevention (2012), on National School Violence in South Africa indicated that at least 22.2% of high school students had experienced some form of violence. The highest form of violence meted on the high school students was found to be cyber violence and this was attributed to the high prevalence of online chat rooms and media sites. Another study in South Africa revealed that the bombardment of media violence in Television, films, and video games seemed to negatively affect young viewers making them act aggressively (Slovak & Singer, 2008). Findings from a study undertaken by Nwabueze and Aduba-Doris (2014) on the influence of social networking on secondary school students in Enugu State, Nigeria showed that extensive use of social media sites had negatively influenced the behavior of students. Another study in Nigeria by Nwana (2008) revealed that all the episodes of television drama inspired learners to use drugs freely, commit anti-social behavioural acts such as raping innocent girls, doing crime and undermining social rules and parental involvement in the education of secondary school learners.

A survey done by Philista and Arne (2015) in Kibra informal settlement found out that most of the youths in Kibra informal settlement in Nairobi, Kenya, especially boys are being recruited into criminal gangs just after completing primary school. The report further showed that due to the abject poverty in this settlement, most of the young adults begin living in the streets where they engage in criminal activities as well as being recruited into street gangs. According to the report, drug abuse among secondary school students within Kibra is a common occurrence. Further sexual immorality has been propelled by the poverty in the slum and intolerant sexual behavior has been favoured by the availability of sexual imagery online. Hence this study will contribute to the body of knowledge by

establishing if there is any association between social media usage and violent behaviours, drug abuse and sexual irresponsibility in Bungoma Central Sub- County, Bungoma County.

A study by Njoki (2014) On the factors leading to anti- social behavior among youths in Nairobi West and South C estates, found out that the main deviant behaviors among young adults included negative sexual behavior and cases of violence. Moreover, the availability of Cyber cafes that are not well regulated has made access to pornographic materials online easy to students. The researcher again noted that secondary school students join up estate gangs that pray the estate roads looking for young girls to engage in sexual activities with. In Kenya scenes of violence on our media have been portrayed. For example the scenes of the Kenya Defence Forces that restored peace in Somalia could have had an impact on the youths (Sunday Nation, 20, November, 2012). These visuals illustrate the forces attitudes and the heinous use of physical torture on their victims to extract the truth. Other violent incidents that could have had an impact on the learners were the events of the 2007/ 2008 post election violence that was televised displaying untold destruction and deaths (Waki Commission, Report, 2009). The year 2008, recorded the highest number of violent strikes in schools. It is possible that through the students' observational experiences they acquired aggression. They were merely replaying what they had viewed in the media earlier in the year. Aggressive behavior has been witnessed in many secondary schools among adolescents in Bungoma Central Sub – County. The violent acts of students have included physical fights and destruction of property worth millions of shillings. These acts could have been influenced by their exposure to mass media. The present study sought to establish if there is a relationship between exposure to mass media and students' problem behaviours including aggression in secondary schools.

The accumulated body of research is consistent and clear concerning the causal connection between media violence and aggressive behavior in some children. Studies conclude that children who watch violent television shows become angrier than children who are not exposed to such violent media increasing the likelihood of aggressive behavior in children. Although exposure to violent media is not the sole factor contributing to aggressive behavior, anti- social attitudes, and violence among children and adolescents, it is an important health risk factor on which members of the society can intervene because it affects the behavior of young people and endangers peace and safety. Despite the findings of many studies linking mass media to adolescent aggression, some studies have revealed contradictory observation about media effect on aggressive behavior. According to Aimel (2009) in her study, there was no difference between children that were exposed to violent media and those who were exposed to no- violent media. The researcher therefore, aimed at establishing if exposure to mass media has any influence on adolescent learner's aggression in secondary schools in Bungoma Central Sub- County of Bungoma County.

Methodology

The study adopted descriptive survey research design. According to Kothari (2008) descriptive survey at times is the only means through which views, opinions, attitudes, and suggestions for improvement of educational practices and other data can be collected. The choice of descriptive survey was made based on the fact that in the present study, the researcher used a sample to represent the whole population and described the current characteristics of the population. No variables were manipulated to establish the influence of mass media on problem behavior. The researcher also used questionnaires and interview which are characteristic of a survey design to adequately get information from a sample in order to describe the population under study. This involved self report on opinion and attitudes of respondents on the influence of mass media on problem behavior among adolescents. This was in line with Kumar (2011) who observed that survey research design is the most appropriate for obtaining self- reported opinions, attitudes, beliefs and values. The study was conducted in Bungoma Central Sub- County in Kenya. This is one of the eight Sub- Counties in Bungoma County. The Sub- County was purposively selected because it has many public secondary schools which are a mixture of girl's only schools and boy's only schools as well as mixed schools. This was essential for comparison purposes.

The target population of the study was 40,000 students in all public secondary school in the Sub- County. A considerable high proportion of problem behavior reported in the Kenyan school system occurs at secondary school level, hence the choice of secondary school students as part of the study population (Makabila, 2010). The teacher counselors were selected because they handle problem behaviors of students. The Deputy Principals were selected because they are in charge of discipline. In this study, both probability and non-probability sampling was used to select study samples. Non probability was used to select Bungoma Central Sub-County. Purposive sampling was used to select the 10 schools and form two class of students enrolled in public secondary schools. To select the specific sample from the population of form twos who took part in the study, simple random sampling was used to select the

student respondents. The deputy principals and teacher counselors were selected proportionately to the 10 selected schools for the study. Thus the study selected 10 deputy principals and 10 teacher counselors for the study.

The sample size of students in form two was determined using a formula developed by Krejcie and Morgan (1970) which assumes:

$$S = \left\{ \frac{X^2 NP (1-P)}{1} \right\} \left\{ d^2 (N-1) + X^2 P (1-P) \right\}$$

Where

S = required sample size

X = the table value of chi- square for 1 degree of freedom at the desired confidence level.

For a significance level of @ =0.5, x =1.96

N = The population size = 10,000

P = The population proportion (assumed to be 100 since this would provide the maximum sample size) = the degree of accuracy expressed as proportion (0.5)

Using this formula, 370 students in form two were obtained where the researcher used simple random sampling to obtain 37 student respondents per school. Deputy Principals and teacher counselors (1) were selected proportionately to the sampled schools. According to Mcneil (1990) data in a large study intended for statistical analysis should be collected from at least a sample of 10% of the population. This view was taken into consideration in the selection of the sample for schools, deputy principals and teacher counselors. The qualitative and quantitative data was extracted from students' and deputy principals' questionnaires and presented as follows:

Results

It is the responsibility of the deputy principals to be in charge of discipline in the schools. Therefore, the deputies were asked of their experience in their schools in relation to aggressive behaviors. The results were analyzed and indicated as shown in table 1.

Table 1: Deputies' experience with aggression

Type of Gender	Frequency	Percentage (%)
Yes	8	80
No	2	20
Total	10	100

Most the respondents agree that they have experienced aggression-bullying, distraction of property, fighting in their schools while just only 20% of the responds who do not agree to this. Further, the deputy Principals response on how often the aggressive behaviors are manifested in their schools was as shown in table 2.

Table 2: Manifestation of aggressive behavior

Type of Gender	Frequency	Percentage (%)
Never	1	10
Once in a while	1	10
Pretty often	3	30
Very	5	50
Total	10	100

It was established that 50% of the interviewed deputy principals believe that aggressive behavior is so often manifested in the schools they are administrating. Besides, collectively 90% of the respondents agree that there is existence of such behaviors in their school. Nevertheless, 10 percent of the deputy teachers seem to have a different view within their schools. Because of the frequency of occurrence of the aggressive behaviors, the consequences for the students include suspension and guidance and counseling.

The first concern of the researcher from the students was to establish from the rating on whether through mass media sites such as world star hip hop fight completions are widely shared do promote violent behavior among students such as assaulting minors. The results are indicated in table 1 and figure 1.

Table 3: Role of mass media in promoting violent behavior

Response	Frequency	Percentage (%)
Strongly agree	92	25
Agree	98	26
Neutral	122	33
Disagree	38	11
Strongly disagree	20	5
Total	370	100

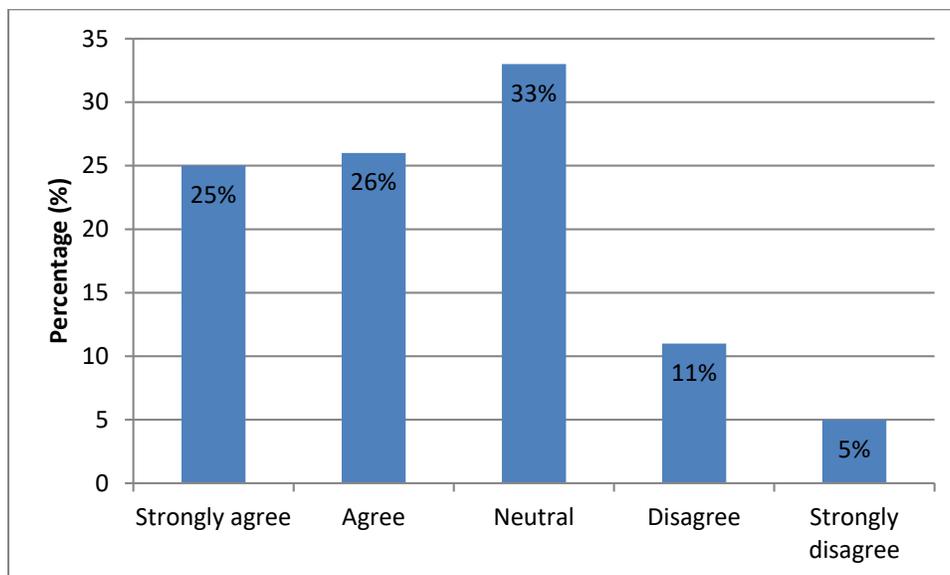


Figure 1: Role of mass media in promoting violent behavior

A larger percentage represented by collectively 51% of the respondents highly rate the media sites such as world sites as world star hip hop fight completions are shared do promote violent behavior among the students as assaulting minors. However, some respondents (16%) object this and don't believe that the world star hip hop fight completions can promote violent behavior amongst the students.

In terms of respondents' response on whether increased sharing of violent videos on social media promotes anti-social behavior among the viewers, the results were summarized as shown in table 4 and figure 2 respectively.

Table 4: Role of violent videos in promoting anti-social behavior

Response	Frequency	Percentage (%)
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Strongly agree	110	30
Agree	92	25
Neutral	62	17
Disagree	56	15
Strongly disagree	50	13
Total	370	100

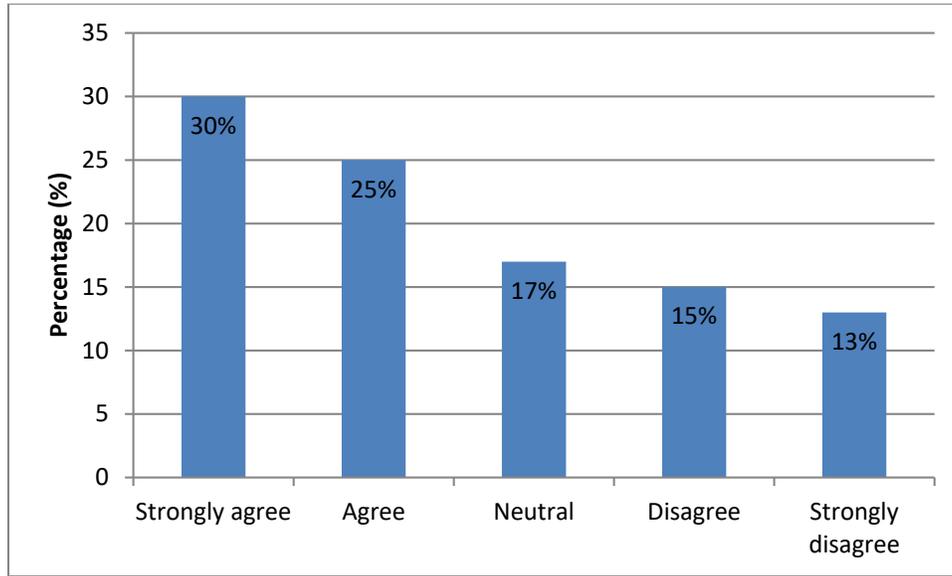


Figure 2: Role of violent videos in promoting anti-social behavior

More than half of the respondents (55%) strongly agree that an increased sharing of violent videos on social media agitate and promotes anti-social among the viewers, but even with that large percent agreeing so there are those who don't believe so, and so a larger extent some are neutral as they don't support either side.

The researcher also aimed at finding out respondents' response on whether they have ever experienced a strike in your school. The results were as follows.

Table 5: Experience of a strike in school

Response	Frequency	Percentage (%)
Yes	200	54
No	170	46
Total	370	100

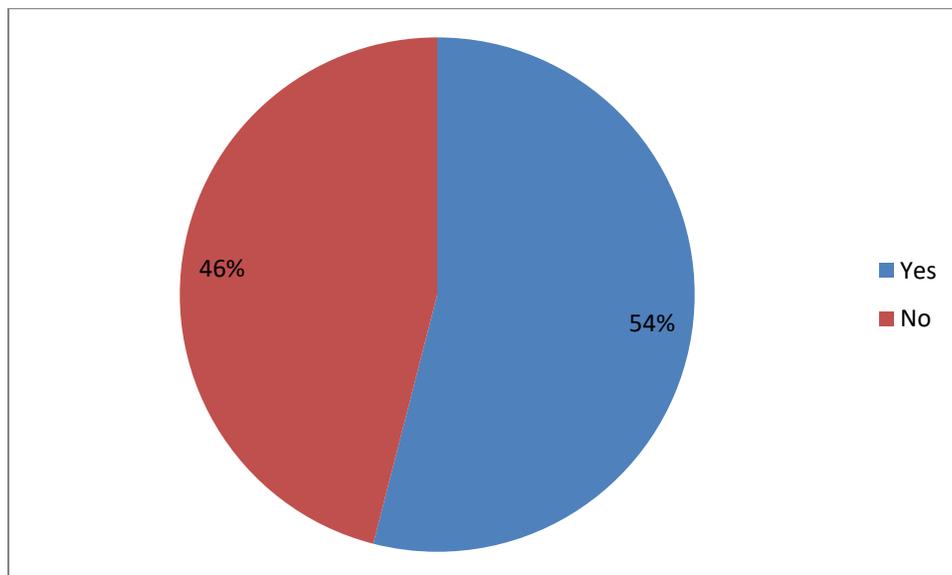


Figure 3: Experience of a strike in school

It was established that 54% of the respondents agree that they have ever at some experienced a strike in their schools, however some (46%) of the respondents have never experienced any type of strike in their schools.

Most of the respondents’ response on whether the time spent on various mass media affects them in any way agreed that it does.

Table 6: Effect of time spent on mass media

Response	Frequency	Percentage (%)
Yes	190	51
No	180	49
Total	370	100

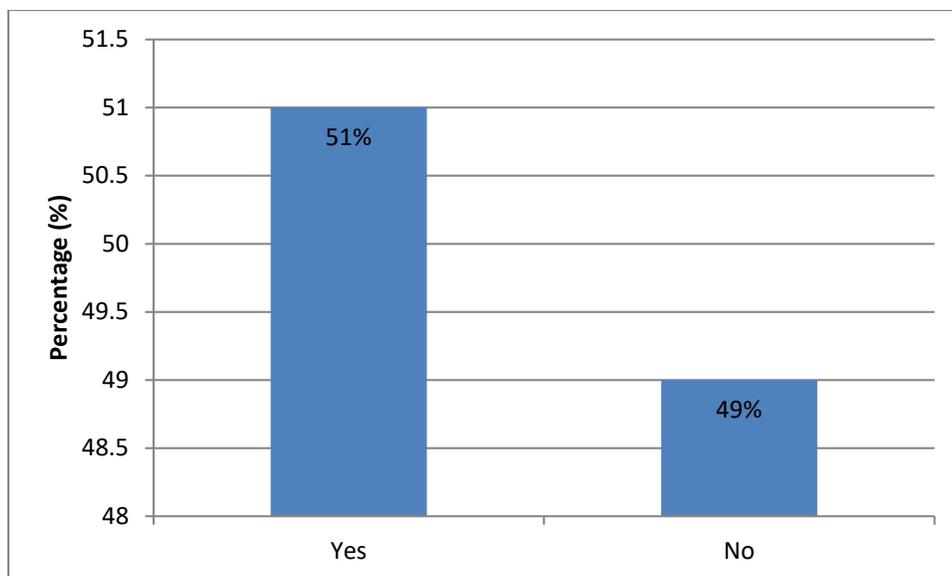


Figure 4: Effect of time spent on mass media

Most of the students agree that the time spend on various mass media affects them in some way. Out of the sampled population its only 49% of the respondents who do not agree that spending much time in mass media affects them in some way and therefore they have every reason to embrace mass media at all cost. It was noted that those in support of media affecting them stated that it affected them in the following ways:

- Too much time on mass media takes much of their time doing unconstructive things.
- There is a lot of much money pumped into mass media that does not output that is equivalent to their expectation thus giving them undue pressure.
- Affects the students’ characters negatively.

Correlation was done to determine the relationship between mass media and aggressive behavior and the results are manifested in the following table.

Table 7: Correlation of relationship between mass media and aggressive behavior

		Mass Media	Aggressive behavior
Mass media	Pearson Correlation	1	.238**
	Sig. (2-tailed)		.000
	N	100	100
Aggressive behavior	Pearson Correlation	.238**	1
	Sig. (2-tailed)	.000	
	N	370	370

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

From the correlation (Pearson Correlation -approaching 1 from the positive) of response by the students on exposure to mass media and adolescent students’ problem behaviors in secondary schools in Bungoma Central Sub-County in Kenya, it depicts that aggressive behavior can intensely be influenced by exposure to mass media. The positive value .238** of Pearson Correlation implies that the aggressive behavior heavily depends on how much the secondary school students have been exposed to the content on the mass media be it either on Television, Internet, Mobile phones, magazines or newspapers. The small number of students who engage in aggressive behavior clearly and equally correlates with the number of students who are exposed to the mass media content, thus indicating that indeed, the students’ behavior relatively depends on the general exposure to mass media.

Recommendation

Based on these findings, the parents and teachers should device effective techniques of dealing with deviant behaviors. The concerted effort of the individual and the stakeholders are important for the successful transition of adolescent students. Therefore, they should aim at developing a holistic individual who is socially, intellectually and psychologically fit in the society. And this can only circumvented by having restrictions to the students to the exposure of mass media while both in school and at home.

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Relationship between Exposure to Mass Media and Drug Abuse among Adolescent Students in Secondary Schools in Kenya

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Abstract

The media serves the function of connecting people and therefore has an enormous effect on people's attitudes and behaviours. It is a contributor to socialization process. Media is the major source of information especially news, education, entertainment, fashion and trends. It can also be used for changing people's attitudes and behaviours. The globalization and propagation of media are among the key factors that have defined and shaped the current generation of young people. The changes in the media industry may have resulted in the many social changes being realized globally, Kenya included. It has been easy for students in Bungoma Central Sub-County to access electronic media (television, radio, video and mobile phones) in cyber cafes in market places which in most cases has destructive content and actions which influence their behavior. Despite intervention from the Ministry of Education, school Principals and NGOs that have sensitized students on proper use of media, anti- social behavior within Bungoma Central Sub-County is on the increase with over 35% of the students abusing various types of drugs. This study therefore sought to establish whether there is a relationship between exposure to mass media and drug use in secondary schools in Bungoma Central Sub- County.

Key words: Mass media, Drug abuse, Adolescent students

Introduction

Mass media refers to any printed or electronic media designed to carry messages to large audiences (Kumar, 2014). Mass media comprises those channels of communication which are used in receiving heterogeneous audiences simultaneously. Examples of electronic media include radio, television, cinema, internet, e- mail, mobile phones among others. Print media include: Newspapers, magazines, billboards, exhibitions, posters etc.

Alcohol consumption continues to be one of the most risk behaviors engaged in by adolescents (Arata, Stafford & Tim, 2003) and it is one of the common habits among peer groups that cause psychological and social problems. The world over, alcohol consumption and intake of other drugs is increasingly becoming a social problem of phenomenal proportion (Hewitt,(1988). About 54% of all adolescents have drunk an alcoholic beverage at least once in their life time (Buddy, 2008). Durant et al., (1997) examined the content of tobacco and alcohol use behavior on television. The results showed that a high percentage (26%) of MTV videos portrayed tobacco use. The percentage of alcohol use on MTV was still the highest at 27%, but differences with other networks were not statistically significant. Of note, given the influence of modeling and imitation in young people, videos that portrayed alcohol and tobacco use depicted the lead performer as most often the one observed to be smoking or drinking.

Subsequent studies of older ages considered the influence of various advertising and marketing techniques and later susceptibility to smoking. Evans, Farkers, Gilpin, Berry and Pierce (1995) examined data on 3, 536 adolescents who had never smoked to determine their susceptibility to smoking; they surveyed two indices: 1) a 5 point index of an individual's receptivity to advertisement, naming e brand, buying, owning a tobacco- related promotional item, and willingness to use tobacco- related promotional item; and 2) an index classifying the individual's reported exposure to family and peer smoking. The relationship of receptivity to advertising and susceptibility to smoking was stronger than the relationship of family or peer smoking and susceptibility, indicating that advertising is

a more powerful influence than exposure to peer or family smoking. Other researches were conducted to look at the relationship between tobacco promotional items and smoking susceptibility.

Each study has documented a strong association between an awareness and involvement with tobacco promotions and subsequent susceptibility to tobacco use. Pierce's study was the only longitudinal examination of the link between advertising, exposure to promotional tobacco items and later smoking. Spanning a 3 year period from 1993 to 1996, the study found that adolescents who had a favourite cigarette advertisement in 1993 compared with those who did not, were twice as likely either to have started smoking by 1996 or to be willing to start and those who owned or were willing to own a promotional item were three times as likely to have started smoking by 1996 or to be willing to start.

Studies from the 1980s showed significant correlation between exposure to alcohol advertising and drinking beliefs and behaviors (Atkin & Block, (1981). In the 90s two major studies examined the effects of alcohol advertising on children and adolescents. Grube and Wallack (1994) looked specifically at the relationship between television beer advertising and drinking knowledge, beliefs and the intention to later drink. The sample queried was a random group of 468 fifth and sixth graders, using a self administered questionnaire and structured interviews. They measured television viewing, awareness of beer advertising, knowledge of beer brands and slogans, alcohol beliefs (both positive and negative) intention to drink as an adult, perceived parental and peer approval of drinking, and demographic and background variables. Children with more knowledge of beer brands and slogans held more favorable beliefs about drinking and more frequently tended to drink as adults. The positive values associated with drinking included romance, sociability and relaxation.

Findings from a descriptive study conducted by Gikonyo (2005) on drug abusers and parental knowledge on factors predisposing the youth to drugs and substance abuse in Nairobi, Kenya showed that people who smoke are portrayed as being either great sportsmen or socially successful, wealthy or important people. He also adds that social pressure from media and friends is a universal risk factor for substance abuse among adolescents in developed and developing Countries. This study did not address the influence of social media on drug abuse. The current study considered the great influence social media has on drug and substance abuse, hence filled the gap in knowledge. Advertisement of drugs is especially common in urban areas through radios, television and billboards. Although these media do not usually promote drug use explicitly they can reinforce a child's impression that the use is normal (NACADA, 2011).

King and Stones (2013) noted that use of social media by middle school students and college students makes sharing of information about the use of drugs among students more readily available. Another study done by Okombe and Ondiek (2013) on patterns of deviant behavior among urban primary school children in Nigeria highlighted that drug abuse among teenagers has been on the rise in the recent years as a result of the advent of internet usage. The authors argue that drug users have created groups in social media networks that show partaking in drug abuse as 'cool' thing among teenagers hence increasing uptake of drugs. A study by Kiragu (2010), investigating the extent to which selected factors contribute to alcohol and cigarette use among male students in public day secondary schools in Nakuru Municipality, established that peer groups influence had the greatest contribution to high school students' use of cigarettes, followed by family factors. The findings also indicated that exposure to pro- alcohol and mass media content was significantly related to levels of alcohol and cigarette use. The findings also indicated that 52% low drug users reported low mass media exposure as compared to 9.3% who reported high mass media exposure. For high alcohol and cigarette users, 58.2% had mass media exposure. This is compared to 42% high alcohol and cigarette users who had low mass media exposure. The results indicated that 15.7 of the respondents had seen or heard pro- alcohol and cigarette advertisement on the internet.

A study done by Maina (2012) showed that outside their classrooms, students often use internet especially for chatting and sending videos, messages in social media sites to other students during school hours, weekend and even late at night. He further indicated that abuse of alcohol, tobacco and marijuana, mostly accessed at home and school, is widely prevalent in public schools. Other studies done by Sidze, Elungata, Maina and Mutua (2015) within Nairobi's informal settlements show that many of Nairobi's youths not only from poor families, but also some from middle and upper class families are being drawn into substance abuse, sexual immorality and association with criminal gangs. However, the above study focused on youths in general; it did not take into account adolescents in secondary schools. The current study emphasized how students are being lured into drug and substance abuse through the use of social media.

A study by Kembo (2012), on the factors associated with drug use among a standard eight primary school pupils in Mathare Division, Nairobi Province, indicated that gender has a significant influence in the pupils drug use. It was found that where both parents use drugs, the father's use of drugs had significant influence on the pupil's drug use. Friends and siblings' use of drugs were also significant in the pupil's drug terminology. On the other hand, socio- economic status, family environment, availability of drugs and having knowledge of drugs were found not to be statistically significant in influencing the pupil's drug use. A study conducted to investigate the factors influencing drug use among boys in high school within Nakuru North Sub – County, revealed that drug use among boys in high school is influenced by factors such as peer pressure, curiosity, influence from family members and celebrities, lack of knowledge about dangers of drug abuse, easy availability of drugs, low cost of drugs, excessive pocket money, lack of good

role models in teachers and parents. Girls were not included in the study. The role of mass media was not examined. The current study aimed at filling these gaps.

Kinywa (2011) conducted a study to investigate the causes of indiscipline and violence by adolescents in Kenyan public secondary schools. The study targeted students, teacher counselors and head teachers. The study sample comprised of 50 students, 5 teachers and 5 head teachers from five secondary schools in Central Embu Division of Embu Sub- County. The study established that drugs and substance abuse among secondary school students in Central Division of Embu Sub- County is on the increase. Among the students who took part in the study, 40% admitted that they were abusing various drugs, which is higher than the global proportion of 13.5% of the youths aged 15-24 who have tried drugs at least once as reported by UNODC (2000). This indicates that the efforts schools have been putting in place to fight drugs and substance abuse has not been working effectively. Consequently, drug and substance abuse has led to the increase in cases of indiscipline, as reflected through strikes, theft, truancy, sneaking out of school, disobedience to teachers and general indiscipline. On the overall this has led to poor academic performance in the schools. In view of the above findings, the current study therefore sought to establish the possible link between drug abuse in secondary schools and students' exposure to mass media.

Methodology

The study adopted descriptive survey research design. According to Kothari (2008) descriptive survey at times is the only means through which views, opinions, attitudes, and suggestions for improvement of educational practices and other data can be collected. The choice of descriptive survey was made based on the fact that in the present study, the researcher used a sample to represent the whole population and described the current characteristics of the population. No variables were manipulated to establish the influence of mass media on problem behavior. The researcher also used questionnaires and interview which are characteristic of a survey design to adequately get information from a sample in order to describe the population under study. This involved self report on opinion and attitudes of respondents on the influence of mass media on problem behavior among adolescents. This was in line with Kumar (2011) who observed that survey research design is the most appropriate for obtaining self- reported opinions, attitudes, beliefs and values. The study was conducted in Bungoma Central Sub- County in Kenya. This is one of the eight Sub- Counties in Bungoma County. The Sub- County was purposively selected because it has many public secondary schools which are a mixture of girl's only schools and boy's only schools as well as mixed schools. This was essential for comparison purposes.

The target population of the study was 40,000 students in all public secondary school in the Sub- County. A considerable high proportion of problem behavior reported in the Kenyan school system occurs at secondary school level, hence the choice of secondary school students as part of the study population (Makabila, 2010). The teacher counselors were selected because they handle problem behaviors of students. The Deputy Principals were selected because they are in charge of discipline. In this study, both probability and non-probability sampling was used to select study samples. Non probability was used to select Bungoma Central Sub-County. Purposive sampling was used to select the 10 schools and form two class of students enrolled in public secondary schools. To select the specific sample from the population of form twos who took part in the study, simple random sampling was used to select the student respondents. The deputy principals and teacher counselors were selected proportionately to the 10 selected schools for the study. Thus the study selected 10 deputy principals and 10 teacher counselors for the study.

The sample size of students in form two was determined using a formula developed by Krejcie and Morgan (1970) which assumes:

$$S = \frac{x^2 NP (1-P)}{1 - d^2 (N-1) + x^2 P (1-P)}$$

Where

S = required sample size

X = the table value of chi- square for 1 degree of freedom at the desired confidence level.

For a significance level of @ =0.5, x =1.96

N = The population size = 10,000

P = The population proportion (assumed to be 100 since this would provide the maximum sample size) = the degree of accuracy expressed as proportion (0.5)

Using this formula, 370 students in form two were obtained where the researcher used simple random sampling to obtain 37 student respondents per school. Deputy Principals and teacher counselors (1) were selected proportionately to the sampled schools. According to Mcneil (1990) data in a large study intended for statistical analysis should be collected from at least a sample of 10% of the population. This view was taken into consideration in the selection of the sample for schools, deputy principals and teacher counselors. The qualitative and quantitative data was extracted from students', teacher counselors' and deputy principals' questionnaires and presented as follows:

Results

As already mentioned, data for this study was obtained from deputy principals, teacher counselors and the pupils. From the questionnaire given to the deputy principals, it was discovered that there have been cases of drug abuse in the schools as shown in table 1.

Table 1: Prevalence of drug abuse

Type of Gender	Frequency	Percentage (%)
Yes	6	60
No	4	40
Total	10	100

It can be noted that most the respondents agree that they have experienced drug abuse amongst the students they are supervising in their schools while just only 40% of the responds who do not agree to this. In fact, this information is quite similar to that given by the professional teacher counselors who note drug abuse as one of the most common behavior among secondary school students as shown in table 2.

Table 2: Prevalent behaviors among students in schools

Problem behavior	Frequency	Out of (number of respondents)
Fighting	4	10
Bullying	5	10
Destruction of property	5	10
Drug abuse	4	10
Irresponsible sexual Behavior	6	10
Student riots	5	10
Vandalism	4	10
Disrespect for teachers and prefects	7	10

The deputy principals who indicated that there are cases of drug abuse in their schools noted the following (as shown in table 2) as how often the behavior is manifested in their school.

Table 3: Frequency of manifestation of drug abuse

Type of Gender	Frequency	Percentage (%)
Never	1	10
Once in a while	1	10
Pretty often	4	40
Very	4	40
Total		100

40% of the interviewed deputy principals believe that drug is so often manifested in the schools they are administering. Besides, collectively 80% of the respondents agree that there is existence of such behaviors in their school. Nevertheless, 10 percent of the deputy teachers seem to have a different view within the school they are administering. Most of the deputy principals noted the following methods as dominant in terms of correcting the drug abuse behavior in schools: Suspension, expulsion, disciplinary and guidance and counseling.

In relation to as to whether the sharing of pro drug messages in social media sites has increased the abuse of drugs among secondary school students, the students responded as follows:

Table 4: Pro drug messages and drug abuse

Response	Frequency	Percentage (%)
Strongly agree	100	27
Agree	84	23
Neutral	64	17
Disagree	72	19
Strongly disagree	50	14
Total	370	100

Most of the respondent (27%) agrees that sharing of pro drug messages in social media sites has increased the abuse of drugs among secondary schools students, however some object and don't believe that just sharing of pro drug messages in social media can ever tilt, change and influence them.

The study also established that majority of the students are not sure whether through sharing of pictures in social media sites while abusing drugs has put pressure on others to idolize smoking as indicted in figure 1.

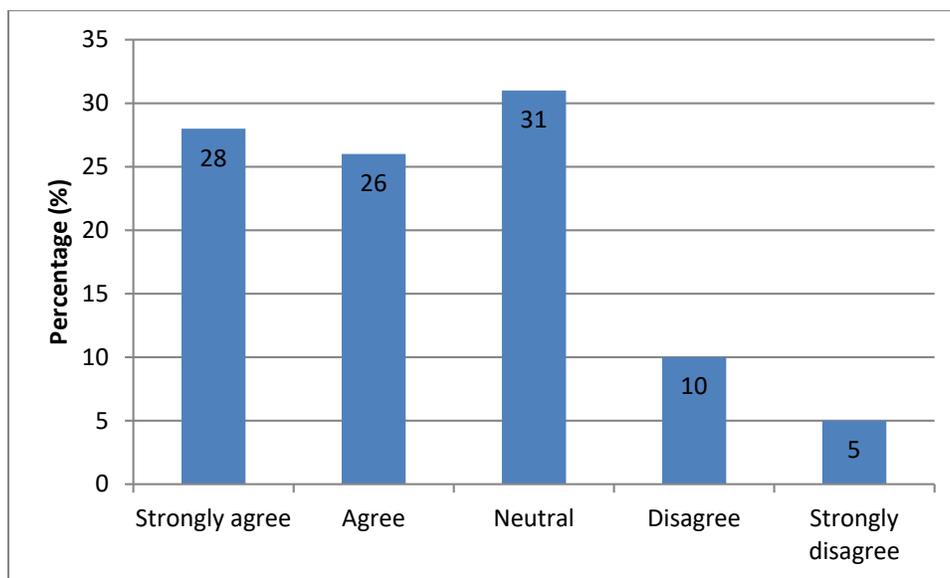


Figure 1: Sharing of pictures when using drug and idolization

Further, about 28% of the respondents strongly agree that sharing of pictures in social media sites while abusing drugs has put pressure on others to idolize smoking. Also 5% of them object and don't believe that just sharing of pictures in social media can ever put pressure on them.

The researcher also established that lack of monitoring of social media sites usage by school authorities has led to creation of pro drug use groups in secondary schools. This was indicated by most of the students agreeing and strongly agreeing on the same as exemplified in the following figure.

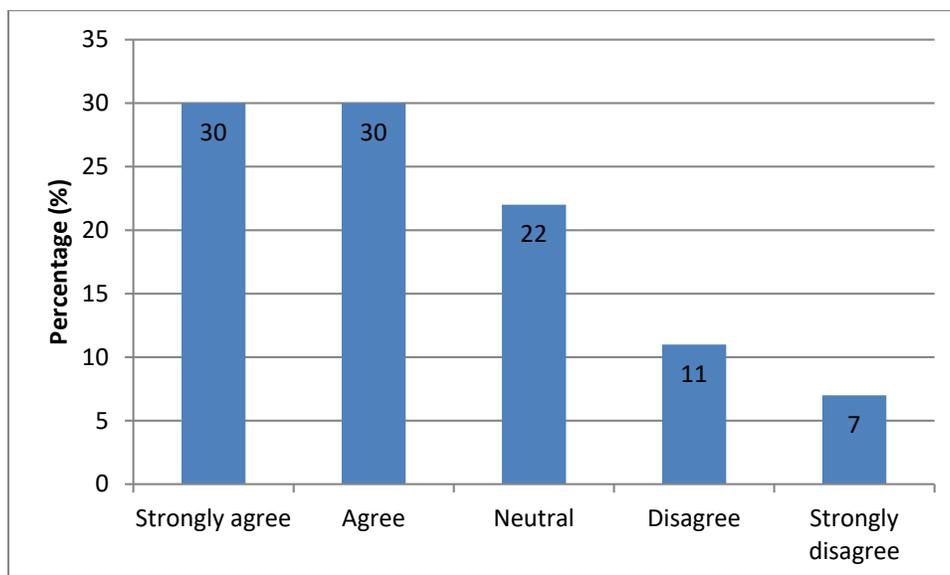


Figure 2: Monitoring of social media by school authorities and drug use

A lower number of respondents (7%) disagreed that lack of monitoring of social media sites usage by school authorities has led to creation of pro drug use groups in secondary schools. The study also sought to find out if lack of monitoring of social media sites usage by security agencies has led to creation of pro drug use groups in secondary schools. The results are indicated in table 5.

Table 5: Monitoring of social media by security agencies and drug use

Response	Frequency	Percentage (%)
Strongly agree	120	32
Agree	102	28
Neutral	82	22
Disagree	42	11
Strongly disagree	24	7
Total	370	100

Majority of the respondents (32% and 28%) agree that lack of monitoring of social media site usages by security agencies has led to creation of pro drug use groups in secondary schools, however some do not agree to these opinions, they object and have a divergent opinions in regard to this.

Although most (30%) of the respondents are not sure if due to fear of intimidation by other students some students actively engage in drug abuse to fit into the social media cliques, a combination of 46 % agree and strongly agree while 16% disagree. This is shown in figure 3.

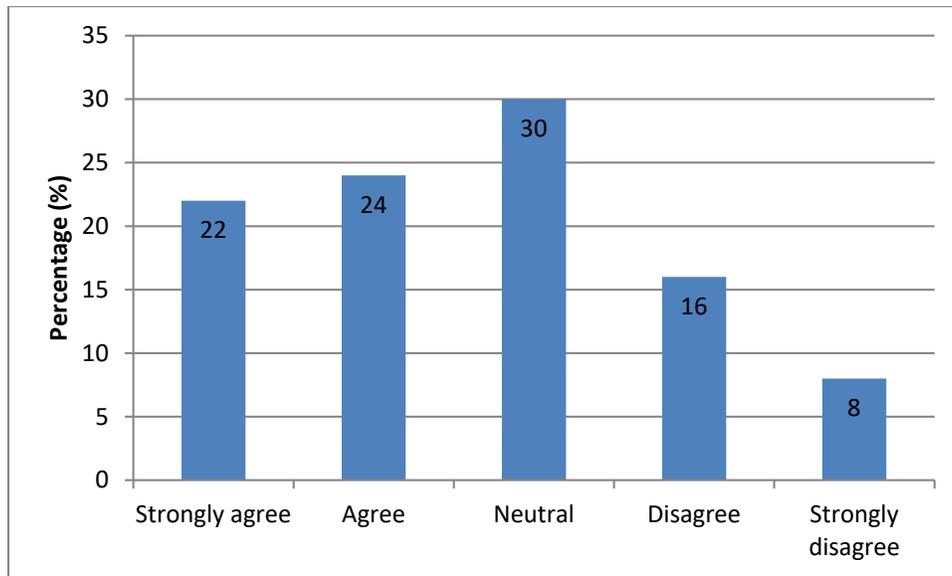


Figure 3: Drug abuse and fitness in social media cliques

In establishing the role of peer pressure in forcing most students to abuse drugs and alcohol, 41% of the respondents strongly agreed that peer pressure played a big role. Those who disagreed were 8% of the respondents as shown in figure 4.

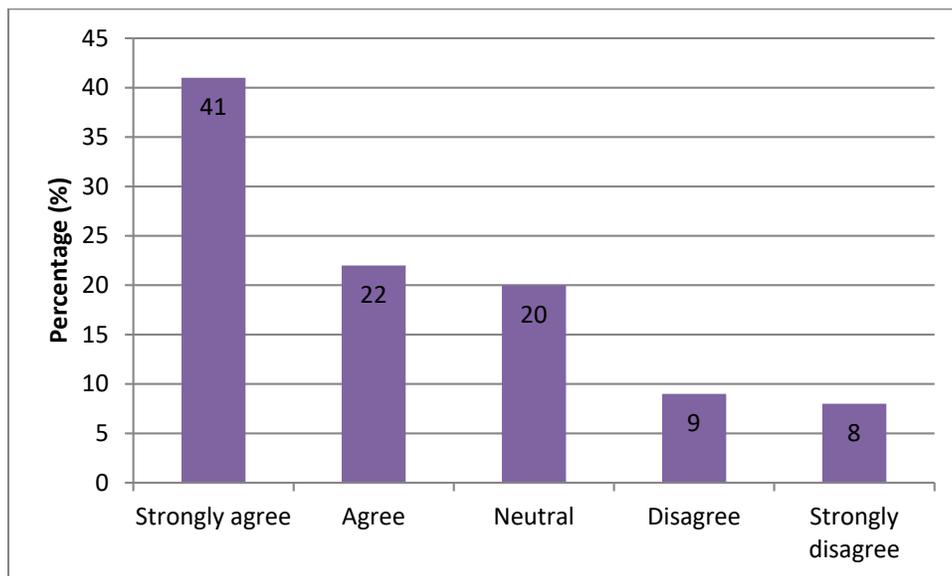


Figure 4: Response on role of peer pressure and drug abuse

The researcher also aimed at finding out the factors that the students consider most important in influencing smoking or drinking. The results obtained were as follows:

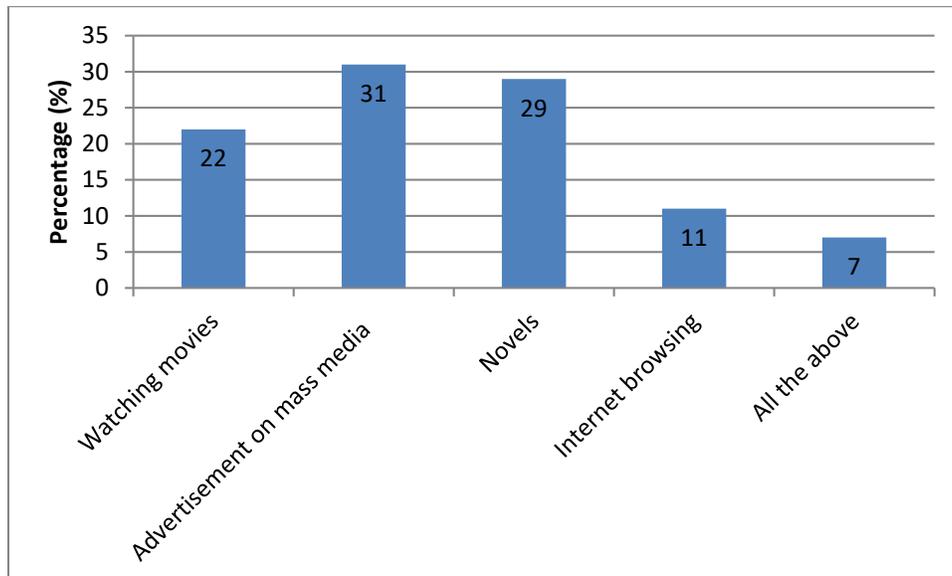


Figure 5: Factors influencing smoking and drinking

Most of the students highly rate advertisement, novels, and watching movies as some of the most factors considered in influencing smoking or/ and drinking among the students. Internet browsing is considered as the list factor in influencing the students. In relation to how often the respondents smoke cigarettes, the results obtained were as follows.

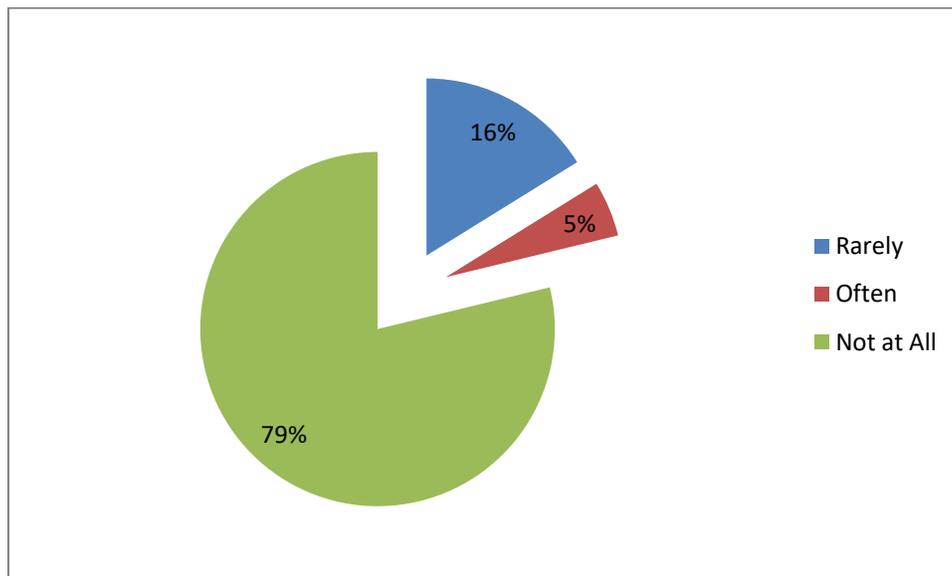


Figure 6: Frequency of smoking cigarettes

From data sampled from the respondents, most of the students do not smoke cigarettes at all, but still there exist a significant number of the students (21%) who smoke cigarettes.

Correlation was done to determine the relationship between mass media and drug abuse and the results are manifested in the following table.

Table 6: Correlation on relationship between mass media and drug abuse

		Mass Media	Drug abuse
Mass media	Pearson Correlation	1	.324**
	Sig. (2-tailed)		.000
	N	100	100
Drug abuse	Pearson Correlation	.324**	1
	Sig. (2-tailed)	.000	
	N	370	370
**. <i>Correlation is significant at the 0.01 level (2-tailed).</i>			

From the correlation (Pearson Correlation -approaching 1 from the positive) of response by the students on exposure to mass media, it depicts drug abuse behavior among the students can intensely be influenced by their exposure to mass media. The positive value .324** of Pearson Correlation implies that the drug abuse among the students in secondary schools heavily relies on their exposure to mass media, as it can be seen from the data collected from the respondents. The low number of students who engage in drug and substance use, clearly and equally reconciles with the number of students exposed to mass media. Ideally it shows how drug addict behave while exposed to mass media contents that promote use of drug.

Through this study, there is a positive response on the effect of media on drug abuse and this ascertains a research done by Durant et al., (1997) who examined the content of tobacco and alcohol use behavior on television. The results showed that a high percentage (26%) of MTV videos portrayed tobacco use. The percentage of alcohol use on MTV was still the highest at 27%, but differences with other networks were not statistically significant. Of note, given the influence of modeling and imitation in young people, videos that portrayed alcohol and tobacco use depicted the lead performer as most often the one observed to be smoking or drinking.

Recommendation

There is need to enhance awareness among parents about the media influence in the psychological development and consequently, the educational outcomes of their children as not the sole responsibility of the government and teachers.

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Relationship between Exposure to Mass Media and Adolescent Students' Irresponsible Sexual Behavior in Secondary Schools

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Abstract

Problem behaviours among secondary school going population world over are of concern to educators, counselors and psychologists and stakeholders. It is a multifaceted and a complex school problem that is manifested in various forms. Problem behavior is of concern because of its potential at the adolescent stage to undermine the achievement of both personal and national developmental goals. It emerges from the several studies that problem behaviors commonly occur in secondary schools. Considering the possible consequences of these behaviors on educational outcomes and socio- economic development of the individual adolescents, it is crucial to have an understanding of the specific occurrence of these behaviors among students in public secondary schools. Although the effects of problem behaviors are apparent as shown by its occurrence, the causes behind it are often abstract and obscure, making it difficult to pin blame on a single source. According to the literature that is available from other countries, mass media is responsible for students' problem behaviors. It is not clear if this factor has any influence on adolescent problem behavior in Kenya. This current study therefore investigated the relationship between exposure to mass media and students' problem behavior (irresponsible sexual behavior) in secondary schools in Bungoma Central Sub- County in Kenya. Many studies have been conducted on the influence of parental factors, peer influence, community influence on adolescents' problem behavior. Influence of exposure to mass media has not been given adequate attention in the academic area. The researcher in the present study filled this gap in knowledge.

Key words: Mass media, Irresponsible sexual behavior, Adolescent students

Introduction

Sexual and reproductive health is part of physical and emotional well being of all human beings. Adolescents globally have unique sexual and reproductive health needs and accompanying vulnerabilities. Many adolescents face sexual health risks of early sexual experiences, sexually transmitted infections including HIV/AIDS, unplanned pregnancies and illegal abortions. These challenges threaten their health and survival.

Youths represent majority of the population (Omolo, 2014). This young population is often good target in social media sites. According to Todd (2009) the young are bombarded with video, shows, advertisements and movies with sexual messages.. With regard to sex, three out of four teenagers say that the social media content make it seem normal for youngsters to engage in sexual relations. The young teens regard the entertainment media as the number one source of information about sexuality and sexual health. Being open about sex and how they talk to their girl friends about it is largely because of what they see and hear (M'maita, (2011). Thus the study of Todd (2009) concluded that mass media targeted adolescents in general in turn making them vulnerable to sexual involvement. The present study focused on mass media and how it has impacted on sexual behavior among secondary school students.

Past studies show that sex is everywhere in the media. The average young TV viewer will see about 14,000 references to sex each year. Teens themselves say that TV as well as movies and other media, are their leading sources of information about sex and sexuality. According to studies by Eysenck, and Nias (2008) of roughly 14,000 references to sex a teen will see on TV each year,

only a small fraction (165) will include any reference to abstinence or delay of sex, birth control, risky pregnancy or sexually transmitted diseases. Some studies Smith, V. (2004) show that repeated exposure to mass media with sexual content may influence teens to have sex earlier. A study of video games found that the few female characters in those games are often highly sexualized, wearing tight revealing clothing and having unrealistically large breasts and distorted small waists (Conway & Vartanian, 2000).

Studies done in the United States (Anderson & Bushman, (2002) have shown that time spent on social media increased by 37% in 2012 compared to 2011. Further Martinez- Pranter and Vandive (2014) point out that the usage of social media has fostered communication among teenagers. This has greatly influenced their indulgence into sexting which promotes unethical sexual behaviours. A research done Bolton et al., (2013) on understanding “generation Y and their use of social media sites in the United States established that, extreme usage of social media sites in the long run contribute to teenagers’ engagement in risky sexual behaviours. Another study by Larkin and Dwyer (2016) on the influence of social media sites and fighting among high school girls showed that circulation of fighting videos online has an influence on the desire of young girls to engage in physical fighting with other teenagers.

The mainstream mass media (television, radio, magazine, movies, music and the internet) provide increasingly portrayals of sexuality. Studies conducted on the relationship between mass media and sexual behavior suggests that the media keep sexuality on public and personal agendas. Media portrayals reinforce a relatively consistent set of sexual and relationship norms, and the media rarely depicts sexually responsible models. The media are an increasingly accessible way for people to learn about and see sexual behavior. The media may be especially important for young people as they are developing their own sexual beliefs and patterns of behavior and as parents and schools remain reluctant to discuss sexual topics. In the United States, young people spend 6 to 7 hours each day on average with some form of media. Many of those televisions are hooked up to cable and a video cassette recorder (VCR) (Brown & Newcomer, 2010). Sexual talks and displays are increasingly frequent and explicit in this mediated world. One content analysis found that sexual content that ranged from flirting to sexual intercourse had increased from slightly more than half of television programs I 1997- 1998 to more than two thirds of the programs in 1999- 2000 season. Depiction of intercourse (suggestive or explicit) occurred in one of every 10 programs. One fifth to one half of music videos depending on the music gene (Country, rock, rap) portray sexuality or eroticism (Brown & Newcomer, 2010)

The internet has increased dramatically the availability of sexually explicit content. The word sex is the most popular search term used on the internet today (Stout & Hillary, 2010). The internet may have both positive and negative effects on sexual health. According to the National Survey of Young People (10- 17 years old) who regularly used the internet, one out of four said she or he had encountered unwanted pornography in the past year, and one out of five had been exposed to unwanted sexual solicitations or approaches (Stout, Hillary, 2010). Despite increasing public concern about the potential risk of early unprotected sexual activity, most of the mass media rarely depict three Cs of responsible sexual behavior: commitment, contraceptives, and consideration of consequences. Although more than half of the couples who engage in sexual intercourse on television are in an established relationship, 1 in 10 are couples who have met only recently; one quarter do not maintain a relationship after having sex (Rubin, 1993). Unwanted pregnancies rarely are shown as the outcome of unprotected sex, and STIs other than HIV/AIDS are almost never discussed (Rubin, 1993). Abortion is never discussed in commercial television and magazines (Hocklong & Linda, 2003).

Two cross- sectional surveys have linked frequent exposure to mass media to sexual intercourse. However, because time order was not clear in these studies, it is plausible to conclude that adolescents who were having sex were also those most interested in sexual content in the media rather than the exposure to sexual media accelerated the adolescents’ initiation of sexual activity. The media are full of sexual information and in some of the different kinds of media the portrayals have grown increasingly frequent and explicit (Haggstron- Nordin, 2005). The most recent study of sexual content on television, for example, found that two thirds of all shows included sexual content. Studies have found that adolescents who were exposed to music videos containing more sexual references were more likely to approve of pre- marital sex than adolescents exposed to randomly selected music videos.

Young men generally report having their first sexual experience earlier than their female counterparts. Surveys in ten Latin American countries found that young men had initiated sexual activities on average one to two years earlier than young women had. An African regional conference reported that most teenage men are not informed about sexuality, safe sex, condoms and other contraceptives. Young men’s attitude towards sex, females, relationships in general often cause negative health and social consequences. Because many cultures associate multiple sexual partners with manhood, young men feel pressurized to engage in sexual behaviors that put them and their partners I at risk. Cultural norms, peer pressure and lack of self confidence may discourage young men from obtaining

reproductive health information and counseling. Earlier King and Stones posited that the nudity and sharing of pornographic materials has been on the rise in Australian schools as a result of the availability of social media channels that young adults are exposed to. The authors further noted that sexual orgies are arranged among friends in the social media hence the rise in immorality among college and middle school students. This study adopted an ethnographic survey, unlike the current study which was correlational in nature.

A recent study by Kiragu (2015) on negative influence of social media on our communities asserted that, the increasing access to smart devices by young teenagers has enhanced their capacity to access sexual materials from the internet share it with their peers through the widely available social network channels. This study however, did not establish the association between the social media usage and sexual practices on secondary school students specifically. A study by Kabiru and Orpinas (2009) found out that most secondary school students within the largest Nairobi informal settlement, Kibra had sexual intercourse at an early age with many confessing of having multiple sexual partners. The study further highlighted that most of these young adults also engage in routine sex trade within the sprawling Kibra informal settlement. From the foregoing, it is evident that sexual practices are prevalent among secondary school students. Similarly studies by Patricia and Ndun'gu (2014) and Omolo (2014) that focused on immorality among children as young as 15 years old in estates such as Karen and Runda respectively found out that youths are engaged in drug abuse and sexual orgies

As exposed by most of the research findings, children from rich families often communicate with other youths through social media and organize parties without the knowledge of their parents. In these parties the minors are known to engage in sex orgies and rampant drug abuse. The fact that the content is readily available in the internet, it is assumed that it is available for the youths. The youths are likely to observe and emulate what they see. The majority of the reviewed studies failed to address the influence of mass media on students' sexual behavior in depth. The current study sought to fill the gaps and contributed to the body of knowledge. In another study in Kenya, the author found that girls who are more biologically developed were more likely to seek out sexual images and information in the media and were likely to interpret media content as sexual and appropriate. From a report published on the Standard News Paper, Kenya, in December 2009, teens have become more exposed to sexual material in mass media, which has encouraged their escapades. "They receive sexual orientation through the media and not through sex education programs in schools which they resent" said Koech. Sexually charged material has become available and teens can access the internet through unsupervised cyber cafes or their mobile phones.

In Kenya a study was conducted on the influence of mass media on youth's sexual behaviors. It aimed at establishing the influence of mass media on the expression of sexual behavior among high school adolescents in Nairobi Province. The findings were that magazines are popular media that provide sexual information from the television. Information accessed through the media by adolescents included pornographic pictures and texts, dressing and fashion, sex styles and contraceptive use. The study found that half of the respondents (50.7%) had experienced sexual intercourse, 63% did not use condom during their first sexual intercourse, 54% of the respondents had had more than one sexual partner in the last one year; 55% of adolescents were influenced into sexual act by pornographic materials from movies. The frequency of material access was found to determine the number of sexual partners among the school going adolescents

From the above studies, it is evident that mass media is directly related to adolescent students irresponsible sexual behaviors. A lot has to be done in terms of programs to educate young men and women about reproductive health. The programs should include decision making and life planning skills that combine sexual health with a broad range of general health services. For instance, opportunities for socio-economic advancement may be coupled with knowledge or skills in reproductive health. Sports can be used as an entry point to raise sexual and reproductive health issues and promote healthy life styles (Kimani, 2014). Through youth's sports association, attitudes of youths can be changed to positive sex practices. Outreach sites such as discos, video arcades, the market place and local fairs are all places to reach young men and women with reproductive health information, condoms and services. Peer programs can help young men reach their peers with information. As peer influences are an important determinant of early sexual initiation, peer educators can provide young men with opportunities to examine the myths that have shaped their attitudes about themselves and about women.

There is abundant media attention focused on all matters related to pregnancy and abortion among youths, much of it is contradictory. Young men are taught as part of the official school curriculum that sexual intercourse and induced abortion leads to a wide range of chronic health and social problems. Young people who procure abortion often end up leading depressed, frustrated, lonely lives which may make them become drug addicts. Despite an official academic curriculum that vigorously condemns abortion (pre-marital sex

and pregnancy), unwanted pregnancy and abortion are prevalent among school going youths in Kenya. The researcher therefore sought to establish the relationship between mass media and irresponsible sexual behavior among adolescents in secondary schools.

Methodology

The study adopted descriptive survey research design. According to Kothari (2008) descriptive survey at times is the only means through which views, opinions, attitudes, and suggestions for improvement of educational practices and other data can be collected. The choice of descriptive survey was made based on the fact that in the present study, the researcher used a sample to represent the whole population and described the current characteristics of the population. No variables were manipulated to establish the influence of mass media on problem behavior. The researcher also used questionnaires and interview which are characteristic of a survey design to adequately get information from a sample in order to describe the population under study. This involved self report on opinion and attitudes of respondents on the influence of mass media on problem behavior among adolescents. This was in line with Kumar (2011) who observed that survey research design is the most appropriate for obtaining self- reported opinions, attitudes, beliefs and values. The study was conducted in Bungoma Central Sub- County in Kenya. This is one of the eight Sub- Counties in Bungoma County. The Sub- County was purposively selected because it has many public secondary schools which are a mixture of girl's only schools and boy's only schools as well as mixed schools. This was essential for comparison purposes.

The target population of the study was 40,000 students in all public secondary school in the Sub- County. A considerable high proportion of problem behavior reported in the Kenyan school system occurs at secondary school level, hence the choice of secondary school students as part of the study population (Makabila, 2010). The teacher counselors were selected because they handle problem behaviors of students. The Deputy Principals were selected because they are in charge of discipline. In this study, both probability and non-probability sampling was used to select study samples. Non probability was used to select Bungoma Central Sub-County. Purposive sampling was used to select the 10 schools and form two class of students enrolled in public secondary schools. To select the specific sample from the population of form twos who took part in the study, simple random sampling was used to select the student respondents. The deputy principals and teacher counselors were selected proportionately to the 10 selected schools for the study. Thus the study selected 10 deputy principals and 10 teacher counselors for the study.

The sample size of students in form two was determined using a formula developed by Krejcie and Morgan (1970) which assumes:

$$S = \frac{x^2 NP (1-P)}{1 - d^2 (N-1) + x^2 P (1-P)}$$

Where { } { } { }

S = required sample size

X = the table value of chi- square for 1 degree of freedom at the desired confidence level.

For a significance level of @ =0.5, x =1.96

N = The population size = 10,000

P = The population proportion (assumed to be 100 since this would provide the maximum sample size) = the degree of accuracy expressed as proportion (0.5)

Using this formula, 370 students in form two were obtained where the researcher used simple random sampling to obtain 37 student respondents per school. Deputy Principals and teacher counselors (1) were selected proportionately to the sampled schools. According to Mcneil (1990) data in a large study intended for statistical analysis should be collected from at least a sample of 10% of the population. This view was taken into consideration in the selection of the sample for schools, deputy principals and teacher counselors. The qualitative and quantitative data was extracted from students' and deputy principals' questionnaires and presented as follows:

Results

As the managers of discipline in the schools, deputy principals were core in this study. The researcher sought to establish from them whether there is presence of irresponsible sexual behavior in the schools. Their responses were indicated in table 1.

Table 1: Existence of irresponsible sexual behavior

Type of Gender	Frequency	Percentage (%)
Yes	9	90
No	1	10
Total	10	100

Most of the respondents agree that they have experienced and witnessed irresponsible sexual behavior in their schools while just only 10% of the responds who do not agree to this. In terms of how often the irresponsible sexual behaviors are witnessed in the schools, table 2 was a summary of the same.

Table 2: Manifestation of the irresponsible sexual behavior

Type of Gender	Frequency	Percentage (%)
Never	0	0
Once in a while	2	20
Pretty often	3	30
Very	5	50
Total	10	100

The results show that 50% of the interviewed deputy principals believe the irresponsible sexual behaviour is so often manifested in the schools they are administering. Besides, collectively 100% of the respondents agree that there is existence of such behaviors in their school. Nevertheless, none of the deputy teachers seem to be having a different persecution. In terms of dealing with this kind of behavior, the three main ways which were dominant were guidance and counseling, suspension and role modeling.

The researcher found out from the students that availability of sexual content in social media sites has increased sexual practices among secondary school students as depicted in figure 1.

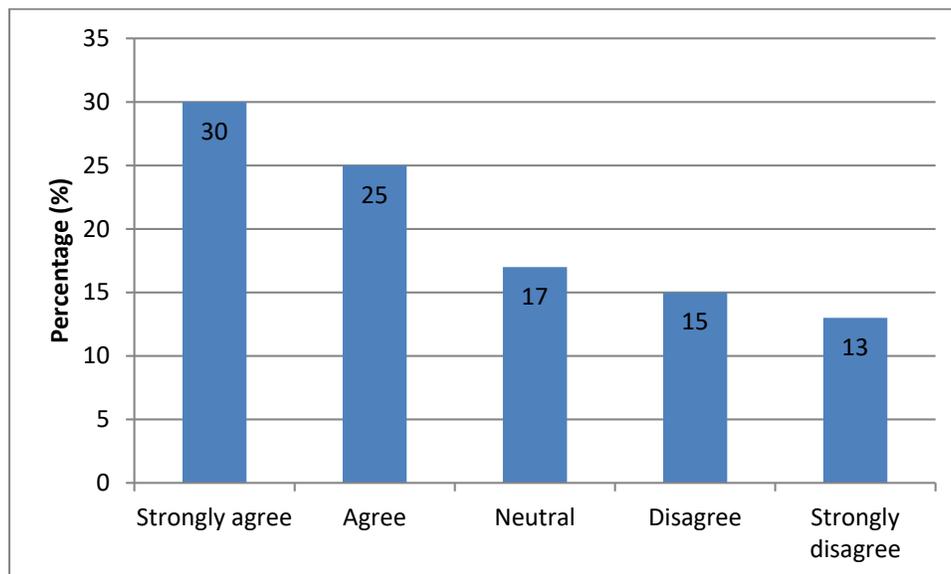


Figure 1: Availability of sexual content in social media sites and sexual practices

Form the figure, majority (represented by 30%) strongly agree that sexual content in social media sites has increased sexual practices among secondary school students. 28% of the respondents however do not agree to this. As to whether most secondary students adopt nudity habits when they see them being glorified in social media sites, majority of the students either strongly agreed or agreed to this fact. This can be exemplified in table 3.

Table 3: Adoption of nudity habits from social media sites

Response	Frequency	Percentage (%)
Strongly agree	120	32
Agree	102	28
Neutral	82	22
Disagree	42	11
Strongly disagree	24	7
Total	370	100

As much as majority (represented by 60%) agree that students adopt nudity habits when they see them being glorified in social media sites, 18% of the respondents do not completely agree to this.

It was also found out by the researcher that most secondary school students are adopting sexual habits such as multiple sexual partners which are glorified in social media sites. A large percentage of the respondents (51%) agree that school students are adopting sexual habits such as multiple sexual partners which are glorified in social media sites. Nevertheless, some of the respondents (16%) do not agree to this.

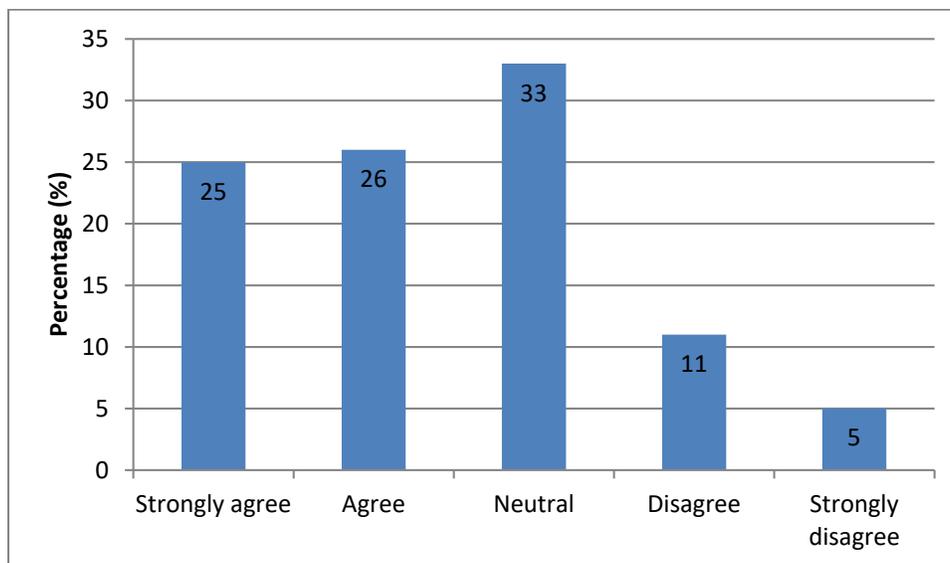


Figure 2: Response on whether social media influences sexual habits

When students were asked if they post nude photos online, many of the secondary school girls have been increasingly posting nude photos in a bid to get online acceptance as indicated in table 4.

Table 4: Posting of nude photos online

Response	Frequency	Percentage (%)
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Strongly agree	82	22
Agree	115	31
Neutral	107	29
Disagree	40	11
Strongly disagree	26	7
Total	370	100

A large percentage of the respondents (53%) agree that secondary school girls have been increasingly posting nude photos in a bid to get online acceptance. Nonetheless, some of the respondents (18%) do not agree to this. In fact, it was established that most secondary school students adopt nudity displayed in social media sites in order to achieve social acceptance among other students as portrayed in figure 3.

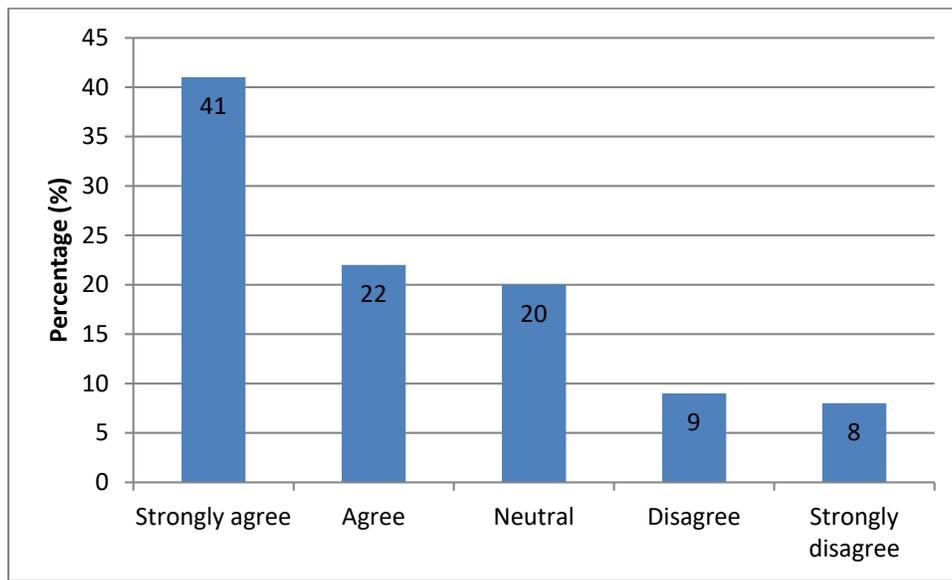


Figure 3: Social acceptance and posting of nude photos

A large percentage of the respondents (63%) agree that secondary school students adopt nudity displayed in social media sites in order to achieve social acceptance among other students. Nonetheless, some of the respondents (17%) do not agree to this. In regard to respondents' response on whether they have a friend whom they regard as a sexual partner, A large percentage of the respondents (78%) agree that they indeed have friends whom they regard as sexual partners. Nonetheless, some of the respondents (22%) do not have such friends. This is shown in figure 4.

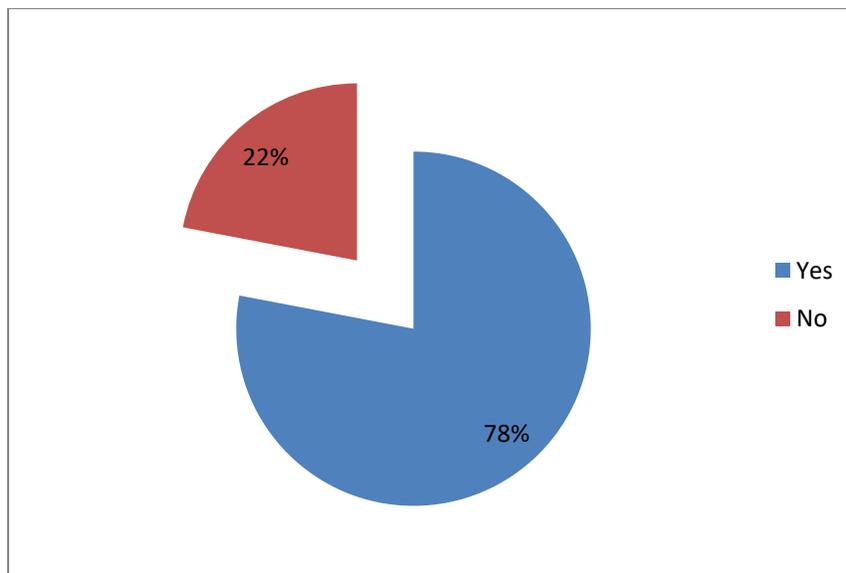


Figure 4: Exposure to sexual partners

For those respondents who reported that they have friends whom they regard to as sexual partners, majority of them admitted of being taken to a movie or video. Though a large percentage of the respondents (73%) agree that they indeed they have watched movies with the friend they regard as sexual partner, some of the respondents (27%) have never watched movies. Respondents that reported of watching a movie noted Nigerian movies (hollywood), bollywood and action movies as being their preferred movies. In addition, 72% of the respondents admitted that their partners insisted on having sex with them after watching the movies. Even so, some of the respondents (28%) have never experienced that.

The researcher further tried to find out the number of sex partners the respondents have had in the last three years and results are as indicated in table 5.

Table 5: Sex partners

Response	Frequency	Percentage (%)
1	150	41
2	120	32
3	60	16
4 and above	10	3
None	30	8
Total	370	100

The majority of the respondents have had 1 sex partner in the last 3 years, followed with those having two sex partners and finally 3 and 4 respectively. Nevertheless, there exist those that have never had any sex partner in the last 3 years. Further, about the respondents' source of sex partner, most of them reported of getting them through mass media such as face book or pen pals in magazines. Majority of the respondents' source of sex partners was through mass media. However, a few (41%) did not get their partners through mass media. It was also established by the researcher that only 11% of the respondents have ever been accused of any sexual offence as shown in figure 5.

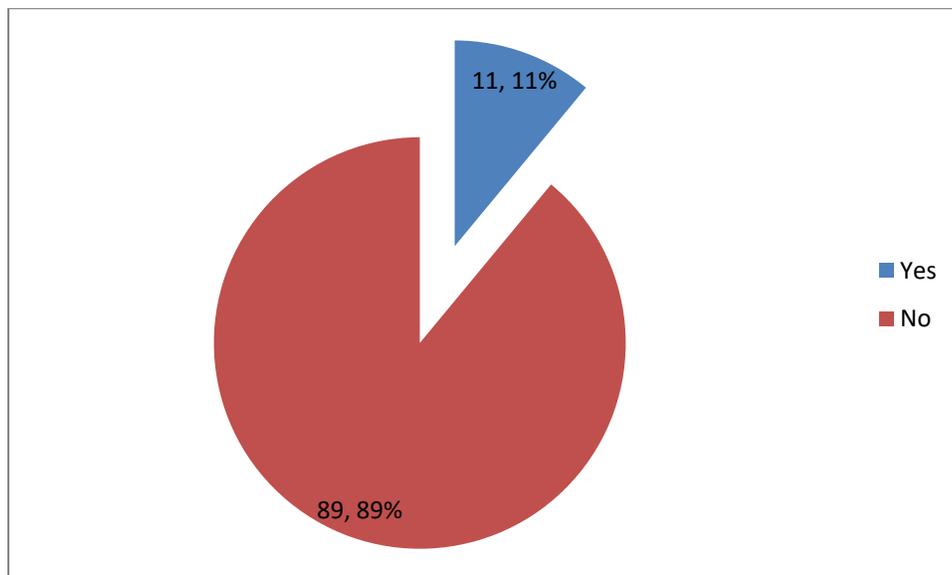


Figure 6: Accuse of sexual offence

It can be depicted from the figure that most (about 89%) of the respondents have never been accused of the sexual offenses whilst have been accused of the sexual offenses committed. The majority of the respondents (54%) support practices such as sex before marriages in adolescents, however some with almost an equal percentage (46%) do not accept and support this as shown in table 6.

Table 6: Practice of sex before marriage

Response	Frequency	Percentage (%)
Yes	200	54
No	170	46
Total	370	100

The researcher also sought to find out whether respondents felt that secondary school students be allowed to have mobile phones in school. Majority of the respondents (73%) strongly agree that it is worth it to allow mobile phones in school. Nevertheless, there are those students who believe that it is not important at all to have phone in school. This is exemplified in figure 7.

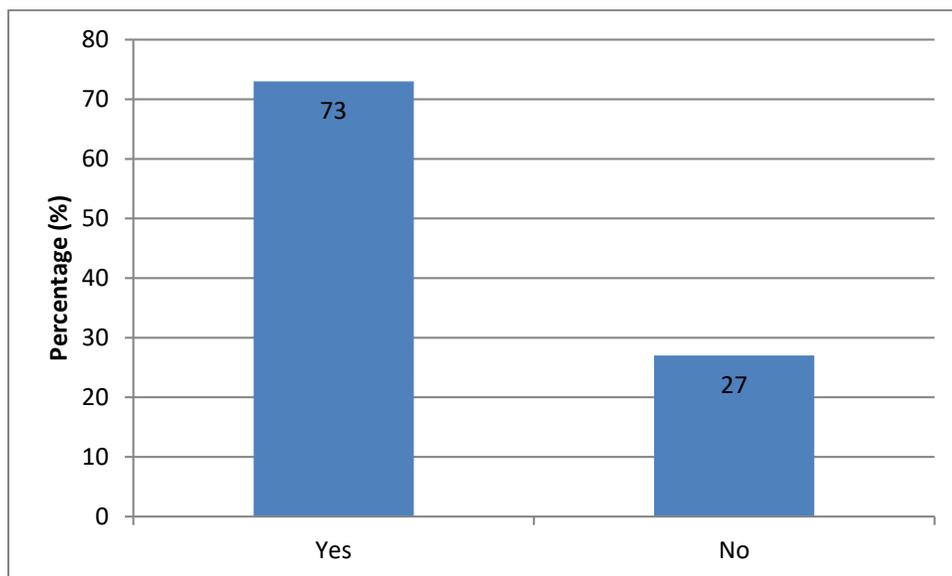


Figure 7: Feeling on ownership of a phone in school

The respondents who were of the opinion of having phones noted that the phones will be used for research and Communication.

Further, it was also noted that most of the high school students (81%) prefer to be given condoms while only 19% are of the contrary opinion and believe that it is not important at all to have condoms given to students. Those who were of the opinion of condoms being given mentioned that they are for protection while those of the contrary opinion noted that it promotes immorality.

Finally, the researcher rated the following as sources of sexual information: Parents, Peers/friends, Television/video, Internet pictures, Movies, Mobile phones and Theatres and the results were as shown in table 7.

Table 7: Sources of sexual information

Response	Frequency	Percentage (%)
Parents	10	3
Peers /friends	100	27
Television/ video	80	22
Internet pictures	80	22
Movies	20	5
Mobile phones	60	16
Theatres	20	5
Total	370	100

From the table, it was established that the leading sources of sexual information were peers/friends, television/video and internet pictures. It was also reported that 57% of the respondents were positive that sexual information from their favorite mass media source makes them desire to have sex? However 43% percent of the respondents don't agree that sexual information can make them have desire for sex. Those respondents who were of the opinion noted that by watching pornographic most students feel it's worth to try and put what they have seen into practical.

Most of the students (62%) agree that they have at some point watched pornographic movies. Out of the sampled population it is only 30% of the students who do disagree to the view of the majority. Respondent's response on how frequent they use the following media to access sexual information.

Correlation was done to determine the relationship between mass media and sexual responsibility and the results are manifested in table 8.

Table 8: Correlation of relationship between mass media and sexual responsibility

		Mass Media	Sexual Irresponsibility
Mass media	Pearson Correlation	1	.262**
	Sig. (2-tailed)		.000
	N	100	100
Sexual Irresponsibility	Pearson Correlation	.262**	1
	Sig. (2-tailed)	.000	
	N	370	370

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

From the correlation (Pearson Correlation -approaching 1 from the positive) of response by the students on exposure to mass media and adolescent students' Sexual Irresponsibility in secondary schools in Bungoma Central Sub-County, Bungoma County, Kenya, it depicts Sexual Irresponsibility behavior among the students can intensely be influenced by their exposure to mass media. The positive value .262** of Pearson Correlation implies that the Sexual Irresponsibility behavior among the students in secondary schools heavily relies on their exposure to mass media, as it can be seen from the data collected from the respondents.

The number of students as it can be seen from the respondents who engage in Sexual Irresponsibility behavior clearly and equally bring together with the number of students exposed to mass media. This clearly shows how students can engage in sexual irresponsibility having exposed to mass media contents. It therefore worth to conclude that mass media has a great impact on the sexual irresponsibility of the students. Sexual being part of physical and emotional well-being of all human beings, it seems like indeed the mass media impacts negatively on the emotions of the students thus making them engage in sexual irresponsibility.

The research (*from the positive correlation of value .262***) ascertains the research done by Todd (2009), that the young are bombarded with video, shows, advertisements and movies with sexual messages. With regard to sex, three out of four teenagers say that the social media content make it seem normal for youngsters to engage in sexual relations.

Recommendation

The schools should organize sessions for parents and educate them on effective ways of regulating the students from exposure to mass media. Besides too the school should organize sessions for students and educate the on the effect of use of mass media for bad content access like pornographies.

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Parent's Involvement Towards the Studies of Their Learners

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Abstract- *Parents are one of the essential elements to a child's achievements. In accordance to the studies of development of a child's personality, the child-parent relationship has a major influence on most aspects of child's development. The study is titled "Parents Involvement towards the Studies of their Learners" this is on Quantitative design; it aims to know the level of parent's involvement and relationship between their students' performance in school. The respondent of this study was all Grade 12 students in Jagobiao National High School. Result indicated that student's performance has No Significant Relationship with parent's involvement. In addition, a learner Co-curricular activity has shown a significant relationship with parent's involvement. Moreover learners Extra-curricular activities also showed a significant relationship. Other factors, such as the number of respondents, are addressed for suggestion for the future researchers.*

Index Terms- *Parent's Attitude, Parents Involvement, Students Performance, Co-Curricular Activities, Extra-Curricular Activities*

I. INTRODUCTION

Parents are one of the essential elements to a child's achievements. In accordance to the studies of development of child's personality, the child-parent relationship has a major influence on most aspects of child development. An optimal parenting skills and behavior of a parent to their children may lead to a positive impact on child's self-esteem, school achievement, cognitive development and behavior. In different circumstances when parental attitude have poor to constructive method of a child development, the impact of its behavior may lead to negative effect of their child's development. Therefore, parent's attitude really matters in their child's education.

Bordhan (2014) stated that the parental attitude can be negative and positive, negative attitudes of a parent towards to their child's education and schooling can prevent their children from getting education. Less parental support in school work, low level of motivation and poor self-esteem of children are the indicators of having negative parental attitude. Thus, it will lead their children to have a poor educational performance. On the other hand positive attitude of the parents can be beneficial to their children in many cases and can be reflected in improvement of their children academic performance. Parent's involvement and attitude really matter in child's learning.

Likewise Hesseinpour, Yazdani, and Yarahmadi (2015), concluded that most of the parents are not involved in their child's learning programs. Thus, a parent who does not take part to their child's learning is not responsible enough in having a positive attitudes and high level of involvement in the child's learning. Which proved that parent's involvement and attitude really significant in their child's learning meaning the more they get involved in, the more positive attitude they have toward their child's learning.

Borak, Kawser & Sharmin (2016), said that parent's attitude has an important role on student's academic activities. Eventually, this current study intends to assess the relation of parent's involvement towards the student's academic performance, correlate parent's attitudes with student academic performance.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Parents have an essential role in making their child's academic performance better but they have different ways in promoting the academic performance of their child (Ding, 2014). A healthy and effective way for child's development is when parents have been involved since the early education of their children (Mahamood, Tapsir, Saat, Ahmad, & Wahad, 2012). Furthermore, students perform better in academic work and extra curriculum activities if parents are involved in their child's education, student's background and income level of parents. Academic success of a student can be increase if parents involvement is present (Mante, Awareh & Kumea, 2016; Ogunsola, Osulale & Ojo, 2004). Home learning activities are the learning process of students which parents should be involved (Mahamood, Tapsir, Saat, Ahmad, & Wahad, 2012) to enhance the academic outcomes of children (Jaiswal & Choudhuri, 2017). A study shows (Tapor & Shelton, 2010) Students who get higher level of academic performance

most likely have parents that are involved in their studies. On the other hand, students who have lesser level of performance have less performance in academic.

A study confirmed that the perception of parents focusing on the learning process has a positive and negative effect on academic. The positive effects are: self-concept, humbleness, performs better and organizes, while the negative effects are: work avoidance, orientation and self-defeating ego orientation (Peixoto & Cavalho, 2009). Parents should give motivation and confidence to their learners by being involved in the adolescent's life, supporting and providing assistance when it comes to school (Schmuck, 2011) thus, this result in bridging the space between parents and school (Kaukab, 2016). Zehadani, Yazdani, Bagheri & Nabebeie (2016) Identifying child's talent and guiding them can have a big impact on the student's achievement through a mutual understanding and a close relationship between parents and students. Various studies have shown that successful children who came from sustaining, wholesome relationship are successful and have accomplished things in life (Noah, Aromolaran & Benson, 2015). As mentioned by Zahedani, Yazdani, Bagheri & Nabebeie (2016) children are more influence by their family.

Physical and mental healths are factors in influencing the correct and balance relationship between parents and their children (Zahedani, Yazdani, Bagheri & Nabebeie 2016). Family environment is also a factor that supports the learning capacity of students (Kashaku, Dibra & Priku, 2014) they also revealed that financial investments of parents increase the learning resources of children. Improving the child's academic performance varies in which parents, adult family members and siblings help to contribute to improve the academic performance (Chohan & Khan, 2010) motivations and home literary practices should be implemented in families in order for children to have great results in academic (Hosseinsppur, Sherkatolabbasi & Yarahmadi, 2015). In addition, a key of transforming students approach has been identified as student engagement which seeks in leading success (Wara, Aloka, & Odongo, 2018). The attitude of parents are strongly molded based on their background and environment (Avvisati, Besbas & Guyon, 2010) thus, they try to influence the learners in order for them to follow (McIntosh, 2008). Chandramuki, & Vrandra (2012) shows that family attitude contributes in forecasting the child's future. A study indicated that family characteristics (e.g. parents' educational level, parents' social economic status, family size, family structure, the place of the children within the family) can be factors in achieving academic success (Porumbu & Necroi, 2013) furthermore, helping and guiding their children are important factors in the child's success (McIntosh, 2008). In fact, environmental, social and economic factors greatly affect the lives of the students (Mante, Awareh & Kumea, 2016).

However, it has been noticed that parents ignore the physical health of their child by putting a lot of emphasis on learning (Kaukab, 2016). As stated on a law, when parents do not succeed in being part of their children's education, it is considered as parental negligence (Oundo, 2014). Study shows that authoritative parenting can be cause in low academic performance, creating negative consequences for the academic achievement of students (Borak, Kawser, & Sharmin 2016). On the other hand, study shows that parents are willing to make sacrifices for their child's education. It also shows that parents have high expectation on the academic performance of their children (Mahamood, Tapsir, Saat, Ahmad, & Wahad, 2012).

Adolescents who have positive and esteemed attitude on school has supportive parents and had less home stress (Schmuck, 2011). A study shows that parents who support their child's academic performance have a higher chance in pursuing higher education (Oundo, Poipoi & Were, 2014). In addition, when students are satisfied by the way they are living at home; they mostly end up becoming better in school life (Schmuck, 2011).

Therefore, parents have a great impact in a student's academic performance. Students perform better when parents show that they care about the studies of their children.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

The researchers made an effort in presenting the data collected through a table.

The data were collected, appropriately analyzed and keenly interpreted on the basis of the respondents' answer.

Table 1
Students Performance in terms of Academic Activities

Content	Weighted Mean	Interpretation
1. I do my school activities every time my teachers give us.	3.55	Agree
2. When our teachers give us a group performance I make sure to do my part.	3.90	Agree
3. My attitude affects my performance in school.	3.66	Agree
4. I pass my project on time.	3.34	Agree
5. I do my best to make my academic performance better.	3.82	Agree
Overall Weighted Mean	6.65	Agree

Legend: Strongly Agree (5.00-4.01), Agree (4.00-3.26), Neutral (3.25-2.51), Disagree (2.50-1.76), Strongly Disagree (1.75-1.00) N=92

The table above shows the weighted mean of **student's performance in terms in their academic activities**. In terms of content, the statement "I do my school activities every time my teachers give to us" has 3.55 weighted mean and interpreted as agree. It indicates

that they are doing the entire task that teachers give to them on time. The statement “When our teachers give us a group performance I make sure to do my part” has 3.90 weighted mean which interpreted as agree. It shows that every time teachers give a group performance, practically students do their part. Along with the statement “My attitude affects my performance in school”, has 3.66 weighted mean interpreted as agree as well. Point out that when the students possess the attitudes of having good and bad performance, it will affect in their performance in school on how they will handle their attitude. Furthermore, the statement “I pass my project on time” evinces that students pass their project on the deadline period. Together with the statement “I do my best to make my academic performance better”, has 3.82 which interpreted as agree. The statement implies that students do all their most excellent performance in order to them to have a better academic attainment. The overall weighted mean of students’ academic performance has 6.65 which interpreted as agree, which indicates that students do their task well.

Table 2
Students Performance in terms of Co-curricular Activities

Content	Weighted Mean	Interpretation
1. I like to participate on quiz bees.	2.55	Neutral
2. I like to join Math Sayaw/Math Jingle contest and other contests in other subjects.	3.40	Agree
3. I like to join poem making essays and other literary contest in school.	2.79	Neutral
4. I like to participate in Science Quiz and other Quiz Competition.	2.48	Neutral
5. I like to participate in answering Math, Science, Social Studies and other Trivia Contest.	2.49	Neutral
Overall Weighted Mean	2.73	Neutral

Legend: Strongly Agree (5.00-4.01), Agree (4.00-3.26), Neutral (3.25-2.51), Disagree (2.50-1.76), Strongly Disagree (1.75-1.00) N=92

The table above shows the weighted mean of **student’s co-curricular activities in school**. In terms of content, the statement “I like to join Math Sayaw/Math Jingle contest and other contests in other subjects” got the highest weighted men which 3.40 and solely interpreted as agree. Evince that students like to participate in terms in their academic performance like joining contest. The entire statement of student’s performance in their co-curricular activities interpreted as neutral. This implies that there are several students that have less participation on joining their other academic contest in school. It shown above that the overall weighted mean of student’s co-curricular activities has 2.73 which interpreted neutral. Thereby, students depend on what kind of activity they will join in.

Table 3
Student’s Performance in terms of Extra-curricular Activities.

Content	Weighted Mean	Interpretation
1. I participate in school clubs.	2.78	Neutral
2. I join sports team in school.	2.82	Neutral
3. I sleep late to finish my club activities.	2.61	Neutral
4. I am present on our club meetings.	2.59	Neutral
5. I can manage between studying and being part of the school club.	2.70	Neutral
Overall Weighted Mean	2.68	Neutral

Legend: Strongly Agree (5.00-4.01), Agree (4.00-3.26), Neutral (3.25-2.51), Disagree (2.50-1.76), Strongly Disagree (1.75-1.00) N=92

It clearly shown above that the **students extra-curricular activities** weighted mean has 2.68 and it generally interpreted as neutral. The table above reveals that student’s join extra-curricular activities for the reason that it only depends on how they manage to make time allotment in school and other activities they perform whether it could affect their studies or not.

Table 4
Parents Involvement in terms of Learners Academic Performance

Content	Weighted Mean	Interpretation
1. My Parents have high expectations of my grade.	3.70	Agree
2. My Parents support me in my academic performance.	3.79	Agree
3. My Parents remind me of my assignments.	2.76	Neutral
4. My Parents help me to do my academic performance when they know I have difficulties of it.	2.84	Neutral
5. My Parents give me pieces of advice about how I will work my academic performance.	3.25	Neutral
Overall Weighted Mean	3.65	Agree

Legend: Strongly Agree (5.00-4.01), Agree (4.00-3.26), Neutral (3.25-2.51), Disagree (2.50-1.76), Strongly Disagree (1.75-1.00) N=92

In terms of content, the statement “My Parents have high expectation on my grade” has a weighted mean of 3.70 that tells under the interpretation of agree. This means that the students agree that the parents have high expectation when it comes to grade related. Together with the statement “My Parents supports me in my academic performance has a weighted mean of 3.79 in which it falls under the interpretation of agree. This indicates that the students` parents have supported their learners in academic performance. As well as to the statement “My Parents give me a piece of advice about how I will work my academic performance” has a weighted mean of 3.25 that belongs to neutral. This means that the learner’s parents sometimes give them advice on how to work on their academic performances. Generally, the weighted mean has 3.65 which interpreted as agree. Evince that parents give vital support in their student’s academic performance.

Table 5
Parent’s Involvement in terms of Learner’s Co-curricular Activities

Content	Weighted Mean	Interpretation
1. My Parents are supportive of me in participating quiz bees.	2.86	Neutral
2. My Parents encourage me to participate on literature contest like poems & essays.	2.61	Neutral
3. My Parents inspire me in making a poster.	2.61	Neutral
4. My Parents help me study when I join school academic contest.	2.42	Neutral
5. My Parents boost my confidence in joining school academic contest.	2.74	Neutral
Overall Weighted Mean	2.65	Neutral

Legend: Strongly Agree (5.00-4.01), Agree (4.00-3.26), Neutral (3.25-2.51), Disagree (2.50-1.76), Strongly Disagree (1.75-1.00) N=92

The table above shows that the statement “My Parents are supportive of me in participating quiz bees” has a weighted mean of 2.86 that belongs under the interpretation of neutral. This means that parents are unsupportive to their child when it comes to quiz bees. The statement “My Parents inspire me in making in making a poster” has a weighted mean 2.61 and interpreted as neutral. It means that the parents do not inspire nor inspire their children in making posters. Furthermore, the statement “My Parent’s boost my confidence in joining school academic contest” that has weighted mean of 2.74, which interpreted as neutral. It means that a parent does not boost their child’s confidence in joining academic contest.

Table 6
Parent’s Involvement in terms of Learner’s Extra-curricular Activities

Content	Weighted Mean	Interpretation
1. My Parents are always there to watch me on my stage performance.	2.24	Neutral
2. My Parents are very supportive to my extra-curricular activities like joining sports or school organization.	3.35	Agree
3. When I have a bad time balancing my studies and school clubs, my parents are there to help me.	2.78	Neutral
4. When it comes to my school gathering for my school performance, my parents are there.	2.71	Neutral
5. My parents encourage me to perform better in school.	2.45	Neutral
Overall Weighted Mean	2.9	Neutral

Legend: Strongly Agree (5.00-4.01), Agree (4.00-3.26), Neutral (3.25-2.51), Disagree (2.50-1.76), Strongly Disagree (1.75-1.00) N=92

In terms of content, the statement “My Parents are always there to watch me on my stage performance” has a weighted mean of 2.24 that falls under the interpretation neutral. This means that parents are sometimes present in a child’s stage performance. The statement “When I have a bad time balancing my studies and school clubs, my parents are there to help me” has a weighted mean of 2.78 that is interpreted as neutral. This means that parents sometimes help their learners in balancing their studies and school clubs. Furthermore, the statement “My Parents encourage me to perform better in school” has a weighted mean of 2.45 and falls under the interpretation of neutral. This means that parents could not always encourage their children to perform better in school.

Table 7
Parent’s Involvement and Areas of Learning of the Learners

Factors	X ²	Df	X ² (0.5)	Decision	Interpretation
Academic Task & Parent's Involvement	12.11	6	12.6	Failed to Reject	Not Significant
Learners Co-curricular & Parents Involvement	22.86	4	9.49	Reject	Significant
Learners Extra-Curricular Performance & Parents Involvement	20.97	6	12.6	Reject	Significant

The table above shows the value of computed chi-square in terms in student's academic task and their parent's involvement. It shows above the computed value of 12.1123 and a critical value of 12.6. Thus, the decision is failed to reject. There is no significant relationship between the academic task and parent's involvement towards their learners. Factors that influence the academic achievement of students traced back to how parents motivate their learners (Ogunsola, Osyolate & Ojo, 2016). When parents attitude is contrary to what student's need in their studies it absolutely adverse to student's performance in school.

The table above shows a computed value of 22.86 and a critical value of 9.49. The decision is to reject the hypothesis. This indicates that there is a significant relationship between the learners co-curricular and parent involvement. In other words, parent's involvement in their learner's co-curricular activities in school would lead to positive outcomes in students learning. Zanedani, Tazdani & Bagneri (2016), indicates that parental involvement and warmth in their child's learning are significant predictors for academic achievement. Furthermore the study of Chowa, Masa and Tucker (2013), implies that the parental involvement in a child's education is consistently found to be positively associated in a child's academic performance.

The table above shows a computed value of 20.97 and a critical value of 12.6. Which entails that decision is to reject the hypothesis. It reveals that there is a significant relationship between learner's extra-curricular performance and parent's involvement. Parental school involvement activities such as communication with the school and participation in school activities were significantly associated with high educational background of students (Jaiswal & Choudhuri, 2017). Point out that there are parents who give inflate support in their learner's extra-curricular activities.

IV. GET PEER REVIEWED

Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

For peer review send you research paper in IJSRP format to editor@ijsrp.org.

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Analyze and understand all the provided review comments thoroughly. Now make the required amendments in your paper. If you are not confident about any review comment, then don't forget to get clarity about that comment. And in some cases there could be chances where your paper receives number of critical remarks. In that cases don't get disheartened and try to improvise the maximum.

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VI. CONCLUSION

The aim of this research was to evaluate the parent's involvement of their students' performance in school. As a result revealed, researchers found out that there was poor involvement of parents towards to their students' academic performance. In one hand, it shows that when it comes to the student's co-curricular and extra-curricular activities parents has high level of involvement. Therefore, there are parents that give less effort in helping their child's academic task however they give more support in co-curricular and extra-curricular activities in their child's performance.

APPENDIX

Research Instrument

Name: _____ Age: _____ Sex: _____ Strand: _____

Academic Average (1st Quarter): _____

Instruction: Please check (✓) and rate honestly based in what you actually feel about the given statements and use the following scales:

5 -- Strongly Agree 4 -- Agree 3 -- Neutral 2 -- Disagree 1 -- Strongly Disagree

Part I. Student's Performance	(5)	(4)	(3)	(2)	(1)
A. Student's Academic Performance					
1. I do my school activities every time my teachers give us.					
2. When our teachers give us a group performance I make sure to do my part.					
3. My attitude affects my performance in school.					
4. I pass my project on time.					
5. I do my best to make my academic performance better.					
B. Student's Co-curricular Performance					
1. I like to participate on quiz bees.					
2. I like to join Math sayaw/Math jingle contest and other contests in other subjects.					
3. I like to join poem making essays and other literary contest in school.					
4. I like to participate in Science quiz and other school quiz competition.					
5. I like to participate in answering Math, Science, Social studies and other trivia contest.					
C. Student's Extra-Curricular Performance					
1. I participate in school clubs.					
2. I join sports team in school.					
3. I sleep late to finish my club activities.					
4. I am present on our club meetings.					
5. I can manage between studying and being part of school club.					
Part II. Parent's behavior and attitude towards the studies of their learners in terms of:					
A. Students' Academic Performance					
1. My Parents have high expectations of my grades.					
2. My Parents support me in my academic performances.					
3. My Parents remind me of my assignments.					
4. My Parents help me to do i my academic performance when they know I have difficulties of it.					
5. My Parents give me pieces of advice about how I will work my academic performance.					
B. Student's Co-curricularlar performance					
1. My parents are supportive of me in participating quiz bees.					
2. My Parents encourage me to participate on literature contest like poems & essays.					
3. My Parents inspire me in making a poster					
4. My Parents help me study when I join school academic contest.					
5. My Parents boost my confidence in joining school academic contest.					
C. Student's extra-curricular performance					
1. My parents are always there to watch me on my stage performance.					
2. My parents are very supportive to my extra-curricular activities like joining sports or school organization.					
3. When I have a bad time balancing my studies and school clubs, my parents are there to help me.					
4. When it comes to my school gatherings for my school performance, my parents are there.					
5. My parents encourage me to perform better in school.					

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Association between serum bilirubin and oxygen saturation for newborn in Al -Zahra'a Teaching Hospital of Al- Najaf Governorate

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Abstract- Objective: To find out Association between serum bilirubin and oxygen saturation for newborn in Al Zahraa teaching Hospital the governorate of Najaf. **Methodology** the study covered convenience sample of (60) newborn in the present study individual in the sample was interviewed using a specific questionnaire form. The present study in order to achieve the early stated objectives for period from February 2017 to March 2017. **Conclusion** The overall of serum bilirubin major under study is reduced. The overall assessment of oxygen saturation is slightly affected, serum bilirubin with oxygen saturation SO₂ non-significant. There is effect of the demographic characteristics on the overall assessment. **Recommendation** the future study association between breast milk and jaundice. The demographics and correlates of serum bilirubin levels. Educational program about breast feeding.

Index Terms- Association, serum, bilirubin, oxygen, saturation,

I. INTRODUCTION

Bilirubin is the major breakdown product of hemoglobin released from senescent erythrocytes. Initially it is bound to albumin, transported into the liver, conjugated to a water-soluble form (glucuronide) by glucuronosyl transferase, excreted into the bile, and converted to urobilinogen in the colon. (1)

Urobilinogen is mostly excreted in the stool; a small portion is reabsorbed and excreted by the kidney. Bilirubin can be filtered by the kidney only in its conjugated form measured as the direct fraction thus increased direct serum bilirubin level is associated with bilirubinuria. (2)

The fetal liver is relatively inactive. the placenta and maternal liver metabolize the bilirubin from worn-out red blood cells. The fetus is capable of conjugating bilirubin in small amounts and when haemolysis occurs in utero (as in severe rhesus isoimmunization), bilirubin conjugation increases and high levels may be measured in the umbilical cord blood. (3)

Most of the daily bilirubin production comes from ageing red blood cells. The red cells are destroyed in the reticuloendothelial (RE) system and the haem is converted to unconjugated bilirubin. One gram of haemoglobin will produce 600 μ mo (35mg) of unconjugated bilirubin. Twenty-five per cent of the daily

production of bilirubin comes from sources other than the red cells, tissue haem. (4)

The level of bilirubin usually peaks by the second to third day of life (10 to 12 mg) and begins to dissipate when the infant is 5 days old. There are several types of jaundice. Physiological jaundice is the transient form that typically occurs after the first 24 to 48 hours of life and becomes visible when the total serum bilirubin level is greater than 5 to 7 mg/dL. Pathological jaundice occurs within the first 24 hours of life. The infant may exhibit a total serum bilirubin concentration (TSB) that increases by 0.5 mg/dL per hour or 5 mg/dL per day. The diagnosis is usually made when TSB concentrations climb to greater than 12.9 mg/dL in a term infant and greater than 15 mg/dL in a preterm infant. (5)

II. STATEMENT OF PROBLEM

Association between serum bilirubin and oxygen saturation for newborn in

Al -Zahra'a Teaching Hospital of Al- Najaf Governorate

The study aims :

1-To find out Association between serum bilirubin and oxygen saturation for newborn in Al -Zahraa teaching hospital governorate

Methodology: The setting of the study, the sample of the study, the study instrument, data collection, statistical data analysis and validity of the questionnaire.

Design of the study:

Setting of the study: The study was carried out in Al-Zahra teaching Hospital in Al-Najaf al-Ashraf Governorate.

The sample of the study: Sample of study of (60) newborn were taken in Al-Zahra teaching Hospital male and female.

III. RESULTS:

Table (1): Distribution of the Study Sample by Their Socio-Demographic Characteristics

Variable	Items	Frequency	Percent
Day age	<= 7	41	68.3
	8 – 21	18	30.0
	22+	1	1.7
	Total	60	100.0
Gender	Male	33	55.0
	Female	27	45.0
	Total	60	100.0
Residences	Urban	45	75.0
	Rural	15	25.0
	Total	60	100.0
Education mother	Illiterate	8	13.3
	Read & write	13	21.7
	graduate primary school	24	40.0
	secondary school	8	13.3
	post graduate	7	11.7
	Total	60	100.0
Education father	Illiterate	7	11.7
	Read & write	8	13.3
	graduate primary school	17	28.3
	secondary school	16	26.7
	post graduate	12	20.0
	Total	60	100.0
Profession mother	Employee	8	13.3
	private sector	13	21.7
	Hose wife	24	40.0
	retied	8	13.3
	helpless	7	11.7
	Total	60	100.0
Profession father	Employee	15	25.0
	private sector	21	35.0
	helpless	24	40.0
	Total	60	100.0

This table shows that the percentage was for age (68.3%). This table shows that the majority of the study subjects have male (55%). This table shows that the majority of the study subjects haven't urban (75%). This table also reveals that frequency is a highly significant mainly at the fourth level of education (graduate primary school) for father education level (28.3%). whereas the mother education level was graduate primary school (40%), this table show is mother occupation was helpless (40%). While father their occupation was Private sector(40%).

Table2: Distribution of the Study overall assessment of serum bilirubin

Assessment	Items	Frequency	Percent
Overall Assessment	<= 10	15	25.0
	11 – 14	31	51.7
	15 – 18	13	21.7
	19+	1	1.7
	Total	60	100.0

This table shows the overall assessment of serum bilirubin the results have indicated that there have been high level for serum bilirubin (51.7%).

Table 3: Distribution of the Study overall assessment of oxygen saturation (symbol SO2)

Assessment	Items	Frequency	Percent
Overall Assessment	96-100	36	60.0
	91-95	17	28.3
	90 and lowest than	7	11.7
	Total	60	100.0

This table shows the overall assessment of oxygen saturation the results have indicated that there have been (60%).

Table 4 correlation between serum bilirubin with oxygen saturation SO2

Variables	Items	Oxygen saturation SO2			Total	p-value
		96-100	91-95	90 and lowest than		
serum bilirubin	<= 10	7	7	1	15	p-value .596 (NS)
	11 - 14	19	7	5	31	
	15 - 18	9	3	1	13	
	19+	1	0	0	1	
Total		36	17	7	60	

The results have indicated that there have been a non-significant differences at $P > 0.05$.

IV. DISCUSSION

Throughout the course of the present study, the study results show that the mean of the sample gender, this table shows that the percentage was for male 55.0%. The study results indicate that the majority of the study subjects 75% urban Concerning the age, most of the study sample 68.3% under 7days (6).

The frequency is highly significant mainly at the fourth level of education (graduate primary school) for father education level . The mother education level was graduate primary school, no found any support with other studies, because no opportunity to complete study (7).

The overall assessment of oxygen saturation the results have indicated that there have

been (60%), disagree with other studies because is environment change. The results

have indicated that there have been a non-significant differences at $P>0.05$, no found supported with other studies or researcher therefore culture different In this study, the association between was not observed. Cohort studies examining the association of bilirubin with incidence of and mortality from cancer have resulted in conflicting findings(8).

V. CONCLUSIONS

According to the present study findings, the researcher can make the following conclusions:

The overall of serum bilirubin major under study is reduced. The overall assessment of oxygen saturation is slightly affected. The correlation between serum bilirubin with oxygen saturation SO₂ non- significant. There is effect of the demographic characteristics on the overall assessment.

VI. RECOMMENDATIONS

Based on the study conclusion, the study can recommend that:

1. In the future study association between breast milk and jaundice.
2. The demographics and correlates of serum bilirubin levels.

3. educational program about breast feeding.

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Fuzzy Logic Control for harvesting maximum power from PV solar based SEPIC Converter

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Abstract: This paper presents a maximum power point tracking (MPPT) control that makes use of fuzzy logic for switching a single-ended primary-inductor (SEPIC) converter for harvesting power from a photovoltaic (PV) system. The proposed FLC MPPT is presented at varying irradiances of 1000, 900, 700 and 500 W/m² and varying temperatures of 30, 25, 20 and 18°C respectively. The SEPIC converter has a voltage output of 58.70 V for 1000 W/m² at 18°C and the PV panel has power output at 407.7 W over 1000 W/m² and 18°C. The fuzzy controller for the SEPIC MPPT scheme shows good current transition and keeps the voltage constant within the acceptable limits, in variable temperatures and irradiances.

Keywords: Fuzzy Logic Controller, SEPIC, Photovoltaic (PV) system, Irradiance and Temperature

1. INTRODUCTION

Alternative renewable Energy has received great attention and importance today due to its sustainability as well as how friendly they are to the environment. The energy demand in the world especially Nigeria has greatly increased due to the industrial revolution. Photovoltaic (PV) solar panel is a simple and reliable technology which directly converts energy from the sun (solar energy) into electricity for home and industrial utilization [2-5].

Maximum power can be obtained from photovoltaic panels, for use by using maximum power point tracking (MPPT) controller [3]. Various approaches have been reported to implement MPPT such as perturb and observe (P&O) method, the incremental conductance method (INC), constant voltage method and short-circuit current method [4-6]. Using this method the maximum power point can be found for specified solar irradiation and temperature condition but they display oscillatory behavior around the maximum power point under normal operating conditions. Moreover the system will not respond quickly to rapid changes in temperature or irradiance.

On the other hand the conventional PI controllers are fixed gain feedback controllers. Therefore they cannot compensate the parameter variations in the process and cannot adapt

changes in the environment. PI-controlled system is less responsive to real and relatively fast alterations in state and so the system will be slower to reach the set point. Recently intelligent based schemes have been introduced [7-10]. Among the intelligent based methods fuzzy logic has its own merits such that the algorithm is easy to form. The shape of the membership function of the fuzzy logic controllers can be adjusted such that the gap between the operation point and maximum power point can be optimized. A SEPIC dc-dc converter provides constant dc voltage which has a duty cycle that is controlled by the FLC MPPT controller [8-11]. Among all the available converters, SEPIC has the merits of non-inverting polarity, easy to drive the switch with low input current pulsating for high precise MPPT that makes its characteristics suitable for the low power PV based charger system. SEPIC converter can raise the output voltage to the suitable range, the supply an isolation route to isolate the input and the output terminals after terminating the charging. But this circuit has two disadvantages; one is low efficiency and the other is it needs two inductors [10].

This paper presents, a control technique using fuzzy logic control (FLC) which is used in tracking MPP of the PV solar panels of a SEPIC dc-dc converter thereby extracting maximum power from the PV solar module under varying solar temperature and irradiation using MATLAB / SIMULINK are presented.

2. METHODOLOGY

The block diagram for the proposed system is as depicted in Figure 1. The PV solar panel generates a current and voltage which are measured and serve as inputs for the Fuzzy based MPPT controller and the task of the MPPT controller is to switch the gate of the SEPIC at a duty cycle that will harvest the maximum power from the PV solar panel to the load.

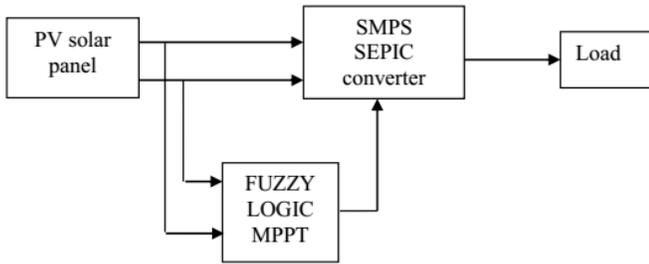


Figure 1: The Block diagram of PV solar SEPIC converter using FLC MPPT

2.1 Photovoltaic Module

A solar PV cell basically is a p-n semiconductor junction. Whenever certain amount of light is being exposed on the solar panel, then a DC current varies linearly with the solar PV irradiance. The equivalent electrical circuit of an ideal PV cell can be considered as a current source parallel with a diode. The I-V characteristic of the solar PV module for varying irradiances (1000, 900, 700 and 500 W/m²) at constant temperature of 25 degrees is as presented in Figure 2.

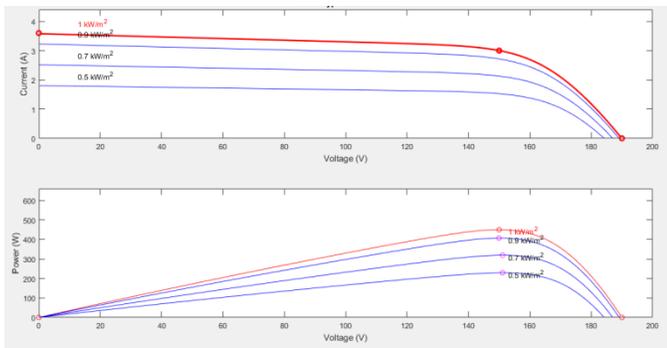


Figure 2: PV characteristic curve for varying irradiance

2.2 Fuzzy Logic (FLC) Controller

The variables are identified and the set values of each linguistic variable are determined. The input variables of the FLC controller are the input variables of the fuzzy logic controller are the slope of the power variation, E (k) and the slope, CE (k) of the PV panel. The output of the FLC controller is the duty cycle of the PWM signal controls the converter switching gate. The triangular membership functions is used for the FLC. The fuzzy logic control system can be generalized presented in Figure 3.

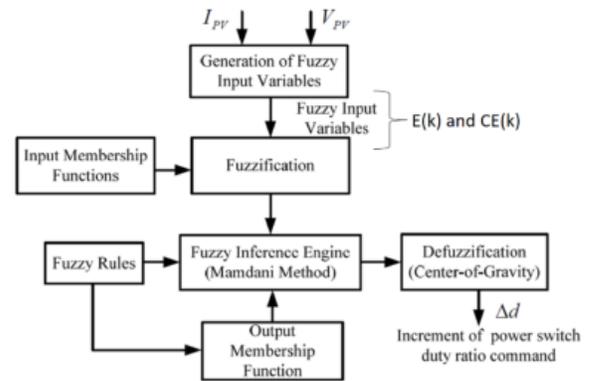


Figure 3: The FLC MPPT design

The input variables of the fuzzy logic controller are the slope of the power variation and the change of the slope defined as in Equations (1) and (2).

$$E(k) = \frac{P_{pv}(k) - P_{pv}(k-1)}{V_{pv}(k) - V_{pv}(k-1)} \tag{1}$$

$$CE(k) = E(k) - E(k - 1) \tag{2}$$

A seven-term fuzzy sets, Negative big (NB), Negative medium (NM), Negative small (NS), zero (ZZ), Positive small (PS), Positive medium (PM), and Positive big (PB) are defined to describe each linguistic variable term. Each linguistic term associated with a set linguistic variable has a degree of membership that ranges from zero to one both inclusive as shown in table 1.

Table 1: FLC Rule table

CE/E	NB	NM	NS	ZZ	PS	PM	PB
NB	NB	NB	NB	NB	NM	NS	ZZ
NM	NB	NB	NB	NM	NS	ZZ	NS
NS	NB	NB	NM	NS	ZZ	PS	PM
ZZ	NB	NM	NS	ZZ	PS	PM	PB
PS	NM	NS	ZZ	PS	PM	PB	PB
PM	NS	ZZ	PS	PM	PB	PB	PB
PB	ZZ	PS	PM	PB	PB	PB	PB

2.3 SEPIC Converter

The SEPIC DC-DC converter consist of two inductors (L₁ and L₂), three capacitors (C₁ and C_o), a diode (D) and switch (Q) which is typically a transistor such as MOSFET.

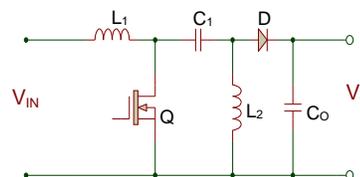


Figure 4: The circuit diagram of the SMPS.

The SEPIC converter in Figure 4 is in Continuous Conduction Mode (CCM) therefore, current in the inductor L_1 is always greater than zero.

3.0 Simulation Study

The simulation of the PV solar FLC MPPT based SEPIC converter is performed in MATLAB/Simulink using the following SEPIC converter and PV solar module parameters presented in table 2 and 3.

Table 2: SEPIC DC-DC Converter design specifications

Description	Value
Minimum Input voltage	50 V
Maximum Input voltage	340 V
Switching frequency	200 kHz
Inductor	26.24 μ H
Output Capacitor	220 μ F
Output voltage	60 V

Table 3: solar panel specifications Sunpower E20 400 watt solar panels SPR-E

Parameters	Specifications
Power output	400 W
Open circuit voltage (Voc)	85.3 V
Short circuit current (Isc)	6.43 A
Voltage at maximum power (Vmp)	72.9 V
Current at maximum power (Imp)	5.97 A
Module size	36 cells

The simulation is performed using the Simulink environment of MATLAB software and the circuit is as presented in Figure 6

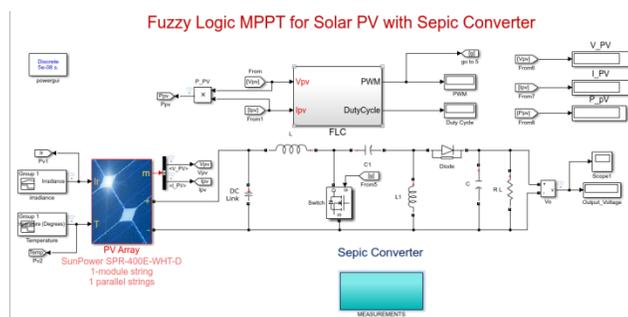


Figure 5: Simulink model of the Fuzzy logic MPPT controller PV solar SEPIC Converter

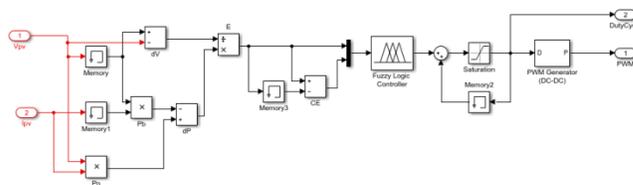


Figure 6: Simulink model of the Fuzzy logic controller MPPT

4.0 RESULTS

This chapter presents output obtained from the simulations of analysis done in chapter three.

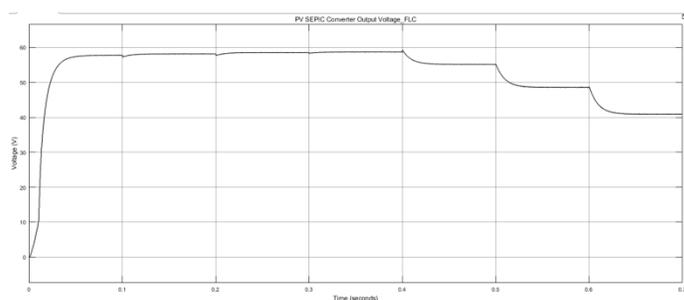


Figure 7: Output Voltage of SEPIC converter using FLC MPPT for different Irradiances and temperature

The summary of Figure 7 is as presented in Table 4

Table 4: SEPIC converter voltage under varying Irradiance and Temperature for FLC MPPT

S/N	Voltage (V)	Irrad (W/m^2)	Temp ($^{\circ}C$)	Time (s)
1	57.74	1000	30	0.0 – 0.1
	58.15		25	0.1 – 0.2
	58.50		20	0.2 – 0.3
	58.70		18	0.3 – 0.4
2	55.17	900	25	0.4 – 0.5
3	48.63	700	25	0.5 – 0.6
4	40.95	500	25	0.6 – 0.7

Figure 7 presents the output voltage of the PV solar based SEPIC converter using FLC MPPT controller. The output voltage as it relates to varying irradiance and temperature is as presented in Table 4. From table 4, it indicates that the output voltage of the converter for FLC MPPT is maximum at 57.74 V, 58.15 V, 58.50 V and 58.70 V for irradiance of $1000 W/m^2$, temperature changes from $30^{\circ}C$, $25^{\circ}C$, $20^{\circ}C$ and $18^{\circ}C$ respectively. At temperature of $25^{\circ}C$, irradiances of $900 W/m^2$, the Voltage output drops to 55.18 V. For irradiance of

700 W/m² and temperature of 25°C, the maximum voltage output is 48.60 V. The irradiance of 500 W/m², temperature of 25°C, the maximum voltage recorded is 40.94 V. Oscillations are not observed in the output wave form of the SEPIC converter but it is observed that at every change in temperature, there is a dip in the output voltage signal before it settles back through the action of the FLC MPPT controller.

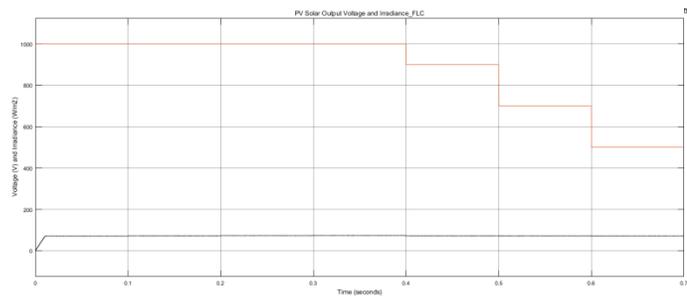


Figure 8: PV Solar Output Voltage and varying Irradiance for FLC MPPT

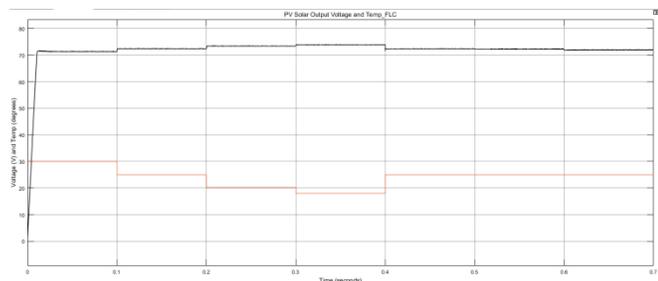


Figure 9: PV Solar Output Voltage and varying Temperature for FLC MPPT

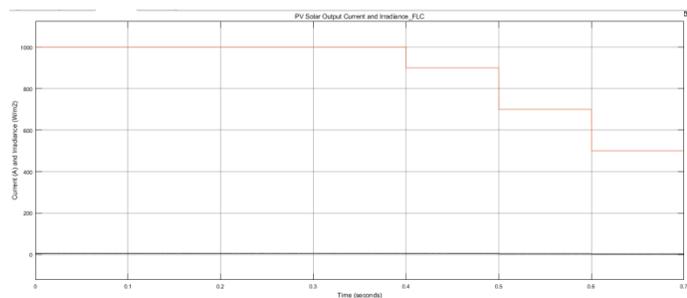


Figure 10: PV Solar Output Current and varying Irradiance for FLC MPPT

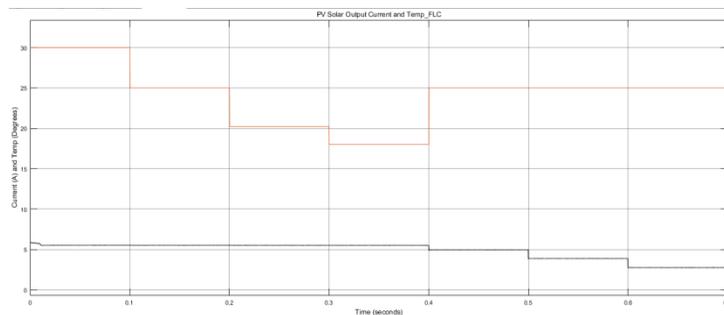


Figure 11: PV Solar Output Current and varying Temperature for FLC MPPT

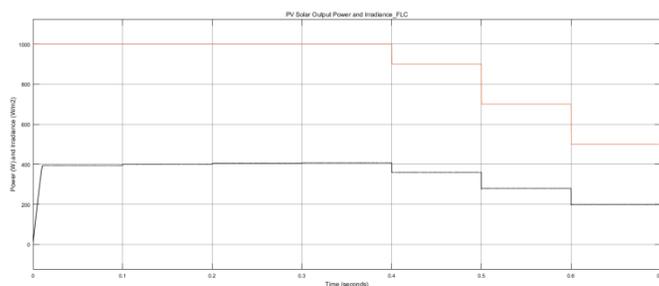


Figure 12: PV Solar Output Power and varying Irradiance for FLC MPPT

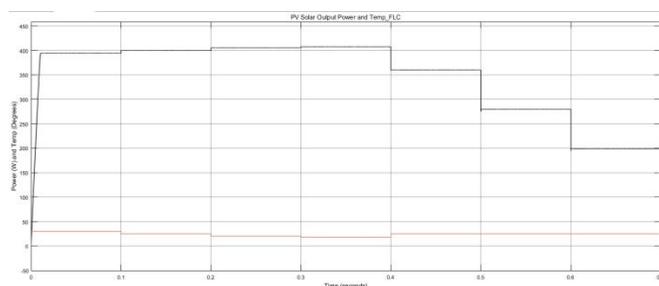


Figure 13: PV Solar Output Power and varying Temperature for FLC MPPT

The summary of Figure (s) 8 – 13 are as presented in Table 5

Table 5: PV Solar Output Voltage, Current and Power under varying Irradiance and Temperature for FLC MPPT

S/N	Voltage (V)	Current (A)	Power (W)	Irrad (W/m ²)	Temp (°C)	Time (s)
1	71.64	5.51	394.7	1000	30	0.0 – 0.1
	72.49	5.52	400.1		25	0.1 – 0.2
	73.56	5.51	405.3		20	0.2 – 0.3
	74.04	5.51	407.7		18	0.3 – 0.4
2	72.54	4.97	360.1	900	25	0.4 – 0.5
3	74.42	3.86	279.8	700	25	0.5 – 0.6
4	72.16	2.76	199.0	500	25	0.6 – 0.7

Figure (s) 8 – 13 presents the PV output for voltage, current and power over varying irradiances and temperature for FLC MPPT. From table 5, and figures (s) 8 – 13, the output voltage of the PV panel using FLC MPPT in figure 8 and 9 is 71.64 V, 72.49 V, 73.56 V and 74.04 V over a constant irradiance of 1000 w/m² and varying temperatures of 30, 25, 20 and 18 degrees respectively, at varying irradiances of 900, 700 and 500 w/m², the temperature remains constant at 25 degrees with the voltage at 72.54 V, 72.42 V and 72.16 V respectively. Figure (s) 10 and 11 presents the current output with varying irradiance and temperature. The Current constantly peaks at 5.51A over an irradiance of 1000 w/m² but varying temperature of 30, 25, 20 and 18 degrees. At varying irradiances of 900, 700 and 500 w/m² and constant temperature of 25 degrees, the output current is 4.94 A, 3.86 A and 2.76 A respectively. Figure (s) 12 – 13 presents the output power of the PV panel at varying irradiances and temperatures. The power output had 394.7 W, 400.1 W, 405.3 W and 407.7 W over a constant irradiance of 1000 w/m² and varying temperatures of 30, 25, 20 and 18 degrees respectively. At varying irradiance of 900, 700 and 500 W/m² at constant temperature of 25 degrees, the output power is 360.1 W, 279.8 W and 199 W respectively.

5.0 CONCLUSION

A solar-PV system with a SEPIC dc-dc converter for harvesting maximum power using fuzzy logic controller has been simulated under varying solar irradiances and temperatures. The performance of the system presented no ripples or oscillations at the output voltage of the PV module. The model shows that at 1000 W/m² PV system output power increases with fall in cell temperature which conforms.

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Construction of Fare Meter Using Pic Microcontroller

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Abstract- Fares are usually calculated according to a combination of distance and waiting time, and are measured by a fare meter. This solves the arbitrary charging of passengers boarding taxi and different point. The fare meter consist of speed sensor, microcontroller (PIC 16F86A), power supply unit, display unit and input buttons to set the amount per unit distance. The speed sensor picks up signal from the rotating gear wheel which is interfaced with the microcontroller to compute the corresponding distance. The multiplication unit of cost per meters is (NAIRA) N 1.50 per meter, this provides the fare rate.

Index Terms- fare meter, microcontroller ,measured distance, rotating gear.

I. INTRODUCTION

Public transportation is one of the most demanded basic needs of a developing city/town (MD et.al 2016). Accurately qualifying the taxi fares is a hard problem for drivers and passengers. Insufficiency of taxi stations, not specified price of taxi lines, getting on between stations and not calculated movement amount, cause difference in the prices (Assadifard et.al 2014 ; Emmanuel, 2015) . Hence the use taximeter systems that can help decrease the problems. A taximeter is a device that is used in taxis to record and show the fare payable for the journey (Md. T., 2005). A taximeter can only be activated to start recording the fare at certain times. If the taxi has been hailed or obtained from a taxi rank, the taximeter can only be turned on when the person enters the taxi. If the taxi has been booked, the taximeter can only be turned on when the person has been notified that the taxi has arrived or at the specific time that the person booked the taxi for (for example 8am). Regardless of how the taxi has been hired, the taximeter must be turned off when the taxi has arrived at the destination and before asking for payment. Nigeria is among the country in Africa that has no effective transport law or policy governing fare rate per unit distance (Draft policy 2010). Fare meter innovation is designed to provide an articulate solution that will calculate the actual cost of journey within Nigeria. Virtually all developed countries have transport laws or policies in place and if Nigeria can look towards this direction, it will rescue the citizens from these reports of abusive and unscrupulous drivers preying on both local and foreign travelers by adopting fare meter system.

In most road particularly airport and seaport in Nigeria, transport accomplice (conductors) has been alleged, charging grossly bloated fares from foreigners, luggage and travelers whom they picked up at the arrival/exit areas in Nigeria (Oguchi 2016). It has been decided that fare meter for vehicles and taxis help passengers pay fare price along with the assurance that they will not become a victim of fare deceit. Place, Time, Fuel Consumption, Additional Charge, Date (holiday), Traffic Hour and Cost of Fuel are methods used to measure fare or cost of transportation (Julio and Ximena 2015) . All fare meter design from literature uses either of these to compute fare. There exist several papers on taxi fare meter designs.

MD. et.al (2016) designed and developed a fare meter for the BRACU university in Bangladesh that consist of several components which includes Arduino board, GSM module, GPS shield, GPS antenna, Bluetooth, Display, and Power supply. The fare meter computes fare with both distances covered and waiting time. The system design specification required that any speed below 10km/h is considered a waiting time and is combined with distance to generate the fare. The GPS device in their design helped to determine be distance covered with the help of longitude and latitude data computed with Haversine formular for great distance calculation in a sphere. The GSM module help transmit the location of the taxi for monitoring and security. The Bluetooth device serves as an interface between the arduino board and the android developed application to constantly keep update of the distance and computing the fare rate which is then sent back to the display via the Bluetooth meaning the communication of the Bluetooth is bidirectional to ensure effective update on the current distance covered and corresponding fare.

Emmanuel (2015), designed and developed a Real Time Taxi Monitoring and Passenger Inventory System. The system incorporated a seat sensor that counts the number of passengers entering the taxi, computes and sends the corresponding distance covered to the company through a GSM/GPS/GPRS modem with antennae. However this system did not consider wait time as done in MD. et.al (2016).

Julio & Ximena (2015) improved on the use of GPS which obtains longitude and latitude to compute distance covered. They place a maximum speed of 40 km/h for taxi and divided the city into three squares with each sides of 1km each. The computation of the fare is done with an interval of 20km distance and the value is summed up to give the fare upon completion of the distance or

trip. And innovative step is that the GPS device is somewhat hidden from the taxi driver so as to avoid manipulation.

Assadifard et.al (2014) in a paper titled Taximeter Design Based on Digital Image Processing Approach solved a nagging problem where a passenger drops off thus computing the fare becomes an issue because of lack of recognition as to who dropped and who didn't. The paper introduced the use of four cameras for face recognition process coupled with four buttons to instantly compute the fare based on the image gotten from the camera. The system incorporated GPS as a device for distance computation and fare is calculated after every 300 meters distance moved. Also the city map system added to the system provides the shorted route analysis computation using Dijkstra Algorithm to reduce distance to destination.

Md. T. I (2005) designed a fare meter using PIC 16F84A microcontroller with four (4) seven segment displays which shows the fare and the corresponding distance covered. In their design the minimum and maximum distance a taxi can move was not expressly stated. Also the distance sensor was not described raising a suggestion that it could be from the car analog odometer device. The odometer operated by a pair of gears from the speedometer shaft. Its motion was carried through the gears to the kilometer number rings. Then by multiplying the traveled distance and unit price per kilometer, total amount of fare is calculated.

Tejaswi et.al (2016) improve on accuracy of the fare-o-meter and provide notification facility on GSM mobile phone.

This proposed work is an attempt to design a taxi-meter that uses the GPS to determine an accurate taxi fare based on the distance traversed and this information can be transmitted to a remote server using GSM modem. The purpose of this system provides the following features: Shortest path from source to destination, Accurate fare based on the distance traversed, Real time tracking, Time to time updates through SMS with the help of GSM module. The use of Taximeter in Nigeria is still at it infancy thus the challenges that comes with none usage is enormous ranging from unscrupulous fare rate from conductors and taxi drivers, the use of abusive language on passenger over dispute of fare, lack of proper documentation of taxis resulting in tendencies to steal from passenger etc. the introduction of taximeter will to a certain extent curb all these challenges.

II. DESIGN

The fare meter design intended to measure the cost of fare through the measure distance covered on the basis of a signal delivered to transducer, it calculates and displays on LED screen the fare to be paid on a journey based on the calculated distance of the journey is shown in figure 1.

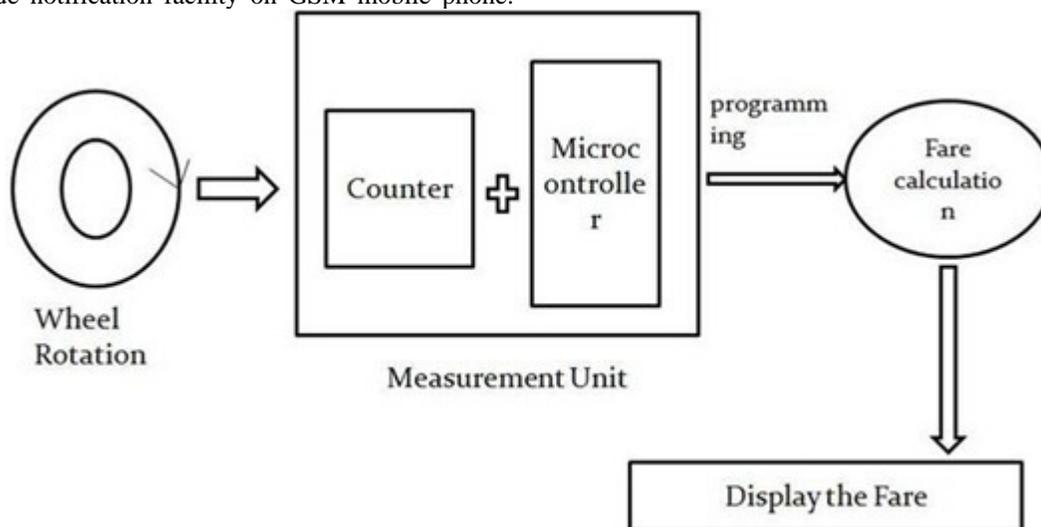


Figure 1 : schematic diagram of faremeter

2.1 Power supply Unit

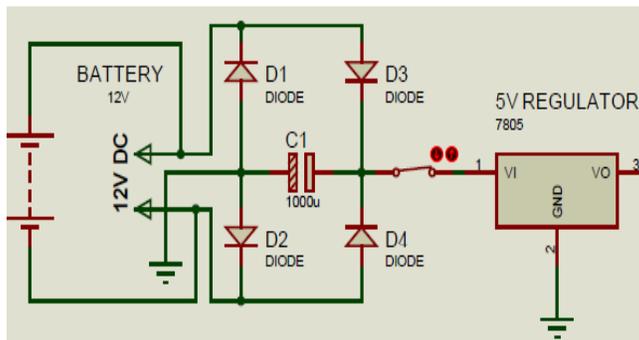


Figure 2 Power Supply Unit regulation

Figure 2 shows the process of power regulation and rectification. The supply voltage from a car battery is +12 v. the required voltage is +5 voltage which is obtained when a full wave rectification process is combined with a voltage regulator LM 7805

Filter Capacitor

The 1000µf/25V capacitor is used to filter the ripple levels present in the rectified voltage. The values of the capacitor used with a 50Hz supply may range from 100µf to 30,000µf depending on the load current and the degree of smoothing required. In selecting capacitors, the ripple voltage required is 10% of the peak value. The selection of this capacitor is based on the following calculation.

For a charged capacitor, $Q = CV = It$

Thus, $I_L = CV/t$

Thus $C = I_L * t / V_{ripple}$

$T = T = 1/f$

For full wave rectifier, the frequency of the rectified DC output is 2X the supply frequency = 100Hz

$T = 1/100 = 0.01s$

$V_{ripple(peak)} = (V_{peak} - V_{dc})$

$V_{dc} = V_o$

$V_o = V_{in} \sqrt{2}$

$V_{in} = 24 - V_d$

V_d being total diode drop = $0.7 * 2 = 1.4$

$V_{in} = 12 - 1.2 = 10.8V$

$V_{dc} = V_o = V_{in} \sqrt{2}$

$V_o = 10.8 * 1.414 = 15.27V$

$V_{peak} = 2V_{max}$

Where $V_{max} = 2V_{r.m.s}$

Therefore,

$2V_m = 2 * \sqrt{2} * V_{r.m.s}$

$V_{r.m.s} = 21.6V$

$V_{peak} = 2 * \sqrt{2} * 21.6 = 43.20V$

$V_{dc} = 0.6366 * V_{peak} = 0.637 * 61.0 = 27.5V$

$V_{ripple} = V_{peak} - V_{dc} = 43.20 - 27.5 = 15.7V$

Therefore, $V_{ripple} = 2 * 15.7 = 31.40V$

10% ripple = $10/100 * 31.40 = 3.14V$

From $C = I_L * t / V_{ripple}$ with I_L – total load on the controllerµ

$C = (0.01 * 0.28A) / 3.14V$

$C = 891µF$ (1000µF was used as preferred value)

The working voltage of a filter capacitor must always be more than 1.414 times the expected secondary voltage of the step-down transformer. For this application, 1000µF/25V is used for C.

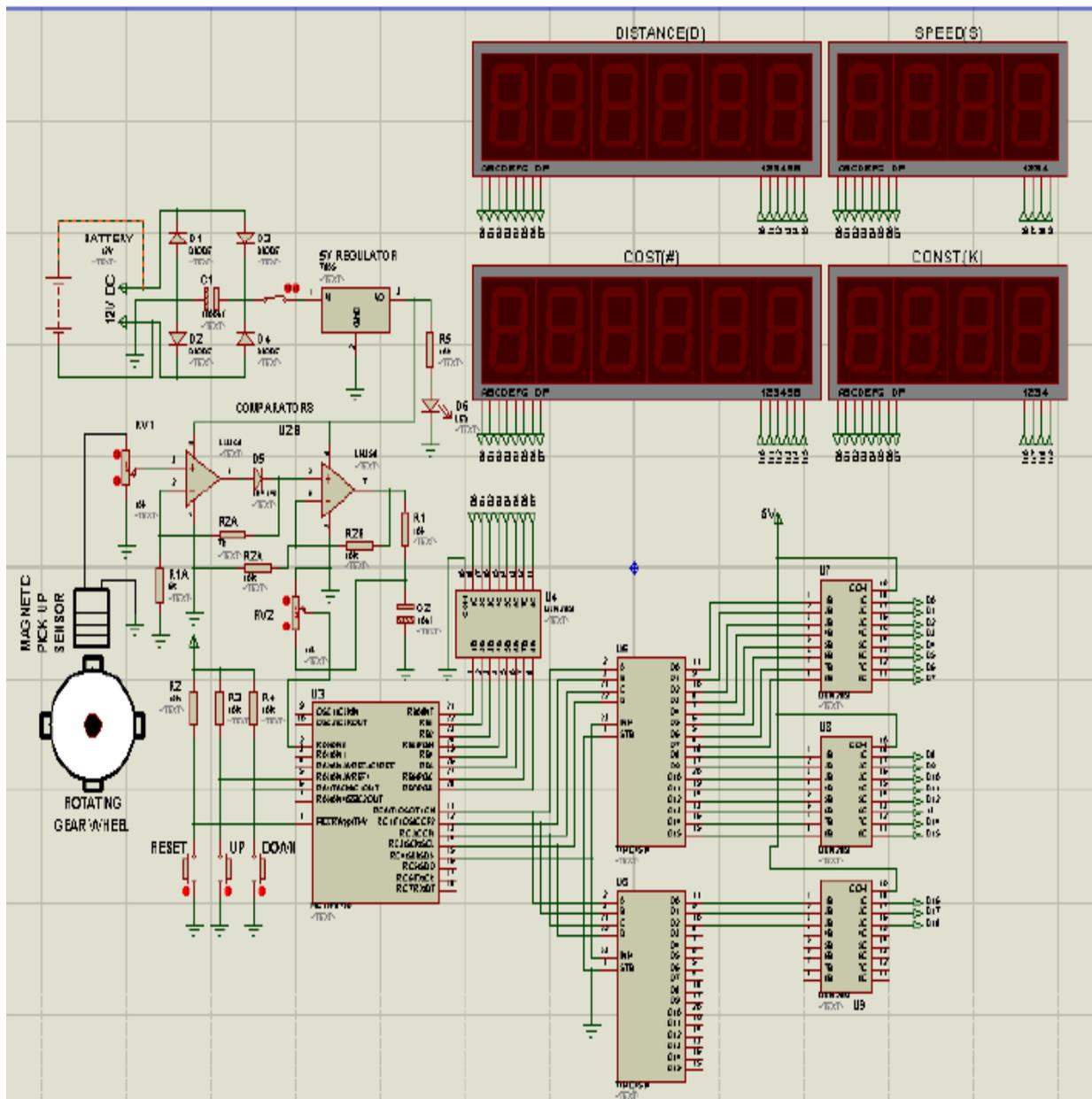


Figure 3 circuit diagram of fare meter with digital display

2.2 WORKING PRINCIPLE OF FARE METER

In figure 3, a rotating gear wheel which is been control by potentiometer (RV1) with an adjustable amplitude signal and a magnetic pickup sensor that senses the rate of rotation of the rotating wheel as far as the rotation continues. The push buttons are assumed to be bounce free which implies that when they pressed and then released, a single pulse is produced (the signal goes high when UP is pressed and goes low when DOWN is pressed.) When the two push buttons are been pressed at same time and held for few seconds (i.e. UP and DOWN bottoms), the present displayed value are been added to the memory and the current value will be automatically display. At that state, if the RESET button is been pressed in addition with the UP and DOWN bottom, all the entire memory will be cleared immediately. When all the three bottoms (controlled by R2, R3 and R4 pull-up

resistors through a 5V supply) are been release, microcontroller receives signal and processes it according to the program.

The circuit design of this fare meter in figure 3 reduces the number of decoder ICs (74HC4514) from four to two for displaying all the twenty (20) seven segment of the LED. A single chip of NPN transistor (ULN2803) and three chips of PNP transistors (UDN2803) are used through the 5V supply to bias the switching of the LEDs. Thus, the common of each of the four seven segment has been grounded to avoid the excessive stray capacitances and all the non-conducting terminals are been tied to ground in case of any charges flowing in them. 20 LEDs are been sectionalized into COST (6 LEDs), DISTANCE (6 LEDs), SPEED(3 LEDs) and CONSTANT(3 LEDs) respectively. The remaining of the two (2) LEDs are added to take care of any overflow

III. RESULTS

The fare meter display unit has a display unit with dimension of 280 mm by 120 mm. The distance and time rate of fare meter is set, including the initial distance interval and the initial time interval, and local tax rate per unit distance (N 1.50 PER 100 METERS) as shown in figure 4. The minimum mileage the fair meter can accommodate is 500 miles and limitless maximum. The fair meter was able to withstand vibration due to motion of the vehicle. Display switching frequency and the scan rate of the fare meter are 960 Hz & 0.0014167 seconds respectively translate into increase in operational speed of the fare meter



Figure 4 fare meter display

IV. CONCLUSION

A lot of people travel using the taxi daily. And a lot of them are overcharged by the taxi driver. Development of a smart yet cost effective fare meter can accurately measure the distance and also can give solution to the fare payment difficulties. The fare-meter uses the rotating wheel of the gear sensor to determine the distance and is computed with a constant unit of amount in naira(N) to determine the fare. This is much better than the taxi driver randomly stating prices for greedy gain.

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Recreational Activities for People with Disabilities; A Traditional Systematic Review

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Abstract- The aim of this study is to review a literature survey on disabled recreation research. Recreation research in people with disabilities has become very popular in recent years. In parallel with the changing living conditions, the increase in the sensitivity towards people with disabilities has been reflected in the researches on this subject. Support for the promotion of recreational activities for people with disabilities can be considered as one of the most important results of these studies. According to World Health Organization data, the number of people with disabilities in the world increased in recent years. This increase reveals that societies should review their policies related to people with disabilities. We need to create suitable living conditions for people with disabilities to know that they feel free in society. One of the most important ways to improve the living conditions of people with disabilities is the creation of appropriate recreational areas. From this point of view, this research consisted of a literature survey which was prepared by reviewing the researches about the participation of people with disabilities in recreation. This study was designed according to content analysis method and used in Ebsco databases. The research is designed to contribute to the promotion of recreational activities in the handicapped.

Index Terms- Disability entertainment, Physical education for the disabled, Recreation, Recreational activities, Recreation for the disabled, Physical education for the disabled

I. INTRODUCTION

In the Special Education Services Regulation (2018), the individual in need of special education is defined as individual and his / her developmental characteristics and educational competence which are significantly different from their peers. Special education is defined as ile education in a suitable environment with training programs developed specifically to meet the educational and social needs of individuals who have significant differences in their individual and developmental characteristics and educational qualifications from their peers. As it is understood from these definitions, individuals with special needs may have different needs than their peers. If the needs of these individuals are not met properly, they have some difficulties both in the school environment and in the social life. These individuals' socialization depends on the provision of appropriate training for them (Özak, Vural, & Avcioğlu, 2015). Recreation can be defined as the activities of the people in their free time outside the time they spend to meet their work and compulsory needs. The emphasis on leisure activities in the definition of recreation this can be considered as a time for people with disabilities.

Because every person has the freedom to participate in social life and to do his / her own activities. People with disabilities often have discretion in terms of participation in social life. Although they are offered various opportunities, they often do not know how to reach these facilities (Karaküçük, 2016; Ragheb, 1980). In this case, trainings given to individuals with special needs may be a guide for this matter. It can be used as a teaching method in recreational activities for the education of people with disabilities regulations relating to individuals with special needs indicate that recreational activities should not be neglected. Today, the most important obstacles for people with disabilities are limited freedom to act.

In order for education to be permanent and effective, it is necessary to meet the recreation activities of the individuals at early ages. The habit of recreational activity acquired in childhood may become a permanent and desirable behavior in later periods. The aim of the education of children with special needs is to ensure that the children are able to be self-sufficient and integrate into society without being dependent on other individuals (Namlı & Suveren, 2017; King et al., 2003). In recreational activities, children have important opportunities in terms of gaining freedom of movement without the need of anybody. Therefore, it may be useful to include disabled people in the education of the disabled by considering the contributions of the recreation educators. It is observed that recreation researches related to disabled people are very common especially in Europe and America (Hammel et al., 2008; Rimmer, 1999; Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004; Sherrill, 1998; Taylor, Baranowski, & Young, 1998). Turkey, but it can be said that much more research needs to be done about it. Especially in the last 15 years it is also provided positive development on many issues related to people with disabilities in Turkey. President Erdoğan supported the participation of people with disabilities in recreational activities and met many times with disabled people who participated in sports (Presidency of the Republic of Turkey, 2018). In a period of increasing political support for people with disabilities, recreation and sports researchers are also required to investigate developments in this area. From this point of view, the purpose of this study was to examine the recreational researches related to the disabled.

II. METHODOLOGY

In this research which is about recreation activities in people with disabilities, data were obtained by content analysis method. Content analysis is a research technique in which the valid interpretations derived from the text are presented as a result of a series of operations. These comments are about the sender of the message, the message itself and the recipient of the message (Weber, 1990). In this research, some articles which have been published in the last 2 years in Ebsco databases have been analyzed. As a result of the analysis, studies on subjects related to recreational activities in disabled individuals were evaluated. There are many studies on the subject. With this method, the findings of more than one research on a subject are brought together and a critical analysis is performed to provide the best evidence. However, systematic review studies are an important research project and should be done within a specific protocol. "Traditional systematic review" protocol is used in this research. Traditional systematic review: Two or more studies published on a specific subject are reviewed and the results are the studies that synthesize the findings, results and evaluations. In this research, two articles are discussed. The titles of the research articles are as follows: "Having Fun and Staying Active!

Children with Disabilities and Participation in Physical Activity: A Follow-Up Study” and “Contribution of Leisure Participation to Personal Growth among Individuals with Physical Disabilities”.

III. FINDINGS

1. Having Fun and Staying Active! Children with Disabilities and Participation in Physical Activity: A Follow-Up Study

In this study, which aims to examine the recreational activities in disabled individuals. The first study to be analyzed is the study titled "Having Fun and Staying! Physical Activity: A Follow-Up Study". This study was published in the journal "Physical & Occupational Therapy In Pediatrics" by Baksjøberget, Nyquist, Moser and Jahnsen in 2017. The study primarily consisted of 3 weeks of intensive physical and recreational activities. Then, behavioral changes of children were examined during the 15 months follow-up. The study applied a 15-month semi-experimental single-group pre / post test design for the recreational and physical activity profiles of children. Children's Assessment of Participation and Enjoyment was used as a measurement tool(CAPE)(King et al., 2006) . The research was conducted in Norway. and the data collection process is planned by considering climatic variations. The sample group of the study consisted of 152 (67 girls and 85 boys) multiple handicapped ages ranging from 6 to 17 years of age. however, since the data collection process of the study consists of 3 stages, the number of different participants in each period was included in the study. There were 152 participants in the 1st stage, 118 participants in the second stage and 80 participants in the last stage. This scale consists of 55 creative activities and each activity is scored in 5 sections. The questionnaire sections were applied to disabled children with expert therapists. The data obtained from the research were analyzed by IBM SPSS program. Data were analyzed by nonparametric (Chi-square, Mann–Whitney U, and Fisher’s Exact tests) tests. The results of the study showed that the participation of 55 recreational activities for 15 months decreased significantly in terms of diversity and intensity. The most significant decrease was reported in children aged 10-13 years. In the study, it was found out that boys prefer more skill oriented activities than girls. They also stated that they preferred "fun activities" significantly more in the selection of recreational activities in both genders (Baksjøberget, Nyquist, Moser, & Jahnsen, 2017).

2. Contribution of Leisure Participation to Personal Growth Among Individuals With Physical Disabilities

The aim of the study is to examine the effects of individuals with various disabilities on individual development of participation in recreational activity. It is desired to determine potential predictors of participation in recreational activities in terms of personal development. Another aim of this research carried out in the country of Korea is to create a program proposal for recreation therapists and to raise awareness on this issue, according to cultural differences. Individuals with physical disabilities over the age of 18 were selected as participants. After obtaining the necessary permits, the subjects in various schools, hospitals and rehabilitation centers were included in the research sample. The data obtained for the surveys were obtained from a total of 254 questionnaires. The participants of the study were female 46.2%, male 53,8 % were female. A measurement tool used in research "Measures of Psychological Well-being" developed in 1989 by Ryff. Also A modified version of “Leisure Participation Involvement Scale” (LPI; Ragheb, 1980) was used to determine the frequency of participation in recreational activities. The findings obtained from the research were reached through

hierarchical regression analysis. Hierarchical regression analysis has been examined the relationship between independent variables and dependent variables. When the results of the research are examined, it is determined that the personal development of individuals in general is relatively high. The researcher also reported the participation rates for recreational activities in Table 1.

Table1. Distribution of participation scores for recreational activities

Cultural activities	(M = 4.69, SD = 1.59)
Social activities	(M = 4.61, SD = 1.52)
Outdoor activities	(M = 3.98, SD = 1.65)
Hobbies and indoor activities	(M = 3.90, SD = 1.73)
Physical activities	(M = 3.47, SD = 1.79)
Volunteer activities	(M = 3.07, SD = 1.71)

IV. CONCLUSION

In this study, which deals with recreational activities in people with disabilities, traditional systematic review method used and the data collection process was conducted according to the content analysis. The selection of the articles discussed in the research was carried out in this method frame. When viewed from this angle in terms of the research methods used in research related to the Turkey-based recreation and physical activity it can be considered as a unique method. When the results of the research are examined, it is reported that the participation of disabled individuals in recreational activities has positive effects on their lives. There are a lot of research literature on this subject (Brandon, n.d.; Bult, Verschuren, Jongmans, Lindeman, & Ketelaar, 2011; Margalit, 1984; McCann, Bull, & Winzenberg, 2012; McConachie, Colver, Forsyth, Jarvis, & Parkinson, 2006; Shields, Synnot, & Barr, 2012; Shikako-Thomas, Majnemer, Law, & Lach, 2008; Young, Rice, Dixon-Woods, Colver, & Parkinson, 2007). however, it may be said that they need more research in Turkey-based. It is also important to promote joint research with physical education, physical activity, recreation researcher and health professionals. More particularly multidisciplinary research is needed in Turkey

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