1ST TTU BIENNIAL RESEARCH CONFERENCE PROCEEDINGS

THEME: TECHNICAL/VOCAATIONAL EDUCATION TRAINING (TVET): A KEY TO ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS

22ND & 23RD NOV., 2017

TTU AUDITORIUM, TAKORADI, GHANA
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TAKORADI TECHNICAL UNIVERSITY

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TAKORADI TECHNICAL UNIVERSITY AUDITORIUM,
TAKORADI, GHANA

22ND & 23RD NOVEMBER, 2017

PROCEEDINGS
FOREWORD

It is with deep satisfaction that I write this foreword to the Proceedings of the 1st TTU Biennial Research Conference held at the Takoradi Technical University’s auditorium on the Theme: “Technical/Vocational Education Training (TVET): A Key to Achieving the Sustainable Development Goals”, from 22nd November, 2017 to 23rd November, 2017.

Takoradi Technical University continues its tradition of bringing together researchers, academics and professionals in Applied Sciences, Arts and Technology and Social Sciences from all over the world to share and to discuss empirical and conceptual issues that will help advance pedagogy and national development. This conference was not an exemption, as quality current papers in the fields of Applied Sciences, Arts, Technology, Social Sciences and Humanities, Teaching and Education, Environment and Sustainable Development, Health and Welfare were presented. This document, therefore, constitutes an excellent reference book for academicians, researchers and professionals.

In addition to the contributed papers, two crucial keynote presentations were given to throw more light on the theme of the conference during the colloquium. Firstly, Mr. Joseph Bawuah from the Association of Ghana Industries (AGI) spoke to the theme of the conference from the industry perspective. Secondly, Prof. Anthony Simons (Dean of the Faculty of Engineering, University of Mines and Technology) spoke to the theme of the conference from the academic perspective.

I trust that the contents of this Proceedings will stimulate further study and research to help improve our world.
We thank all authors and participants for their contributions.

Prof. Anthony Joe Turkson
Conference Chair
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Prof. Anthony Simons (Dean, Faculty of Engineering, University of Mines and Technology, Tarkwa)
PROFILE OF TAKORADI TECHNICAL UNIVERSITY

Takoradi Technical University (previously Takoradi Polytechnic) was established in April 1954 as a Government Technical Institute and operated for thirty-nine (39) years under the Ghana Education Service of the Ministry of Education. During that period, it offered programmes mainly at the Craft and Technician Certificate levels in commercial and technical subjects awarding Royal Society of Arts (RSA) and City and Guilds of London, United Kingdom Certificates. However, in 1990, the Ghana Education Service took over the awards of the above-mentioned certificates.

As part of the Government Educational Reforms which began in the late 1980s, the Institution and five others were upgraded by the Polytechnic Act 321 (PNDC Law 1993) to become part of the Ghana Tertiary Education System. The Polytechnics, per the law, began to offer Higher National Diploma (HND) in the 1992/93 academic year. These reforms mandated the polytechnics to complement the role of the universities to increase access to tertiary education for the training of middle and higher level manpower.

An act of Parliament, the Technical University Act 2016 (Act 992), subsequently converted eight of the ten existing polytechnics in Ghana to technical universities in 2016. Takoradi Polytechnic was part of the eight. To this end, Takoradi Polytechnic Council adopted the name “Takoradi Technical University”, thus making the institution a fully-fledged Technical University.

Administratively, the direct governance and administration of the University is vested in the University Council which is the highest policy-making body while the Academic Board is responsible for determining
academic policies, prescribing rules and regulations for operations and advising the Council on policy formulation.

The membership of the University falls into four categories. These are the senior members, the junior members, the senior staff and the junior staff. The senior members include senior academic and professional staff like the Vice Chancellor (who is the Head of the University) and the Registrar. The junior members constitute students enrolled in the University and registered with an academic department for a programme of study. The senior staff are the administrative and technical staff of the equivalent rank of administrative assistant and above. The junior staff are supporting staff, both administrative and technical and of equivalent rank below administrative assistant. Again, the staff are put under two main categories which are the academic and non-academic staff. The academic staff of the University are in charge of teaching and assessing students while the non-academic staff consist of administrative staff, security officers and labourers.

The faculties are responsible for coordinating academic work of the various academic departments of the university and ensuring that proper academic standards are maintained. Takoradi Technical University currently has five faculties (Faculty of Applied Sciences, Faculty of Built and Natural Environment, Faculty of Applied Arts and Technology, Faculty of Business Studies and Faculty of Engineering) (Takoradi Technical University Strategic Plan, 2016).
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PROGRAMME

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Colloquium (University Auditorium)
All Panel Sessions (Main Auditorium and Conference Room 1)
Exhibition (Conference Room 2)

8:00 a.m. - Registration of Participants
9:00 a.m. - Welcome Address – Evg. Prof. Anthony Joe Turkson, Chairman of Publications Board)
9:10 a.m. - Chairman’s Remarks – Rev. Prof. John Frank Eshun (Vice Chancellor, Takoradi Technical University)
9:20 a.m. - Keynote Address 1 – Mr. Joseph A. Bawuah (Chairman, Association of Ghana Industries – Western and Central Regions)
9:40 a.m. - Musical Interlude
9:45 a.m. - Address and Opening of Conference – Hon. Dr. Kweku Afriyie (Western Regional Minister)
10:05 a.m. - Keynote Address 2 – Prof. Anthony Simons (Dean, Faculty of Engineering, University of Mines and Technology, Tarkwa)
10:25 a.m. - Corporate Presentation (FOCUS 1 MEDIA)
10:40 a.m. - Chairman’s Closing Remarks
10:45 a.m. - Tea Break/Photographs/Visit to Stands

MC - Dr. Eudora Hagan
STUDENTS’ MATHEMATICS ACHIEVEMENT AND ATTITUDE TOWARDS MATHEMATICS: THE SIAMESE TWINS

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Abstract
The study determined whether relationship existed between students’ mathematics achievement and their attitude towards Mathematics in Public Senior High Schools in Ahanta West and Mpohor Districts of the Western Region of Ghana. The correlational research design was used for the study. Multi-stage stratified and purposive sampling techniques were used to select two Public Senior High Schools and 221 students for the study. Questionnaire and performance test were the instruments used for data collection. The reliability coefficient for the questionnaire was 0.81. Pearson Moment Correlation was used to test the hypotheses at 0.05 level of significance. The results of the study showed a high positive relationship between students’ attitude towards mathematics and performance in mathematics. It was found that significant relationship existed between students’ attitude towards mathematics and performance in mathematics. It was recommended that any attempt to improve mathematics achievement of Senior High School students should focus on helping the students develop positive attitude towards mathematics.

Key words: Assessment, relationship, attitude, mathematics, achievement
Introduction
Mathematics has been universally recognized as the fulcrum of the sciences and many people in the world require its knowledge to overcome some life challenges. According to Ernest (2000), mathematics is learnt in schools to reproduce mathematical skills and knowledge - based capability and to develop creative critical appreciation of the social application and use of mathematics. This means that mathematics is an essential subject which helps students to acquire knowledge and skills to solve societal problems.

Mathematics is also seen as an important subject in schools, workplaces, businesses and the modern society at large. It helps individuals to take useful personal decisions in life. Mathematics is seen to be the language of everyday use whether in the market place, schools or even at home. It is the language of life and some individuals may not be able to survive without it because it is the tool needed to cope with the challenges of life (Omoegun, 2009). The usefulness of mathematics can be observed in the application of numbers to measure length, volume, weight, density, temperature, speed and acceleration.

Arons (1993) states that positive attitudes help students develop problem-solving abilities, develop interest in their environment and develop useful skills. This means that students cannot achieve much in mathematics without a positive attitude towards the subject. Positive attitudes make them curious and they would wish to learn much. The importance of mathematics may have led the Ghanaian Government to make it a compulsory subject in the Basic and the Senior High Schools as well as a prerequisite for admission to tertiary institutions.

In Ghana, mathematics is one of the core subjects taught at all levels but students seem to shy away from the subject for many reasons which
include phobia, teachers’ attitude towards the teaching of mathematics and students’ negative attitude from the assumption that mathematics is generally a difficult subject to study (Okereke, 2006).

It could therefore be said that any attempt to deal with the poor mathematics achievements of Senior High School students without dealing with the attitudes of these students with regard to the subject mathematics will be a fiasco. The two; mathematics achievements and attitudes towards mathematics are two sides of the same coin.

The Concept of Attitude
According to Shrigley, Koballa and Simpson (1988), the word attitude is from the Latin word ‘aptus’ and it is defined with the framework of social psychology as a subjective or mental preparation for action. It defines the outward and visible postures and human beliefs. Attitudes determine what each individual will see, hear, think or do. They are rooted in experience and do not become automatic routine conducts. Attitudes again mean individual’s prevailing tendency to respond favourably to an object, person, event or institution. This means that attitudes are an individual’s overall orientation about a phenomenon, person, or an institution.

Factors Influencing Students’ Attitudes
Attitudes of students could be influenced by many factors. These include competence and conceptual mastering of content, lack of confidence, school environment, motivation, teachers ‘commitment and peer influence. Competence and conceptual mastery of content as stated by Schafer, Bene and Newbery (2001) is that technically incompetent and lack of fundamental concepts on the part of the student has great influence on the kind of attitudes students form.
A student who does not know the skills and knowledge of solving a simple mathematical problem will never like mathematics lessons.
According to Brown (1982), most students especially girls lack the confidence of solving mathematical problems both at school and at home. Brown goes further to say that the students’ lack of confidence is due to their poor conceptual and phenomenological mathematics foundation. This creates difficulties for the students to understand the concept they learn in their further studies.

Another factor that influences students’ attitudes is the school environment. Conditions such as school structure, furniture, learning materials, libraries and other related conditions play important roles in the formation of students’ attitude towards mathematics. These conditions have great influence on students’ attitudes towards the learning of the subject. Cedrez (1993) says that poor school facilities can affect the attitudes of even the most devoted and prepared student and it goes a long way to affect the performance of the students. The report from Lockheed and Verspoor (1991) emphasised that the basic elements of the school environment are frequently missing in most developing countries and these lead to regular absenteeism of students from mathematics lessons in the Senior High Schools. The World Bank Report (1992) also asserts that poorly maintained school facilities or resources discourage students and have negative effects on students’ academic performance.

Furthermore, motivation counts as far as students’ attitude towards the learning of mathematics is concerned. Musaasi (1998) defines motivation as the inner drive which promotes people to act in a certain way. He explained that it involves a number of psychological factors which start and maintain activities towards the achievement of personal goals.

Chauhen (2007) posited that motivation is the arousal or tendency to act in order to produce one or more effect. He identifies two types of motivation, namely, intrinsic and extrinsic motivation. He considers the intrinsic motivation as those needs, wants and desires which exist in the individual
and that, the student who is intrinsically motivated will learn with positive attitude on his or her own with little or no supervision.

The extrinsic motivation according to him stems from external stimulation such as rewards, availability of resources, encouraging responses and strict supervision. This explains that motivation has a positive relationship with students’ academic performance. Teachers’ commitment also influences students’ attitudes. Lodahl and Kejner (1965) define teachers’ commitment as the extent to which a teacher is involved in his/her work or the importance which he/she attaches to teaching and his perception of it as contributing to his/her self-image.

Her Majesty’s Inspector of Schools (UK), (1990) reports that a dominant factor in the achievement of high standards by students was the strength of commitment on the parts of the teachers to ensure that pupils were making progress. Moreover, peer influence could affect students’ attitude towards mathematics. According to Shilts (1991), students’ attitude is highly influenced by their peers. Adolescent always try to fit well into their association. As a result, the most influential or popular person in their group has the potential of influencing the others to think and act the same.

Students’ attitudes could have an implication on the work of the classroom teacher. Osarenren and Asiedu (2007) postulate the following as the implications of attitudes to the classroom teacher: teachers teaching the subject should be well vested in the content and pedagogy of teaching to help students form positive attitudes towards the subject, teachers should teach students to understand the principles behind mathematics to enable them grasp the most basic concept in mathematics so that learning the complex one will not be difficult for them and students should be allowed to assess themselves or evaluate their learning so that they can confidently deal with their own weakness.
Effect of Students’ Attitude on Mathematics

Attitude can be positive or negative. Arons (1993) noted the following as effects of positive attitudes of students towards the learning of mathematics. (1) Promote critical thinking in students. That is when students have good opinion or feeling for the subject, they tend to develop skills to have in-depth knowledge in the subject, (2) helps develop problem solving abilities in students. This is to say that when students have positive attitude towards mathematics it helps them to internalize the mathematical concepts and its applications.

This then helps the students to use the mathematical concepts to solve problems and (3) helps students develop interest in their environment. Students with positive attitudes towards mathematics will have positive perception about the environment. Since mathematics is the language of nature (environment), students’ positive interest in mathematics will be evidenced in their manipulation of the environment to solve environmental problems.

However, according to Arons (1993), negative attitudes towards mathematics makes students see mathematics as difficult and scaring. When students are not able to solve even the most basic problems in mathematics and do not understand the lessons, they tend to see the subject as difficult and unattractive. Fisher (2005) states that negative attitudes towards mathematics makes students see mathematics as abstract and not real.

When students are not made to understand the principles behind the formulae or the concepts in mathematics, they do not see the reality or the authenticity of the subject. This discourages them from learning the subject or anything related to it. This leads to low academic performance of students in mathematics.
Ways to Change Attitudes of Students towards Mathematics

Arons (1993) reported that the students style and mainly their attitudes are strongly context outcomes rooted in experience and do not become automatic routine activity. In this sense, they are developed through very slow communication and become established constructs for each individual only after sometime. He further noted that attitudes can be modified only by each individual when he/she becomes aware through elements and pieces of evidence that new postures would be better to deal with the world around. Students’ attitudes are not fixed or static or destined but a formation through the interaction of the environment. This means the current attitudes of Senior High School students could be changed for the better if the environment is modified in that direction. Fisher (2005) also revealed that students require an entitlement to regular practice in school time. Students’ involvement in activities could help to modify their attitude in all aspects and learn new methodologies to make their studies in mathematics more effective.

Chauhen (2007) also says motivation is the arousal or tendency to act in order to produce one or more effects. This means that one of the surest ways to change students’ attitude towards mathematics is to motivate their lesson in mathematics. De Lange (1996) has it that, one basic aspect to improve classroom practices with respect to students’ attitude is to allow the students’ to identify and to reflect the aspects of their attitudes that need change.

This is to say that students’ self-assessment or reflection on their mastering of a concept and their personal evaluation of their attitude towards mathematics is one of the surest ways to help them develop positive attitude towards the subject and also learn better.

Bruner (1996) says students should be directly involved in defining priorities about their real problems and should be able to select appropriate
solutions. This means that students should be part in selecting the most essential aspects of their lessons and should be made to reflect on how the lessons could be used to solve societal problems. This makes students develop interest in the lesson because they are involved.

Meaning of Academic Achievement
Academic achievement has become a hot topic in education today, especially with increased in accountability for classroom teachers. The ultimate goal for any teacher is to improve the ability level of students and prepare them for adulthood. Defining academic achievement and factors that impact progress is critical to becoming a successful teacher.

According to the Cambridge International Dictionary of English (2000), ‘academic’ is related to school, college and university or connected with studying and thinking and to ‘achieve’ means to succeed in finishing or reaching an aim after a lot of work. Therefore, academic achievement could be seen as finishing or reaching the educational goals after going through some activities and processes. It also means that academic achievement could successfully accomplish the academic goals of a school or college or university. The attainment could be measured after the completion of a course or lesson.

According to Cowen et al., (1996), academic achievement measures the amount of academic content a student learns in a determined amount of time. Each grade level has learning goals or instructional standards that educators are required to teach. Standards are similar to a 'to-do' list that a teacher can use to guide instruction. This means that academic achievement is concerned with students’ ability to master the content of the educational goals.

Becker and Luthar (2002) define academic achievement as a person's strong performance in a given academic arena. A student who earns good
grades or awards in Mathematics has achieved in the academic field of Mathematics. Stakeholders in education monitor the overall level of students’ academic achievement to decide what, if any, changes need to be made in the educational system. That is students’ ability to earn good grades in examinations is an evidence of academic achievement in that particular subject area.

Factors that Affect Students’ Academic Achievement

Cowen et al., (1996) stated that, classroom instruction is the most important factor that impacts student achievement. Teachers influence the quality of instruction, set expectations for learning, and measure the level of understanding. For example, when a standard is not presented in a way that a student can understand, or if it is taught in a way that is boring, it can be very difficult for a student to meet the required level of achievement. That is to say that the classroom teacher should use strategies that boost the interest of students in the lesson and make them responsible for achievement. Likewise, student achievement involves well-thought out strategies to improve the quality of learning. Student success in using real-time assessment in its web-based differentiated instruction influences academic achievement.

As stated by Cowen et al., (1996), one potential explanation for the lack of significant achievement improvements despite increased economic resources is that concerted efforts have not been taken to ensure that teachers and school leaders receive essential professional development experience, which allows them not only to be effective teachers, but also to be sensitive to the developmental needs of schools or students.

Becker and Luthar (2002) believe that another factor that may influence academic achievement is learning disability. Learning disability is a condition that causes a student to learn at a slower pace than students of the same age or grade level. A learning disability can make understanding
of some standards more difficult. They stated that the mental health of students is a key factor to influence academic achievement because academic achievement is cognitive centred.

According to Schmoker (1999), there are two main contributing factors to students’ academic achievement that are psychological and sociological factors. Psychological factors refer to the internal elements of the individual including emotional and cognitive domains, whereas sociological factors refer to external factors such as environment and friendship. However, both factors are inter-related and dependable.

Magnuson (2007) states that, the support and availability of the parents, their financial situation and standard of living also influences students’ academic achievement. Parent’s academic socialization is a term describing the way parents influence students' academic achievement by shaping students’ skills, behaviours and attitudes towards school. Parents influence students through the environment and the discourse they have with their children. Academic socialization can be influenced by parents’ socio-economic status. Highly educated parents tend to have more stimulating learning environments for the students.

According to Schmoker (1999), there is only one factor that influences academic achievement and that factor is the teacher. It is the teacher and what the teacher knows and can do that is the determining factor with student achievement. The bottom line is that there is no way to create good schools without good teachers. It is the administrator who creates a good school. And it is the teacher who creates a good classroom. Therefore, excellent classroom management, high academic engagement, positive, reinforcing, cooperative environment and encouragement of self-regulation are all what the classroom teacher needs to ensure effective instruction which leads to students’ achievement. Students’ academic achievement is wrought with some implications.
These include (1) teachers setting clear expectations for student behaviour and creating achievable learning goals for the students’ academic achievement, (2) motivating students intrinsically to boost their academic achievement, (3) ensuring learning-friendly classroom environment devoid of fear and anxiety for students to be at peace to learn and (4) positive, reinforcing and cooperative environment are needed for academic achievement.

This could be achieved with the help of assessment as learning which involves students in the assessment process and tag students to their own progress in academic performance. It is indeed, important to note that the progression of the student is at stake when mathematics is not given keen attention. Hence, the study determined whether relationship existed between students’ mathematics achievement and their attitude towards mathematics in Public Senior High Schools in Ahanta West and Mpohor Districts of the Western Region of Ghana.

Research Hypotheses
1. There is no significant relationship between students’ attitude towards mathematics and mathematics achievement.
2. There is no significant relationship between the attitude towards mathematics and mathematics achievement due to gender.
3. There is no significant relationship between the attitude towards mathematics and mathematics achievement due to schools.

Methods
The correlational research designed was used for the study. Multi-stage-stratified and purposive sampling techniques were used to select Mpohor Senior High School in the Mpohor District and Baidoo Bonsoe Senior High School/Tech in the Ahanta West District for the study. Baidoo Bonsoe Senior High/Tech and Mpohor Senior High were purposively
selected over their counterparts on mixed gender and stronger enrolment respectively. The courses offered in each school were identified. Then the random sampling was used to select a class from each course with more than one class. With courses with a class, that class became automatic participant in the study. Through this, seven classes were selected from Baidoo Bonsoe Snr. High/Tech and five from Mpohor Snr. High. This is because Mpohor Snr. High did not offer technical and science courses.

Two hundred and twenty-one (221) Form Two Senior High School students participated in the study. Questionnaire and mathematics achievement test were used for the data collection. Sixty-one (61) Baidoo Bonsoe Senior High School students in Visual Art and Technical and one hundred and sixty (160) Mpohor Senior High School students in Home Economics, General Art, Agricultural Science and Visual Art totalling 221 participants participated in the study. They were selected because against all other extraneous variable, there was no significant difference in their performance and attitude with regard to mathematics.

The results of the test and questionnaire were analysed using Pearson Moment Correlation. The relationships were tested at a significance level of 0.05.

**Results**

**Hypothesis 1**

There is no significant relationship between students’ attitude towards mathematics and mathematics achievement.

Research hypothesis one sought to test the relationship that existed between students’ attitude towards mathematics and mathematics achievement. Pearson moment correlation was conducted at a level of significance 0.05. The result of the analyses is presented in Table 1.
Table 1: Descriptive statistics and correlation coefficient of attitude towards mathematics and mathematics achievement

<table>
<thead>
<tr>
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<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>P</th>
<th>R</th>
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<tr>
<td>Achievement</td>
<td>9.85</td>
<td>2.47</td>
<td>221</td>
<td>0.000</td>
<td>0.736</td>
</tr>
<tr>
<td>Attitude</td>
<td>44.89</td>
<td>9.68</td>
<td></td>
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</tr>
</tbody>
</table>

Significant at p<0.05

Table 1 presents the descriptive statistics and the correlation coefficient of the total students from the selected schools for the study. The results showed that students achievement scores (M = 9.85, SD = 2.47) was lower than attitude scores (M = 44.89, SD = 9.68). But the results further showed a high positive significant relationship between students’ achievement and their attitude towards mathematics (r = 0.736, p<0.05, (2-tailed). This implies that students with positive attitudes towards mathematics tend to perform well in mathematics.

Hypothesis 2
There is no significant relationship between the correlation coefficients of attitude towards mathematics and mathematics achievement due to gender.

The purpose of research hypothesis two was to find out the relationship between the correlation coefficients of attitude towards mathematics and mathematics achievement due to gender. Pearson moment correlation was conducted at 0.05 level of significance and the results is presented in Table 2.
Table 2: Descriptive statistics and correlation coefficient of attitude towards mathematics and mathematics achievement due to gender

<table>
<thead>
<tr>
<th>Schools</th>
<th>Gender</th>
<th>Variable</th>
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<td></td>
<td>Attitude</td>
<td>43.89</td>
<td>8.81</td>
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<td>Female</td>
<td>Achievement</td>
<td>9.35</td>
<td>2.54</td>
<td>123</td>
<td>0.000</td>
<td>0.783</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitude</td>
<td>40.80</td>
<td>8.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBSHT</td>
<td>Male</td>
<td>Achievement</td>
<td>10.14</td>
<td>2.33</td>
<td>17</td>
<td>0.001</td>
<td>0.893</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitude</td>
<td>51.50</td>
<td>10.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Achievement</td>
<td>10.11</td>
<td>1.745</td>
<td>44</td>
<td>0.008</td>
<td>0.604**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitude</td>
<td>49.22</td>
<td>6.674</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>Male</td>
<td>Achievement</td>
<td>10.52</td>
<td>2.711</td>
<td>54</td>
<td>0.000</td>
<td>0.741**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitude</td>
<td>48.52</td>
<td>10.53</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Achievement</td>
<td>9.59</td>
<td>2.332</td>
<td>167</td>
<td>0.000</td>
<td>0.731**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitude</td>
<td>43.53</td>
<td>8.774</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at p<0.05

Table 2 shows the correlation coefficients of students’ attitude towards mathematics and their mathematics achievement due to gender. The results showed that for males in MPOSEC, achievement scores (M = 11.11, SD = 3.02) was lower than attitude scores (M = 43.89, SD = 8.81). However, it was observed that significant relationship existed between achievement and attitudes (r = 0.889, p<0.05, (2-tailed) of males. Female counterpart in MPOSEC had achievement scores (M = 9.35, SD = 2.537) which was lower than attitude scores (M = 40.80, SD = 8.45). The results of the study also showed a significant positive relationship between achievement and attitude (r = 0.783, p<0.05, (2-tailed) of females.
In Baidoo Bonsoe Senior High/Tech, the results of the study revealed that males’ achievement scores (M = 10.13, SD = 2.09) was lower than attitude scores (M = 50.38, SD = 8.85). But it was found that significant positive relationship existed between achievement and Attitude (r = 0.893, p<0.05, (2-tailed) of males. For females in Baidoo Bonsoe Senior High/Tech, achievement scores (M = 10.11, SD = 1.745) was lower than attitude scores (M = 49.22, SD = 6.67). It was however revealed that a significant positive relationship existed between achievement and attitude (r = 0.604, p<0.05, (2-tailed) of females.

For the overall correlation between gender, males’ achievement scores (M = 10.52, SD = 2.711) was lower than attitude scores (M = 48.52, SD = 10.54). But it was found that attitude of males significantly related to their achievement (r = 0.741, p<0.05, (2-tailed). Again, females’ achievement scores (M = 9.59, SD = 2.332) was lower than attitude scores (M = 43.53, SD = 8.774). However, it was shown that attitude of students significantly related to their achievement (r = 0.731, p<0.05, (2-tailed). The results showed that there was a statistically significant relationship between students’ attitude towards and their achievement in mathematics at 0.01 sig. level within gender.

That is for any group; the correlation between students’ attitude mathematics and their mathematics achievement is same for both male and female irrespective of their performance.

Hypothesis 3
There is no significant relationship between the correlation coefficients of attitude towards mathematics and mathematics achievement due to schools.

Research hypothesis sought to find out whether significant relationship existed between the correlation coefficients of attitude towards
mathematics and mathematics achievement due to schools. Pearson moment correlation was conducted at 0.05 level of significance and the results are presented in Table 3.

Table 3: Descriptive statistics and correlation coefficient for Mpohor and Baidoo Bonsoe Senior High/Tech. schools

<table>
<thead>
<tr>
<th>School</th>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>P</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpohor Snr. High</td>
<td>Achievement</td>
<td>9.67</td>
<td>2.69</td>
<td>160</td>
<td>0.000</td>
<td>0.800</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>41.31</td>
<td>8.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baidoo Bonsoe Snr. High/Tech</td>
<td>Achievement</td>
<td>10.13</td>
<td>2.09</td>
<td>61</td>
<td>0.001</td>
<td>0.779</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>50.38</td>
<td>8.85</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at p<0.05

Table 3 presents the correlation coefficient between achievement and attitude for Mpohor Senior High and Baidoo Bonsoe Senior High/Tech. The results showed that in Mpohor Senior High School, achievement score (M = 9.67, SD = 2.69) was lower than attitude score (M = 41.31, SD = 8.51). But the results also showed a significant positive relationship between achievement and attitude (r = 0.800, p<0.05, (2-tailed).

Also, in Baidoo Bonsoe Senior High/Tech School, the achievement scores (M = 10.13, SD = 2.091) was lower than attitude scores (M = 50.38, SD = 8.85). The study results however showed a significant relationship between achievement and attitude (r = 0.779, p<0.05, (2-tailed). This means that there is a high positive correlation between attitudes towards mathematics and students’ mathematics achievement in both schools with approximately the same degree and nature of relationship.
Discussions
The results of the study showed that there is a significant correlation between students’ attitude towards mathematics and mathematics achievement. This means that students with positive attitude towards the study of mathematics tend to perform well in mathematics. This confirms past studies that suggest that there is a close relationship between students’ attitudes towards academic subject and their overall achievement (Erdogan, Bayram & Deniz, 2008).

There is a positive relationship between student’s interest in academic subject and its performance. (Arham, Mesir & Mohammad, 2006; Zainudin et. al., 2007) This means that irrespective of the level of performance or attitude, the two moves in the same and degree. According to Popham (2005), students’ attitudes or interests should be enormously important to educators, because affective dispositions are powerful predictors of students’ subsequent behaviour.

There is a strong association between individuals’ attitudes towards education and their academic performance and commitment. Students who have negative attitudes towards education activities are found to exhibit challenging behaviour including anti-social and off-task behaviour (Awang, Jindal-Snape & Barber, 2013).

Also, the study revealed that; there is a significant correlation between female students’ attitude towards mathematics and their mathematics achievement just like male counterparts. This means that there is no significant difference in the correlation between students’ attitude mathematics and their mathematics achievement due to gender. Though research has shown that males perform better and possess positive attitude in mathematics than their female counterparts, the relationship between attitude towards mathematics and mathematics achievement in terms of nature and degree is the same for both gender.
The results of the study also revealed that there is significant correlation between MPOSEC students’ attitude towards mathematics and mathematics achievement. The result is the same for Baidoo Bonsoe Senior High/Tech. School. It can therefore be said the relationship between students’ attitude towards mathematics and mathematics achievement is not limited to a particular school. No matter the level of performance of the school in mathematics, the performance is directly proportional to the attitudes of the students towards mathematics.

Conclusions and Recommendations

The results of the study revealed the Siamese nature of students’ attitude towards mathematics and mathematics achievement. This means that the two, are inseparable hence move in the same direction and degree. It therefore means that any change in one will contribute a proportional change in the other. The results showed that the relationship between students’ attitudes to mathematics and their achievement in mathematics is not a function of school or gender.

It can be said that the various attempt made by all educational stakeholder to improve on students’ performance have not yielded positive results because all these attempts have failed to have a second look at students’ attitude towards the subject. It can be seen that students, especially girls, who are perceive to perform poor in mathematics can improve on their performance when they are made to develop a positive attitude towards mathematics.

It is, therefore, recommended that teachers and facilitators of mathematical knowledge should adopt strategies that would cause students to develop positive attitude towards mathematics. This would help students to perform well in mathematics.
References


QUELLE FORME D’HUMANISME POUR UNE AFRIQUE MODERNE DANS LA NOUVELLE CONSCIENCE DE CAMARA NANGALA?

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Resume
Le texte littéral tourne autour d’un pouvoir despote et tortionnaire en Afrique où l’homme en général et le noir en particulier n’est plus au centre des préoccupations sociales et humaines. Dès lors, les plus riches ou les pouvoirs décisionnels, pour des intérêts mesquins, dépossèdent des plus démunis les richesses agricoles et naturelles, la force de travail et le principe de développement politique, social, signes annonciateurs d’une émergence soutenue en Afrique. Camara Nangala, Directeur de conscience, demande à la nouvelle génération dont Tanoh, autochtone et Thibault, sympathisant européen de servir le peuple que d’être servi et ce par l’entremise de l’humanisme, une assistance aux personnes vulnérables, le respect de la dignité d’autrui, le patriotism, la philanthropie, la convivialité et la culture de la paix.

Mots clés: Forme, humanisme, Afrique moderne

Abstract
The literal test turns round a despotic and iniquitous power in Africa where man in general and black man in particular is no longer in the middle of social and human concerns. Ever since then, the richest people or the powers that take decisions, because of some mean interests, have been disseizing the most unprovided people of agricultural and natural
richness working strength and the principle of political, social and economic development, signs that are forerunners of a sustained emergence in Africa.

Camara Nangala, a confessor, asks the new generation which Tanoh, a native and Thibault, a European sympathizer are from, to serve the people rather than being served and this can only be done through humanism, assistance for vulnerable people, respect of other people’s dignity, patriotism, philanthropy, conviviality and culture of peace.

Key words: Pypef, humanism, modern Africa

Introduction

Dès lors, nombreux sont des écrivains qui vont se servir de leurs plumes comme une arme de combat pour stigmatiser les perversions engendrées par-ci par-là en orientant la voix des sans voix vers ce qui peut constituer pour elles la voie royale : l’humanisme.

L’écrivain ivoirien Camara Nangala s’inscrit au rang de ceux-ci par le truchement de son œuvre romanesque « La Nouvelle Conscience »\(^1\) dans laquelle la notion d’humanisme est largement abordée. Sur ce, comment pourrons-nous percevoir l’humanisme dans cette œuvre contemporaine ? Comment se manifeste t-il dans le roman ?

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\(^1\) Nangala (C.), La nouvelle Conscience, Abidjan, Ed.CALAO, 2006.
Dans le souci de garantir une adéquation entre l’humanisme et le contenu de la trame romanesque, nous utiliserons une démarche sémiotique et sociocritique dans la mesure où le texte par sa structure se veut un acte social. Claude Duchet en parle : « Dans de l’œuvre et dedans du langage : la sociocritique interroge l’implicite, les présupposés, le non-dit ou ‘impensé, les silences et formule l’hypothèse de l’inconscient social du texte »

Les indices textuels renvoient à la sémiotique qui vient du grec « semeion » qui veut dire “signe” à décoder et la sociocritique, les éléments imprégnés du social. Les deux méthodes se complètent. En vue de mieux appréhender cette notion d’humanisme, nous procéderons d’abord à une présentation succincte de l’auteur et enfin montrer ses implications dans le récit.

Présentation de l’auteur
Camara Nangala est un écrivain ivoirien, né le 10 Novembre 1955 à Katiola dans le nord de la Côte d’Ivoire, Chef-lieu de région du Hambol. Dès sa tendre enfance, il prend goût à la lecture grâce à son père lui-même grand lecteur de renom : ils ont donc cultivé ce vignoble de père en fils.

Après de brillantes études primaires, secondaires et universitaires, il devient enseignant de Physique et de Mathématiques ; disciplines qu’il enseigne actuellement au Collège Notre Dame du Plateau à Abidjan.

Aussi, le souci majeur de mettre l’intérêt collectif au-dessus de l’intérêt personnel, c’est-à-dire aider son prochain à se réaliser, à se prendre en charge, l’incite-il à nourrir des ambitions de devenir écrivain.

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Fort de cela, la lecture et l’écriture vont le conduire à produire plusieurs œuvres littéraires dont des poésies, des recueils de nouvelles, des romans et surtout des ouvrages pour la jeunesse.

La pertinence des thèmes abordés, traduite par une plume simple et séduisante fera de lui le lauréat de plusieurs concours littéraires dont « Raconte-moi une histoire » en 1989 et « une histoire pour l’an 2000 » en 1999, organisés par les Editions CEDA.

A la date d’aujourd’hui, il est considéré comme l’un des auteurs ivoiriens les plus prolifiques en trente ans d’écritures.

Approche définitionnelle de l’humanisme
Dans la Rome antique, le mot ‘’humanitas ‘’ désigne « toutes choses élevant l’homme à une place différente de celle des autres êtres vivants »\(^3\). L’expression humaniores litterae désigne les ‘’humanités ‘’. On dit encore, ‘’faire ses humanités ‘’ pour présenter une activité d’éducation ou de civilisation portée sur les travaux de la littérature classique, à savoir la solidarité envers les plus faibles, le respect de la dignité d’autrui, l’équité, l’amour de sa patrie et la culture de la paix.

Du théocentrisme médiéval, on aboutit aussi à une vision anthropocentrique du monde à la renaissance, « une conception philosophique qui considère l’homme comme la finalité de tout le reste de l’univers »4. Pour nous donc, le terme “humanisme”, revêt diverses valeurs sémantiques, divers sens de façon générale :

- Au sens philosophique, l’humanisme renvoie au fait de mettre l’homme et ses valeurs au-dessus de tout : l’homme incarne à la fois une valeur suprême et la fin de toute action.

S’agissant de l’approche littéraire, l’humanisme désigne un vaste mouvement qui se rapporte à l’intelligence ou à l’intellectuel de la renaissance.

Comment se manifeste l’humanisme dans la nouvelle conscience ?
Lorsqu’on parcourt l’œuvre, l’humanisme, selon les personnages clés du roman dont Thibault, un européen et Tanoh, un autochtone, est un comportement, une culture exprimant une confiance en l’homme et en ses capacités de développement et d’ouverture.

3.1- L’exercice du pouvoir confisqué
Le pouvoir politique, symbole d’assistance d’aide et de secours aux populations, se transforme dans le récit.
Nous avons un pouvoir arbitraire où l’homme n’est plus au centre des préoccupations sociales et même humanitaires : Les plus nantis maltraitent et dévorent les plus démunis.

On a l’impression que nous sommes à l’état de nature où les règles les plus élémentaires qui régissent la démocratie : la liberté d’expression, la bonne gouvernance, la libre appartenance à un parti politique sont foulés au pied.
L’auteur à l’instar de Thomas HOBBES : « Homo Homini Lupus » (L’homme est un loup pour l’homme, cf Léviathan 1651), le confirme

dans ce passage: « Le système n’est pas à une contradiction près. Il ne connait qu’une logique : celle qui assure son maintien aux commandes. Même si cela heurte la morale et le bon sens. Il n’a pas d’état d’âme »\(5\). En outre, les champs lexicaux « pouvoir sans partage, demi-dieux’ »\(6\), en disent plus. L.S.Senghor l’atteste : « on ne bâtit pas un Etat moderne pour le plaisir de bâtir. Il s’agit, en définitive, de faire l’homme noir dans une humanité en marche vers sa réalisation totale, dans le temps et l’espace »\(7\). Cela nous fait penser à une vision mythique, qui rappelle l’âge d’or évoqué par les poètes antiques selon laquelle les peuples vivent dans une communauté harmonieuse et égaleitaire régie par une pleine possession de biens communs.

Par la suite, l’auteur ne discrédite pas sa plume et prend appui pour construire un réquisitoire voire acerbe contre le pouvoir insatiable qui, loin d’étancher sa soif de domination, animalise, chosifie, suce le sang et la moelle des populations comme des sangsues. Les termes lexicaux évaluatifs d’animosité : « violence, sauvage, traquer, gibier, bétail, soumettre, bestial, chasse »\(8\) qui parsèment l’ouvrage le rassurent. Ce tableau sombre que présente Camara Nangala nous amène à nous poser les questions suivantes sur les politiques : Méritent-ils de gérer les affaires de l’Etat ? Comment amener ces ‘‘bandits’’ de grand chemin, vils et sans cœur à revoir leurs copies?

La réponse à ces préoccupations se trouve dans l’étude des personnages suivants Thibault et Tanoh, des modèles d’humaniste à cultiver pour exorciser les tenants du pouvoir posséder par le diable et l’esprit maléfique.

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\(5\) Nangala C., La nouvelle Conscience, Ibidem,P.117.
\(6\) Ibidem.
\(7\) Senghor L.S, Eléments constitutifs d’une civilisation d’inspiration négro-africaine, Liberté 1, P.286.
\(8\) Nangala C., La nouvelle Conscience, Ibidem P.32.
3.2- Les partisans de l’humanisme
Si pour bon nombre de personnes, l’humanisme n’est qu’un simple mot, pour d’autres, par contre plus qu’un vain mot, l’humanisme est une culture, et même une façon d’être.

Cette vision de l’humanisme se perçoit à travers les traits de caractère des êtres fictifs, c’est-à-dire des « êtres de papier »9 comme Thibault et Tanoh.

Le choix de ces deux personnages répond au fait que Thibault est un Européen et Tanoh, un Africain. Cela dénote deux races, origines d’une nation forte et d’une nation en voie d’émergence.

3.2.1-1. Thibault : Une conduite modèle de l’humanisme
Philippe Edouard Thibault, le plus jeune fils de la famille Prevost montre l’humanisme à travers ses idéologies et ses projets de société : « L’Afrique serait paisible si la France n’allait pas y foutre la merde »10. Ce fait nous rappelle le partage de l’Afrique comme un gâteau qui sort du four lors du congrès de Berlin (1885). L’humaniste, exprime ici un sentiment de colère qui heurte la conscience morale face aux actions perverses de la métropole dans les affaires africaines. Dans une analyse comparative, il expose la situation sociale des Africains soumis et les actions perpétrées par la France qu’il est censé défendre. L’évocation des termes « désastres humains dus au développement, morts, faim, guerre »11 sont autant de calamités qui s’abattent sur une population dont le continent est doté d’énormes richesses naturelles. Instruit de cela, en clouant au pilori, ces fléaux avec une tonalité émouvante et poignante, Thibault nous fait vivre non seulement sa compassion mais aussi son refus systématique et sa révolte face à un peuple supposé nanti qui exploite et pille avec la dernière énergie et sans le moindre scrupule les richesses de tout un continent.

10 Nangala C. Ibidem P25.
11 Nangala C., Ibidem, P.27.
Nous avons également la succession des termes lexicaux qui décrivent la duperie, les attitudes fallacieuses des occidentaux dans les rapports qu’ils tissent avec des Africains : « farce grossière, marché de dupes, coups de force et autres coups tordus »

Thibault déplore l’insatiabilité ou la gourmandise exacerbée de la France qu’il aurait voulu voir comme un pays empreint de douceur d’honnêteté et de solidarité agissante.

Ce personnage, attaché aux vertus cordiales de l’humanisme, nous dit qu’être humaniste, c’est aussi savoir et pouvoir dénoncer les injustices quand il le faut même si cela ne nous arrange pas.

A tout prendre, le bon sens, l’intérêt aigu pour le bien être d’autrui font de Thibault un humaniste incontesté et incontestable. Le personnage de Tanoh répond, par ailleurs, à ce même besoin.

3.2.2- Tanoh : personnage et défenseur de L’humanisme
Le choix du personnage de Tanoh se justifie d’abord par sa provenance. En effet, ce personnage est né d’un père esclave et d’une mère dont les origines ne sont pas renseignées.

Rappelons que le terme esclave désigne toute personne qui est sous la dépendance absolue ou qui se soumet servilement aux volontés d’un maître.

Généralement, les personnes éduquées par des esclaves, font preuve d’humanisme patent et manifeste. Cela est dû aux souffrances endurées en tant qu’esclave. Frappées au coin du bon sens, elles refusent que le même sort soit réservé à leurs semblables.

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12 Nangala C., La nouvelle Conscience, P.27
Par voie de conséquence, les maîtres mots humilité, honnêteté, amour pour son prochain les caractérisent. Et, Tanoh n’est pas en marge à travers son sens accru d’humilité.

Le champ lexical de fraternité, d’amour et de philanthropie évoqué par les termes suivants : « concitoyens, camarades, frères »\(^{13}\), le confirment véritable apôtre d’altruisme.

Tanoh épouse l’emploi de chirurgien, qui consiste à faire des opérations (ablation, autogreffe, césarienne, pour sauver des vies. Il exclut de son champ d’intervention d’autres formes d’opération comme le curetage, qui consiste à tuer une vie pour sauver une vie.

Généralement, lorsqu’un patient est admis en salle d’opération, l’irréparable peut se produire si le médecin ne s’y prend pas bien. Il s’agit donc d’un travail très délicat et compliqué.

Cette disposition à vouloir le bien d’une entité humanisée, Tanoh, tient à le justifier à son entourage préoccupé. Et, c’est avec des inflexions vocales riches d’amour et d’affectuosité qu’il se confie :

« Je suis fasciné par le corps humain. Je me suis donné corps et âme à la chirurgie. J’en ai fait ma passion, ma raison de vivre »\(^{14}\). Ces phrases emphatiques et hyperboliques montrent son implication dans la chirurgie qui lui permet de conclure la convention solennelle de l’amour du prochain et de bonne foi. Sa vie se résume exclusivement à porter secours aux Hommes. Ce ferme dévouement pour son métier lui vaut les traits distinctifs d’humaniste accompli.

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\(^{13}\) Ibidem, P.P.9-148

\(^{14}\) Nangala C. La nouvelle Conscience, P.46.
Après s’être engagé de sauver des vies, il oriente son combat vers le développement économique pour offrir des conditions de vie agréable à la population : il ne vit que pour se mettre au service des autres au point où il ne s’appartient plus. C’est un maniéré.

C’est le motif pour lequel, il a refusé de rompre avec son port d’attache, c’est-à-dire sa patrie pour rentrer au pays et le servir. Et chose singulière et curieuse, tout était à sa portée : un bon travail, une situation financière enviable, une vie amoureuse stable et harmonieuse et bien d’autres bonheurs de vivre.

A mieux y regarder, il a fait le bon choix, car on est mieux chez soi. Et qui plus est, il soutient:

« Chez nous, tout reste à faire. Avons-nous le droit de tourner le dos aux autres ? »15. Cette interrogation ouverte et voilée d’une tonalité éprouvante et poignante, met en relief chez le personnage l’attachement à sa terre natale afin d’engager le développement durable.

Sa cible, c’est la jeunesse, l’avenir d’un pays. Il est question de l’éduquer, la guider dans sa formation intellectuelle tout en lui donnant des conseils avisés et sages pour y arriver :

« Vous aurez prouvé que vous aimez votre patrie, car vous serez aptes à la défendre et à la faire rayonner »16. Et, à Tanoh de renchérir : « je vous invite donc à rallier la bonne cause, la cause de la patrie. Je vous invite aussi à partager ma foi en l’avenir. »17, car « j’aime profondément mon pays et je crois fermement en lui »18.

16 Ibidem, P.121.
17 Nangala C, La nouvelle Conscience Ibidem, P.342
18 Ibidem, P.339

Ainsi, donne-t-il la nouvelle morale et le sens de la solidarité dans la révolution qui doit habiter la jeunesse. Ce fait nous fait penser à Ô pays, mon beau peuple ! de Sembène Ousmane 22 où Oumar Faye, a trouvé nécessaire d’organiser la jeunesse afin d’aider au développement de son peuple.

C’est en cela que Jean Zeigler fait remarquer :

« L’autonomie, l’indépendance d’un peuple sont réalisées lorsque le peuple est maître de ses richesses agricoles, de sa force de travail, de son projet politique, social et économique »23.

Indépendamment de tout cela, Tanoh est aussi un homme de paix. Lorsqu’on l’écoute dans l’entretien qu’il a avec la jeunesse, nous avons un vocabulaire de cohésion, de fraternité et d’union. Le personnage chirurgien sait lui seul, qu’il ne changera pas le monde, mais il tient à apporter sa pierre à l’édification de sa patrie.

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19 Ibidem, P.124
20 Monémémbo T. Les crapauds-Brousse, Paris, Ed du seuil, 1986,
21 Nangala C., P.115.
Nous retenons, enfin, de ce dernier qu’être humaniste, c’est avoir une grandeur d’âme pour sa patrie : « Les fruits de votre lutte ne seront vraiment de saveur agréable que si les actes que vous posez sont dénués de haine et empreints d’humanisme »\(^{24}\).

**Conclusion**

Somme toute, il ressort que l’écrivain engagé, Camara Nangala, à travers « la nouvelle conscience », tente d’injecter une autre façon de voir la vie aux Africains en général et plus spécifiquement aux Ivoiriens par l’entremise des êtres fictifs clés de l’œuvre dont Tanoh (un autochtone) et Thibault (un sympathisant européen). Cette nouvelle orientation consiste à inculquer aux Ivoiriens la culture, ciment d’une saine et harmonie sociale. Si des auteurs de renoms tels que Socrate et surtout Montaigne (Essais I, Chapitre XXXI) enseignent la bienveillance envers son prochain, la notion d’humanisme trouve tout son sens dans cette célèbre réflexion du dramaturge Latin, Terence (II ème siècle avant Jésus-Christ) lorsqu’il affirme : « je suis homme et rien de tout ce qui est humain ne m’est étrangé »\(^{25}\).

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ECONOMIC BENEFITS OF COIR FIBRE PRODUCTION IN GHANA

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Abstract
This presentation critically examines the essential benefits of coir fibre, document its production processes in Ghana and discusses its economic benefits that are likely to increase with further technological improvement in its production. The methodology employed was the qualitative approach and the descriptive survey. Observation and interviews were the research instruments used to gather data. Some findings are that there is lack of attention on the sector by the government; the lack of skilled personnel, modern machinery and technology have together plagued the industry, hindering its growth and development. The study recommends among others that the government of Ghana invests massively in the local textile industry through its ‘one district one factory’ flagship programme partnering manufactures in the acquisition of new machinery, human resource and manpower development.

Keywords: Coir fibre, textile industry, Ghana, production processes, coconut
Introduction
Ghana’s textile industry has been on the pathway of steady decline over the past forty (40) years or so and continued to deteriorate. From over 24 large-scale textile factories established in the mid-1960s that employed more than 25,000 Ghanaians, the country now has only four (4) textile factories employing less than 2,500 workers. Available statistics indicate that the country’s total industry output was pecked at 129 million yards in 1977. Unfortunately, the figure declined from 129 million to 44 million yards in 2009 and subsequently, 42 million in 2011.

As at July 2017, Volta Star Textile limited at Juapong was in a dire financial quagmire that needed close to about Twenty Million Ghana Cedis (GH¢20,000,000.00). Tex Styles Ghana Limited (GTP) had laid-off 178 workers. Akosombo Textiles Limited (ATL) had also sent home a number of workers and is still planning to lay-off more (MOTI, 2017). Indeed, the statistics do not look good at all.

Some schools of thought have argued that Ghana’s overreliance on cotton and other cellulosic textiles have led to the detriment of lesser-known fibres like bamboo, banana, plantain, coir and many others. In the light of the several challenges that the Textile Industry continues to battle, the researchers find it necessary to examine the opportunities and prospects of coir as a resource for fabric manufacture.

Purpose of the Study
The study is an exploratory one that seeks to examine and discuss the opportunities and prospects of Coir Fibre vis-à-vis the enormous recession through which Ghana’s textile industry is going.

Overview of Coir Fibre
Coir is an important fibre with a high commercial value in the breadth of application in both domestic and industry worldwide.
It is a natural fibre obtained from the fruits of the coconut palm (Cocos nucifera) which is a tree of the palm family (Arecaceae). The coconut palm is one of the most important crops of the tropics. It has a long slender, leaning, ringed trunk that rises to a height of up to 80feet (25inches) from a swollen base. This trunk is crowned by graceful moving giant feather-like leaves which branch from the apex of the trunk and hold the flowers and fruits at the base from which they branch off the trunk.

The matured fruits are ovoid, about 12inches (30cm) to 18inches (45cm) in length and 5inches (12.7cm) to 8inches (20.3cm) in diameter. The coconut fruit has a thick fibrous husk that surrounds a single-seeded nut. A hard shell encloses the embryo with its abundant endosperm composed of both food (flesh) and liquid (juice).

The coconut is a very popular plant in Ghana. It abounds from the coast through the forest regions to the middle belt of the country. The local people believe that coconut has no origin. This is because they are mostly found on the coast where no one takes care of them. Agriculturists in the country, however, have a different view about its origin. They are of the view that coconut originated from countries such as India, America and the Caribbean. Others claim that it originated from Fernando Po, just like cocoa.

Coconut is a very important plant in tropical countries. It is not only widely used as food and in different forms of trade, but various parts of the coconut are chiefly employed in building, roofing, furniture, electric poles, for agricultural purposes and as fuel. The rest are alcohol, carbon, bullet for guns and other products useful to man. One of its major products is coir, which is a seed-hair fibre obtained from the outer shell or husk of the coconut fruit.
According to the Coir Board – India, the term coir came from the Malayalam word *kayar* or *kayaru*, which mean cord, to be twisted. Coir is the term used to describe the coarse fibre from the outer husk of coconut fibre, fibre a slender and greatly elongated solid substance chiefly in making rope and matting.

The individual fibre cells are narrow and hollow, with thick walls made of cellulose. They are pale when immature but later become hardened and yellowed as a layer of lignin, is deposited on their walls. Mature brown coir fibres contain more lignin, and less cellulose than fibres such as flax and cotton and so are stronger but less flexible. They are made up of small threads, each less than 0.05 inch (1.3 mm) long and 10 to 20 micrometres in diameter. White fibre is smoother and finer, but also weaker. The coir fibre is relatively waterproof and is the only natural fibre resistant to damage by salt water (Sankar, 2013).

Table 1: Physical properties of coir fibre

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimate length</td>
<td>0.6 mm</td>
</tr>
<tr>
<td>Diameter/width</td>
<td>16 micron</td>
</tr>
<tr>
<td>Length</td>
<td>6 to 8 inches</td>
</tr>
<tr>
<td>Single fibre</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>1.4 g/cc</td>
</tr>
<tr>
<td>Tenacity</td>
<td>10g/tex</td>
</tr>
<tr>
<td>Breaking Elongation</td>
<td>30%</td>
</tr>
<tr>
<td>Moisture regain at 65% RH</td>
<td>10.5%</td>
</tr>
<tr>
<td>Swelling in water</td>
<td>5% in diameter</td>
</tr>
</tbody>
</table>

Source: Coir Board – India
Table 2: Chemical properties (composition) of coir fibre

<table>
<thead>
<tr>
<th>Composition</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Solubles</td>
<td>5.25</td>
</tr>
<tr>
<td>Pectin &amp; related compounds</td>
<td>3.30</td>
</tr>
<tr>
<td>Hemi-Cellulose</td>
<td>0.25</td>
</tr>
<tr>
<td>Cellulose</td>
<td>43.44</td>
</tr>
<tr>
<td>Lignin</td>
<td>45.84</td>
</tr>
<tr>
<td>Ash</td>
<td>2.22</td>
</tr>
</tbody>
</table>

Source: Coir Board – India

These characteristics make the fibres quite useful in the making of floor and outdoor mats, aquarium filters, cordage and rope, and garden mulch. Green coconuts, harvested after about six to twelve months on the plant, contain pliable white fibres. Brown fibre is obtained by harvesting fully mature coconuts when the nutritious layer surrounding the seed is ready to be processed into copra and desiccated coconut. The fibrous layer of the fruit is then separated from the hard shell (manually) by driving the fruit down onto a spike to split it (De-husking). Machines are now available which crush the whole fruit to give the loose fibres. The Coir Board of India (2014) indicated that the total world coir fibre production is over 800,000 tonnes. However, the Food and Agriculture Organization of the United Nations (2014), put the total world coir production at 1,130,735 tonnes which is not far from the figure the Coir Board of India put out for the same year. Table 3 is the 2014 global production of coir.

The coir fibre industry is particularly important in some areas of the developing world. India, mainly the coastal region of Kerala State, produces 60% of the total world supply of white coir fibre. Sri Lanka produces 36% of the total world brown fibre output (Coir Board - India, 2014). Over 50% of the coir fibre produced annually throughout the world is consumed in the countries of origin, mainly India.
Presently, Ghana’s production of fibres and coir fibre products for both the local market and export is insignificant.

Table 3. 2014 Global Production of Coir

<table>
<thead>
<tr>
<th>World Coir Production</th>
<th>Quantity (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>544,300</td>
</tr>
<tr>
<td>Vietnam</td>
<td>303,500</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>152,400</td>
</tr>
<tr>
<td>Thailand</td>
<td>56,000</td>
</tr>
<tr>
<td>Ghana</td>
<td>39,835</td>
</tr>
<tr>
<td>Malaysia</td>
<td>22,280</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>10,300</td>
</tr>
<tr>
<td>Cote D’ Ivoire</td>
<td>2,120</td>
</tr>
</tbody>
</table>

Source: Food and Agriculture Organisation of the United Nations
FAOSTAT

Methods
This section presents the method that was employed by the researchers in the conduct of the research. The design is based on the qualitative research method with emphasis on the description of the economic viability of coir fibre and its importance to Ghana’s economy. The section also provides information on the research instruments employed for gathering the data needed to answer the research questions; the population studied, sampling design and data processing methods.

Research Design
In this research, the purposive and convenience sampling have been used concurrently. Andale (2015) explains that in purposive sampling, the researcher selects a sample based on their knowledge about the study and population.
In other words, the participants are selected based on the purpose of the sample. The justification for using the purposive sampling is that the selection of the population meets the objectives of the research; and for the researchers, the population for the study was not too large to be covered, given the time at their disposal. The items (questions) in the interview guide were not lengthy and too demanding, therefore, the researchers were able to manage effectively.

Convenience sampling is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in a study (Saunders et al., 2012). The convenience sampling was used in areas where the respondents were not ready to speak due to confidentiality of data. The researchers had to solely rely on those who were ready and willing to speak, but under extreme anonymity, for fear of victimisation.

**Findings and Discussion**

This part interprets and analyses data collected for the study and provides the necessary basis for the findings and conclusions of the study.

**Coir Fibre and its Processing in Ghana**

Coir is a reddish-pale yellow to brown fibre from the fruit of the palm Cocos nucifera. The fibre can be obtained from the fruit through both mechanical and manual processes. The manual processes yield fibres of higher quality. After maturity, the fruits are harvested by trained climbers. They are cracked open to release its highly nutritious and refreshing juice, which is a delicacy to most people in Ghana. The husks are then processed fresh or dried for some time under various conditions. The processing of the coconut husk for the coir (fibre) starts with Retting. This is a process of steeping the husk in various types of water, either fresh or seawater, for a period. This helps to soften the woody husk to prepare it for the next process of crushing.
Crushing: This is a mechanical process done by hand or by specially designed machines. It helps to release and liberate the individual fibres from the firm wooden coconut husk. Crushing has been practised in Ghana for a very long time. The hand process makes use of stones or metal beaters.

Washing: The crushed fibres then go through a process of washing which results in a reddish-brown mass of fibres of various lengths and fineness, measuring from 3 inches (7.62 cm) to 10 inches (25.4 cm) in length. These move to the next stage of drying.

Drying: Various means are used in the drying process. These include natural sunlight to mechanised forms of drying. It is important that care be taken to ensure that the drying process does not harm the fibres in any
manner. Large open places are used for the sun drying. Although sun drying is cheap, it comes with some problems and is quite slow.

Sorting: After drying, the fibres go through a process of sorting. This results in three types of coir fibres. These are the longest, the medium in length and the short fibres. These result in three grades of coir fibres, with the longest fibres also leading in grades as the finest. This is followed in grade by the medium in length, which is coarse and not as fine as the long fibres. This medium grade is also generally referred to as the bristle coir fibres. The third grade is made up of the short fibres. The textile Terms and Definitions emphasises that coir spun from unripe fruits give the longest and the finest yarns.

Coir fibres have staple lengths that range from 4 inches (10cm) strands 1 to 12 inches (30.5cm). The fibre is also made up of smaller strands of about 0.01 to 0.04 inches (0.0254cm to 0.1016cm) long and 12 to 14 microns in
diameter. These qualities help to determine the end products for which the fibres should be used in making.

Sorting
Source: Field Studies

Spinning: The long fibres are usually selected for spinning on traditional spinning wheels referred to as Ratts. After spinning into varieties of yarns and ropes, with specific characteristics desirable for industrial, agricultural and domestic applications, these yarns and ropes are dyed in various colours according to consumer needs. The textiles industry is very large and uses a variety of natural fibres, some of which are considered as major while others are considered as minor fibres. The major or traditional textile fibres include cotton, linen, silk and wool. These are popular and used in large quantities. The minor fibres are not very popular for garment production but may have varied usefulness as a result of peculiar properties and characteristics that they exhibit.

Others can be used as acceptable substitutes or even to adulterate other fibres as long as the finished goods fulfil the purpose for which they are intended. Examples of the minor natural fibres are jute from the jute plant;
kapok from the silk cotton tree; ramie or China grass from a tall shrub, hemp from a tall woody plant in nearly all temperate and tropical countries of the world; sisal from the leaves of agave; pina from the large leaves of the pineapple plant; manila from the leaves of the abaca plant and coir from the husk of the coconut fruit.

Coir forms part of a group of textile fibres categorised as miscellaneous plant fibres. These miscellaneous fibres are described as a selected group of fibres that have relatively limited, but specialised end uses. To support this, Joseph (1988) as cited by Mupfumira and Jinga (2013) argues that miscellaneous fibres have limited interest to consumers and that they may have special uses for selected textile products. This perception is quite subjective basically because current swirl around indicate that the end use of coir (a perceived miscellaneous fibre) and other fibres that fall into this category are enormous.

In a tacit endorsement of the above, The FAO (2017) contends that Coir is thickest and most resistant of all commercial natural fibres, coir is a coarse, short fibre extracted from the outer shell of coconuts. Its low decomposition rate means a key advantage for making durable geo-textiles. This is reemphasised by Tortora (1987) who indicates that coir is an invaluable fibre with a wide array of uses; and is obtained from the outer hull or shell of the coconut and is, therefore, classified as a fruit hair fibre. She further argues that most of the coir fibre produced is utilised in the geographic areas where the fibre is grown.

The diversity of products from coir is therefore usually linked to the socio-economic needs of the people according to their geographical location. For this reason, coir products differ from country to country. This results in a long tapestry of products that can be produced from coir. Coir fibre, irrespective of place of origin and process employed in its manufacture has a characteristic brown colour. Textile Terms and Definitions (1997)
emphasise that coir is a reddish brown –to-buff coarse fibre. The FAO (2017) explains that Coir is extracted from the tissues surrounding the seed of the coconut palm (cocos nucifera), which is grown on 10 million hectares of land throughout the tropics. Its coarse stiff and reddish-brown fibres are made up of smaller strands.

Most coir products come in their natural brown colour. Although the fibres are sometimes dyed in dark colours they are extremely difficult to bleach, hence are left in their natural state. Coir is also coarse and stiff. These make it impossible to twist coir into fine yarns like other natural fibres. Coir yarns are therefore relatively thicker. However, coir fibre has qualities that enable it to be used for many products.

Coir is resistant to rot, moisture and seawater. Its other valuable features include lightness, coupled with elasticity and resistance to mechanical wear and abrasion. Its features are outlined by Joseph (1988) as cited by Mupfumira and Jinga (2013), and they include: a high degree of stiffness, wrinkle-resistant, enormously strong, and crush-resistant and is impervious to abrasive wear. Also, coir can stand exposure to extreme weather conditions especially rain, sleet or snow and therefore proves to be a suitable fibre for many products.

Application of Coir Fibre
These properties and characteristics emphasise the suitability of coir fibre in different types of products. The use of coir, therefore, ranges from technical or specialised textile products to very simple household products. One area that coir has found elaborate application is the craft and low technology industry. However, its technical application is catching up. Coir craft can be made very interesting and profitable for full-time commercial venture or as leisure. Working with coir is one of the simplest of all crafts, and skills can be acquired easily.
One major advantage of working with it is the very low cost of materials and tools. The tools required for this craft are indeed few, and most of them are found in an average household. When the materials have been worked into useful articles with good designs, there are always ready markets for them. The fibre is clean to work with and very little, or no protective clothing is needed, and it can be worked at intervals and at any time of the day. Coir fibres have found a variety of interesting application in Ghana.

The resultant fibres are sometimes mixed with mud for the production of bricks which are used in the building of mud houses common in the countryside. The fibres serve as reinforcement and add strength and durability to the bricks. The fibres also serve as a stabilizer for the bricks and give high dimensional stability. In this way, coir fibre finds application in local geo-textiles though the technology has not been well developed.

Erosion Blanket
Source: Field studies

Although the fibre has not attained significant recognition on the local market, it is presently enjoying an unprecedented consumer and industrial demand in Europe and the United States of America. Coir has played a major role in some countries which otherwise have no other natural resources of any important economic significance. Considerable quantities are exported from the Pacific. Preparation of coir also plays a major role in Sri Lanka’s economy. Great Britain imports substantial quantities of coir mainly for exportable products after manufacture. Germany, Netherlands, U.S.A., France and Italy also import and manufacture coir products.

For the purpose of trade, coir is dealt with either in a retted state or as yarn. Coir manufacture has undergone a series of changes and improvements over the years as a result of technological development in both equipment and processes. It has therefore found more uses that include geo-textile and agro-textile applications. These are technical or specialised textile materials or products.

The exhaustive range of floor coverings, hardwearing doormats, durable mattings and rugs, crush-proof pile carpets and heavy flowered Mourzouks in a variety of dimensions enhance the elegance of the place of choice. Coir Geo-Textiles are inexpensive, quick and effective in Civil Engineering practices. Rubberised coir, a blend of coir and latex, offers mattresses and cushioning for restful comfort. Coir products that are exceptionally functional are virtually irreplaceable when it comes to economy, durability and beauty.

Currently, there are two main coir manufacturing factories in Ghana. These can be located precisely in the Western Region. One is a small-scale industry initiated and managed by the National Board for Small Scale Industries, and the other one is a large-scale industry which produces a
considerable quantity of coir fibre and products mainly for export. A survey of these two factories indicates that they are unable to meet demands from the market. Only 20% of the demand for coir fibres is met, and about 30% of the finished products are met. This indicates that the industries are currently under immense pressure to meet the high demand for their produce.

These situations exist partly because of the production process employed by the manufacturers. Some of the processes are indeed time-consuming and very clumsy, especially the drying of the fibre after the final cleaning operation (sifting). Sun drying is used for this process which employs the sunlight. Therefore, in the rainy season, there is a drastic decline in production. This is so because the fibres must be prevented from getting wet.

They, therefore, have to be gathered and covered whenever it is about to rain or during the rainfall. Instead of this clumsy and time-consuming process, a simpler and efficient machine such as a drying kiln can be employed. This machine operates with gas, oil or firewood and would not rely on the sun on drying. It can work for 24 hours and therefore will help increase production considerably. Different parts of the country have favourable conditions and facilities for the location of various factories, one of which is coir, which has a large supply of raw materials in the Western, Central and Greater Accra Regions. Having considered all the factors of location and localisation of the factories (factors being natural, acquired and government-sponsored), the three regions were deemed fit for the establishment of modern coir factories.

When the natural factors are considered, it was realised that there is the availability of labour (either skilled or unskilled). There is also the availability of cheap raw material that is the husk. Climatic conditions are also stable and favour the industry. In other words, the general
environmental conditions do not adversely affect the industrial production of coir in Ghana. Looking at the acquired factors, it is realised that there is the availability of good drinking water, electricity and communication facilities even in relatively remote areas in each of these regions. The roads are also in a good state; therefore, transportation of goods and equipment is easier. One other important infrastructure of significant importance to the industry is the Takoradi harbour that would help in importing of machines and other relevant equipment and in exporting of the finished products to various markets around the world.

On government sponsored factors, benefits like tax concession, investment grants, free land and support services are available. These are some of the benefits for investors who site their industry outside the urban areas. All these factors serve as an incentive for anybody who will want to invest in this industry. There are many advantages associated with investment in this field of textiles. This emanates from the fact that, the by-products from almost every stage of coir fibre production is a raw material for other useful products. Due to this, the most appropriate industrial integration could be adapted for optimum benefits and profits.

The coir factory could be sited so that its operations can be integrated with other related industries. In this way, the by-products from the factory would serve as raw materials for the others. In addition to this, the investor could put up other production lines that will use the by-products for other end-products. In so doing, the industry will be producing many varied products at the same time. The factory can also go into fibre production only and then export or sell it to other industries to further process the fibres into other products. These make the coir industry very dynamic and very flexible.

The coir industry, from all that has been put forward, seems to have unprecedented pluses. However, there was a crippling menace that
appeared in the industry a few years ago. This was a serious mycoplasma disease called “lethal yellow” which affected the coconut plants and killed most of them with time. This disease is known in Ghana as the “Cape Saint Paul” disease. It wiped out thousands of hectares of coconut trees. This disease is now a problem of the past since new tolerant varieties of coconut plants have been developed to overcome the menace. These tolerant varieties have been planted in place of the diseased and dead ones. It is hoped that this will help forestall life in the wiped-out farms and will help in the long term in coir production, as there are prospects for the expansion of the industry in Ghana.

In summary, it is recommended that:
i. production processes must be improved by employing newer technology for optimum efficiency;
ii. planting of tolerant and disease resistant varieties must be improved to replace the affected coconut plants and to establish new coconut farms;
iii. the government should provide incentives for investors who would want to invest in the coir industry; and
iv. awareness must be created about the usefulness of coir products locally.

Conclusions
Considering the scientific, technological and economic development that Ghana yearns to attain and the ever-increasing need for investment in the private sector, an important proposed area is the coir industry, which presents very attractive opportunity for the production of a range of simple households materials to specialised industrial products. The economy of most developing countries including Ghana depends on its indigenous industry for substantial growth and progress. Consequently, it is most urgent that the growing problem of unemployment is tackled on a high priority basis. Promoting and protection of the indigenous industry could help solve the problem to a greater extent. It is, therefore, expected that,
when given the necessary boost, the coir industry will help considerably in achieving fast technological and economic development of coastal and some rural areas of Ghana.

The usefulness of coir vis a vis its economic significance cannot be overlooked. Investment in this field of textiles is very flexible, very simple and relatively inexpensive machines can be employed for the small-scale outfits whereas the large-scale manufacturers can acquire very expensive, sophisticated and fast working machines. Another area that coir fibre is being used elaborately in recent years is in textile art.

Here the fibre property is representative of the design. Also, the fibre is employed in finishing processes for high fashion in the United States of America and elsewhere. These are normally used as theatre costumes and for some special occasions like street carnivals and procession. Coir has proved to be a very useful fibre. The list of coir products is endless. Newer products are being developed, and it is ever finding newer applications. The technology involved in becoming more sophisticated and the investment potential has become wider. The coir industry will continue to thrive so every effort should be made towards its total upliftment. This will help solve the unemployment situation and increase profits in Ghana.

**Recommendations**

Based on the findings and conclusions of the study, it is recommended that:

i. the government of Ghana adopts the strategy of India and thus, establish a Coir Board to dedicate time and financial resources to the sector to ensure it sees the light of day;

ii. with its flagship policy of ‘One district, one factory’, the government of Ghana takes advantage of the exploration of this commercially viable natural resource to help reduce the high
unemployment rate in Ghana. Perhaps this should culminate the resuscitation of the once vibrant textile sector; and

iii. various Metropolitan, Municipal and District Assemblies within the country should be encouraged to make good use of coconut waste which is part of the causal agents of the perennial floods experienced by several parts of Ghana.

References


IS THERE A PLACE FOR LANGUAGE AND COMMUNICATION SKILLS IN THE TVET REGIME?

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Abstract
In 1968, Paulo Freire redefined the art of teaching and learning by recognising learners as co-creators rather than mere recipients of knowledge. 21st Century narratives of Africa’s lethargic industrialization demonstrate heightened thirst for embracing Competency-based teaching in an era of technical university education within the larger framework of Technical Vocational Education Training (TVET). It is expected that this would evolve novel ideas whose authorship would be owned by Africans for Africa and the rest of the world. This paper critically interrogates the place of language and its appropriate registers as tools for effective communication in disseminating such technological innovations for the benefit of targeted audiences across the world. The chief objectives of this paper are two-fold: to establish the non-negotiable place of language in the TVET regime, especially in a world of increasing globalization, and to champion the primacy of applying Paulo Freire’s intervention.

Keywords: Language, Communication Skills, TVET Regime, learners, CBT
Introduction
The TVET idea envisages exploring core competencies vested in the learner. With the learner at the centre of the teaching and learning activities; and whereas he or she now becomes responsible for communicating his or her ideas to various audiences, the facilitator also has roles to play in communicating instruction and eliciting relevant information and from learners. This calls for effective communication skills between the two. Besides, new findings and ideas would have to be documented and disseminated to external audiences. To what extent do language and communication skills matter here? The objective of this paper is to address this, and related concerns.

Development
When the reputed ancient Greek mathematician, philosopher and inventor, Archimedes, after a long study, discovered a method of detecting the amount of gold in the crown of the king of Syracus, he exclaimed: “Eureka!” as a sign of triumph to mean “I have found it”. "Eureka" originates from the Ancient Greek word εὑρέκα heúrēka, meaning "I have found (it)". It is useful to appreciate that his famous rendition is captured in the first person singular perfect indicative active form of the verb: εὑρίσκω heuriskō "I find". It is very much associated with the word heuristic which refers to experience-based techniques for problem solving, learning, and discovery.

This sets the basis for this article. In fact, without the use of a language, Archimedes, perhaps, could neither have exhaustively expressed nor conveyed his inner sentiments at his own discovery. Perhaps even more importantly, other discoveries including the famed Archimedes’ principle, which has successfully been communicated and interpreted through generations, and translated into several modern languages as a means of promoting his findings for the benefit of mankind.
This historic feat leads us to an important connecting hypothesis of Paulo Freire’s *Pedagogy of the Oppressed* (1974). Considered as one of the foundational texts of critical pedagogy, and originally written in Portuguese as *Pedagogia do Oprimido* (1968), it was later translated into English, thanks to its wide acceptance. It proposes a nouvelle ideological pedagogy which advocates a trinity of relationship between teacher, learner, and the society. In this book, Freire identifies the traditional pedagogy where learners are treated as empty vessels to be filled with the teacher’s knowledge as the “banking model of education” which he debunks. He then takes as his point of departure that the learner ought to be seen as a co-creator of knowledge.

This paper is concerned that, as we combine synergies and forces to promote scientific discoveries in a regime of Technical Vocational Education Training (TVET), we shall be endorsing the view that, by engaging our learners as creators of knowledge, we would also be strengthening the conviction that, our learners are being led out of the teachers’ pedagogical ‘oppression’, in that, they would no longer be the ‘banks’ in which the teacher ‘deposits’ his knowledge. Instead, the learner would be able to rack his or her brains, and bring out new ideas, concepts, convictions and ways of doing things. The question then arises: ‘How does the learner disseminate his or her new ideas, especially in our contemporary TVET era?’

This is where language finds its non-negotiable and undeniable locus in the affairs of TVET, especially as it relates to technical university education. TVET in itself is established on concepts including Competency-based teaching (CBT) which refers to systems of instruction, assessment, grading, and academic reporting that are based on students demonstrating that they have learned the knowledge and skills they are expected to learn as they progress through their education.
Competency-based learning or competency-based education and training is an approach to teaching and learning more often used in learning concrete skills than abstract learning. This far, it is admissible that whether giving or receiving instructions, teachings, teachers and learners need a medium of exchange for such interaction.

Language thus becomes an indispensable tool for effectively communicating our new ideas, discoveries and innovations to our audiences who might become active or passive consumers of such new discoveries. A bothering concern which cannot escape teachers of language is the subtle debate on whether learners in the vocational / technical domain should be subjected to or be bothered by issues of syntax, grammar, spellings and related technicalities of a language as a part of their studies, or be left “free” to focus on their technical / vocational tuition, and give less attention to the academic demands of the language, in our case, English Language. Some proponents who believe that such details should be shelved have argued the ideas inherent in discoveries are far outweigh the ‘packaging’ of the discoveries through language.

But what is language? Santrock (2000) upholds the view that, language is a form of communication whether spoken, written or rendered in the form of signs that are based on a system of symbols (Santrock, 2000:219). Language affords humanity the privilege to pass down thoughts and information from one generation to the next.

All human languages have common characteristics which include infinite generativity and organisational rules. Indefinite generativity refers to the ability to produce an endless number of meaningful sentences using a finite set of words and rules. This quality makes language a highly creative enterprise (Carroll, 1999).
Language is also characterized by a number of organizational rules which include phonology, morphology, syntax and semantics. In this context, language is virtually part of every aspect of human interaction. Consequently, its role in all spheres of social activities, especially in academia and scholarly engagement, cannot neither be downplayed nor over-emphasized. Otherwise, in what convincing language could we have expressed and conveyed thoughts, ideas and discoveries? Whether we are involved in activities within the confines or the fast fading traditional four walls of a classroom or outside the jurisdiction of formal education we employ language. In fact, even when we mutter to ourselves we use language.

Some researchers even maintain that our thoughts are cast in terms of the language we speak (Fodor, 1975; Bloom, 1981). This is not difficult to ascertain. After all, linguists and other cognitive scientists have convincingly suggested that thought is simply a non-vocal language. Edward Sapir (1921) proposed that thoughts require language in order to be thinkable (Sapir, 1921). Ferdinand de Sassure speaks to the same issue when he reiterates that thought without language is inchoate (de Saussure, 1959).

It does appear as though, we tend to take our linguistic abilities for granted, scarcely noticing its essence. However, it is very worth noting and emphasizing that the study of language is motivated by an even more compelling consideration as posited by Chomsky (1968). Language, in fact, distinguishes humans from all other organisms. To a large extent, even our most mundane activities depend on language. Without language our ability to express ourselves would be considerably diminished. Although para-linguistic features (body language) may provide considerable information, human language also involves abstract vocabulary arbitrarily related to meanings.
This makes human language open-ended in its expressiveness and suitable for a wide range of purposes. The ability to use language, itself is a species-specific ability of human beings. Language development culminates with a sound system, followed by the first words: one-word utterance followed by sentences of one or two words in length. This makes language unfold in stages. Language is dynamic, and keeps changing because according to some linguists, language is a living thing, and it is clear that English has been changing since the beginning of the seventh century. Some modern speakers of English can scarcely make meaning of the works of Beowulf (Weisler & Milekic, 2000).

But why would language change as a dynamic enterprise, in any case? It might not be out of place to contemplate that change in language becomes primarily informed by the changes which human beings encounter through discoveries, inventions and related developments such that, new terminologies and more appropriate registers and coinages are required to effectively convey thoughts and intentions as they relate to events including technological innovations. Consider that, in the past, a word like ‘modern’ when used in a context like ‘modern equipment’ reflected that which is in tandem with contemporary scheme of affairs. Today, it is perceived more apt to use ‘State-of-the-art’ facilities for the same idea of ‘modern’. What is acceptable in a language changes over time.

Language as a Tool for Effective Communication
When we communicate with each other as human beings, we are able to exchange knowledge, discoveries, beliefs, opinions, commands, gratitude, displeasure and all forms of intrinsic feelings to our audiences. Such communication by means of language may be referred to as linguistic or non-linguistic communication. The first concerns itself with oral and or written communication whereas the latter associates itself with non-verbal communication.
Broadly speaking, language should be intelligible to all its users irrespective of the dialect. That is the pivot of effective communication. Language is a flexible tool that grants us a vast range of expressiveness. Effective communication entails combining simple words beautifully which will effectively convey the intended information the speaker or writer seeks to put across. This is the crux of effective communication.

However, because language is based on a set of symbols (Santrock, 2000), it tends to be governed by peculiar arrangements, principles, rules, contexts and conventions that make them distinct from other languages, such that inflections for plurals, tenses, voice, person etc. are effected neither arbitrarily nor haphazardly. These are indicative apt application of language and communication skills are so critical that they cannot be disengaged from the TVET enterprise. The paragraph below, especially as it relates to research findings, and for that matter, TVET might be sufficient to draw the curtains.

Consider that, TVET establishes the learner as the fulcrum around which teaching and learning revolves. This involves a learner-led or learner-focused activity. The learner in the end would have to communicate his or her discoveries, findings and conclusions. In the context of research and or publication, the application of bibliographical ‘language’ cannot be short-circuited. The mere sequence of information in any bibliographical entry, application of symbols and where to place them in a particular entry becomes so critical. It is also thanks to bibliographical entries that ownership of discoveries is propagated to discourage plagiarism and related concerns. With the anticipated plethora of new ideas and discoveries from TVET and CBT, their proper documentation and consequent dissemination calls for appropriate registers, language and communication skills.
Conclusions
This paper has interrogated the place of language and Communication Skills in the TVET regime. It has argued and submitted that language serves as a tool of thought and as a tool for effective communication through the use of language. It suggests that no effective teaching, learning and or perhaps, communication can take place in the TVET regime without language. It concludes that indeed, there is a non-negotiable place for language in the TVET regime.

Recommendations
It is hereby recommended that, because language and communication skills are indispensable in the teaching and learning enterprise, its teaching should be continuously reviewed and revised to make it locally-relevant to various areas of study. Besides, learners must be encouraged to appreciate the importance and non-negotiable place of language and communication skills in conveying ideas.

References
HIDDEN CONSTRUCTS ON GRADUATE EMPLOYABILITY DECISIONS: THE PRINCIPAL COMPONENT FACTOR

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Abstract

This study adopted the quantitative research design to unearth hidden factors which go into graduate employability decisions. Purposive sampling technique was used to select graduates, institutions and industries within Takoradi, Cape Coast, Kumasi and Accra metropolis. Three different questionnaires were designed and used to solicit information from the target groups. A total of 200 sampling units including 68 industries, 120 graduates and 12 institutions were used. The data was coded and keyed into SPSS version 20. Tables and Charts were used to explore the data. Principal component analysis was employed to extract hidden factors industries consider in graduate employability decisions. The method extracted six hidden factors namely: setting of SMART goals and structuring actions; demonstrating a willingness to embrace new systems, processes, technology and ideas; determined, committed, resilient, focused person; passion for driving profit; ability to deconstruct a problem or situation; and clear and unprompted ability to present information to a group. These six hidden factors could explain 68.8% of the variances in graduate employability decisions.

We recommend that internships be properly planned and executed with the involvement of industry players, facilitators of learning, and the Ministry
of trade and industries. In addition, facilitators should inculcate into students, important traits and attributes identified in this study.

**Keywords:** Graduate employability decisions, principal component analysis, internships, sustainable employments, metropolis

**Introduction**

Employability denotes skills and attributes that make an individual desirable to potential employers. For the past ten years, the nation has witnessed a tremendous increase in the number of higher education institutions (HEIs): public and private universities, polytechnics and other colleges of higher learning. The major feature of these institutions is that all of them churn out thousands of graduates each year into the job market with various levels of expertise. A diploma or degree is no longer a guarantee of employment. The economy, relatively small offers limited number of job opportunities, the imbalance between the supply of graduates and the number of job vacancies in the market workforce should serve as a motivation for these institutions to develop the contents of their academic programmes and methods of teaching to equip their graduates with knowledge and skills necessary to enhance their employability chances. As a consequence, the relationship between knowledge and skills possessed by graduates and job demands has been the subject of intensive empirical research.

According to Knight and Yorke (2015), if there is any hope of transferring the learning from one context to another, the learner needs to use that learning in a variety of different situations. From these comments, it seems that practice in a number of contexts is fundamental to the development of employability skills and attributes.

The essence of establishing a higher education institutions (HEIs) such as a polytechnic and university is to equip students with the necessary
training, knowledge and skills, thus, providing employment skills for the teeming youth in Ghana, curbing unemployment and alleviating poverty. To benefit from such education, stakeholders ought to ensure that institutions’ curricula are detailed and focused on industry needs so that it will be receptive to the needs of society. Bridging the gap between the institutions’ curricula and industry needs has been the concern of governments and other stakeholders from the dawn of time till date; this is as a result of graduates’ inability to secure jobs after school.

Studies have shown a number of factors which contribute towards graduate inability to secure jobs after school - the factors include poor performance of graduates at work places, lack of knowledge and skills required by industry and attitude to work.

The questions we need to ask ourselves are as follows: Are the content of instructions of our HEIs in consonance with the skills and competencies required by the industries? Do the graduates of these HEIs have the requisite knowledge and employability skills to easily slide into the changing needs of industries? De la Harpe et al. (2000) have suggested that there is concern worldwide that existing undergraduate programmes are not producing graduates with the kind of lifelong learning skills and professional skills which they need in order to be successful in their careers.

Hillage and Pollard (1998), have opined that being in possession of employer-relevant knowledge, skills and attitudes are not enough for an individual to be relevant within the labour market, and to realise their potential, they need to exploit their assets, market and sell them.

Knight and Yorke (2001) have presented two main concepts of employability; the educational conception relating to the ability of graduates to tackle graduate jobs and the ability of graduates to get a job.
It is the first concept that most practitioners in HEIs are primarily concerned with. This implies that the curricula designed to enhance students’ employability are desirable purely on academic grounds. This study is an attempt to draw together the concepts of employability in relation to Higher Education (HE) in Ghana. Though this study is a rapidly growing area for research, we cannot hope to comprehensively cover all aspects of employability; nonetheless, it aims at putting the main issues into context.

The motivation behind this study is unearthing the hidden factors that go into graduate employability decisions. Over the years, graduate unemployment has been on the rise, many attempts by governments and other stakeholders to nip this canker into the bud has proven futile. Through this work, institutional curricula reforms could be made in line with industry needs. The study was delimited to Takoradi, Cape Coast, Accra and Kumasi metropolis. It was also delimited to a sample size of 200 comprising of 120 graduates, 68 industries and 12 higher educational institutions. Furthermore, the study was delimited to the use of the purposive sampling technique.

Employability Skills
Coopers and Lybrand (1998) have defined employability skills in terms of four key areas: traditional intellectual skills (e.g. critical evaluations and logical argument); key skills - (e.g. communication and information technology); personal attributes - (e.g. motivation and self-reliance) and knowledge of organization and their functions.

Harvey (2003) has noted that employability is not just about getting a job; it is about developing attributes, techniques or experiences just to enable a graduate to get a job, or to progress within a current career. He further noted that employability is all about learning and called on HEIs to place less emphasis on ‘employ’ and more emphasis on ‘ability’. Hillage and
Pollard (1998) have carried out a study on developing a framework for policy analysis on employability. Their main findings are outlined below:

Employability is about having the capability to gain initial employment, maintain employment and obtain new employment if required.

For the individual, employability depends upon:

- assets in terms of knowledge, skills and attitudes;
- the way these assets are used and deployed;
- presentation of assets to potential employers; and
- the context within which the individual works, e.g. labour market, personal circumstances.

Industries’ Concept on Employability

Researchers have observed that businesses want graduates who can read, write, speak intelligently, solve problems, work collaboratively, understand mathematics and science, possess a good work ethic and professional attitude, understand self-theories that are marked by confidence, optimistic, believe that they can make a difference, can adapt to the workplace culture, can use their abilities and skills to evolve the organization, value critical thinking, bring about innovations, leaders of change and can participate in teamwork (Harvey, 2000; Harvey, 2016; Davidson, 2017; Loon, 2017; Little, 2001; Arthur Rothkopf [as cited in Matton, 2007]).

Over the years, industries tend to complain about the abysmal performance of graduates they employed and the accompanying problem of having to spend a lot of resources in retraining them to become fit-for-purpose. HESA (1998) has observed that only a minority of students who are able to gain employment directly utilises the academic content of their degree programme. Eraut (1994) has also noted that Industries’ criticism of the shortcomings of graduate is not so much the results of failure in the
higher education curriculum, rather of failure in the transfer process. He sees transfer as a learning process in its own right.

Atkins (1999) has added his voice to the importance of transferable key skills to employment contexts. Brown (1999) believes that learning and the transfer of that learning is most likely to be effective if the learning situation closely resembles the work place situation. The process of this learning transfer may include internships for student, practical work through the use of modern technology and equipment and the use of everyday life issues in teaching.

Increasingly, graduate attributes are more important than the degree subject studied (Harvey, 2000). For some employers, the subject studied is not as important as the graduates’ ability to handle complex information and communicate it effectively (Knight & Yorke, 2000). Graduate recruiters want a variety of other skills, personal and intellectual attributes, rather than specialist subject knowledge. Oral communication, teamwork, self-management, problem solving, and leadership (Warn & Tranter, 2001)

**Material and Methods**

**Research Design**

The study adopted the quantitative research design. The population of interest were graduates, industries and higher educational institutions within the Takoradi, Cape Coast, Kumasi and Accra metropolis. These cities were selected because they had enough industries, institutions and churns out lots of graduates annually. The industries enlisted range from manufacturing, production, and services. The higher education institutions selected were universities, polytechnics and other higher education institutions.
Source of Data
Primary source of data was used for the study. This source was used because it provides direct evidence concerning a topic under study; moreover, it is more exact and presents information in its original form.

Research Instruments
Both closed-ended and open-ended questionnaires were designed and used for the study. Three different questionnaires were used in gathering the data. The first questionnaire was used to collect information from graduates. The second was used to solicit information from the industry regarding preferred graduate employability needs. The third was used to evaluate the curricula of the HEIs. The questionnaires were self-administered with the help of a trained research assistant.

Sampling Technique
Purposive sampling technique was used for the study. This method is useful when research units in the population are very few and likely to be missed in the selection process when other methods are employed. The method was used to select units for the sample that were considered representative of the population (Turkson, 2012). Graduates were divided into polytechnics, universities and other higher education institutions (both private and public).

For the industries, the following were considered: manufacturing, mining, and services. From these groupings the required numbers of sampling units were selected. A total of 200 sampling units were used; this is made up of 68 industries, 120 graduates and 12 HEIs.
Data Analysis
The data was combed, coded and keyed into SPSS version 20. Pie charts, tables and line charts were used to explore the data. Principal component analysis (PCA) was employed to do further analysis. This was done to unearth the hidden factors that industries consider in graduate employability decisions. A brief description of the principles governing PCA is discussed below.

*Principal Component Analysis (PCA)*
Principal component analysis is a statistical technique that is used to analyse the interrelationships among a large number of variables and to explain these variables in terms of a smaller number of variables, called principal components (PC), with a minimum loss of information. Often the variables under study are highly correlated and as such are effectively ‘saying the same thing’. It may be useful to transform the original set of variables to a new set of uncorrelated variables called principal components. These new variables are linear combinations of the original variables and are derived in decreasing order of importance so that the first PC accounts for as much as possible of the variation in the data, the second PC accounts for maximum variance that was not accounted for by the first PC and so on (Gorsuch, 1983). We need inter-variable correlations > 0.30 otherwise the PCA would not accomplish much, large inter-variable correlations do not guarantee a solution either, while two variables may be highly correlated, they may not be correlated with each other. Kaiser’s measure of sampling adequacy can help assess the inter-variable correlations. If the Kaiser’s ratio approaches 1 then the inter-variable correlations are small.

*Models of Principal Components*
We could let $X = [x_i]$ be any $k \times 1$ random vector and define a $k \times 1$ vector $Y = [y_i]$, where for each $i$ the $i$th principal component of $X$ is
\[ y_i = \sum_{j=1}^{k} B_{ij} x_j \]

for some regression coefficients \( \beta_{ij} \). Since each \( y_i \) is a linear combination of the \( x_j \), \( Y \) is a random vector. Now define the \( k \times k \) coefficient matrix \( \beta = [\beta_{ij}] \) whose rows are the \( 1 \times k \) vectors \( \beta^T X = [\beta_{ij}] \). Thus,

\[ y_i = \beta^T X \quad Y = \beta^T X \]

For reasons that will become apparent shortly, we choose to view the rows of \( \beta \) as column vectors \( \beta_i \), and so the rows themselves are the transpose of \( \beta^T X \).

Observation: Let \( \Sigma = [\sigma_{ij}] \) be the \( k \times k \) population covariance matrix for \( X \). Then the covariance matrix for \( Y \) is given by \( \Sigma_Y = \beta^T \Sigma \beta \)

i.e. population variances and covariance of the \( y_i \) are given by

\[ \text{var}(y_i) = \sum_{p=1}^{k} \sum_{m=1}^{k} \beta_{ip} \beta_{im} \sigma_{pm} = \beta_i^T \sum \beta_i \text{cov}(y_i, y_j) = \sum_{p=1}^{k} \sum_{m=1}^{k} \beta_{ip} \beta_{jm} \sigma_{pm} = \beta_i^T \sum \beta_j \]

Real statistics using excel (2017)

*Scree Plot of Eigenvalues*

Another way to determine how many factors should be kept in the remainder of the analysis is to use the scree plot. The scree plot simply displays the eigenvalues for each of the factors in a plot, from the first eigenvalue (the one that explains the most variance) to the last eigenvalue. (Chartfield & Collins, 1990).
Figure 1: Views of Industries about Graduate Employment

Results

Table 1: Nature of the business of the industries

<table>
<thead>
<tr>
<th>Nature of the business of the industries</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banking services (including savings and loans services)</td>
<td>16</td>
<td>23.5</td>
<td>23.5</td>
</tr>
<tr>
<td>Life Insurance</td>
<td>7</td>
<td>10.3</td>
<td>33.8</td>
</tr>
<tr>
<td>Shipping and logistics</td>
<td>13</td>
<td>19.1</td>
<td>52.9</td>
</tr>
<tr>
<td>Automobile services</td>
<td>10</td>
<td>14.7</td>
<td>67.6</td>
</tr>
<tr>
<td>Healthcare services</td>
<td>12</td>
<td>17.6</td>
<td>85.3</td>
</tr>
<tr>
<td>Oil and gas</td>
<td>10</td>
<td>14.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 2: KMO, Bartlett's Test and Reliability statistics

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</th>
<th>0.514</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett's Test of Sphericity</td>
<td></td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>75.380</td>
</tr>
<tr>
<td>df</td>
<td>66</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.025</td>
</tr>
<tr>
<td>Cronbach's Alpha</td>
<td></td>
</tr>
<tr>
<td>Cronbach's Alpha Based on Standardised Items</td>
<td></td>
</tr>
<tr>
<td>Cronbach's Alpha</td>
<td>0.707</td>
</tr>
<tr>
<td>Number of Items</td>
<td>12</td>
</tr>
</tbody>
</table>

Reliability of the Instrument
Table 1 gives the KMO, Bartlett's Test and Reliability statistic for the questionnaire. Cronbach's alpha reliability test [ranges from 0 to 1] was used to ensure reliability of the research instrument. A value closer to 1 indicates greater reliability and consistency. The value of Cronbach's alpha (0.701) which falls within the acceptable region indicates that the research instrument is consistent and reliable. The KMO measure of sampling adequacy and that of the Bartlett’s test which assess whether or not the correlation matrix was suitable for factor analysis is also shown in the same table. Both the KMO value of 0.514 (which is closer to the minimum threshold of 0.60 and the Bartlett’s test \( p \text{ value} = 0.025 \)) suggest that the sample size was adequate and that, at least, some of the variables were inter-correlated and therefore the data was suitable for factor analysis.
Table 3: Communalities of the data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal communication</td>
<td>1.000</td>
<td>.773</td>
</tr>
<tr>
<td>Team work</td>
<td>1.000</td>
<td>.635</td>
</tr>
<tr>
<td>Commercial awareness</td>
<td>1.000</td>
<td>.802</td>
</tr>
<tr>
<td>Analysis and investigation</td>
<td>1.000</td>
<td>.808</td>
</tr>
<tr>
<td>Initiative or self-motivation</td>
<td>1.000</td>
<td>.661</td>
</tr>
<tr>
<td>Drive</td>
<td>1.000</td>
<td>.760</td>
</tr>
<tr>
<td>Written communication</td>
<td>1.000</td>
<td>.754</td>
</tr>
<tr>
<td>Planning and organizing</td>
<td>1.000</td>
<td>.509</td>
</tr>
<tr>
<td>Flexibility</td>
<td>1.000</td>
<td>.657</td>
</tr>
<tr>
<td>Time management</td>
<td>1.000</td>
<td>.632</td>
</tr>
<tr>
<td>Transferable skills</td>
<td>1.000</td>
<td>.511</td>
</tr>
<tr>
<td>Personal skills or competences</td>
<td>1.000</td>
<td>.751</td>
</tr>
</tbody>
</table>

The communalities have been shown in Table 3. In PCA, all variables are assigned an initial variance (total communality). The final communalities of each variable represent the variance accounted for by the chosen factor solution of the variable. All the variables used in the analysis remained in the final factor solution, they all remained because their communalities were greater than 0.50. This means that at least 50% of the initial communality of each variable was accounted for in the final factor solution. The factor solution is thus considered to be satisfactory since at least half of the variance of each variable is shared with the factors.
Table 4: Attributes industries consider for graduate employment

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Yes %</th>
<th>No %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work experience/internships/placement</td>
<td>98.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Attitude/behaviour/disposition/Stature</td>
<td>10.3</td>
<td>89.7</td>
</tr>
<tr>
<td>Adherence to work ethics</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Gender</td>
<td>13.2</td>
<td>86.8</td>
</tr>
<tr>
<td>Programme of study</td>
<td>85.3</td>
<td>14.7</td>
</tr>
<tr>
<td>Division (class) of student</td>
<td>8.8</td>
<td>91.2</td>
</tr>
<tr>
<td>Performance at interview</td>
<td>82.4</td>
<td>17.6</td>
</tr>
<tr>
<td>Expertise in the fieldwork</td>
<td>92.6</td>
<td>7.4</td>
</tr>
<tr>
<td>Engaging in extra-curricular activities</td>
<td>2.9</td>
<td>97.1</td>
</tr>
<tr>
<td>Professional association member/engagement</td>
<td>5.9</td>
<td>94.1</td>
</tr>
<tr>
<td>Personal development/appearance</td>
<td>66.2</td>
<td>33.8</td>
</tr>
<tr>
<td>Parental background</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Religious background</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Collaboration and cooperation</td>
<td>70.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Organisational ability</td>
<td>14.7</td>
<td>85.3</td>
</tr>
<tr>
<td>Time management</td>
<td>57.4</td>
<td>42.6</td>
</tr>
<tr>
<td>Political affiliation</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Ethnic background</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Empathy</td>
<td>30.6</td>
<td>69.4</td>
</tr>
<tr>
<td>Adaptability</td>
<td>85.3</td>
<td>14.7</td>
</tr>
<tr>
<td>Having initiative /Innovation</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Self-control</td>
<td>77.9</td>
<td>22.1</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>94.1</td>
<td>5.9</td>
</tr>
</tbody>
</table>
### Table 5: Skills industries value during graduate recruitment

<table>
<thead>
<tr>
<th>Skills</th>
<th>Yes %</th>
<th>No %</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT/ICT skills</td>
<td>86.9</td>
<td>13.1</td>
</tr>
<tr>
<td>Team work skills</td>
<td>67.6</td>
<td>32.4</td>
</tr>
<tr>
<td>Conflict management skills</td>
<td>10.3</td>
<td>89.7</td>
</tr>
<tr>
<td>Entrepreneurial skills</td>
<td>60.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Persuasion and negotiation skills</td>
<td>88.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Computer application skills (office, word, excel, PowerPoint)</td>
<td>75.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Statistical skills/Computational skills</td>
<td>23.5</td>
<td>76.5</td>
</tr>
<tr>
<td>Business communication skills</td>
<td>83.8</td>
<td>16.2</td>
</tr>
<tr>
<td>Flexibility skills</td>
<td>100</td>
<td>0.0</td>
</tr>
<tr>
<td>Financial management skills</td>
<td>5.9</td>
<td>94.1</td>
</tr>
<tr>
<td>Planning and organisation</td>
<td>97.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Building rapport skills</td>
<td>85.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Social or interpersonal skills</td>
<td>67.2</td>
<td>32.8</td>
</tr>
<tr>
<td>Research ability</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Reasoning skills</td>
<td>70.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Problem identification and solving skills</td>
<td>83.8</td>
<td>16.2</td>
</tr>
<tr>
<td>Advocacy skills</td>
<td>29.4</td>
<td>70.6</td>
</tr>
<tr>
<td>Presentation skills</td>
<td>83.8</td>
<td>16.2</td>
</tr>
<tr>
<td>Leadership skills</td>
<td>66.2</td>
<td>33.8</td>
</tr>
<tr>
<td>----------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Creative Thinking skills</td>
<td>86.8</td>
<td>13.2</td>
</tr>
<tr>
<td>Initiative and self-motivation skills</td>
<td>97.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Analysis and investigation</td>
<td>52.9</td>
<td>47.1</td>
</tr>
<tr>
<td>Verbal and written communication skills</td>
<td>97.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Decision-making skills</td>
<td>86.8</td>
<td>13.2</td>
</tr>
<tr>
<td>Personal competence</td>
<td>98.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Motivational skills</td>
<td>14.7</td>
<td>85.3</td>
</tr>
<tr>
<td>Drive</td>
<td>96.1</td>
<td>3.9</td>
</tr>
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</table>

Table 6: Total variance explained

<table>
<thead>
<tr>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of Variance</td>
<td>Cum %</td>
</tr>
<tr>
<td>3</td>
<td>1.443</td>
<td>12.028</td>
</tr>
<tr>
<td>4</td>
<td>1.210</td>
<td>10.083</td>
</tr>
<tr>
<td>5</td>
<td>1.086</td>
<td>9.054</td>
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<tr>
<td>6</td>
<td>1.011</td>
<td>8.422</td>
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<tr>
<td>7</td>
<td>.841</td>
<td>7.005</td>
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<tr>
<td>8</td>
<td>.737</td>
<td>6.142</td>
</tr>
<tr>
<td>9</td>
<td>.655</td>
<td>5.458</td>
</tr>
<tr>
<td>10</td>
<td>.586</td>
<td>4.884</td>
</tr>
<tr>
<td>11</td>
<td>.490</td>
<td>4.085</td>
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</table>
Table 6 shows that 6 components were extracted, these factors could cumulatively explain 68.8% of the variability in the original data which is higher than the minimum threshold of 60.

Table 7: Rotated component matrices

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.811</td>
</tr>
<tr>
<td>team work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>commercial awareness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.656</td>
<td></td>
</tr>
<tr>
<td>analysis and investigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.885</td>
</tr>
<tr>
<td>initiative or self-motivation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.544</td>
</tr>
<tr>
<td>Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.841</td>
</tr>
<tr>
<td>written communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.816</td>
</tr>
<tr>
<td>planning and organizing</td>
<td></td>
<td></td>
<td></td>
<td>.647</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.765</td>
</tr>
<tr>
<td>time management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.779</td>
<td></td>
</tr>
<tr>
<td>transferable skills</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>-.539</td>
</tr>
<tr>
<td>personal skills or competences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.616</td>
</tr>
</tbody>
</table>

NB: comp = component var = variance; cum=cumulative
Discussion
The result reveals that 52 (76.5%) of the 68 industries were from the private sector while 16 (23.5%) were from the public sector. From Table 3.1, 16 (23.5%) of the industries were into banking services, 7 (10.3%) were into life insurance services, 13 (19.1%) were into shipping and logistics, 10 (14.7%) were into automobile services, 12 (17.6%) run healthcare services and 10 (14.7%) were into oil and gas businesses. The attributes that industries look out for in selecting graduates for employment is shown in Table 4.

These attributes have been listed in decreasing order of importance: adherence to work ethics (100%), having initiative and innovative (100%), work experience/internships/placements (98.5%), trustworthiness (94.1%), expertise in the field of study (92.6%), commitment (89.7%), programme of study (85.3%), adaptability (85.3%), performance at interview (82.4%), achievement driven (80.9%), self-control (77.9%), a person interested in details (77.9%), collaboration and cooperation (70.6%), personal development and appearance (66.2%) time management (57.4%) and optimistic (54.6%).

Table 5 gives us data on the skills for employability decisions. The key skills that most industries expect from graduates include but not limited to the following: flexibility (100%), personal competence (98.5%), verbal/written communication (97.1%), planning and organisation (97.1%), initiative and self-motivation (97%), drive (96.1%), problem-solving (89.7%), persuasion and negotiation (88.2%), IT/ICT (86.9%), decision making (86.8%), creative thinking (86.8%), building rapport (85.0%), problem identification and solving (83.8%), presentation (83.8%), initiative (80.9%), computer application (office, word, excel, power point) (75%), reasoning (70.6%), team work (67.7%), leadership (66.2%), entrepreneurial (60%), analysis and investigation (52.9%), and research ability (50%).
The pie chart in Figure 1 shows the views of industries concerning graduate employability. 42.7% of them said there was a gap between what goes on in industry and what goes on in the classroom, 25% were of the view that graduates do not have the skills and attributes that the industries needed, only 4.4% say that graduates have the skills and attributes that industries needed, interestingly, 27.9% abstained from saying anything about graduate employability.

From the foregoing results, a majority of industries (78%) pointed out that there was a gap between what goes on in the classroom and industry. Moreover, graduates lacked the skills needed for them to slide easily into the world of work. What this means is that to secure a job in this competitive job market, the learning institutions, graduates and the industries have a serious role to play to ensure that graduates were well prepared for the world of work.

The results of the PCA threw more light on the latent constructs (attributes and skills) that could be used to access graduate employability. The scree plot assisted us to extract six components that have a telling effect on graduate employability decisions. The eigenvalue less than one concept also revealed six constructs that have a very strong influence on graduate employability. After assessing all the 12 factors that could possibly contribute towards graduate employability (Table 3) only 6 came out as the rotated principal components (Table 6 and 7) which could boost the employability skills or attributes that most organisations look forward to in graduates, these components together with their factor loadings and total variance explained are provided as follows: The first component; planning with time consciousness could explain the variance by 14.4%, the second component; competences with flexibility (variance explained = 11.9%), third component; drive and versatility (variance explained = 11.0%), fourth component; commercial knowledge and writing skills (variance
explained = 10.7%), fifth component; analysis and investigation skills (variance explained = 10.5%), and the sixth component; oral and initiative skills (variance explained = 10.3%). All these six hidden components could explain 68.8% of the variances of the determinants of graduate employability decisions.

Conclusions
The conclusion of the study is that after setting out to unearth hidden factors that contribute towards graduate employability decisions using primary data from sixty-eight (68) industries, one hundred and twenty (120) graduates and twelve (12) institutions from Takoradi, Accra, Cape Coast and Kumasi. The Principal Component analysis techniques reduced the many skills and attributes to six salient and hidden factors that could be used as determinants for graduate employability decisions. These extracted factors and their hidden constructs are summarised in Table 8:

Table 8: Summary of skills and attributes that contribute towards graduate employability decisions (ranked in order of importance with 1 being the most important and 6, least important)

<table>
<thead>
<tr>
<th>Extracted factors</th>
<th>Hidden factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Planning with time management</td>
<td>Setting of SMART goals and structuring action</td>
</tr>
<tr>
<td>2. Competences with flexibility</td>
<td>Demonstrating a willingness to embrace new systems, processes, technology, and ideas</td>
</tr>
<tr>
<td>3. Drive and versatility</td>
<td>Determined, committed, resilient, focused</td>
</tr>
<tr>
<td>4. Commercial writing skills</td>
<td>Passion for driving profit</td>
</tr>
<tr>
<td>5. Analysis and investigation skills</td>
<td>Ability to ‘deconstruct’ a problem or situation</td>
</tr>
</tbody>
</table>
6. Verbal and initiative skills  Clear and unprompted ability to present information to a group

**Recommendations**

Based on the analysis of this research work, we make the following recommendations:

a. Internships and industrial attachments should be carefully planned and executed with the involvement of industry players, facilitators of learning and the ministry of trade and industries.

b. Facilitators should inculcate into the learners’ skills, knowledge and attributes identified in this study so that they could easily slide into the world of work.

**References**


Knight, P. T., & Yorke, M. (2015). *Embedding employability into the curriculum.* Retrieved from:


ATTRIBUTES THAT PREDICT OCCUPANTS’ RESIDENTIAL SATISFACTION: A REVIEW OF EXISTING THEORETICAL AND CONCEPTUAL PERSPECTIVES IN RESIDENTIAL SATISFACTION STUDIES

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Abstract
This study reviewed and synthesised existing literature on residential satisfaction, highlighting main attributes that have been used to explain occupants’ residential satisfaction in some cultural and nation contexts, and draw lessons from them. A desktop survey approach to research was adopted; involving 26 relevant literature, published from 1950 to 2017. The study identified that over the past decades since 1950, Housing Features, Physical Features, Social Features, Neighbourhood Characteristics, Human Perception, Household Services, Building Quality, Government Services, Beneficiaries’ Participation, Beneficiaries’ Needs and Expectations, Management Characteristics, Residents’ Complaints, Dwelling Unit Features, Owners’ Maintenance Culture, Household Types, and Personal Characteristics, have been the main attributes that have been used to explain occupants’ residential satisfaction in some cultural and national contexts; with Neighbourhood Characteristics and Dwelling Unit Features being the common predominant attributes in diverse cultural and national contexts.
This study brings researchers to abreast with developments in residential satisfaction studies from 1950 to date, and proposes new directions for further studies; and the most comprehensive research framework that could guide future residential satisfaction studies.

Keywords: Residential, satisfaction, attributes, theoretical and conceptual perspectives, occupants

Introduction
According to Kotler (2000), satisfaction is a feeling of pleasure or disappointment, a person experiences as a result of comparing the performance (outcome) of a product to his or her expectations. Hence, occupants’ residential satisfaction is a feeling of pleasure or disappointment, a person experiences as a result of comparing the performance of a residence to his or her expectations (Somiah et al., 2017). In consonance, Galster and Hesser (1981) and Aigbavboa (2014) informed that, residential satisfaction largely measures the difference between occupants’ actual and expected residential attributes (Galster & Hesser, 1981; Aigbavboa, 2014). However, as to what actually constitute the attributes that explain occupants’ residential expectations, several theories and concepts have been conjectured by different studies in some cultural and national contexts, taking into recognition some demographical characteristics such as age, nationality, culture, employment status, annual income, marital status, among others (Aigbavboa, 2014; Ajayi et al., 2015; Somiah et al., 2017). In this present research, and usually in residential satisfaction researches, the residential expectations of an occupant constitute the attributes or variables that explain or predict individuals’ residential satisfaction (see Galster & Hesser, 1981; Aigbavboa, 2014; Ajayi et al., 2015; Somiah et al., 2017).

More so, residential satisfaction is synonymous in meaning with occupants’ residential satisfaction in this study; hence will be used
interchangeably. Thus, this study seeks to review and synthesis existing theories and concepts on residential satisfaction, highlighting the main attributes/variable that have been used to explain residential satisfaction from 1950-2017.

This will bring to the fore developments in attributes that explain residential satisfaction, and inform researchers about new directions for further studies. More so, it will inform researchers on the most comprehensive research framework (theoretical and/or conceptual) that could guide future residential satisfaction studies. The literature reviewed in this study spanned from 1950 to 2017. The literature review aided in identifying the main attributes that have been used to explain residential satisfaction over the past decades, from 1950. Lessons were drawn from the review of literature and proposal for new direction in residential satisfaction studies were suggested. In this study, theoretical and conceptual perspectives are views or ideas researchers have advanced in literature in explaining of occupants’ residential satisfaction.

**Some Theoretical and Conceptual Perspectives in Residential Satisfaction Studies from 1950**

In relation to the attributes that explain residential satisfaction, several views have been conjectured over the years in some cultural and national context (Aigbavboa, 2014; Ajayi et al., 2015). Residential satisfaction studies could be traced back into the 1950s. In 1955, Rossi (1955) opined that residents’ complaints explain residential satisfaction. The absence of complaints suggests satisfaction whiles the existence of complaints foretells dissatisfaction. Hence, residents’ complaints constitute the main attribute that explains residential satisfaction (Rossi, 1955).

However, this concept saw little development in literature (Harris, 1976). Therefore, Butler et al. (1969) posited that housing features, neighbourhood characteristics and dwelling unit features are the main
attributes that explain individuals’ residential satisfaction (Butler et al., 1969). In subsequent developments, Morris et al. (1976) found housing features and neighbourhood characteristics to be the main attributes that explain residential satisfaction (Morris et al., 1976); thus supporting the earlier findings by Butler et al. (1969). Accordingly, Speare (1974) further revealed that housing features, neighbourhood characteristics, and proximity to work place are the main attributes explaining residential satisfaction (Speare, 1974). Hence, the inclusion of proximity to work place broadened the frontier of exiting literature.

However, the attribute, proximity to workplace, later in residential satisfaction studies, was used as one of the latent variables in measuring neighbourhood characteristics. This is even evident in some quite recent residential satisfaction studies (see Aigbavboa, 2014; Somiah et al., 2017). Therefore, individuals’ residential satisfaction is largely as a result of its neighbourhood characteristics and dwelling unit features. Hence, confirming the assertions by Galster (1987), Lu (1999) and Aigbavboa (2014) that, neighbourhood characteristics and dwelling unit features are the main residential satisfaction attributes that constitute individuals’ residential satisfaction.

In 1974, Onibokun (1974) expanded the frontier of existing knowledge through the addition of household Services, social features and building quality to dwelling unit features and neighbourhood characteristics as the main attributes that constitute individuals’ residential satisfaction (Onibokun, 1974). But that notwithstanding, Ubong (2007) informed that, building quality features are the most important attribute that explains residential satisfaction.

Accordingly, Maran and Rodgers (1975) and Oktay et al. (2009), in separate studies from different cultural contexts affirmed neighbourhood characteristics to be attribute of residential satisfaction (Marans & Rogers,
1975; Oktay et al., 2009). Though, the latent variables constituting neighbourhood characteristics varied to some extent in each cultural context. In a related study, Michelson (1977) identified housing features, physical features and social features as very essential attribute of residential satisfaction (Michelson, 1977).

These attributes of residential satisfaction were confirmed by Francescato et al. (1979) in another study when the researchers opined that housing features, physical and social features constitute the elements of individuals’ residential satisfaction (Francescato, et al., 1979). Furthermore, in a year later, Morris and Winter (1978) buttressed that, housing, physical and social attributes of residential satisfaction, as earlier asserted by Michelson (1977), are very essential elements of residential satisfaction, but added, household services in giving a more holistic definition to the attributes of residential satisfaction (Morris & Winter, 1978).

Subsequently, Maran and Sprecklemeyer (1981) revealed that physical features and human perception are critical attributes of residential satisfaction (Marans & Sprecklemeyer, 1981). In a related study, Hesser and Galster (1981) conceptualised that attributes such as, household types, neighbourhood characteristics and dwelling unit features constitute individuals’ residential satisfaction (Hesser & Galster, 1981); with household types being the notable attributes in the study by Hesser and Galster (1981). Successively, in a single study, Canter and Rees (1982) found housing features and neighbourhood characteristics to be very essential attributes in explaining individuals’ residential satisfaction.

Though, housing features and neighbourhood characteristics had, in previous studies, been used to explain residential satisfaction in different cultural and geographical contexts, little was known of studies the combined the two attributes in a single study; hence, the two main
attributes being combined in a single study by Canter and Rees (1982) was a novelty. Furthermore, Hourihan (1984) found neighbourhood characteristics as well as personal characteristics to be main attributes that explain residential satisfaction. Remarkable of the study by Hourihan (1984) was the introduction of personal characteristics as an independent attribute that explains residential satisfaction. In addition, Weidemann and Anderson (1985) identified human perception, physical features as well as social features to be very essential attributes of residential satisfaction (Weidemann & Anderson, 1985).

Accordingly, Bonnes et al. (1991) and Lu (1999) in separate studies identified housing features, neighbourhood characteristics and household services to be main attributes explaining residential satisfaction; while Crull et al. (1991) informed that, neighbourhood characteristics and dwelling unit features are very significant in explaining residential satisfaction (Crull et al., 1991). Moreover, Price et al. (2003) identified residence management as a key attribute in explaining residential satisfaction; the researchers further informed that, good residence management practice contributes to residential satisfaction, especial in commercial facilities; whiles bad residence management breeds dissatisfaction. The management features included maintenance measures, security measures, and hygiene measures (Price et al., 2003).

Likewise, Adriaanse (2007) informed that social features, neighbourhood characteristics, and dwelling unit features are the main attributes of residential satisfaction.

Similarly, the study by Amole (2009) suggested that, social features, demographic features and dwelling units feature such as: availability of kitchenette, bathroom and storage facilities explains residential satisfaction (Amole, 2009). Affirmatively, Oktay et al. (2009) found
neighbourhood characteristics to be the main attribute in explaining residential satisfaction.

In another related residential satisfaction research in Nigeria, Ajayi et al. (2015) identified management features, physical features, social features as well as persons’ characteristics to be main attributes that explain individuals’ residential satisfaction. In South Africa, Aigbavboa (2014) identified housing features, neighbourhood characteristics, building quality, government services, beneficiaries’ participation, beneficiaries’ needs and expectations and dwelling unit as the main attributes that explain residential satisfaction. Notable of the study by Aigbavboa (2014) is the introduction of beneficiaries’ participation, and beneficiaries’ needs and expectations into residential satisfaction studies as main attributes of residential satisfaction.

Then quite recently, Somiah et al. (2017) broadened the frontiers of existing knowledge when the authors concluded that neighbourhood characteristics social features, building quality, management, dwelling unit feature and owners’ culture of maintenance are attributes that explain residential satisfaction. Significant of the study by Somiah et al. (2017) is the introduction of owners’ culture of maintenance as a main attribute of residential satisfaction. Again, the latent variables that constitute neighbourhood characteristics social features, building quality, management, dwelling unit feature were reconceptualised as new variables were introduced in measuring a particular main attribute.

Hence from the literature survey, there has been consistent and significant development in residential satisfaction studies, with the attributes essential for defining residential satisfaction gradually broadening and becoming more comprehensive as the years elapse.

This suggests that researchers in residential satisfaction studies have not yet reached consensus in their findings with regards to what actually
constitute individuals’ residential satisfaction. This is probably due to the very subjective nature of residential satisfaction attributes; and that individual demographics differs considerably. Hence, Aigbavboa (2015) informed that generalization of attributes of residential satisfaction may not be accurate, since the needs and expectations of individuals do vary; but that notwithstanding, attributes such as neighbourhood characteristic, and dwelling unit features appear to be a consistent and largely accepted attributes that explain residential satisfaction in and across diverse cultural and national settings. In view of this, Galster (1987), Lu (1999) and Aigbavboa (2014) concluded that neighbourhood features and dwelling unit features are the key attributes that explain residential satisfaction. This is attributable to the fact that, they have been found to be empirically consistent and significant in explaining residential satisfaction in diverse cultural and national contexts over the past decades. But that notwithstanding, further studies on the other attributes of residential satisfaction to ascertain their relative contribution in diverse cultural and national contexts will be a novelty. Accordingly, Table 1 is the summary of main attributes of residential satisfaction identified from the review of relevant residential satisfaction literature and will aid in further synthesis of the relevant literature this study reviewed.

Table 1: Summary of main attributes of residential satisfaction from the literature survey

<p>| Author(s)         | H | F | P | S | N | C | H | P | H | B | Q | G | S | B | P | N | E | M | D | U | OM | C | P | C | R | C | H | T |
| Rossi (1955)     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | x |
| Butler et al. (1969) | X | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | |
|-----------------------------|------|------|------|------|------|------|------|
| Speare (1974)               | X    |      |      |      |      |      |      |
| Onibok-un (1974)            | x    | X    | X    |      |      |      |      |
| Maran and Rodger (1975)     |      | X    |      |      |      |      |      |
| Morris et al. (1976)        | X    |      |      |      |      |      |      |
| Michel-son (1977)           | x    | X    |      |      |      |      |      |
| Morris and Winter (1978)    |      | X    | X    |      |      |      |      |
| Francescato et al. (1979)   | X    | X    |      |      |      |      |      |
| Hesser and Galster (1981)   |      |      |      |      |      |      |      |
| Maran and Spreck            | x    |      |      |      |      |      |      |</p>
<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>Lemeyer (1981)</td>
<td></td>
<td></td>
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<tr>
<td>Canter and Rees (1982)</td>
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<td>Hourihan (1984)</td>
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<td>Weidemann and Anderson (1985)</td>
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<td>Galster (1987)</td>
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<td>Bonnes et al. (1991)</td>
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<td>Crull et al. (1991)</td>
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<td>Lu (1999)</td>
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<td>Price et al. (2003)</td>
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</tr>
<tr>
<td>Amole (2009)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Oktay et al. (2009)</td>
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<tr>
<td>Aigbayboa (2014)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ajayi et al. (2015)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Somiah et al. (2017)</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Where: Housing Features (HF), Physical features (P), Social features (S), Neighbourhood Characteristics (NC), Human Perception (HP), Household Services (HS), Building Quality (BQ), Government Services (GS), Beneficiaries’ Participation (BP), Beneficiaries’ Needs and Expectations (NE), Management characteristics (M), Residents’ Complaints (RC), Dwelling Unit features (DU), Owners’ Maintenance Culture (OMC), Household Types (HT) and Personal Characteristics (PC).
Developments in Attributes of Residential Satisfaction Studies

Accordingly, Table 1 and Table 2 inform that several thoughts have been advanced by researchers with regards to the attributes that constitute residential satisfaction in diverse cultural and national contexts. The main attributes of residential satisfaction keep on broadening as the years evolve. Thus, suggesting a higher level of continuity in knowledge in residential satisfaction studies.

However, it is evident from the literature survey that researchers over the years have not reached consensus, in relation to the attributes that explain residential satisfaction. The main attributes of residential satisfaction identified from 1950 to 2017 were conceptualized as: Housing Features (HF), Physical features (P), Social features (S), Neighbourhood Characteristics (NC), Human Perception (HP), Household Services (HS), Building Quality (BQ), Government Services (GS), Beneficiaries’ Participation (BP), Beneficiaries’ Needs and Expectations (NE), Management characteristics (M), residents’ complaints (RC), Dwelling Unit features (DU), Owners’ Maintenance Culture (OMC), Household Types (HT) and Personal Characteristics (PC).

In accordance with Table 2, the main attribute that was used for explaining residential satisfaction in the 1950s was residents’ complaints; while the 1960s saw the introduction of housing features, neighbourhood characteristics and dwelling unit as main attributes of residential satisfaction. Additionally, in the 1970s, social features, household services, building quality, physical features and household perception emerged as attributes for explaining residential satisfaction; with social features largely dominating residential satisfaction studies in the 1970s (see Tables 1 and 2).

Furthermore, the 1980s saw the introduction of the personal characteristics in addition to the attributes that form people’s residential satisfaction;
whiles largely residential studies in the 1990s affirmed the attributes that have been revealed in previous residential satisfaction studies in the past decades. Attributes such as household services, neighbourhood characteristics, dwelling unit features and housing features were found significant in explaining residential satisfaction.

Then the attribute of management characteristics took centre stage of residential studies from 2000-2010; while from 2010-2017 main attributes such as government services, beneficiaries’ participation, beneficiaries’ needs and expectations, and owners’ Maintenance culture were added to existing knowledge on residential satisfaction attributes (see Tables 1 and 2). However, from Table 1, Aigbavboa (2014) and Somiah et al. (2017) appear to be more holistic as it contains almost all the attributes for explaining residential satisfaction that pre, and each could be a more holistic theoretical framework for further studies in residential satisfaction in other cultural and national contexts.

More so, Table 1 informs that, neighbourhood characteristics and dwelling unit features have been found to be very important in explaining residential satisfaction in diverse cultural and national contexts. This finding supports the assertions of Galster (1987), Lu (1999) and Aigbavboa (2014) that, neighbourhood features and dwelling unit features are very key attributes of residential satisfaction.
Table 2: Developments in attributes of residential satisfaction from 1950-2017

<table>
<thead>
<tr>
<th>Years</th>
<th>Existing Variable</th>
<th>Additions to existing variables</th>
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<tbody>
<tr>
<td>1950-1959</td>
<td>RC</td>
<td></td>
</tr>
<tr>
<td>1960-1969</td>
<td>HF,NC,DU</td>
<td>HF,NC,DU</td>
</tr>
<tr>
<td>1970-1979</td>
<td>HF,NC,DU,S,HS,BQ,P,HP</td>
<td>S,HS,BQ,P,HP</td>
</tr>
<tr>
<td>1980-1989</td>
<td>P,HP,HC,NC,PC,S,HT</td>
<td>PC,HT</td>
</tr>
<tr>
<td>1990-1999</td>
<td>HF,HS,NC,DU</td>
<td>-</td>
</tr>
<tr>
<td>2000-2009</td>
<td>M,S,DU,NC</td>
<td>M</td>
</tr>
<tr>
<td>2010-date</td>
<td>HF,NC,BQ,GS,BP,NE,DU,P,S,M,OMC</td>
<td>GS,BP,NE,OMC</td>
</tr>
</tbody>
</table>

**Methods**

The aim of the study was to review and synthesis existing literature on residential satisfaction, highlight main attributes/variable that have been used to explain residential satisfaction and draw lessons from them. Hence, a desktop survey approach to research was adopted. Secondary data relevant to the study were obtained from books, journals, reports, the internet, theses as well as conference and working papers. Some existing
literature on residential satisfaction from 1950 to 2017 were reviewed and synthesised, while main attributes of the existing studies were highlighted and lessons were drawn accordingly. Literature summaries were presented in tables. The study covered 26 relevant literatures that were published since 1950 to 2017; out of the 25 literature, 16 were journals and conference papers, 7 were books and the rest were reports. The reports included thesis and technical papers. Literature was accessed via Google search engine and some journal or conference specific search engines.

Conclusions
Attributes of residential satisfaction have evolved over the past years. In the early years of residential satisfaction studies, residents’ complaints was the main attribute for explaining residential satisfaction; while the latter years have seen a more holistic conceptualization of residential satisfaction attributes. This is evident in the studies by Aigbavboa (2014) and Somiah et al. (2017), which contain almost all the main attributes of residential satisfaction that previous studies have investigated in some cultural and national contexts, in addition to some key attributes notable to the two studies only; and each or amalgamation of the two studies could give a more holistic theoretical framework for further studies in residential satisfaction. Though attributes of residential satisfaction are more subjective, that is, they are influenced by several demographic characteristics such as age, culture, nationality, among others; attributes such as neighbourhood characteristics and dwelling unit features have been found to be very indispensable attributes of residential satisfaction in diverse cultural and national contexts. Hence, further studies in other cultural and national contexts to ascertain the generalization of the other attributes will be a novelty. The main attributes that have explained residential satisfaction over the past decades have been Housing Features, Physical Features, Social Features, Neighbourhood Characteristics, Human Perception, Household Services, Building Quality, Government Services, Beneficiaries’ Participation, Beneficiaries’ Needs and
Expectations, Management Characteristics, Residents’ Complaints, Dwelling Unit Features, Owners’ Maintenance Culture, Household Types, and Personal Characteristics.

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THE PASTORAL FULANI AND CHALLENGES OF INTEGRATION AMONG THE NANUMBA IN NORTHERN GHANA

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Abstract
The pastoral Fulani in Nanun do not functionally integrate among the local population. Using mainly observation, the interviews and purposive sampling techniques, this paper has gathered that, despite the level of integration reached between the Nanumba and the resident Fulani, the pastoral Fulani are unable to get well integrated. This is said to be due to challenges such as their inability to avail themselves to educational opportunities, robbery allegation, elopement with women and ‘Sukogu’ the wandering disease. Other reasons include scam in the name of money conjuration, low prices of dairy products during rainy season and scarcity of same during the dry season. This paper concludes with the observation that despite the inability of the pastoral Fulani to fully integrate, their contribution to the socio-economic development of the study area is monumental as they shepherd cattle for the indigenes thereby giving the later enough time to engage in farming activities.

Key words: Fulani, herders, integration, conflict, indigenes

Introduction
The Nanumba is one of the three linguistic units of the Mole-Dagbamba people. The other two are the Mamprusi and Dagomba. The Mamprusi kingdom is headquartered in Nalerigu, that of the Dagomba is in Yendi and Bimbilla is the capital of the Nanun kingdom, Awedoba (2002).
According to Wumpini (2012), Nanun is situated in the Eastern corridor of the Northern Region of Ghana and covers an estimated total landmass of 4178 square kilometres with Bimbilla as the Traditional capital. Geographically, Nanun is located within Latitude 8.50 N and 9.250 N and Longitude 0.50 E and 0.50 W of the Greenwich Meridian. Wumpini added that the land stretches from the Kpandai District in the south to the Yendi Municipal Assembly area in the north, Republic of Togo to the east and East Gonja District to the west, Nkwanta North District in the Volta Region to the south east and to the north east, the Zabzugu District in the Northern Region of Ghana.

Nanun has two administrative areas: the Nanumba North Municipality headquartered in Bimbilla and Nanumba South District headquartered in Wulensi. The Fulani is an ethnic group that hails from Mali, Burkina Faso, Niger and Northern Nigeria Tonah (2002). The Fulani is related to the Hausa and both are largely referred to as Hausa-Fulani following similarity of their cultures Eghosa et al. (2005). The first Fulani contact with Nanun (the land of the Nanumba people) and the rest of the north predates colonialism. This is evidenced by names of Hausa-Fulani origin with which children were named in Nanun long before colonialism by Fulani Islamic clerics.

For example, in 1896, the Bimbilla Naa at the time, Abalsi, who fought the German invaders bore a Hausa-Fulani name Halawayhi (2012). The Fulani went to Nanun as Islamic clerics for the purposes of proselytizing or for trading. In their quest to trade and preach Islam to the people, some of them (Fulani) remained in the land, as evident in the families in the Bimbilla township. Others stayed in the then Northern emporium of Salaga. Currently, the families in both towns still interact with one another.
The Fulani group that had first contact with Nanun had a good reception from the Nanumba, the later were mainly farmers. In addition to farming, the Nanumba also reared cattle. But the ownership of cattle was a sign of affluence as only the rich could afford them. More Fulani people entered the land, some as clerics, others sought for greener pastures. The later were therefore employed by the indigenes to shepherd their cattle for them since the Fulani had a lot of expertise in tendering cattle. In almost every town, village or hamlet of the Nanumbas, one could find the Fulani, tendering cattle for the indigenes.

Also present were the visiting herders or trans-humans with their much bigger herds camping two three miles away from towns and villages. Stock owning has also become a lucrative business for the Nanumba farmers. There was therefore a large presence of cattle in Nanun owned by either the indigenes or by the Fulani community. This has become a source of conflict as the cattle compete with farmers for land and water resources. But the visiting herders do not stay long enough as they hardly stay beyond a year. Rather, they keep changing settlements, moving to neighboring communities such as Dagbon, Kpandai, and Krachi. The pastoral Fulani who may be Ghanaian born, also change settlements very often in similar fashion.

Several pastoral families have had short stay in popular Fulani settlements such as Kabulya, Kuku and Jilo communities close to Bimbilla. This rather short stay of the pastoral Fulani puzzles many since they seem to have come to stay like the resident ones have done. Some of the pastoral ones might have spent between five and ten years living and working in the area but will eventually leave to other areas. This study therefore sought to find out underlying reasons for the inability of the pastoral Fulani to stay and fully integrate among the Nanumba as the resident Fulani migrants did.
Methods
Multiple approaches were adopted to obtain information for this study. The purposive sampling was used to identify and interact with people who had various contentions with Fulani on issues such as cattle theft, and farmer-herder problems. With the same study strategy, the author also identified and interacted with people who were victims of various robbery incidences to find out how they arrived at the conclusion that their assailants were Fulanis. Stock owners were also identified and interacted with to give insights into problems they had with their Fulani shepherds and how problems arising from farm destructions by their stocks were settled. Various Fulani settlements were also visited for interaction with the people.

The Fulani answered questions on how they were paid for tendering cattle, whether or not the incomes were sustainable, why they frequently change locations, their perception of the Fulani robbery allegation in Ghana, possibility of integrating with the indigenes among others. The interactions were done in Dagbanli with each session spanning between one hour and one hour thirty minutes.

The two police stations in the study area were visited to find out frequency of reports on robbery cases. Though there was little documentation on the subject, the police have information on various incidences that occurred but never brought to their attention officially.

Discussions were also held with drivers who ply the Eastern Corridor road from Accra, the capital of Ghana to the study area in Northern Ghana. Discussions were held with three Ghana Private Road Transport Union (GPRTU) drivers, and three Metro Bus drivers. Discussions focused on their robbery experiences driving from Accra to the study area which is usually done in the night. The last trip undertaken for this purpose was in May, 2016.
The study also employed unstructured observation as the researcher is a regular visitor to the study area. The observation was focused on current Fulani herding duties and general life style as they interact with other members of the society. Another key issue observed was the indigenous persons’ perception of the character of the Fulani, regarding theft, robbery reliability and other stereotypes. Some of the information in this write up came from secondary sources such as internet, published journal articles, and newspaper reports.

Results
A total of 54 respondents were interacted with for the study. These involved 21 Fulani in their settlements, 10 local stock owners, 4 cattle dealers, and 6 police officers. Others included 7 victims of armed robbery and 6 drivers, three of whom were victims of robbery while three escaped narrowly. It emerged that despite the level of integration reached between the Nanumba and the resident Fulani, the pastoral Fulani were unable to get well integrated due to challenges such as their inability to avail themselves to educational opportunities, robbery allegation, and elopement with women among others.

Discussion
Lots of crimes, especially, that which were committed in the bushes and villages were attributable to the Fulani. This was due to the fact that when culprits of such crimes as murder and robbery were caught they turned out to be Fulanis who are easily identified by their body statures and accent in speaking Dagbanli, Pidgin English or Twi. A Benz bus driver told this author that when he was attacked in March 2015 by armed robbers around Kpassa in the Volta region, the robbers were Fulanis. The robbers after taking his money and that of the passengers then asked him to know if the Metro mass bus for Bimbilla had gone or yet to reach that spot they were.
Though the bus had gone, the driver lied that it was yet to reach that place with the hope that if the robbers kept waiting the police patrol team could meet them and deal with them. Incidences of this nature have led to prejudices and unpalatable perceptions about the Fulani in the study area.

The Resident Fulani and Functional Integration

The presence of the Fulani in the study area is conspicuous in every hamlet, village or town in the northern Region of Ghana. They can be said to be categorized into three: the resident, pastoral and visiting Fulani. The resident ones are those that have lived in these parts for decades, have homes in towns and villages and do their businesses of herding or trading. The resident Fulani have functionally integrated into the society through the following ways:

*Contraction of marriages with the local people*: The accumulation of social capital and more led to the contraction of marriages between the Fulani and the indigenes. According to the respondents, marriage between culturally different people kills feeling of strangeness and estrangement in society. Jasmin (2004), concludes that immigrants who marry spouses born in the host country accumulate social capital relatively faster than immigrants married to foreign-born spouses. Though the ethnicity of the second and third generation Fulani seems to be diluted as a result of marriage and integration, they still consider themselves as Fulanis: they own cattle, speak Fulbe (Fulani language) and preach as Islamic clerics.

It must be emphasised however that in the early days of the Fulani contact with the Nanumba, it was a sacrilege for a *Nanuna* (singular form of Nanumba) to marry a Fulani woman. So the inter-marriages with the local Nanumba according to respondents were between the Fulani men and indigenous women.
The offspring of the marriages between Fulani and Nanumba were however not outcasts like Clara Okeke, Achebe (1960) in the novel *No longer at Ease*.

Achebe in this novel graphically describes Clara as professional nurse but who cannot be married because she was an *Osu*, an outcast and not fit for a free born as a wife. The Fulani in these areas of study were worthy of marriage as the blood of the locals was also running through their veins. In the early days of integration with the Fulani, it was claimed that a Nanumba marrying a Fulani woman would die unless he strapped a matured bull on his back and walked upright with it, wore the favourite sandal of the Fulani – it was said to be rare in Ghana, and always placed a bowl of cow milk by his bed during sex. These requirements made it impossible for marriage to be contracted with the Fulani woman. The logic behind the requirements was to discourage the young men of the Nanumba traditional areas who had amorous and lustful admiration for the young and pubescent Fulani girls in the early days of contact from striking relationships.

In the wisdom of the elders, if stringent rules were not laid down to guard their relationship with the Fulani girl folk, the young men could mar the relationship between the Fulani and the indigenes. Consequently, the ritualistic and physical requirements discouraged the young men from going for the Fulani girls. Serenity and peaceful co-existence therefore reigned among the locals and their Fulani guests.

*Joking relationship:* There exists a joking relationship between the Fulani and the Butchers’ clan. This is because both groups were involved in the cattle business. But in doing the business, a lot of litigated transactions have ensued involving the two groups and cattle owners bothering on theft.
Similar incidences of theft have been reported by Tonah (2005) who stated that livestock rustling has increased conflicts between Nchumuru cattle owners and their hired Fulani herdsmen. And that many Nchumuru believe that the Fulani herdsmen connive with their colleagues to steal cattle in the Middle of the Volta Basin.

The author concludes that the relationship between Fulani herdsmen and Nchumuru cattle owners is therefore full of mistrust, suspicions, acrimony and tensions. Among the Nanumba, such tensions have led to joking relationships between butchers and Fulani communities who jokingly accuse each other of being the cattle thieves. This situation is similar to Awedoba’s (2002) contention that conflicts among ethnic groups have led to joking relationships as between the Dagbamba-Gonja, Frafra-Dagati in northern Ghana.

This relationship provide example of how unrelated people maintain ties with one another through jokes and other social activities. Arhin (1979), writing on interethnic joking relationship remarked that such quasi kinship ties between ethnicities are observed largely in the urban areas, especially in the Zongos of Ghana where different ethnicities intermingle. The Fulani were well represented in the social activities of butchers (and vice versa) such as wedding, outdooring, and funerals, as the groups see each other as friends at the clan or professional levels.

*Institution of chieftaincy:* In order to decisively deal with the social problems that arose as a result of the intermingling of different ethnic groups, the *Nanima* (chiefs) have instituted chieftaincy offices for the various groups within their jurisdiction including the Fulani Halawayhi (2012). The Fulani chief arbitrates disputes among members of his group, using their own customary procedures.
The chief receives strangers from their homelands and serve as port of call when a member of the group is needed for any reason. The chief is expected to pay homage to the native chiefs on Mondays and Fridays dressed in his cultural attire.

*Knotting of charms:* The Fulani are known for their powerful magical prowess. Cyprian Ekwensi in his novel *The Burning Grass* (1961) puts it graphically that by magic they (Fulani) live, and by magic they die.

They knot charms for the Nanumba friends for protection against evil spirits, protection against bullets, protection against witches and sorcery machinations as well as charms for women. The spiritual undertaking detest by the people is the one that makes people resurrect from death. The caution is always that if a Fulani man asks you to bring a hollow dried corn-stalk, one should not because he will end up preparing a charm for one to die early, resurrect and live elsewhere as a normal person (or as ghost). Otherwise the Fulani are respected for their tremendous spiritual powers of both traditional and Islamic backgrounds. The prowess of the Fulani in spirituality, and the Nanumba admiration and interest in the various spiritual powers strengthened their relationship. The faith that the Fulanis have in their spiritual powers emboldens them, making them feel protected from danger in case they destroyed farms and were attacked.

The Visiting Herders/Transhumance
There are a lot of visiting herders in and around the Nanumba provinces. They come in hugely large numbers such that standing on one end of the herd one could not see the other end of it. The individual cattle were also relatively big in comparison to the local breeds reared by the indigenes.

Their migration to this area from Mali, Burkina Faso, Cote d’ Ivoire to the Savanna and other parts of Ghana was intensified in the 1970s following the deteriorating ecology of their home countries Tonah (2002).
Tonah further states that in northern Ghana the environment, the ecology and the ability of the nomads to establish reciprocal relations with the host communities have largely explained their migration and settlement in the Region. He further reports that throughout the 1960s and early 1970s the relationship between Kassena agro-pastoralists and Fulani herdsmen was quite good, with both groups co-operating for mutual economic benefit. Several Kassena households entrusted their cattle herds to Fulani herdsmen when water and pasture were scarce.

No such reciprocity takes place between the indigenes and the visiting Fulani herdsmen in the study area. The nomads roam in the forest of Kpagturi, in the plains of Jilo and along the basins of Kukuo, Wulensi and Chichagi rivers. The local farmers saw them day in day out, standing from far to view them in awe and admiration as they block their way especially when travelling on the bush paths. The long horns of the cattle knock against one another producing a musical rhythm that added to the awe they inspire. No one sells grazing land nor water source to them. They get everything free of charge. To that extent, there is no conflict between farmers and chiefs over sales of parcels of land to Fulani as is the case between farmers and chiefs in the settlements along the Volta Basin (Tonah, 2005).

Tonah (2005) also intimates that many indigenes, particularly the youth, were furious about the practice whereby chiefs and landowners in the Volta basin gave or rented out large tracts of land to commercial farmers and Fulani herdsmen. They frequently accused their chiefs/landowners of recklessness and lack of foresight in the management of communal lands. Chiefs and landowners, on the other hand, considered their ability to rent out land to nomads as a golden opportunity to obtain some revenue since their subjects only made token contributions for the use of the land in the area and could not be expected to support the chiefs financially.
Fulani herders in Nanun use land and water resources for free. They pitch camps three four miles away from the villages around which they live. And on market days the rich herd owners go to the markets in Bimbilla, Wulensi, Makayili, Nakpayili, Lepusi to buy items that ranged from food to clothes.

The Fulani are careful when tendering their cattle in order to avoid farms. But in some instances, the cattle stray into people’s farms destroying crops and yam mounds. When this happened, conflict between the farm owners and the Fulani is always probable. A farmer narrating his confrontation with a Fulani stated that his farm was destroyed by a grazing herd one early morning. In the afternoon when he went to ask the Fulani whom he saw sitting under a tree some distance away from his farm, the herder pulled out an assault rifle from the long garment he was wearing. More than terrified, the farmer went away, without further statement or confrontation.

A lot of farmers had similar confrontation with the gun wielding visiting herders. The cases however died naturally as they were not as frequent and deadly as those reported by farmers in Atebubu and other settlements in the Volta basin (Tonah, 2005). If there was a semblance of conflict between the farmers and the herders, it could only be described as latent but not manifest.

The rich herds owning visiting pastoralists usually engage the services of young local Fulani to cater for their cattle. They then have the luxury of time to visit the nearest town or village to socialize with other herders in the markets. The cattle dealers or middlemen have always been the ones who make the interaction possible as they introduce herders to their colleagues or the indigenous population.
Tendering herds for the visiting herders has always been a source of income for the local pastoral Fulani. The pastoral Fulani and the indigenous people also buy arms from the visiting herders who might have brought the arms from across the borders, carrying them on the back of bullock or donkeys. As it pertains with the Nanumba herd owners, the visiting Fulani also pay the young hired pastoral Fulani for their services, not in cash but in kind.

This take the form of a payment of a calf after the person worked for three months. These calves will live in the herd till maturity. Usually such cows are moved into the kraals of the resident herders since the visiting ones could go away any time. In case the shepherd was careless, as they usually are, and the cattle destroyed farms, the calves or even the matured cattle were used to compensate the farmer. This is the more reason why the visiting herders hardly destroy farms as frequently done by the resident ones. When the resident Fulani destroy farms, the owner of the herd pays the compensation whereas with the visiting herders, the hired shepherd (usually the resident Fulanis) is made to pay for the destruction as a disincentive for future negligence.

The pastoral Fulani, reciprocity and contest for resources. The Nanumba are basically subsistent farmers; crops such as yam, maize, groundnuts, cassava thrive well in the area. In recent times, most people have taken to large acre farming for commercial purposes. Most of the available arable lands are used for cultivation of crops especially yam, maize and groundnuts for commercial and subsistent use. At the same time, the number of people owning cattle has increased tremendously as a means of diversifying investment. Ofuoku (2009) made a similar observation that in the Delta State of Nigeria livestock is a major form of investment among large sections of the communities, especially those involved in the agricultural, fishing, trading, and the informal sector.
Ofuoku opined that almost every person in the community is part of a collective or cooperative investment in cattle in a bid to diversify their investment.

This is similar to what obtained in Nanun where people own cattle individually or collectively as family, friends or associates. Most of the Fulani that are hired and who shepherd these cattle are always at loggerheads with farmers as the later complain of destruction of crops by the herds. Sometimes the farmers gang up and beat up the shepherds or shoot and kill a cow or two to compensate for the destroyed crops.

Such conflicts are usually resolved at the palace of the nearest village or town, between the shepherd and stock owners on one side and the farmers on the other. Farmers, whose violent encounters with shepherds are recent, are usually free for some time from herding disturbances as the Fulani shepherds will forge friendly relations with them and move the cattle away from their farms. Sometimes the Fulani befriend such farmers and may strengthen the relationship with a gift of milk. This situation brings about the popular statement that ‘if you don’t beat a Fulani man, you will not drink his milk’. By implication, one’s problem with a Fulani cannot be over yet, or said to be fully resolved until one receives milk from him as a sign of good will.

The conflict has become even more intense at the basins of sources of water. The tributaries of rivers such as Wampu, Wulehmogli, Kpukpugri, and host of other water bodies always dry up in the dry season leaving a fertile land for crop cultivation. The farmers used the opportunity to cultivate crops such as tomatoes, cabbage, carrot, onions, and garden eggs along the river banks. The dry season also happened to be the period that water is scarce for the teeming flocks of cattle in and around the areas. Their search for water along the river banks is always a recipe for conflict as they destroy and consume the succulent sprouting crops.
This led to attacks and sometimes reprisal attacks as the cattle owners sometimes feel that the level of destruction did not warrant the level of attack on the Fulani and their cattle. Such attacks created enmity among people.

Often, the Fulani leave the job of tendering to their children who do not properly monitor the grazing animals. Before long, the poorly supervised animals stray to farms destroying crops. The natives may also give cattle to their own children to shepherd. Such children (cow-boys- Nagkparba, in the local parlance which literally means cattle farmers) did not also behave differently from the Fulani children.

The children were mostly whipped for leaving the cattle to destroy farms and farm produce, leading to conflict between their parents and farmers. The hired pastoral Fulani is not remunerated in cash but in kind. They are paid with food items such as dried cassava, maize, and guinea corn. This is done every two months or upon the request of the shepherd. In addition to the food items provided, the pastoral Fulani augment their earnings by selling cow milk. Oyedipe (1977) reports on similar co-operation in Nigeria where sedentary farmers entrust their herds, either permanently or during the peak dry season, to nomadic pastoralists who had better knowledge of livestock herding and whose nomadic life style facilitated the utilization of pastures and waterholes in distant locations.

In this way, nomadic pastoral groups have access to the herds' milk, which often constitute a substantial portion of their diet, while farmers spend less time and energy searching for pasture and water. Reciprocity of exact nature obtains in Nanun where Nanumba farmers entrust their cattle to pastoral Fulani and remunerate the later with the dairy products and food items. This way, they farmers are able to concentrate on their farming whiles the pastoral Fulani shepherd their cattle.
The Nanumba stock owner may either buy the milk or beg for it from the Fulani since that is his bonafide property and the main remuneration for the job performed. It is common to see Fulani women carrying fresh milk and cheese for sale in the towns or markets. Cow milk is highly patronized since it is used for human and animal consumption and for spiritual purposes. The Fulani made a living from this business and are believed to be stingy with the milk.

The Pastoral Fulani and Challenges of Integration
According to the African Union (2009), social integration is a prerequisite for sustainable social development as it ensures that all members of society enjoy full and equal participation. The Union opines that social integration is a concept of inclusion and provision of equal opportunities and rights for all people. And that the achievement of these should be addressed on a long term basis and through a process which countries in Africa should be ready to undertake. This includes: enhancing social justice and human rights; improving the quality of life of people; and enhancing the life chances of the population, including the most vulnerable group of the society.

Social integration policies should therefore seek to reduce inequalities; promote access to basic social services, education for all and health care; and increase the participation and integration of social groups. It added that development has to encompass the aspirations of people and be sustained by the people themselves through their full and active participation and that the ultimate goal of social integration is to create a ‘society for all.’ The Fulani social integration in Nanun has been challenged by a number of factors making the creation of society for all impossible.
Some of the factors are internal to the Fulani social life while others are external as they impugned on the Fulani relationship with their indigenous neighbors and that of the larger Ghanaian society. These factors are:

Fulani Armed Robbery Menace

Incidents of robbery of armed robbery by Fulanis have not only become popular but also gaining momentum. Victims suffer from varying degrees of issues ranging from trauma, ailments, maiming and deaths. The phenomenon occurs often more than reported in the media.

The most occurring ones are those that happen in the villages and towns where media coverage is not widespread. The nomadic Fulani from Niger, Nigeria and other neighboring countries are said to be the sources of the arms for the robbery operations in the study area and perhaps nationwide. But the pastoral Fulani are at the forefront of the operations as they are the ones conversant with the Eastern-corridor terrain. It is believed that the pastoral Fulani offer themselves for the robbery as a result of dwindling shepherding opportunities. Halawayhi (2012) intimates that, most of the Fulani youth are idling in towns after realizing that there are no herding opportunities for them in the villages. Halawayhi (2012) concludes that the Fulani youth are largely uneducated; neither have they any form of training in trade and artisanship and so find it difficult surviving in the cities. Consequently, they are involved or suspected to be involved in most of the armed robbery cases in the country.

In the study area, the unavailability of news stringers, and other media professionals, made the incidences of robbery gone without media reportage. At the time this paper was written, Wulensi still had no FM radio, so advertisement, social announcements or administrative information had to be sent to the Gmantambu FM in Bimbilla.
Cases of robbery attacks on passengers are not given the needed hype they deserve in order that people who hear about them could be more cautious when travelling. This robbery phenomenon has rendered the entire Fulani a devastating image.

In 2009, this author witnessed an incident where a Tamale market truck was attacked allegedly by Fulani from the Gushegu Market in which one person was killed. Upon reaching Tamale, the victims of the attack went amok attacking every Fulani on sight to the astonishment of onlookers. In the process two innocent Fulanis were killed. Fear of similar reprisal attacks has always been lingering on the minds of the Fulani who live in the study areas especially when robberies occurred.

Educational Challenges
There are primary schools in most of the villages in Nanun where Nanumba and Konkomba children attend. In most cases these children trek to the nearest village or town to attend Junior High Schools and later to Senior High. But the Fulani children hardly avail themselves of the educational opportunities as their parents do not see the need since the children are needed to support parents in shepherding the cattle. Similar observation was made by Fabusoro and Oyegbami (2009) in South West Nigeria where Fulani children’ major constraints to participating in existing basic education programmes were found to result from their constant movements in search of water and pasture for their livestock; and the critical role they played in their production systems, which made parents and guardians reluctant to release them to participate in formal schooling.

The authors added that the irrelevance of the school curriculum which was tailored to meet the needs of sedentary groups and thus ignored the educational needs of nomadic people; their physical isolation, since they
operate in mostly inaccessible physical environments; and a land tenure system that made it difficult for the nomads to acquire land and settle in one place have made it difficult for the later to send their children to school. In Nanun, the few Fulani that had education are often referred to as *Fulan ninnei* (the eye-opened Fulani). Such individuals are popular, very interactional and well to do financially.

According to Craig *et al.* (1994) education disciplines one self and teaches the value of hard work, acquiring pride in one’s country and its political and economic institutions, and becoming aware of one’s place in society and being shaped for it. The authors add that for functional integration to be achieved, educational system should ignore students’ social class and prepare them for whatever career that the students have the ability to fill.

Educated Fulani are functionally integrated, have filled several careers as nurses, teachers, drivers, and cannot be identified by mere looks whereas the illiterates are identified by dress (they usually wear robe and big hats) and mannerisms as they are not confident enough for interactions. The attack as mentioned above in Tamale was possible because of the unique looks of the pastoral Fulani. The inability to take up educational opportunities coupled with irrelevant school curriculum has made functional integration a challenge to the Fulani.

**Low Income**

The main sources of income for the Fulani are the sale of dairy products and remuneration from stock owners. The milk and food items that are given to Fulani households are supplemented by backyard farming of maize, on the rich soil of the kraal where the cattle are kept. In the rainy season, fresh milk and cheese are always in abundance and cheaply sold.
In the dry season, the milk and other dairy products are hard to come by as the scarcity of feed make it difficult for the cattle to produce enough for the calves and for sale.

This does not augur for the security of their livelihood as the Fulani do not have several livelihood options to depend on. For instance, they do not have financial capital as most households are hired to shepherd the herds and therefore could not sell the cattle. Poor accesses to fresh pasture for grazing and water inadequacy are major sources of livelihood vulnerability during dry seasons. The vulnerability of their livelihoods continued in the rainy season when the abundance of fresh pasture makes the production of fresh milk high leading to glut and consequently poor prices. Whether in the dry or in the rainy season, the vulnerability of the Fulani livelihoods continues posing a challenge to their continuous stay in the study area hence frequent evacuations.

Cattle Theft

The disappearance or loss of a cow has always been seen as the clandestine action of the Fulani herd man by flock owners. The flock owners believe that the Fulani social connection with their peers in other towns and villages has always given the later the opportunity to transfer stolen cattle for safe keeping. Usually on the first two or three days of a reported disappearance of a cow by Fulani, flock owners team up searching in the bushes and in nearby villages for the cow or cattle. If the cows are not found, the Fulani is always suspected of stealing them by asking another herder to come and move them away at a designated point in the bush during grazing. If the loss of cattle is regular with one particular herder, he easily lost his job as every cattle owner would have gone for their cattle.
Before long, the said herder would have no cattle to shepherd and so has to change a location prospecting for another herding opportunity. The subject of cattle theft has therefore remained an integration challenge for the pastoral Fulani in Nanun.

Elopement with Women
It looks fashionable the rate at which Fulani young men elope with pubescent girls or with married women. Young Fulani who has herding opportunities with the visiting herders make some money from milk or the sale of calves which they get after two years of tendering their stocks. The monies made are usually spent on young girls on market days as the market centers serve as areas of socialization for them. In most cases, these girls are betrothed to other men and so the new suitors would have no option than to run away with the girls to another location where it will be difficult to locate them.

This means that the herding job they have been doing would have to be abandoned and another one sought for in their new places. These elopements are similar to the one undertaken by Hodio with Fatimeh described by Cyprian (1962) in his novel *The Burning Grass* in which the two ran away to start a new life somewhere without the blessing and approval of any one. News of elopements is not uncommon in the Fulani community.

There are instances of elopements with married wives as well. The men always strike acquaintances with the women and visit them only in the afternoons when their husbands are tendering cattle and the women left at home to attend to the milk and cheese. To the dismay of such unsuspecting husbands, they come home to meet empty houses without their wives.
This has led to several deadly attacks reported on the streets of Bimbilla usually on market days and in the Kpayansi areas in the Nanumba South District. Victims of these attacks who sustain various degrees of cuts from cutlasses are said to have eloped with wives of their attackers. As noted earlier the women were taken far away to begin new life. Awedoba (2002) reports of a similar elopement by the Moshie in Burkina Faso.

The Moshie have lineage alliances and friendship establish and sustained through the lineage heads known as budkasma. Reciprocal exchanges between the heads involved services, goods and girls. A young man in Moshie society must be in good terms with the budkasma if he is to get a girl to marry since the later control the distribution of girls for marriage. Awedoba concludes that under this circumstance, many men were known to elope with married women and Ghana became the destination for such fugitives escaping from the strictures of traditional system. The attempt to hide with the eloped women from prospective intruders has made the stay of the Fulani quite unstable as they move around to resettle quite frequently. Elopement as a form of marriage has been a ban on integration of the Fulani among the Nanumba.

Money Conjuration
Lots of Fulani spiritualists visit Nanun to help people make money by spiritual means. This category of Fulani comes as Islamic spiritual healers or conjurers. The Nanumba have always initiated the coming of the conjurers. The conjurers usually establish brotherly relationship with other Fulani resident in Nanun. The brotherly relationship is reminiscent of the one described by Awedoba (2002) where African migrants in Europe see themselves as brothers though they may communicate not in any African language but in English to the surprise of Europeans. The Fulani speak Fulbe (language of the Fulani) though with some dialectal differences.
Money conjuration could be done in full glare of the public just to woo clients. This author has witnessed several of these where the conjurers have recited incantation and money fell in sheets to the admiration of crowds. It is also true that when such conjurers are met by interested clients who want money conjured for them in huge amounts, such transactions have always failed.

In most cases the conjurations have failed after the clients had expended so much money on the deal. The conjurers have always run away leaving their so called brothers to answer for their whereabouts. These happenings have always marred the image of the Fulani adding to the stereotypes. New conjurers have always arrived, seen to be different, but none was known to have actually enriched the clients yet they later kept trusting that one day they will meet the right conjurer to help them end their financial woes. Some of the conjurers have loosely married after one year of stay usually to the indigenous women but not to fellow Fulani. Such women have always been left to their fate after their conjurer-partners absconded with people’s money in the name of multiplying the monies for them.

The Wandering Charm
The social integration of the Fulani among the Nanumba is hampered by the former endless wanderings. Growing up, this author saw several Fulani families who have resided in the homes where the interviews for this paper were conducted. They settled and went away usually not exceeding ten years. The Fulani have attributed this endless movements to the wandering charm (Sokugu) with which sorcerers afflict their enemies in order that they never have rest. The indigenous population calls it balyogu which is literally translated to mean ‘stay forever in the wildernesses’. The Fulani respondents have countless examples of people who are afflicted with this disease and who have not been able to live stable lives.
Cyprian (1962) describes *Sokugo* as the charm of the Fulani cattlemen; as a magic which turned studious men in to wanderers, which make husbands to desert their wives, chiefs their people and sane men their reason. The coming and going of the Fulani which is done quite often is attributable to this disease making integration with the cattle men a mirage in Nanun.

Estrangement
The uneducated Fulani feels estranged no matter how long he has been in Ghana while the educated ones feel part and parcel of the Ghanaian community. Tonah (2002) opines that in Ghana the Fulani are found in small numbers throughout the country but are concentrated in the north and south-east.

And that many of them are immigrants or descendants of recent immigrants from the Sahel region but are nevertheless still considered by the state and by many Ghanaians as ‘aliens' even though a sizable number of them are third-generation descendants of immigrants. The pastoral Fulani in Nanun have always seen themselves as sojourners. But are happy to see the resident Fulani functionally integrated among the indigenes. The perception of alienism both on the part of the Fulani and Ghanaians generally, as the statutes of the Fulani, have led to the pastoral Fulani being lackadaisical in things that could facilitate their integration. These integration facilitating things include formal education, buying land, putting up of buildings in towns and villages, and what you have. As a result of the absence of these, the estrangement of the Fulani is deepened thereby decelerating integration.
Conclusion
This paper looked at the activities of the Fulani herders in the Nanumba traditional area. Three sets of Fulani were found: the resident ones who were functionally integrated; the pastoral, who tendered herds for livelihoods; and the visiting ones who usually were transhumance. The activities of the pastoral Fulani such as negligence, citing of stocks closer to homesteads, low or even nonpayment of compensation lead ineluctably to contentions with farmers. The visiting herders, on the other hand, avoided contention by staying away from settlements, paying compensation to farmers with the remuneration of the pastoral Fulani who were usually hired to tender the herds. These coupled with the fact that the Nanumba chiefs did not sell land and water resources to herders, as done in other areas, has led to a relatively peaceful co-existence between the indigenes and chiefs as well as the herders.

It was also realised that intermarriages between the Fulani men and Nanumba indigenous women, appointing Fulani men as chiefs for the Fulani community, and the preparation of magical charms by the Fulani for the Nanumba have led to a peaceful coexistence and functional integration between the resident Fulani and local communities. It also emerged that the pastoral Fulani were unable to get fully and functionally integrated.

This is said to be due to challenges such as their inability to avail themselves to educational opportunities, robbery allegation, elopement with women and the wandering disease. Others included scam in the name of money conjuration, low prices for dairy products during rainy season and scarcity of same during dry season and accusation of cattle theft.
This paper concluded with the observation that despite the inability of the pastoral Fulani to fully integrate, their contribution to the socio-economic development of the study area is monumental as they contribute to the production of dairy products, tendering herds for the locals, knotting of charms and many more, have made them a force to reckon.

**Recommendations**

Giving the frequency with which Fulani pastoralists pick contentions with sedentary farmers, it will be good to reserve tracks of land for the former for pasturing so as to prevent their cattle straying into peoples’ farms. This way, the farmer-herder conflict in Ghana would be minimized. It is equally important for the Ghanaian state to fashion out modalities on how to end the feeling and thought of alienisms and estrangement on the part of the Ghanaian community and the Fulani. This way, the pastoralists who may have been in Ghana for decades would take steps to become citizens, and active participants regarding civic duties and responsibilities instead of continually sitting on the fence as strangers.

**References**


THE MEAL EXPERIENCE OF CUSTOMERS OF GRADE-THREE RESTAURANTS IN SEKONDI-TAKORADI

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Abstract
Meal experience is key to customer satisfaction and the profitability worth of restaurants. The main objective of the study was to examine the meal experience of customers of Grade-three restaurants in Sekondi-Takoradi, Ghana. It further sought to determine if there were significant differences in meal experience of males and females as well as first-time and repeat customers. A sample size of 272 customers from all Grade 3 restaurants was surveyed using a questionnaire. Data was analysed using SPSS. The study revealed that generally, customers had a favourable meal experience. However, there were no significant differences in the meal experience of males and females as well as first-time and repeat customers. Finally, it was recommended that Grade-three restaurants in Sekondi-Takoradi should target men within the age range of 31 and 50 to patronise their restaurants. Likewise, they must improve upon their services, provide ample dining and parking space as well as provision of toilet facilities.

Keywords: Customer, food, gender, meal experience, restaurants
Introduction
Food consumed outside the home has become a necessity for many people in recent times and this is partly due to the fact that more and more women are pursuing careers outside their homes (Andaleeb & Caskey, 2007). In Ghana, though there is a dearth of statistics on patronage of food services, there is anecdotal evidence that restaurants in especially cities like Accra, Kumasi and Takoradi have seen increased patronage. Foodservice sector in Ghana has become fully-fledged comprising of multinational restaurant chains like KFC, On-the-Run and Mr. Bigg’s as well as independent restaurants like Asanka Locals, Papaye and Frankies (Mensah & Dei-Mensah, 2013).

Restaurants are classified into three (grade one, two and three) depending on the quality of services and facilities. Grade three restaurants focus on acceptable choice of dishes or snacks served in a modest, informal atmosphere with staff offering a satisfactory level of service” (Ghana Tourist Board, 2005). The term ‘meal experience’ was first used by Campbell-Smith (1967) and later became a worldwide term used in the hospitality industry. It begins when customers are seated and ends when they leave the restaurant (Noone, Kimes, Mattila & Wirtz, 2007). The meal experience was a combination of several factors including food, menu variety, service, atmosphere, group size, facilities for children, recommendation, new experience, provision of unique twist and price value which were combined to achieve customer satisfaction (Davis, Lockwood, Alcott & Pantelidis, 2012; Ismail, 2012; Pantelidis & Marée, 2009).

The increase in the number of restaurants operating in Ghana is a good omen for both restaurateurs and the government, but meal experience which is one of the critical determinants of successful restaurant operations has not attracted the same level of attention.
Studies on the food service sector in Ghana have generally focused on food service quality (Mensah, 2009) and food safety (Akyeampong, 2007; Davis et al., 2012). Admittedly, there has been a modicum of studies on meal experience and customer satisfaction (Ismail, 2012; Kleynhans, 2003).

A study by Canny (2014) found out that the experiences of customers were influenced by their demographic characteristics, food, service, ambience as the factors of meal experience but ignored others like menu and price. The study was undertaken in Sekondi-Takoradi which had 20 Grade-three restaurants operating in the region. However, the mushrooming of restaurants in the city to take advantage of the oil find could compromise the quality of services which could affect customers’ meal experience. This study therefore sought to examine the meal experience of customers of grade-three restaurants. It further sought to determine if there were significant differences in the meal experience of males and females as well as first-time and repeat customers.

**Literature Review**

Determinants of meal experience

Meal experience originated from a set of interactions between oneself and a product which incited a reaction (Verhoef, Lemon, Parasuraman, Roggeveen, Tsiros & Schlesinger, 2009). Generally, five factors namely food, variety of menu, price of food, service, atmosphere, location were found to determine the meal experience (Kleynhans, 2003, Ryu & Han, 2010). However, customers’ overall meal experience varied greatly in relation to these five factors (Noone et al., 2007; Reynolds & Hwang, 2006).
Food is the most basic and most important factor that influences meal experience and is termed as an integral part of the overall experience at any restaurant (Geissler & Rucks). Food is described using sensory aspects such as taste of food, temperature, type of food, quality, quantity, textures, aroma and colour of food (Geissler & Rucks, 2011). Menu determines the meal experience and it is a list of food items which is either written out to form part of the décor or described to customers when they enter restaurants (Gregoire, 2013). Menu is further described by Pantelidis and Marée (2009) as the center piece of any eating establishment which often contains pictures that entice customers to try new dishes. Price is the amount of money charged for a product, a competitive tool and a major factor influencing customers’ meal experience (Gregoire, 2013).

It was also emphasized by Davis et al. (2012) that customers will re-visit a restaurant not only because of food and service but also value for money. Service is the presentation of food to customers which takes many forms in a foodservice establishment (Gregoire, 2013). In a restaurant, the only point of contact that customers have is through the service staff (Davis et al 2012). In restaurants, divisions of service delivery that takes place are actual and indirect services (Davis et al., 2012; Gustafsson et al., 2006). The restaurant atmosphere comprises of tangible and intangible aspects which is the number one point of call and the first thing that a diner notices as he/she enters a restaurant (Gustafsson et al., 2006). Atmosphere is seen by customers as the size, shape, colour scheme, furniture and fittings, lighting, air conditioning, temperature, appearance, music, table settings, seating arrangement, crockery and cutlery. Davis et al. (2012) is of the view that a restaurant can be known for preparing reasonably priced menu with quality service, but if the distance to the premises is far from the target population target can affect the customer’s meal experience.
Demographic Characteristics and Meal Experience

Demographic variables influence customers’ dining experience (Geissler & Rucks, 2011). According to Kleynhans (2003:23) “Consumers differ regarding their age, gender, nationality, genetics, culture and tradition and, therefore will react differently regarding their expectations of the meal experience as well as their assessment of the meal experience. Gender has an impact on the assessment of quality and the physical environment (Ganesan-Lim, Russel-Bennet & Dagger 2008). Again, women rely more heavily on the environment and service evaluation, whilst men pay attention to sales employees. Kleynhans (2003) confirms that as males consider taste and nutrition of food to be more important and are risk takers, whilst females hold on to tastes as being important and are willing to try new or strange foods. According to National Institute of Health News (2004) men visit restaurants more frequently than women. Age has a significant effect on customers’ assessment of products and services (Ganesan-Lim et al., 2008).

Reynolds and Hwang (2006) observed that generation X and Y born from 1965-1976 and 1977-1994 respectively are noted for frequent eating out whilst older consumers, specifically, baby boomers (born between 1946 and 1964) shy away from trying new cuisine but visit restaurants as an opportunity to socialise. Some of such people also move to visit different restaurants as first timers, whilst others prefer to continually visit a particular restaurant of their choice. Rahman (2012), on the other hand, found out that older restaurant customers were more concerned about their health and therefore, quality of food is more important to them.

Diners’ status comprises of first-time and repeat visitors. In restaurants, first-timers are people who may not have heard of the establishment, but would have certain expectations based on what they may have heard or seen through communications (Marone, 2011).
Roozbeh, Ng and Boo (2013) observed that first-time customers were more positive evaluators than repeat visitors in the assessment of meal experience due to the fact that they were not familiar with the establishment. However, Kasapila (2006) strongly believe that repeat visitors are likely to be more lenient in assessing overall meal experience than first-timers.

From the foregone, it is hypothesised that:

H₁: There is no significant difference in the meal experience of males and females.
H₂: There is no significant difference in the meal experience of first-time and repeat visitors.

**Methods**

The study was conducted in Sekondi-Takoradi which is situated within the Shama Ahanta East Metropolis of the Western Region of Ghana. It is popularly known as the ‘Twin City’ of Ghana. It is the largest city in the Western Region and the capital of the region. It is an industrial and commercial centre and has a population of 445,205 people (Ghana Statistical Service, 2012). Sekondi is the oldest and largest whilst Takoradi is a port city and bustling commercial hub.

This study was underpinned by the positivist paradigm which is based on realisation through experience and has long been the most suitable paradigm for social science research Sarantakos (2005). The research design was a cross-sectional survey involving the collection of data from a representative sample of customers, who dined out in Grade-three restaurants in the Sekondi-Takoradi Metropolis during the month of February, 2014. The target population for the study comprised of all people who dined out in Grade 3 restaurants in Sekondi-Takoradi during the period of the research.
The sample size was calculated based on the formula required for accuracy in estimating proportions. This was done by considering the standard normal deviation set at 1.96 which corresponds to 95% confidence level, with percentage picking a choice at 50% (0.5), and a confidence interval of (0.05 = ±0.5). Based on this the sample size was 384. All 20 registered Grade-three restaurants in Sekondi-Takoradi were selected for the study. Initially, the researcher visited all Grade-three restaurants in the ‘Twin City’ in order to solicit information concerning their daily average covers.

Information gathered from Restaurant Managers indicated that average covers ranged from 27-100 per day depending on location, price as well as types and variety of food served. The estimation of sample size for each restaurant was based on the average daily covers. The overall sample size of 384 was distributed among all the registered Grade-three restaurants in proportion to their average daily covers as seen in Table 1.

Convenience sampling technique which allows any subject available to participate in a study was used for the study. Permission was first sought from managers of the restaurants. Customers who had finished eating were approached, the purpose of the research was explained to them and their consent was sought after assurances of anonymity and confidentiality. Those who agreed to take part in the survey were handed out questionnaires to fill. Questionnaires were mainly self-administered but in few instances, it was administered by the researcher. The first part of the questionnaire used a 5-point Likert scale where respondents rated the various determinants of the meal experience. The second part sought data on respondents’ socio-demographic characteristics. Out of the 384 questionnaires distributed, 272 were completed fully and were useful for the data analysis. This represented a response rate of 70.8%.
The data collected were coded and analysed using the Statistical Product for Service Solution. Independent sample T-test was used for testing the hypotheses.

Table 1: Sample allocation to restaurants

<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Average daily cover</th>
<th>Sample allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>88</td>
<td>33</td>
</tr>
<tr>
<td>B</td>
<td>44</td>
<td>17</td>
</tr>
<tr>
<td>C</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>39</td>
<td>15</td>
</tr>
<tr>
<td>E</td>
<td>52</td>
<td>20</td>
</tr>
<tr>
<td>F</td>
<td>60</td>
<td>23</td>
</tr>
<tr>
<td>G</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>H</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>I</td>
<td>100</td>
<td>38</td>
</tr>
<tr>
<td>J</td>
<td>63</td>
<td>24</td>
</tr>
<tr>
<td>K</td>
<td>53</td>
<td>20</td>
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<tr>
<td>L</td>
<td>49</td>
<td>19</td>
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<tr>
<td>M</td>
<td>52</td>
<td>20</td>
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<td>N</td>
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<td>O</td>
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<td>Q</td>
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<td>10</td>
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<tr>
<td>R</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>S</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>T</td>
<td>67</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,011</strong></td>
<td><strong>384</strong></td>
</tr>
</tbody>
</table>

Source: Fieldwork, 2014

Results
Respondent’s demographics were made up of 74.4% males and 25.6% females.
Half of the respondents were between the ages of 31-50 years (50.2%) whilst 62.5% were married. Generally, 81.9% had tertiary level of education and 60.3% were employed by others.

The Meal Experience
Generally, customers rated their meal experience as good because all the items on the scale for measuring meal experience had category mean scores greater than 3 as presented in Table 2. The specific means were food (Category Mean = 3.88), menu (Category Mean = 3.77), price (Category Mean = 3.77), service (Category Mean = 3.67) and environment (Category Mean = 3.60). Thus, customers were more satisfied with the food than any of the other components of the meal experience. They were least satisfied with the environment of the restaurants. Over 70% of customers thought the food served by the restaurants was good and also agreed that food temperature was right (Mean = 4.00). In addition, they agreed that food was tasty, was of good quality and healthy (Mean = 3.90). They further agreed that the food was attractive (Mean = 3.87) and had pleasant aroma (Mean = 3.86). However, with regard to the nutritional value of the food offered by the restaurants, 67.3 percent agreed that the food was nutritious while 32.7 percent did not share this opinion (Mean = 3.88).

Customers generally agreed that the menu they chose were available (Mean = 3.88), had different prices (Mean = 3.85), variety (Mean = 3.77) and were easy to understand (Mean = 3.76). However, 37.3 percent of customers did not agree that dishes were described to them by staff of the restaurants (Mean = 3.75). Additionally, patrons of the restaurants agreed that food prices were reasonable (Mean = 3.79), fair (Mean = 3.75) and offered value for money (Mean = 3.76).
Respondents generally rated services rendered by staff of the restaurants highly though almost half of the respondents did not agree that restaurant staff were prompt and handled complaints well. Staff of the restaurants were considered to be polite (Mean = 3.95) and decently dressed (Mean = 3.90).

However, just a little above half (53%) of the customers agreed that the service was prompt and that complaints were handled properly. Also, 55.8% and 55.2% respectively agreed that staff exhibited professionalism and made customers feel special. This means about 45% did not agree.

Respondents further agreed that the restaurant environment was good (Mean = 3.60), safe (Mean = 3.87), the furniture was comfortable (Mean = 3.85) and the atmosphere was clean (Mean = 3.84). Slightly more than 50% of respondents agreed that the restaurants had adequate parking spaces (Mean = 3.27) and were spacious enough (Mean = 3.41). On the contrary, 66.5% of respondents did not agree that the restaurants had toilet facilities (Mean = 2.96).

Table 2: Customers’ Meal Experience

<table>
<thead>
<tr>
<th>Components</th>
<th>% in Agreement</th>
<th>Mean</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food (Category mean=3.88)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food is attractive</td>
<td>71.7</td>
<td>3.87</td>
<td>0.762</td>
</tr>
<tr>
<td>Food is tasty</td>
<td>76.7</td>
<td>3.90</td>
<td>0.792</td>
</tr>
<tr>
<td>Food has good quality</td>
<td>72.4</td>
<td>3.90</td>
<td>0.84</td>
</tr>
<tr>
<td>Food quantity is sufficient</td>
<td>71.5</td>
<td>3.82</td>
<td>0.986</td>
</tr>
<tr>
<td>Food has pleasant aroma</td>
<td>72.0</td>
<td>3.86</td>
<td>0.812</td>
</tr>
<tr>
<td>Food temperature is right</td>
<td>76.9</td>
<td>4.00</td>
<td>0.816</td>
</tr>
<tr>
<td>Food is nutritious</td>
<td>67.3</td>
<td>3.82</td>
<td>0.806</td>
</tr>
<tr>
<td>Food is healthy</td>
<td>74.2</td>
<td>3.90</td>
<td>0.796</td>
</tr>
<tr>
<td><strong>Menu (Category mean=3.77)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Menu has variety & 73.0 & 3.77 & 1.015 \\
Menu is easy to understand & 71.9 & 3.76 & 1.053 \\
Menu chosen was available & 77.1 & 3.88 & 0.993 \\
Menu has different prices & 71.6 & 3.85 & 0.993 \\
Dishes described to diners & 62.7 & 3.59 & 1.079 \\
**Price (Category mean=3.77)** &  &  &  \\
Price of food is reasonable & 72.3 & 3.79 & 1.060 \\
Price is fair & 68.4 & 3.75 & 1.011 \\
Price has value for money & 67.8 & 3.76 & 1.009 \\
**Service (Category mean=3.67)** &  &  &  \\
Staff welcome customers & 59.3 & 3.58 & 1.157 \\
Staff are polite & 79.0 & 3.95 & 0.776 \\
Staff exhibit professionalism & 55.8 & 3.51 & 0.942 \\
Staff are knowledgeable & 57.3 & 3.56 & 0.825 \\
Service is prompt & 53.0 & 3.41 & 1.117 \\
Staff do not discriminate & 66.3 & 3.73 & 0.935 \\
Staff are helpful & 69.4 & 3.82 & 0.829 \\
Staff make customers' special & 56.2 & 3.54 & 0.955 \\
Properly handled complaints & 53.3 & 3.50 & 0.942 \\
Staff are decently dressed & 76.2 & 3.90 & 0.916 \\
Requested food was served & 73.7 & 3.89 & 0.958 \\
**Environment (Category mean=3.60)** &  &  &  \\
Adequate parking space & 51.1 & 3.27 & 1.273 \\
Restaurant easily accessible & 79.4 & 3.39 & 0.911 \\
Environment is safe & 73.9 & 3.87 & 0.931 \\
Restaurant is clean & 73.5 & 3.84 & 0.848 \\
Restaurant has pleasant smell & 69.5 & 3.79 & 0.787 \\
Restaurant is spacious & 54.8 & 3.41 & 1.09 \\
Restaurant nicely decorated & 59.2 & 3.63 & 0.881 \\
Restaurant is not noisy & 66.9 & 3.74 & 0.984 \\
Clean cutlery and crockery & 71.3 & 3.82 & 0.853 \\
Comfortable table and chairs & 73.2 & 3.85 & 0.971 \\
Restaurant has toilet facilities & 33.5 & 2.96 & 1.223 \\

Source: Fieldwork, 2014
Meal Experience between Male and Female Customers

T-test was performed to determine whether there were any significant differences (p<0.05) in food, menu, price, service, environment and overall meal experiences reported by males and females and the results are presented in Table 3. The results did not show a significant difference in the overall meal experience scores for males (Mean = 3.76, SD = 0.48) and females (Mean = 3.93, SD = 0.41); t (185) = 2.25, p = 0.31.

In spite of the fact that there was no significant difference in the meal experiences of males and females, females rated their meal experience higher than males. Additionally, there were no differences in the experiences of males and females with regards to the other components of the meal experience except for menu. There was a significant difference in the menu experiences of males (Mean = 3.71, SD = 0.73) and females (Mean = 3.96, SD = 0.55); t (249) = 2.57, p = 0.03. This result suggests that women tend to have a more favourable experience with the menus of restaurants than their male counterparts. Interestingly, the mean scores of females on all the components of the meal experience was higher than that of their male counterparts except for service which had a mean score of 3.70 and 3.65 for males and females respectively.

Table 3: Differences in Meal Experience between Males and Females

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>Food</td>
<td>3.87</td>
<td>0.54</td>
<td>184</td>
<td>3.98</td>
<td>0.56</td>
<td>64</td>
</tr>
<tr>
<td>Menu</td>
<td>3.71</td>
<td>0.73</td>
<td>185</td>
<td>3.96</td>
<td>0.55</td>
<td>66</td>
</tr>
<tr>
<td>Price</td>
<td>3.73</td>
<td>0.89</td>
<td>195</td>
<td>3.84</td>
<td>0.89</td>
<td>69</td>
</tr>
<tr>
<td>Service</td>
<td>3.70</td>
<td>0.63</td>
<td>173</td>
<td>3.65</td>
<td>0.59</td>
<td>59</td>
</tr>
<tr>
<td>Environment</td>
<td>3.64</td>
<td>0.57</td>
<td>170</td>
<td>3.88</td>
<td>0.44</td>
<td>59</td>
</tr>
<tr>
<td>Meal experience</td>
<td>3.76</td>
<td>0.48</td>
<td>139</td>
<td>3.93</td>
<td>0.41</td>
<td>48</td>
</tr>
</tbody>
</table>

Source: Fieldwork, 2014
Meal Experience between first-time and repeat customers
The independent sample \( t \)-test was used to ascertain the differences in meal experiences of first-time and repeat customers of grade three restaurants. Table 4 presents the results on the differences in meal experience for first-time and repeat customers.

The results did not show a significant difference in the overall meal experience scores for first-time customers (Mean = 3.82, SD = 0.38) and repeat customers (Mean = 3.80, SD = 0.48); \( t \) (186) = 0.20, \( p \) = 0.32. The result revealed that there was no significant difference at the \( p \leq 0.05 \) between the mean of first-time and repeat customers in terms of all the components of the meal experience. In relative terms however, the mean scores of repeat customers on all the components of the meal experience was slightly higher than that of first-time customers except for environment where first-time customers had a higher mean score (3.80) than repeat customers (3.67).

Table 4: Differences in Meal Experience Between First-Time and Repeat Customers

<table>
<thead>
<tr>
<th>Variable</th>
<th>First-time customer</th>
<th>Repeat customer</th>
<th>T</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Food</td>
<td>3.80</td>
<td>0.53</td>
<td>60</td>
<td>3.93</td>
</tr>
<tr>
<td>Menu</td>
<td>3.69</td>
<td>0.62</td>
<td>57</td>
<td>3.81</td>
</tr>
<tr>
<td>Price</td>
<td>3.76</td>
<td>0.91</td>
<td>61</td>
<td>3.77</td>
</tr>
<tr>
<td>Service</td>
<td>3.57</td>
<td>0.61</td>
<td>46</td>
<td>3.71</td>
</tr>
<tr>
<td>Environment</td>
<td>3.80</td>
<td>0.63</td>
<td>56</td>
<td>3.67</td>
</tr>
<tr>
<td>Meal experience</td>
<td>3.82</td>
<td>0.38</td>
<td>34</td>
<td>3.80</td>
</tr>
</tbody>
</table>

Source: Fieldwork, 2014
Though there was no significant difference in the experience with the restaurant environment between first-time and repeat customers, it was close to the \( p \leq 0.05 \) level. The difference in the restaurant environment as experienced by first-time customers was (Mean = 3.80, SD = 0.63) and compared to that of repeat customers (Mean = 3.67, SD = 0.53); \( t (228) = 1.50, p = 0.08 \). Generally, it could be concluded that there is no significant difference in the meal experience of first-time and repeat visitors of Grade-three restaurants in Sekondi-Takoradi.

**Discussion**

The main objective of the study was to examine the meal experience of customers of Grade-three restaurants in Sekondi-Takoradi and how the meal experience differed between males and females as well as first-time and repeat customers. This study underscored the importance of all five factors; food, price, menu, service and atmosphere to the meal experience. However, the results showed that food, menu and price were perhaps the most important determinants of the meal experience. This was not surprising because Grade-three restaurants basically provided lunch to customers in a modest and informal setting. The emphasis was on the food instead of the ambience. For customers, the motive for going to grade-three restaurants was to fulfil a biological need of hunger rather than sociological need. Thus, what mattered to customers was food taste, nutritional value, portions, quality, variety and affordability.

Furthermore, Kleynhans (2003) asserted that males and females attached different importance to food and other factors related to it. However, the results of the study indicated that there were no significant differences in the meal experience of males and females. This was in line with the findings of Mhlanga et al. (2015) who did not find any significant difference in the overall meal experiences of customers of different genders.
This study, however, found a significant difference in the assessment of menu of the restaurants by males and females \( (p = 0.03) \). Menu here referred to the variety foods available in the restaurants with their prices. Though the mean scores of females were higher on almost all the components of the meal experience, service was the only component that scored lower than their male counterparts. This was probably due to the fact that the service component of the meal experience looked more at the relational quality, the relationship between the staff of the restaurants and their customers. Men emphasized on the core service provision whilst women valued the relationship with the service staff (Noone et al., 2009). So, whilst the men were more interested in the food, women were more concerned about the relationship with the waiters and waitresses of the restaurants; their attitudes towards them, how helpful they were towards them and how they handled their complaints.

This study proved that there was no statistically significant difference in meal experiences of first-time and repeat customers. This was contrary to the findings of Roozbeh et al. (2013) who found significant differences between first-time and repeat visitors in terms of their food experience in Malaysia. Generally, the mean scores of repeat customers on all the components of the meal experience were slightly higher than that of first-time customers except for environment. This was expected because repeat customers were described as people who had already developed some affinity for the restaurant and so would freely patronize the restaurant again. Also, a customer who has had a bad meal experience at a restaurant would not continue to patronise it. Likewise, whilst repeat customers knew exactly what to expect from restaurants, their first-time counterparts mostly had greater expectations about the restaurants they visited.
Conclusions

Most customers of Grade-three restaurants in Sekondi-Takoradi rated their overall meal experience very high even though some had concerns about promptness and professionalism of staff and the provision of toilet facilities. These were the areas where the restaurants fell short and needed to improve. The study unearthed the attributes of the restaurants which were essential for enhancing customers’ meal experiences; food, menu, price, service and environment. Secondly, the study corroborated the results of similar studies which affirmed that there was no significant relationship between gender and meal experience.

Though there were differences in assessment of the meal experience between males and females, the females had a slightly higher meal experience; however, those differences were not statistically significant. Most patrons of the Grade-three restaurants were males. This was not different from the literature because traditionally males were noted for eating out more than females. Furthermore, though there were observed differences in the meal experiences of first-time and repeat customers, the differences were not statistically significant. The mean scores of meal experience and its components indicated that repeat customers had a slightly more favourable meal experience.

The proliferation of restaurants in the twin city of Sekondi-Takoradi has engendered a competitive business environment. Thus, to remain competitive, restaurants operators must continue to provide favourable meal experiences. The results of this study showed that the clientele of Grade-three restaurants were mainly males within the age range of 31 and 50 years. This constituted the market segment that the restaurants should target. Since there were no significant differences in the meal experience of males and females, what appealed to the males would likely appeal to their female counterparts.
It was also recommended that management should organise periodic in-service training for their staff and ensure that good staff-customer relationship was maintained. Employees should always be decently dressed and make it a point to welcome customers cheerfully and promptly as soon as they enter the restaurants.

From the results, a significant number of customers were not satisfied with the inadequate spaces in the dining and parking areas of the restaurants as well as lack of toilet facilities. It appeared some restaurateurs took that for granted.

A spacious facility would ensure the comfort of customers and thereby increase the patronage of the restaurants. Seating arrangements should enable free movement of customers and staff. Parking areas and toilet facilities should also be provided and clearly labelled. The Ghana Tourism Authority should strengthen its regulatory role by ensuring that restaurants that do not have the requisite facilities and service standards are closed down whilst ensuring that licensed restaurants have the requisite facilities.

Finally, previous studies did not include price and menu as factors influencing meal experience (Kleynhans, 2003; Ryu & Han, 2010). Though in this study, price and menu were included in the components of meal experience, future studies should seek to establish the relative importance of these attributes to the overall meal experience not only in Grade 3 restaurants but the different categories of restaurants in Ghana. Methodologically, a mix of quantitative and qualitative methods (triangulation) should be employed to gain greater insights into customers’ meal experiences, to ensure greater reliability and validity of research findings.
References


ASSESSMENT OF THE FACTORS THAT CHALLENGE THE QUALITY OF BILLBOARD ADVERTISING IN THE SEKONDI-TAKORADI METROPOLIS

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Abstract

Billboard advertising is one of the most effective means of advertising concepts, the world over, because it improves mileage. This means of advertising is common in the Sekondi-Takoradi Metropolis as well. The study assessed the factors that challenge the quality of billboard advertising in the Sekondi-Takoradi Metropolis. The qualitative research design was used for the study. The study was based on a random sample of 15 billboards within the metropolis for analyses. Four designers and four business owners within the metropolis were also purposively sampled and interviewed. It was found that the billboards had poor visibility, had weak and aged structures, and, also, had poor designs. Moreover, some of the advertisers failed to contract qualified personnel to develop and mount the billboards. It was recommended that professional designers be considered by advertisers for effective billboard advertisements.

Key words: Billboard, advertising, Sekondi-Takoradi Metropolis, advertisers, designs
Introduction
The role of the media industry is multi-faceted, and one of its crucial roles is to deliver advertising through a variety of media vehicles to reach the target audience (Lopez-Pumarejo & Bassel, 2009). One of such pivotal means of advertising is the billboard. The etymology of ‘billboard’, according to Duncan (2018), is ‘billing board’ which is a large outdoor advertising space designed to capture the attention of road users. According to him, billboards are designed to be simple, striking, creative and impactful. Widely considered as the oldest medium of advertising, outdoor advertising, including billboards, dates back at least 5,000 years (Taylor, 1995). Universally, over the period of about 150 years, billboard advertising has metamorphosed in terms of materials and technology used in creating them in order for them to meet the contemporary demands of their users (Lopez-Pumarejo & Bassel, 2009; Hatter, 2017).

The case is not any different in Ghana. Billboard advertisement is fast becoming a more convenient and effective means of advertising by businesses and brands in Ghana (and particularly in the Sekondi-Takoradi Metropolis) due to how mobile society has become in this 21st century. Many businesses, churches and other organisations operating in the Sekondi-Takoradi Metropolis and beyond patronise billboards over other means of advertising. This is consistent with the observation made by Hatter (2017) that the effectiveness of billboard advertising is unparalleled due to the fact that any business entity which engages in its usage has a full and uninterrupted control over the advertising space, and gets to enjoy constant exposure 24 hours a day, 7 days a week. It is not surprising then that billboard advertising is highly patronised by businesses and other entities as a key means of advertising since 82% of billboard viewers actually look at the advertising message (Matrix Media, 2016).
Billboards therefore need to have few words as much as possible, be devoid of too many details since it is not meant to give secondary information and possess brighter colours to convey the needed message in seconds. Again, it is necessary that a billboard be sited strategically and be devoid of any obstruction for the intended message to be communicated effectively (Sugget, 2010). Unfortunately, most billboards in the Sekondi-Takoradi Metropolis do not meet up to the expected standards which culminate in them actually creating problems and public nuisance. This study therefore assessed the factors that challenge the quality of billboards in the Sekondi-Takoradi Metropolis.

Methods
The qualitative research design was used for the study. The study was based on a random sample of 15 billboards within the Sekondi-Takoradi Metropolis between November and December, 2017. The data were collected through images taken by the researchers themselves on the various sites that the billboards were located. Permission was sought from the Sekondi-Takoradi Metropolitan Assembly in that regard. In addition, 4 graphic designers and 4 business owners were purposively sampled to elicit their expert views on the topic under consideration. Interviews were conducted for the participants. In addition, content analysis and observations were carried out on the sampled billboards for the study.

Findings & Discussions
Four thematic problem areas associated with billboards in Sekondi-Takoradi Metropolis were identified, and the discussions of the findings have been centred around them. The four problematic areas were: billboards which were overaged, billboards with design deficiencies, billboards which were poorly located and positioned and billboards that communicated poorly.
Over-aged Billboards
Two categories of problems with billboards were identified – billboards which have badly rusted frames, are weak and therefore pose serious threat to life. These billboards usually fall under the mercy of the weather and are usually seen falling on vehicles or across roads (see Fig. 1).

The second group of billboards in this category are so faded that they can hardly been seen or read. They virtually fail to communicate any message about the business, product or service they represent and thus cause visual noise where they are located.

It is obvious that most billboards in this group have outlived their stay. The current finding stands in opposition to the posits of Duncan (2016). According to him, billboards are required to be active for a maximum of 12 weeks. Figure. 2 gives an idea of the rate of deterioration of some of the billboards.

Figure 1: An old and weak billboard positioned close to a major road. Source: Fieldwork (2017)
Figure 2: A billboard with information that can hardly be seen or read. Source: Fieldwork (2017)

Poor Designs
Three groups of billboards were identified as having various forms of bad designs: firstly, there were those with poor handling of colour, that is, contrast was not taken into consideration. That made it difficult for information to be read easily because the colour of the text used did not contrast so well with that of the background colour (Figure 3). Secondly, there were those billboards with poor typography.
Since billboards are technically meant for road users who are often on the move, it is imperative that designers rely on font sizes that can be seen and read at a glance (Wor, 2016). Usually san-serif typefaces are known to be ideal for billboards rather than serif typefaces. This is because the latter makes readability a challenge, especially for those in moving vehicles. Additionally, other billboards are seen laden with lots of information or texts (Figure 4) which obviously is not a sign of an effective billboard advertising (Sugget, 2017). Lastly, there are some other billboards with poor layouts which made information dissemination difficult. Specifically, those billboards in this category: (1) had texts not well organised to enhance communication and (2) did not give important information the needed emphasis.

Figure 3: A billboard with poor handling (contrast) of colour. Source: Fieldwork (2017)
Poor Location and Positioning
Billboards which fall in this problem area are either positioned at places where they are not visible enough due to obstruction by tree branches, or they are seen cluttered with other billboards within the area they are situated. These make their content too difficult to be focused on and read by road users since information on them are either concealed or are competed with by the presence of other billboards.

Some of the billboards have sizes not desirable enough (too small) for major roads such as the Sekondu-Takoradi to Accra highway.

Figure 4: Poor handling of typography
Figure 5: Poor layout.

Source Fieldwork (2017)
On a highway, billboards must come in such sizes as they can be clearly seen or read at a glance irrespective of how fast a vehicle may be speeding. It is therefore advisable for smaller signages or billboards be placed in towns and along urban roads where vehicles that ply such roads do not exceed certain speed limits. This will afford the potential advertising targets the opportunity to read the contents of such billboards.

Figures 6 and 7: Billboard with obstruction (6) and too small size on a highway (7)

Source: Fieldwork (2017)
Poor Communication
The last category of problematic billboards within the Sekondi-Takoradi metropolis has to do with disorderliness in the presentation of information. In this category of billboards, coherent and orderly presentation of information is not given attention. These make it difficult for road users to capture all the essential information on these billboards at a glance. It is imperative that designers of these billboards pay attention to how information is presented on them so their content can be seen and read for better understanding.
The interviews conducted on the designers revealed that most business owners did not seek the designers’ professional services because unprofessional designers were always ready to render cheap services. The implication of this finding is that the proliferation of unprofessional designers in the system was responsible for some of the problem laden billboards. The low charges they offer easily attract business owners to engage their services at the expense of professional designers.

On the part of the business owner interviewed, it was found that many who engaged the services of designers for billboard advertisement had little or no knowledge about designing and what makes an effective billboard design. As a result, they easily accepted many unprofessional designs done for them.
Conclusions
A thorough look at the findings of the study gives the following conclusions:

i. Professional designers are not usually contacted by business owners for billboard designs due to the issue of affordability, and this resulted in most of the problems associated with the billboards found out in the study;

ii. Most clients and business owners had limited knowledge as to what goes into effective billboard designs. Resultantly, they accept any poor designs even if the designs do not have what it takes to carry their messages across effectively;

iii. City authorities (Sekondi-Takoradi Metropolitan Authority STMA) are doing little in the areas of ensuring proper siting of billboards and enforcement of regulations on the lifespans of billboards. Clearly, most of these billboards needed to be pulled down due to the threat they posed to human life; and

iv. Most billboards, due to their numerous challenges, hardly serve their intended purposes. They consequently become liabilities rather assets to their owners.

Recommendations
The following recommendations have therefore been adduced for the study:

i. Designers must ensure best practices when designing billboards in order to meet standards for effective advertisements;

ii. City authorities must ensure that proper practices are carried out by designers and business owners as regards siting of billboards;
iii. Business owners must also endeavour to engage the services of professional graphic designers in order to reap the full benefits of their billboards as tools for advertising their ideas; and

iv. City authorities must ensure that billboards that have outlived their usefulness are pulled down.

References


PRODUCTION OF POWDERED MAKUEA POO-UNG AS A CONVENIENT FOOD FOR FAMILY USAGE

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Abstract
Makuea poo-ung is a perishable vegetable which can be transformed to prolong usability and availability during lean season. Basic preparation of makuea poo-ung for use has been so demotivating that, home makers only make use of it when there is availability of time. The main objective of the study was to process makuea poo-ung into a convenience food. An experimental research was used to assess how to produce dried makuea poo-ung and prevent conspicuous change in the nutritional content. Oven drying of makuea poo-ung took place within 12 hours. Dried makuea poo-ung was milled into powder when it became crispy. Results revealed that dried makuea poo-ung can be stored up to at least one year in the fridge, then four months at room temperature. It was recommended that home makers should adopt the recipe for the production of dried makuea poo-ung for convenience use.

Keywords: Convenience, dried, makuea poo-ung, perishable, family use

Introduction
Eggplant is a fruity vegetable made up of 98 different varieties and is one of the ten sources of the world’s healthiest food.
Makuea poo-ung locally called *nsaman ntroba, khawu nsusua* or *ama gyiree* is also called cherry eggplant belonging to *Solanum melongena* group (Dias, 2012; Bhaskar & Ramesh Kumar, 2015). Makuea Poo-ung has three similar species known as, Turkey berry (*Solanum torvum*), Thai eggplants (Makuea Praow) and Pea eggplants (Makua Puong) all grow in clusters (Dias, 2012; Garden-Robinson, 2012; Muyandar & Devahastin, 2014; Bhaskar & Ramesh Kumar, 2015). It is highly nutritious, medicinal, seasonal, bitter, highly perishable and difficult to use in cooking. Processing into convenience foods and identifying specific nutrients are key determinants required for higher patronage (Xie, Yu-Wei., Luo, Zhen-Ping, Hao & Li, 2014). Production of makuea poo-ung/cherry eggplant into convenience foods fundamentally conserves time and energy needed for food production (Garden-Robinson, 2012; Muyandar & Devahastin, 2014; Elkhodiry et al., 2015). This can be transformed to prolong their usability when processed and likewise for use during the lean season. Also, in the quest to achieve good results, the ideal time for processing perishable products like makuea poo-ung should be within the first few days after harvesting so as to prevent visible changes colour of fruit (Garden-Robinson, 2012; Muyandar & Devahastin, 2014; Xie et al., 2014).

Food preservation offers perishable products a longer life span and the production of new manufactured product (Çağlarırmak & Hepçimen 2013; Carroll, 2013). Drying is one of the most fairly easy, traditional and most ancient common method of preserving food. It is also a very important activity that takes place in the food processing industries, pharmaceutical, agricultural, ceramics, biotechnology, minerals and wood industry (Santacatalina, Ozuna, Cárcel, García-Pérez & Mulet, 2011; Garden-Robinson, 2012; Muyandar & Devahastin, 2014; Elkhodiry et al., 2015).
Makuea poo-ung is inexpensive, easily accessible but has a natural limited shelf life which continues to attract food loss due to the high perishability rate (Bliss & Elstein, 2004; Habwe, Waling & Onyango, 2008; Hu et al., 2010; Bhaskar & Ramesh Kumar, 2015; Urun, Yaman & Köse, 2015). Curbing enzymatic browning by the use of red onions or lemon to prolong the lifespan, can only be sustained for barely two weeks of storage after which discolouration is inevitable (Fraikue, Prasanna Kumar & Amenumey, 2017).

Homemakers who are working mothers encounter constraints of time executing their day to day activities. As a result, preparing makuea poo-ung for daily food preparation is so cumbersome that most people deter from using it (Engle & Altoveras, 2000; Bliss & Elstein, 2004; Habwe et al., 2008; Asiedu-Addo, 2014). Similarly, others who wish to add makuea poo-ung to their meals do so only when they have enough time available. Challenge are, what can be done to minimise wastage of fresh makuea poo-ung during food preparation? What measures can be put in place to make makuea poo-ung readily available for use by homemakers all the time and especially during lean season? In the light of this, the researcher aims to explore a simple device used to transform fresh makuea poo-ung into convenience form.

The main objective of the study is to use a technique to process makuea poo-ung into convenience food and also devise a simple procedure for homemakers to domestically prepare makuea poo-ung powder for use during daily meal preparation.
Literature Review
Preservation by Drying

Drying or dehydration is one major way utilized to preserve food. Generally, drying of products occur when liquids are vapourised mostly by the supply of heat or when liquid contents are expended using hot air under hygienic conditions (Muyandar & Devahastin, 2014; Elkhodiry et al., 2015). The existence of dried product ensures the supply of foodstuffs throughout the year by taking care of acute shortage during the shift in agricultural season (Akeredolu & Adebajo, 2013; Elkhodiry, et al., 2015). Dried foodstuffs are described as successful when products produced are safe, have good texture, colour and nutritional properties (Garden-Robinson, 2012; Kendall, DiPersio & Sofos, 2012). The introduction of dehydration offers an alternative which assists in the stability of the vegetable.

It facilitates easy transportation because of the lighter weight, prevents microbial contamination, enhances product quality and makes use of small storage space (Sagar & Suresh Kumar, 2010; Santacatalina et al., 2011; Akeredolu & Adebajo, 2013; Elkhodiry et al., 2015). The basic requirement for drying is to begin with a higher temperature when moisture content is high, then reduce temperature till the product is dry. All dried products contain some small percentage of moisture of about 2% when drying is complete. Drying time is calculated as the difference between final moisture content and initial moisture (Wu, Orikasa, Ogawa & Tagawa, 2007; Elkhodiry, et al., 2015; Urun et al., 2015), whilst amount of water removed per unit time is equal to the drying rate.

The commencement of drying essentially begins with pre-treatment that includes blanching, addition of ascorbic acid or high-pressure treatment (Adedeji, Gachovska, Ngadi & Raghavan, 2008; Yucel, Alpas & Bayindirli, 2010; Elkhodiry, et al., 2015).
As this takes place before processing, it increases brightness of dried samples which finally attract consumer attention. All dried products experience some percentage of shrinkage as water evaporates, colour turns darker or lighter and texture is dry (Wu et al., 2007; Elkhodiry et al., 2015). Moisture content removed counteracts the activities of all food materials responsible for spoilage. This eventually seals the action of micro-organisms, enzyme activities, chemical and physical reactions (Wu et al., 2007; Guiné & Barroca, 2012a; Urun et al., 2015).

Processing General Eggplant into Powder (Drying)
In the preparation of dried eggplant, researchers (Garden-Robinson, 2012; Kendall et al., 2012; Çağlarırnmak & Hepçimen, 2013; Carroll, 2013; Elkhodiry et al., 2015; Urun et al., 2015) proposed the procedure below which begins with pre-treatment before the drying process.

Pre-Preparation
- Sort and dispose of fruits that have traces of discolouration.
- Wash thoroughly with running water and dry eggplant thoroughly.
- Add 20ml of ascorbic acid/citric acid to one-pint water and allow about 5-10 minutes inhibition period, stir and pour unto eggplant, refresh and dry.

Drying Procedure
- Line a flat tray with parchment or plastic wrap, then arrange a single layer of makuea poo-ung on it. Also, room should be left in between the pieces of food being dried on the flat tray/drying rack in order to ensure even cooking.
- Dry in the oven at maintained low temperatures.
- An oven thermometer is either needed to ensure that temperature is maintained within 140-145°F (60-65°C) suitable for dehydration (Carroll, 2013, Garden-Robinson, 2012).
It has also been researched by (Elkhodiry et al., 2015) that laboratory scale bed layer using drying should have a temperature of 60, 70, and 80°C at constant air velocity of 3.10ms⁻¹, whilst Urun et al. (2015) aver that three-different temperature needed for drying should be 40, 50, 60°C using air velocity at 5m/s. At day 1, temperature for drying should be 80°C so as to expend the high moisture content, then lowered to 60°C by the end of day 2.

In testing for dryness, eggplant should be brittle and able to crisp when mashed.

Apart from the exhibition of step by step procedure required for effective drying of eggplant, the authors (Garden-Robinson, 2012; Kendall et al., 2012; Çağlarırmak & Hepçimen, 2013; Carroll, 2013) are of the view that, speed, temperature and uniform drying should be the guiding principles needed to attain good results. Furthermore, the speed required for drying should not be interrupted, so that partially dried food is avoided, likewise, care must be taken to prevent scotching. Finally, eggplant can easily be milled into powder once drying is completed.

Methods
Production of Dried Makuea Poo-Ung
Drying method was used to process makuea poo-ung into a conservative food item. This dry method also known as indirect distillation was undertaken using the oven as the main apparatus. The experiment took place at the Crop Science Laboratory, Department of Crop and Soil Sciences, Faculty of Agriculture, College of Agriculture and Natural Resources at Kwame Nkrumah University of Science and Technology (KNUST). Also, the researcher organised domestic drying of makuea poo-ung for comparison. Apparatus/tools used at the laboratory for production of dried makuea poo-ung Oven, oven thermometer and timer, Moisture
Ingredients
Makuea poo-ung 500g
Lemon 20ml
Water 500ml

Method
- Wash fresh makuea poo-ung in water and lemon solution and dry thoroughly.
- Weigh makuea poo-ung and record initial reading.
- Arrange makuea poo-ung in pans and preheat drying oven.
- Set the temperature at 80°C, put pans in the oven and allow sample to dry for 6 hours.
- Remove pan from oven and stir after 6 hours to ensure even/uniform drying.
- Reset the oven to 70°C for another 6 hours to get it crispy.
- Weigh pan and sample on the electric balance so as to calculate the moisture lost.
- Mill proceeds into powder and package in zip locks/plastic and glass bottles.

Observation
- Dried makuea poo-ung is ready for milling after 12 hours of oven drying
- Milled makuea poo-ung with stalk attached had a lighter jade green colour and the sample with stalk removed had a darker colour after physical examination.
- Milled makuea poo-ung is kept in zip locks/bottles and stored in a cool dry place.
Production of Dried Makuea Poo-ung at Crop Science Laboratory

(a) with stalk attached (b) with stalk detached

Figure 1.1 Makuea poo-ung samples put in moisture pans and ready for processing

Figure 1.2. Makuea poo-ung after 6 hours of oven drying at 80°C at the laboratory

Figure 1.3 Makuea poo-ung after extra 6 hours of drying at 70°C
Figure 1.4 Dried makuea poo-ung milled with stalk (a) and without stalk (b) at the laboratory

1.3c. Domestic production of dried makuea poo-ung by the researcher

Figure 1.5 Oven set at a temperature of 80°C ready for domestic drying of makuea poo-ung (a) with stalk detached (b) with stalk attached

Figure 1.6 Makuea poo-ung after 6 hours of oven drying at 80°C in the domestic kitchen
Figure 1.7 Makuea poo-ung after 12 hours of drying at 70°C in the domestic kitchen

Figure 1.8 Makuea poo-ung milled into powder domestically (a) with stalk detached (b) with stalk attached

Figure 1.9 Makuea poo-ung packaged in zip lock, plastic bottle and glass bottle
Results and Discussion
Lemon used to inhibit browning of makuea poo-ung still got discoloured when sample got into contact with heat. However, the addition of lemon juice to makuea poo-ung reduced the cooking time so samples dried within 10 hours. On the contrary, when water alone was used to dry makuea poo-ung it took 12 hours to get the sample crispy before milling took place. Final colour of milled makuea poo-ung looked greenish brown. Comparison between dried makuea poo-ung at the laboratory and domestically prepared ones were so similar. Samples that had fruit stalk attached both at the laboratory and at home, had a brighter greenish brown colour than fruit stalk detached. Stalk attached to makuea poo-ung during drying safeguarded the fruit from extreme discolouration. However, the stalk attached slightly prolonged the drying period.

The dried samples were stored in zip lock, plastic bottle and glass bottle as seen in Figure 1.9. Dried makuea poo-ung stored at room temperature, remained on the shelf up to four months. Again, there was no difference in the state of dried makuea poo-ung stored in zip lock, plastic and glass bottles. The smell was still fresh, taste was intact, colour had no change and it was still floury with no molds nor entanglement. Finally, at six months, only the one stored in glass bottle was still fresh for human consumption.

Conclusions
Makuea poo-ung could be processed into powder both at the laboratory and in the home. Researchers (Garden-Robinson, 2012; Kendall et al., 2012; Çağlarırma & Hepçimen, 2013; Carroll, 2013; Elkhodiry, et al., 2015; Urun et al., 2015) affirmed that eggplant in general could be dried within 3 days at 80°C for day 1 and 70°C for day 2 and 3.
However, results revealed that, makuea poo-ung can be dried within 10 to 12 hours; at 80°C for 6 hours and 70°C for another 4 to 6 hours (with stalk attached). Samples soaked in lemon juice and water to inhibit browning before drying got dried within 10 hours. Dried makuea poo-ung with fruit stalk attached had a more pleasant greenish brown colour than those with fruit stalk detached. Also, dried makuea poo-ung could be stored in zip locks/polyethene, plastic bottle and glass bottle up to at least four months at room temperature. At six months, only those in glass bottles had the smell still fresh, taste was intact and colour did not change.

**Recommendations**

Homemakers should adopt the recipe provided and prepare their own makuea poo-ung powder for daily use in meal preparation. A teaspoon of dried makuea poo-ung could be sprinkled unto every meal that is ready for consumption because it is cooked. Do not add a lot to dishes ready to eat otherwise the taste could be altered. In relation to storage, keep dried makuea poo-ung in glass bottles if you intend to store them up to six months or in the fridge for one year.

**References**


AN EXAMINATION OF SENDING RATE AS A MEANS OF CONTROLLING NETWORK CONGESTION IN TAKORADI TECHNICAL UNIVERSITY

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Abstract
Whenever computers are networked, congestion resolution becomes problematic when trafficking of packets comes into play. This study: (1) explored the benefits of regulating sending rate of packets for congestion resolution and (2) examined the extent to which congestion resolution measures are deployed to mitigate network congestion. The experimental research design was used for the study, and the experimental simulation methodological format was adopted for the study. It was found that the network’s congestion was resolved to near zero. It was concluded that bandwidth subscription cannot be done away totally with, but, in resorting to regulating sending rate of packets for congestion resolution, bandwidth subscription could be very low, meaning warranting lower cost. It was recommended that the institutions adopt sending rate as a means of regulating congestion.

Keywords: Sending Rate, Latency, Simulation, Protocol

Introduction
Among one of the best efforts in bringing the Takoradi Technical University’s “unending” computer networking system to a lower cost for the same subscribed bandwidth and regulating sending rate is under consideration here.
With the University’s ICT finances capped at a given threshold for a given bandwidth allocation from the ISP, what are some of the technicalities that should go into bringing the network’s congestion into near zero even as the nodes on the network further blots up into levels never anticipated by management for the period of time?

A series of challenges have hampered the steady growth of Takoradi Technical University’s internet network. The network tends to slow down in the early hours of work just as smart phone users and big-time “browsers” come to campus. This increase in network traffic brings the network transmission to near zero even as more users come on board thus putting undue pressure on the ICT personnel. Since the inception of the Electronic Library in 2002, this has been repeated eroding the confidence of its usage by the supposed users. A lot of factors could contribute to the low performance of the institution’s network. Most of the protocols could be fixed or replaced with better ones thus becoming likened to a fixed or constant entity. Blaming social networks and switching them off helped slightly but the truth is that in the field of academia, social networks cannot be seen as problematic because some sort of interactions as well as research cannot be taken out of the system.

One specific cause could not be seen as the real problem though. As the Takoradi Technical University’s intake of students keep increasing year after year with increase in programs as well, the chances of the system’s congestion going overboard cannot be overlooked. The reason being that the same system which is not in a good state and unable to serve a certain population is now going to be subjected to a higher population way beyond its capacity. Though the system is a bit better than before, due to some work done on it recently, more could be done to make the computer network congestion story a thing of the past if not driving it close to zero.
Currently, the congestion in the institution’s networking system during working hours is frustrating as sometimes the internet source fails to deliver the needed service. Some of these flaws in the networking system does not allow maximum usage of the system by users.

This has necessitated this research with the intention to explore how regulating sending rates of packets as a cost-effective means, could contribute in controlling network congestion. The purpose of this study is to investigate the extent to which congestion resolution measures are deployed to mitigate the network congestion that had hampered academic progress in TTU. The research seeks also to analyse and improve the entire computer networking system of Takoradi Technical University.

According to Dickinson (2014), “Network congestion is caused by a variety of factors, including network topology, bandwidth and usage patterns while faulty hardware, network broadcasts and expansion also slows down networks”. Franchitti (n. d.) also explained that congestion occurs when the number of packets being transmitted through the network approach the packet handling capacity of the network (p.4). Also, Kolosovskiy and Kryuchkova added that “the goal of congestion control is to avoid congestion in network elements. A network element is congested if it is being offered more traffic than it can process”.

The main objective of this study is to explore various network congestion and find a way to reduce it. In achieving the general objectives, this study concentrated on specifically determining how regulating sending rates contribute in controlling network congestion.

**Material and Methods**
Academics see research design as the plan, structure, and strategy of research - the roadmap that will guide the research process.
Wills (2010) also refers to research design as how a researcher puts a research study together to answer a question or a set of questions. The tried, tested and proven NS-2 Network Simulator was employed in carrying out the experiments. The NS-2 network simulator, installed onto the Linux platform enabled us to generate data which was also collected for further analysis. Simulation strategy was employed for this research by applying the TCL (Tool Command Language) files rooted in the NS-2 network simulator which is C++ based.

Figure 1 shows a simulation with TCP (Transmission Control Protocol) only on Resized Packets against Time Packets Dropped on a 2-Node Network topology. It is through this that data is generated and collected for further usage. Here, one can see snap-shots showing a constant bandwidth of 1.0 Mbps with variant Packets within the range of 100 bytes and 1000 bytes using a simulation time of 4 seconds (4000 ms).

Figure 1: A snap-shot of a 2-Node network simulation for generating data and analysis
Simulation
The best method for this kind of research is Simulation because this kind of research is very technical. Simulation will help in generating reliable data upon series of tests and simulations. The results from the simulator realized based on specific data inputted into it would go a long way to inform the analysts in tackling the real problem on the ground in relation to the Takoradi Technical University’s Networking System. Simulation is cost-effective and one of the most reliable and proven methods for undertaking experiments. Using a robust Linux platform makes it even more reliable and preferred.

The NS-2 simulator is the instrument that would be used in carrying out this research. According to Chung and Claypool (*Network Simulator*, n. d.), “NS (version 2) is an object-oriented, discrete event driven network simulator developed at UC Berkely written in C++ and OTcl. NS-2 is primarily useful for simulating local and wide area networks”. The NS-2 has been tried and tested and has proven over several years of experimentally-based research to be an effective tool that authenticates its validity and reliability. Using it over a number of given simulations over and over again be it on the same day or on different days gives the same output to confirm its level of precision and reliability. Key (1997) defines validity as “a degree to which a test measures what it is supposed to measure”. He also defines reliability as “the extent to which the instrument yields the same results on repeated trials”. The two definitions fit into the work of NS-2 simulator hence the choice to use it for this research. Data is internally generated by the NS-2 simulator depending on the initial data that the researcher would input.
Series of analyses were carried out on data collected based on which tables, charts and graphs were generated. A description of the phenomenon of each table, graph or chart has been used to portray a vivid, easy-to-read and understandable picture of the data obtained. Below in Figure 2 is a snap-shot of a simulation from which data is generated. A table was drawn out of the generated data and a graph was generated from the table which was used for the analysis.

It could be seen from Table 1, a packet size of 100 bytes through to 650 bytes was used at a bandwidth of 1 Mbps. The system did not experience even a single packet drop. However, as the packet size went up to 660 bytes per packet, the first packet dropped at a time of 470 milliseconds. With a packet size of 800 bytes per packet, packets started dropping at a simulation time of 120ms.

Figure 2: A snap-shot of a 2-Node network simulation for generating data and analysis
Table 1: Data from a 10-Node Topology using a Variant 0.1 to 1.0 Kb Packet size

<table>
<thead>
<tr>
<th>Packets Size (bytes)</th>
<th>Packet Drops Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>200</td>
<td>0</td>
</tr>
<tr>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td>400</td>
<td>0</td>
</tr>
<tr>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>600</td>
<td>0</td>
</tr>
<tr>
<td>650</td>
<td>0</td>
</tr>
<tr>
<td>660</td>
<td>470</td>
</tr>
<tr>
<td>700</td>
<td>240</td>
</tr>
<tr>
<td>800</td>
<td>120</td>
</tr>
<tr>
<td>900</td>
<td>90</td>
</tr>
<tr>
<td>1000</td>
<td>75</td>
</tr>
</tbody>
</table>
When the packet size was increased to 900 bytes per packet size, packets started dropping at a simulation time of 90 milliseconds and finally with the packet size increased to 1Kbyte per packet size, packets started dropping at a simulation time of 75 milliseconds. This shows clearly that varying packet sizes could have a great impact on computer network congestion control and thus giving the research team the needed motivation to carry on with this all-important research. Values used in generating the graph have been recorded in Table 1.

![Figure 3: Graph of Packet Size versus time packets drop for a 1 Mbps Bandwidth](image)

Figure 3: Graph of Packet Size versus time packets drop for a 1 Mbps Bandwidth
The graph in Figure 3 pitches Packet Sizes (Blue coloured) against Time Packets drop (Brown coloured). The brown colour gives you an idea instantly of when packets dropped and when they did not drop.

**Results and Discussion**

This section focused on simulation with real-time parameters to give us what really happened on the ground. It discussed the root causes of problems encountered, and what was done to overcome them with minimal time applied and also at a reasonable cost. The simulation took into consideration a 10-node topology and how it could be used in demonstrating how congestion could be controlled to near zero or getting it eliminated. The usage of this 10-node topology would mean using 9 links for this topology. The simulation restricted itself to addressing only issues spelt out in the objective which is: to determine how regulating sending rates of packets contributed to computer networking congestion resolution.

In this case, regulating sending rates of packets becomes the variant whilst the other parameters are kept constant. On one hand, the simulator enables us to know the existing state of the situation on the grounds whilst on the other hand the variance tells us the true impact being experienced by the Institution’s Networking System. In other words, if there were variances, it indicates how vast the variances were. If reasonable adjustments proven by the simulator are made thus eliminating the known variances, then this empowers us to implement the outcome with all scientific backings.

Referencing Figure 4 through to Figure 14 are some simulations with snap-shots of a table, graphs and animations to support this argument. The bandwidth subscription that cannot be totally done away with here in this case was perched at 1 Mbps which is very low in terms of cost.
With this, data is generated from the simulator’s output for any variant that is put in with regards to the time packets drop. We then use this information in plotting a graph or graphs as scientific proof for the parameters put into it.

A 10-Node topology and regulating Sending Rates was used against Time Packets dropped to determine how changes in regulating sending rates directly impacted network congestion using both Tcp (Transmission Control Protocol) and Udp (User Datagram Protocol) protocols. The researcher first resorted to making all parameters used in the simulation constants and made Packet Sending Rates the variant parameter again. With this also, the researcher observed the times that packets dropped as the researcher continued to vary the sending rate time from 0.1mb to 1.0 mb of packet sizes in graduations of hundred from one hundred through to one thousand bytes per packet.

10-Node Topology Pitching Sending Rate Vs Time Packets drop at 1 Kbyte Pkt Size
At this stage, the research resorted to the simulator and saw how it helped in controlling congestion by way of varying sending rates of packets. Sending rate always brings to mind the “Thrower-Catcher” concept in that if the one throwing the balls takes his time and throws the balls one at a time, the one catching will have no problem catching each balls thrown. However, if the “thrower” increases the rate of throws of each ball more than the catcher’s capability to catch the ball within a given time frame, some of the balls will start dropping. From this we can say that the faster the throws, the higher the probability of some of the balls to drop. We can also use the “Supplier-Consumer” analogy as well to explain this. If a Supplier (Sender) supplies more than a Consumer (Receiver) could consume or contain, the remainder (left-over packets) could possibly get rotten (drop) should the storage (buffer memory) get full and overflow its banks all other things being equal – ‘ceteris pari bus’.
With this in mind, we started the simulation with a fixed packet size of 1000 bytes per packet, a bandwidth of 3 Mb per second, and varied the sending rate from 0.1 mb through to 1.0 mb.

The pictorial view of figure 4 below shows a snap-shot of a simulation which used a sending rate of 0.1 mb per second. With such a lowered or slowed sending rate, there was not a single drop of packet throughout the 10,000-millisecond simulation period.

When the sending rate was lowered or slowed, the processing time became virtually low as fewer packets went through to be processed – noting that when these packets got processed, they went out to their destination and returned with an acknowledgment of getting to their destination successfully. These acknowledged signals, from the received end on their way to the sent end contribute to the congestion or the bottlenecks at the node. This is when they come in contact with new signals from the Sender on their way back to their destination by themselves which also leads to delay in the process time. In this experiment, no packets were dropped.

![Diagram of 10 Node Topology using Udp & Tcp Protocol at a 0.1 mb sending rate](image)

Figure 4: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.1 mb sending rate
When the sending rate increased from 0.1 mb to 0.2 mb per second, Figure 5 showed clearly also that no packets dropped on its transmission route.

Figure 5: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.2 mb sending rate
Figure 6: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.3 mb sending rate

The snap-shot above in Figure 6 was a simulation with a sending rate of 0.3 mb per second which showed the topological layout where not a single packet dropped. Here too, the study recorded the same zero drops of packets. The study experimented the entire ten Simulation stages for the various snap-shots to observe what really happens so as to have a vivid and fair view of it.

In Figure 7, the sending rate for this simulation was 0.4 mb per second and interestingly, packets found their way into the buffer zone yet not a single packet dropped. The movement of packets into the buffer memory was an indication that the increase in speed or the sending rate indeed had effect on the system just as it was.
Figure 7: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.4 mb sending rate

Figure 8: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.5 mb sending rate
Figure 8 shows a simulation with a sending rate of 0.5mb where the packets have filled the buffer memory and it is at the brink of overflowing its banks. Notwithstanding, no packets dropped as the buffer memory was still in full contention memory-wise.

Running the coded script as in Appendix A, the coded programme would output the Network Animator – NAM – for the various snap-shots from figure 4 through to figure 14 using the various values ranging from 0.1mb per second to 1.0 mb per second sending rates used in the simulations above and below respectfully.

Figure 9: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.6 mb sending rate
Figure 9 shown above is a snap-shot simulation with a sending rate of 0.6 mb per second; as that of Figure 8 simulated with a sending rate of 0.5 mb per second was almost at its wit’s end memory-wise, it was just logical that the slightest increase in sending rate or speed would cause overflow of packet or will cause the packets to drop as vividly seen in figure 9 at a simulation time of 1700 milliseconds.

Figure 10: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.7 mb sending rate

The researcher simulated, as in Figure 10, with a sending rate of 0.7 mb per second. It was realized that it took a shorter time for the packets to drop at a simulation time of 1500 milliseconds as shown by Figure 10 above.
Note that Roundtrip time (Ping time) is equal to 2 multiplied by Packet delivery time plus processing delay. So as packets start dropping, the Tcp protocol will not let it go free but will re-send or retransmit it and as usual, it will go through processing which will cause some delay on account of some factors including acknowledgment. This will eventually cause the Round Trip Time to be longer.

Figure 11: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.8 mb sending rate

At a sending rate of 0.8 mb per second, packets started dropping “proportionately” earlier than when the sending rate was 0.7 mb per second. The packets started dropping at a simulation time of 1450 milliseconds as showed in Figure 11.
Figure 12: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 0.9 mb sending rate

With sending rates of 0.9 mb per second as in Figure 12 and 1.0 mb per second as in Figure 13, packets started dropping at 1400 milliseconds and 1380 milliseconds of simulation times respectively. All these values were tabulated in Table 2.

Figure 13: Snap-Shot of a 10-Node Topology using Udp & Tcp Protocol at a 1.0 mb sending rate
Table 2: Data from a 10-Node Topology using a Variant 0.1mb to 1.0 mb Sending Rate

<table>
<thead>
<tr>
<th>Sending Rate * 10^-1 (mb)</th>
<th>Time Packets Dropped X 10^2 ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>2.0</td>
<td>0</td>
</tr>
<tr>
<td>3.0</td>
<td>0</td>
</tr>
<tr>
<td>4.0</td>
<td>0</td>
</tr>
<tr>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>6.0</td>
<td>17</td>
</tr>
<tr>
<td>7.0</td>
<td>15</td>
</tr>
<tr>
<td>8.0</td>
<td>14.5</td>
</tr>
<tr>
<td>9.0</td>
<td>14</td>
</tr>
<tr>
<td>10.0</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Analysis
The data analysed was collected from real-time world situations. Looking at the trend as shown by the previous figures and comparing it with Figure 14, it was realised that as the packet sizes increase, the dropping rate of the packets also increase, an indication that manipulating the packet sizes could help in congestion resolution. Also as the rate at which the packets kept dropping decreased with increased packet sizes, at a point in time the packet droppings would also cease conspicuously.
Using 3-Mbps bandwidth, the packet sizes of 100 packets per packet size could not flow that easily meaning that the processing time for each single packet was not enough for the processing to be completed before another packet arrived at the processing end. This happened in the initial part as well as the middle part of the entire simulation period. However, on the third part, packet dropping ceased as shown by the graph below. Note again that at smaller packet sizes, more packets tend to be processed just as sending rate increase and that tends to cause more packets to drop and even drop earlier than when the packets are larger as in Table 2 above. As the packets get larger, the amount of packets to be processed reduce by virtue of their sizes and thus reduces processing time as well as delay times. Thus, at larger sizes, packets “refused” to drop. You could see that as the packets keep increasing, the simulation time for packets to drop also increases or keeps longer before dropping.

Figure 14: Graph of Sending Rates Vs Time Packets Dropped Using Packet sizes of 1000 bytes
Conclusions and Recommendations
From the outset, I set out to investigate the extent to which Congestion Control measures are deployed to mitigate the network congestion being experienced by Takoradi Technical University. In order to achieve this, I used the NS-2 simulator which is very cost-effective as compared to building a pilot network. It also takes away setup complications, poor connectivity errors, improper cabling, wrong protocol selections, and human errors among others. The NS-2 simulator with its attached animator-feature makes it ideal for use producing the exact bandwidth to use in combating network congestion at a minimum cost. Having come up with this conclusion, the perception that using bandwidth for congestion resolution is the only “perceived” method has been diffused. There are many ways to go about computer network resolution some of which are expensive and some economical taking into cognizance the fact that there is a price for everything.

Using Regulating of Packet Sending Rate therefore for computer network resolution is recommended as it works to perfection when the analyst takes into consideration the other parameters including how much management wants to spend, what should go into maintenance cost, monitoring, among others. Thus, using sending rate as a means of controlling network congestion would be very beneficial as the high-cost bandwidth subscriptions would be reduced drastically whilst delivering to enhance the Takoradi Technical University’s computer network system.

I conclude therefore that Using Regulating of Packet Sending Rate is convenient and better in terms of cost as compared to bandwidth subscription which is very expensive. Again, the usage of the NS-2 simulator is very cost-effective as compared to building a pilot network.
It also takes away setup complications, poor connectivity errors, improper cabling, wrong protocol selections, and human errors. It even takes away the size of the physical area to be used which increases with increase in the network topological layout. The NS-2 simulator is the ideal tool for this experimental research. It gives you knowledge on how the system works; how packets travel; how to increase or decrease packet sizes; how to increase or decrease the transmission speed or the sending rate, and even on how to increase or decrease bandwidth sizes, as well as how topologies are created.

References


980/newpage18.htm
FROM POLYTECHNIC TO TECHNICAL UNIVERSITY: 
THE ROLE OF TECHNICAL EDUCATION IN 
NATIONAL DEVELOPMENT

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Abstract: Several transformations have taken place in the technical and vocational education sector of Ghana since independence. Technical and vocational education has seen many waves of changes and paradigm shifts in pedagogical methods and mode of teaching, learning and research. From technical institutes, to polytechnics and now technical universities of higher learning; polytechnics have also seen several transformations in terms of governance and administration. There has been a lot of changes in terms of infrastructure and capacity building of many polytechnics across the country. In spite of all these changes and transformations in the technical and vocational institutions in Ghana, technical and vocational institutions still face many challenges.
Technical and vocational education over the years have used more theoretical approach to teaching, learning and research due to the lack of appropriate infrastructure, equipment, tools and systems to enable a more practical and competency based approach. In addition, technical and vocational institutions have produced graduates, technicians, professionals, apprentices and students with little practical knowledge, skills and competencies which do not fit directly in the job market.

Meanwhile, in this modern world, development and growth of economies is based on advancements in science, technology, engineering as well as other related disciplines. This paper performed a systematic review of technical and vocational education in Ghana in order to unearth some challenges faced by these institutions of higher learning. The paper conducted a detailed study to determine the importance of technical and vocational institutions in nation building. Furthermore, the paper proposed competency-based teaching, learning and research as the modern approach to technical and vocational education for national development.

**Keywords**: Technical education, vocational education, competency-based education, polytechnics, national development

**Introduction**
Polytechnics are institutions of higher learning mandated to undertake technical, vocational, professional and applied teaching and research in diverse fields of study (Honyenuga, 2013; Boakye-Agyeman, 2006). Polytechnics in Ghana have grown to include different faculties, schools and departments which make use of different applied technologies and techniques in performing their day to day academic activities. These institutions of higher learning offer diverse technical, vocational and technology-based programmes and courses (Sulemana, Alhassan & Kinder, 2014).
The use of various practice-based approaches in teaching and learning in polytechnics has enabled these institutions to distinguish themselves from other institutions of higher learning such as the colleges and universities which are largely theoretical-based. Furthermore, the use of pragmatic teaching and learning methods has enabled Polytechnics to provide students with modern state-of-the-art knowledge, professional and practical skills which is needed for industrial growth.

Polytechnics for that matter; technical and vocational institutions produce graduates who generally possess practical, technical and professional skills needed for sustainable development and growth of society (Boakye-Agyeman, 2006; Honyenuga, 2013). Additionally, most graduates of technical and vocational institutions possess very competent middle level skills and technical know-how to provide the needed human resource capacities for national development.

Polytechnics for that matter, technical and vocational institutions have faced many challenges since their inception. Many challenges have plagued technical and vocational education across the country. This has reduced the standard and quality of teaching and learning in these polytechnics mandated to train in practice-intensive technical and vocational programmes and courses over the years. Since its inception, technical and vocational institutions for that matter Polytechnics have used a mixed theory and practice intensive pedagogical approach in the delivery of teaching, learning and research while emphasizing on the latter (Mouzakitis, 2010; Sulemana et al., 2014). But due to lack of infrastructure, machinery, equipment, tools and logistics to provide a more practice-intensive technical and vocational education, Polytechnics have now resorted to using more theory-intensive and less practice-intensive approaches to technical and vocational education.
Where available, most of these infrastructures, machineries and equipment needed for practice-based training and research are woefully inadequate. Furthermore, the lack of interest by industry to spearhead technical and vocational education in the country is a major challenge. Polytechnics, technical and vocational institutions are setup to train middle level professionals and technicians with competent practical skills, technical know-how and knowledge needed by industry and the job market as a whole (Honyenuga, 2013; Sulemana et al., 2014). Hence the failure of industry to champion the development of curriculum for technical and vocational institutions is a major challenge to national development. In addition, the lack of collaboration from industry and academia for research has hindered the development of most polytechnics, technical and vocational institutions across the country.

**Related Works**
The growth of an economy is largely measured by advancements in the development, deployment, and implementation of science and technology across every aspect of its society (Mouzakitis, 2010; Oviawe, Owaneiye & Uddin, 2017). Consequently, the importance of Polytechnics setup to train middle level manpower in technical, vocational and professional programmes and courses for industry and job market cannot be underestimated (Honyenuga, 2013; Sulemana et al., 2014). Polytechnics provide competent, professional and practice-based skills training needed by industry for high productivity and development.

In this modern world of technologies, Competency-Based Training (CBT) is seen as the hallmark for technical and vocational education (Keatin, 2012; Charles et al., 2016). Competency-Based Training is training designed to allow learners to demonstrate their ability to perform a task to a set standard. Usually, competency based training is designed along set standards for a specific job or task.
The learners are not expected to perform tasks better than others and they are also not in competition with others but rather to demonstrate that they can perform the task well enough. This approach to teaching and learning is used to learn concrete skills rather than abstract skills (Keatin 2012; Charles et al., 2016). Additionally, learners can skip modules in competency based training after demonstrating previous knowledge and skills in certain tasks. Furthermore, a verification process is used to determine the quality of training and also to assess whether a learner is competent in performing a task. Competency-based training (CBT) calls for close collaborations between industry and academia in the design and development of curriculum (Keatin, 2012). In Competency-Based Training (CBT); industry is seen as a major player and is at the forefront of most training and research activities. The joint collaborations with industry for training and research makes it possible for technical and vocational institutions to get infrastructure development, machinery, equipment and logistical resources needed for successful and efficient practice-based training and research (Ayonmike, Okwelle & Chijioke 2014).

**Challenges of Technical and Vocational Institutions**

Some challenges faced by technical and vocational institutions are:

*Lack of infrastructure:* Some technical and vocational institutions lack the needed infrastructural development and support systems for their smooth operations.

*Inadequate equipment and resources:* Some technical and vocational institutions lack adequate resources such as equipment, machineries, tools and logistics to enable a successful practice-based training and research.
Inadequate funds and scholarships: Technical and vocational institutions usually do not have enough financial support for their day to day activities and research works.

Lack of professional staff: Some technical and vocational institutions lack the required capacity building and professional staff.

Lack of industry support: The lack of support from industry players hinders the smooth operations of most technical and vocational institutions.

Lack of government support: The lack of government support hinders the development of most technical and vocational institutions.

Methods
The paper conducted a systematic review of technical and vocational education in Ghana to identify some pertinent challenges affecting technical and vocational institutions. The paper performed a detailed study to determine the importance of technical and vocational institutions in promoting national development. Additionally, the paper unearthed some challenges faced by technical and vocational institutions across the country. Furthermore, the paper suggests the way forward for technical and vocational education by examining modern approaches to technical and vocational education. The paper also proposed a paradigm shift in the theoretical teaching, learning and research inherent in most technical and vocational institutions to a practical and competency-based teaching, learning and research in technical and vocational institutions for national development.

Results
The findings of the study are:
Technical Education and National Development
It was observed during the study that, technical and vocational education plays a key role in national development (Atakilt & Everard, 2013; Oviawe et al., 2017). Technical and vocational institutions provide the needed manpower and capacity building across diverse fields for the job market. Furthermore, technical institutions train in practical-based skills and knowledge as demanded by industry for direct consumption in the job market. Moreover, technical and vocational education enables people to acquire employable and practical skills, competencies and knowledge thereby reducing the burden on organisations to retrain people in employable and job-oriented skills and technical know-how. (Cong & Wang, 2012; Ayonmike, 2014).

Competency Based Education
It was also discovered during the study that, competency-based training is the state of the art approach for modern technical and vocational education (Keatin, 2012). The training of people with different levels of competencies is critical to their personal career and national development. Competency-based training enables individuals to acquire job ready and employable skills according to market-required and other set standards. In addition, competency-based training promotes the training of professionals and technicians with adequate technical know-how and expertise in performing work related activities (Keatin, 2012).

Conclusions
Polytechnics, technical and vocational institutions remain an integral part of the development and growth of the economy (Cong & Wang, 2012). Technical and vocational institution produces middle level manpower and skilled labour of high demand in industry and the job market. Technical and vocational institutions are respectively contributing their quota of professionals and technicians to national development in various capacities. Technical and vocational institutions have produced some
finest artisans and engineers who have established many supporting companies and organisations in order to contribute to the economic growth and development of the country (Mouzakitis, 2010).

Also Competency-Based Training is the hallmark of modern technical and vocational education (Keatin, 2012). This approach to training and research has produced more practice-oriented skills, knowledge and technical know-how in various disciplines.

**Recommendations**
The study recommends close collaborations between industry and academia to support the training and research activities of technical and vocational institutions. This would enable students to come out with market ready and employable skills. Industry players should also endeavour to support technical and vocational institutions with the needed infrastructural developments, equipment, machineries and logistical resources to enable technical and vocational institutions undertake more practice-intensive education. Government should also support technical and vocational institutions by providing the needed infrastructural development, capacity building and funding to enable them undertake more practical-based training, learning and research. Management of technical and vocational institutions should also be responsive to the needs of their institutions in order not to allow them run out of basic logistics, equipment and tools needed for smooth running of these institutions. The paper further recommends the adoption of Competency-Based Training (CBT) paradigms in technical and vocational education in Ghana. The government should expedite actions on the implementation of CBT curriculum in technical and vocational institutions across the country. This would promote the development of employable and market ready practical skills and knowledge for industry.
References


LIBRARIES AND SUSTAINABLE DEVELOPMENT GOAL 4: A REVIEW OF LITERATURE

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Abstract
This study examined the role of libraries in achieving sustainable development goal four (4) which is targeted at ensuring inclusive and equitable quality education and life-long learning opportunities for all. Emphasis was on tracing the history of sustainable development, exploring the role of education in the provision of information for sustainable development. It also examined the relationship between libraries and quality education and investigated ways libraries could contribute to the attainment of the sustainable development goal four (4). The UN in September, 2015 launched Transforming Our World: Agenda for Sustainable development. This agenda has 17 goals with 169 targets. To achieve goal 4, information and education is critical. Access to opportunity starts with access to unfettered information and knowledge. Public access to information empowers people to make informed decisions that can improve their lives and sustainability. The study concludes that the SDGs are collective agenda for changing our world and to attain this change, we must reconsider the approaches that have left libraries out of national planning, implementation and decision, and monitoring process. The study recommends the introduction of sustainability into curriculum and service learning.

Keywords: Sustainability, sustainable education, education for sustainability, libraries and development sustainable goals
Introduction
The United Nations Organization since its formation has helped steer the course of the world through initiatives and programmes for the benefit of human-kind. It is noted for its ability in couching, implementing and rallying the support of nations under its umbrella toward a particular course. It is a truism that it has held a unique place in shaping the global multilateral system. The UN sets universal norms and standards, has unequalled convening powers, possesses legitimacy and neutrality, creates global knowledge and has a comprehensive mandate coupled with in-country presences worldwide. Mention could be made of the UN Habitat for a Better Future; UN Environmental Programme; and UN Human Right Initiatives. At the beginning of the millennium, the UN adopted the Millennium Declaration in September 2000 to eradicate poverty, promote human dignity and equality and achieve peace, democracy and environmental stability. This declaration was later christened as Millennium Development Goals (MDGs). According to Unegbu and Igwe (2006), since the millennia summit in 2000, the MDGs received universal acceptability as targets for human survival and sustainable development. They became international standard for measuring the progress and effectiveness of development programmes of nations.

At its 64th General Assembly, the UN adopted the Sustainable Development Goals (SGDs). The SDGs officially known as Transforming Our World: the 2030 Agenda for Sustainable Development is a set of 17 “Global Goals” with 169 targets between them.

Led by the United Nations through a premeditated procedure comprising its 193 Member States, as well as global civil society, the goals are contained in paragraph 54 United Nations Resolution A/RES/70/1 of 25 September 2015. The Resolution is a broader intergovernmental agreement that serves as the Post 2015 Development Agenda (successor to the Millennium Development Goals).
The SDGs build on the Principles agreed upon under Resolution A/RES/66/288, popularly known as The Future We Want. Generally, this study examines the role of libraries in the provision of information for the attainment of the Sustainable Development Goal Four (4) (SDGs). The study specifically:

I. explores the role of education in the provision of information for Sustainable Development
II. examines the relationship between libraries and quality education (SDGs).
III. investigates ways libraries could contribute to the attainment of the SDGs and

The History of Sustainable Development
The concept of sustainable development has its genesis in the 1968 UNESCO conference. Under its auspices in 1968, UNESCO convened an intergovernmental conference targeted at merging the environment and development. It was this conference that mid-wifed the concept which is now known as sustainable development. This conference led to creation of UNESCO’s Man and the Biosphere (MAB) Programme. The ripple of this same conference was clearly visible because it precipitated the organisation of the 1972 UN conference on the Human Environment in Stockholm.

Again, under the leadership of Gro Harlem Bruntland, the World Commission on Environment and Development used the expression “sustainable development for the first time in 1987 in its report, “Our Common Future”. The concept has evolved since it emerged. At first, emphasizing environment only in development policies, the idea has encompassed socioeconomic domains since the Johannesburg Summit (2002).
It now incorporates other areas previously neglected by development, such as education or culture, the latter being recognized as a full-fledged source of development by the Universal Declaration of Cultural Diversity adopted. As with previous efforts the report was followed by major international meetings.

The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 (also called “Earth Summit”) which issued a declaration of principles, a detailed Agenda 21 of desired actions, international agreements on climate change and biodiversity, and a statement of principles on forests.

Agenda 21 is a non-binding programme of action, which was adopted by more than 178 Governments at the ‘Earth Summit’ in 1992. It was the foundation for a “global partnership” that inspired collaboration among nations as they back a shift or transition to sustaining life on earth. The central credence is that all countries can protect the environment while simultaneously experiencing growth. Implementing Agenda 21 fell squarely on the lap of governments, international and regional organizations, and non-governmental organizations. Governments were expected to craft national strategies, policies, plans and procedures and solicit the commitment and genuine involvement of all institutions and social groups. Ten years later, in 2002, as a follow up, the World Summit on Sustainable Development in Johannesburg (nicknamed Rio+10), South Africa was held. This was a platform to confront serious and growing threats in the environment that threatened human well-being. Human activities such as increase in use of fossil fuel, deforestation, changes in patterns and consumption that continue to eat up natural resources at a faster rate than their rate of replenishing etc. threatens human existence now and in the future. This means that present and future generations stand certain risks if practices that engender sustainability are not enforced concertedly.
According to UN Secretary General’s Report (2016), Rio+20 Conference, held in 2011 Solo, Indonesia, Colombia recommended the idea of the SDGs. This was picked up by the UN Department of Public Information 64th NGO Conference in that same year in Bonn, Germany. Belay (2017), asserts the outcome document proposed 17 sustainable development goals and its associated targets. In the run-up to Rio+20 there was much discussion on the idea of SDGs.

At the Rio+20 Conference, a resolution, known as *The Future We Want* was reached by member states. Among the key themes agreed on were poverty eradication, energy, water and sanitation, health, and human settlement. In all these conferences, the UN has been building commitment for sustainable development by ensuring collaboration and cooperation among its members by encouraging, enforcing and influencing policies and strategies.

The Concept of Sustainable Development

According to Ukachi (2016), “the environment does not exist as a sphere separate from human actions, ambitions, and needs and attempts to defend it in isolation from human concerns have given the very word “environment” a connotation of naivety in some political circles. The word “development” has also been narrowed by some into a very limited focus, along the lines of what poor nations should do to become richer, and thus again is automatically dismissed by many in the international arena as being a concern of specialists of those involved in questions of development assistance. But the “environment is where we live: and “development” is what we all do in attempting to improve our lot within the abode”. The two are inseparable.

This means that development cannot be decoupled from the environment. All human actions or inactions have a direct or indirection impart on the environment both in the now and in the future.
It behoves humans to exercise great caution in the use of the environment to fulfil their needs or improve upon their lot. This is because that same environment would to have served succeeding generations. According to the Bruntland Commission, sustainable development ensures that a given resource meets the needs the present generation while at the same time, safeguarding the ability of future generations to meet their needs as well. Improving living standards in the world, the UN implemented the eight (8) Millennium Development Goals (MDGs). The MDGs ran for fifteen (15) years (from 2000-2015). The UN played an important role in helping to achieve the MDGs agenda on many levels including contributing directly with its operational activities, building capacity, gathering and assessing data, and by advocating for the agenda’s implementation. Now, the agenda of the UN is implementing Sustainable Development Goals (SDGs).

According to the UN General Assembly (2015), there are 17 SDGs with 169 associated targets which are integrative in nature. These are as follows:

I. End poverty in all its forms everywhere;
II. End hunger, achieve food security and improved nutrition for all, and promote sustainable agriculture;
III. Ensure healthy lives and promote well-being for all at all ages;
IV. Ensure inclusive and equitable quality education and life-long learning opportunities for all;
V. Attain gender equality, empower women and girls everywhere;
VI. Ensure availability and sustainable management of water and sanitation for all;
VII. Ensure access to affordable, sustainable, and reliable modern energy services for all;
VIII. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
IX. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation;
X. Reduce inequality within and among countries;
XI. Build inclusive, safe and sustainable cities and human settlements;
XII. Promote sustainable consumption and production patterns;
XIII. Take urgent actions to combat climate change and its impact;
XIV. Attain conservation and sustainable use of marine resources, oceans and seas for sustainable development;
XV. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt all biodiversity loss;
XVI. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels; and
XVII. Strengthen and enhance the means of implementation and revitalise global partnership for sustainable development.

An Overview of Goal 4 and Its Associated Targets
The Goal 4 of the SDGs focuses on ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all people regardless of gender, age, ethnicity, and physically challenged or migrants. It aims at providing quality education at all levels from early childhood, primary, second cycle to tertiary. This goal is unique and focuses purely on education.

According to international conventions ratified by many nations, eliminating all forms discrimination (be it against girls/women, minority groups or languages, migrant workers and their children etc.) in the environment and pushing the right to education into action by reaching out to all learners, regarding their diverse capabilities, individualities, and needs.
This stems from the fact that education is a basic human right and indeed a premise for a more just and equal society. To tear down certain discriminatory practices that inhibit inclusivity requires a gamut or wide range intervention from stakeholders. Slade (2015) asserts these interventions not only be effective academically but in addition be friendly, safe, clean and healthy and gender responsive. The World Conference on Special Needs Education in Salamanca, Spain (1994) posit that “schools with an inclusive orientation are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all….”

This position was reaffirmed by the World Education Forum at Dakar 2000 that the needs of the poor and the underprivileged, including working children, distant countryside dwellers and nomads, ethnic and linguistic minorities, children, young people and adults suffering for HIV and AIDS, hunger and poor health, and those with disabilities must be seriously considered. Quality education thrives on equity.

Equity in education can be said to be the vehicle for achieving equality. It aims at offering the best opportunities for all students as they strive to achieve their full potential. It also addresses instances of drawbacks which bars educational achievement. As expressed by the World Education Forum (2000), equity in education embroils distinctive handling or action taken to reverse the historical and social hindrances that prevent learners from gaining access to and profiting from education on equal grounds.

Quality education according to Slade (2015) is not just content delivery rather it is a system designed to aid all children reach their full potential and enter society as full and productive citizens. In other words, quality education is supposed to help learners identify, develop and maximize their potential to solve problems in the society they live in.
The quality education being espoused here goes beyond literacy and numeracy though very critical skills, is not just access to any education but is a grand step in ensuring that children not those from high income or developed countries, have quality education. One can confidently conjecture that for children to become active and productive citizens of society, thoroughly bred to lead the future, quality education cannot be wished away.

ASCD and EI define quality education as one that focuses on the whole child – the social, emotional, mental, physical and cognitive development of each student regardless of gender, race, ethnicity, socioeconomic status, or geographical location.

It prepares the child for life, not just for testing. This means, for one part to be developed to the neglect of the others defeats the purpose of quality education.

A child may develop cognitively, but lacks social or emotional skills. This would affect his relationship and may be adamant to solving the challenges plaguing members of the community because they may not affect him directly. Having emotional skills would make you empathize with the challenges confronting your community.

Again, they defined quality education as one that provides resources and direct policies to ensure that each child enters school healthy and learns about and practices a healthy lifestyle; learns in an environment that is physically and emotionally safe for students and adults; is actively engaged in learning and is connected to the school and broader community; has access to personalized learning and is supported by qualified, caring adults; and is challenged academically and prepared for success in college or further study and for employment and participation in a global environment.
Learning and practicing about healthy lifestyle is important to achieving sustainable development. Healthy lifestyle among other things includes proper use of environment resources which embraces all sustainable practices. The tripod stand of quality education is access to quality teachers; providing use of quality learning tools and professional development; and the establishment of safe and supporting quality learning environment (Slade, 2015).

Lifelong learning is a whole array of learning that embraces the skills, knowledge, attitudes and behaviours that people acquire in their daily experiences. This could occur through formal, informal and non-formal learning (Dunn, 2003). Laal & Salamati (2012) conclude that lifelong learning is a nonstop building of skills and knowledge through the life of an individual.

It only enhances social inclusion, active citizenship and personal development. According to Dunn (2003) lifelong learning helps individuals become active and participatory citizens, leading a more sustainable lifestyle, and improving their health and wellbeing.

The International Convention on Economic, Social and Cultural Rights (ICESCR), Universal Declaration on Human Rights (UDHR) and Convention on the Elimination on All Discrimination Against Women (CEDAW) explicitly highlight the essence of education as everyone’s right and that at the fundamental or elementary level shall be at least free. It is their view that education is directed to the full development of human personality and to the strengthening of respect for human rights and fundamental freedom. Again, they abhor any discrimination against women and ensure they have equal rights with men in the field of education.
Furthermore, the Convention on the Rights with Persons with Disabilities (CRPD) and International Convention on the Protection on the Right of All Migrant Workers (ICRWM) upholds the right of persons with disabilities to education. With a view to realizing this right without discrimination and on the basis of equal opportunity, shall ensure an inclusive education system at all levels and life-long learning. Children of migrant workers are entitled to basic right to access education on basis of equality of treatment with the citizenry of the nation. UNICEF (2005) observed that reducing all forms of discrimination is critical to improved learning and quality education. Children of ethnic and language minorities, politically or geographically disfavoured groups, and groups at low socio-economic levels very often suffer from discriminatory policies and practices that hamper the progress of quality education for all children.

This can occur by excluding such children from school 10 or by excluding their participation in school once they are attending. Restructuring of most learning environments need to occur to improve learning opportunities for children of all abilities and backgrounds. Driel et al. (2016) in a study carried in the European Union concluded that in all countries in Europe have educational policies, and practices that foster tolerance, respect for diversity. According to them, education is a right and must be upheld by all nations and all effort at discriminating against others based on ethnicity and income level be ended. Almost all national constitutions champions this right and some have even commenced to implementation of free second cycle education.
Associated with this goal are seven (7) targets which are interwoven and these have some similarities with those espoused by ICESCR, UDHR, CEDAW, CRPD, ICRWM. They are as follows:

I. By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes;

II. By 2030, ensure that girls and boys have access to quality education early childhood development, care and pre-primary education so that they are ready for primary education;

III. By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university;

IV. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship;

V. By 2030, eliminate gender disparities in education and ensure equal access to all level of education, vocational training for children in vulnerable situation and disability people;

VI. By ensure that all youth and a substantial portion of adults, both men and women, achieve literacy and numeracy;

VII. By 2030, ensure all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, sustainable life styles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity; and

VIII. By 2030, ensure substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small Island developing States (ICSU, 2015).
In brief, the associated targets stated above anticipate that in the next 15 years, girls and boys should have access to quality early childhood education which would prepare them for equitable primary and secondary education free of any inhibitions. It is expected that by the time they attain youth and adult stages, they would achieve literacy and numeracy, be armed with the relevant vocational and technical skills, acquire the skills needed for sustainable lifestyle, human rights. This would be capped with increased in the number of teachers.

Education and Sustainable Development
Education is viewed as central to national development since it comprises the development of the total person intellectually, psychologically, socially, vocationally, religiously or morally. Through education, individuals or group of people acquire knowledge and skills formally and informally. The formal training comes from established schools from the basic to the tertiary level.

Umar (2004) asserts that knowledge enables people to become meaningful contributors of development and hence sustainable development. Education at all levels is crucial to the attainment of the SDGs. This is because, according to ICSU (2015), education is the means of addressing environmental, mortality, health issues and bridging social inequalities while at the same time offering life-long learning opportunities for all without exclusion. Education is seen as the only agency that can deliver the desired development, make people explore to the maximum available natural resources without engaging in practices that would compromise their availability and use by successive generations irrespective of their cultural, geographical, ethnicity or gender (Alam, 2008).
In the view of Opeke (2004), the library is pivotal in providing education and that at the heart of the library is the provision of the right type of information resources that empowers the educational institutions to produce highly resourceful people to impart positively on sustainable development. Mkumbo (2016) reiterates information and knowledge are critical and strategic resources in human development, which encompasses life-long learning opportunities, poverty elimination.

Some literatures posit that to clearly understand sustainable development, it is necessary of find out what development is. Development is known as capacity expansion and freedoms. It requires adequate empowerment of the state and society for proper distillation in the political community and its constituent parts, as well as individual members of such communities (Sen, 1990; UNESCO, 2005; Omotola, 2006). It is this empowerment that education predisposes itself to provide. Ukachi (2012) asserts that development at the personal level connotes increased skill and capacity, greater freedom, creativity and material well-being, while at the group level, suggests increasing capacity to regulate internal and external relationships. It could be seen as general improvement in every sphere of human life, be it material, social, moral or spiritual.

Sustainability however, is the social strength to constructively carry things forward for all into the future. In their view, Bruntland (1987) and Giddings, Hopwood and O’Brien (2002), sustainable development is development have to do with meeting the present social, political, economic, cultural etc. needs of both the nations and its citizenry without compromising the development and needs of future generations.

Ukachi (2012) asserts society’s developmental voyage, hence, its advancement and continued progress would be achieved through education. Education always influences the progress of mankind because it is the source and pillar in a nation’s growth.
An educated populace give birth to a knowledge society. Educated societies regulate the activities of human-kind which is vital to the attainment of sustainable development. A fundamental feature of educated societies include inclusion of all, freedom of expression, participation, equality of all, is central to sustainable development. Consequently, it is challenging if not impossible to find alternative to sustainable development besides educated societies (Dike, 2007).

Critical to promoting sustainable development and improving the aptitude of humans to address environment and development issues, is education. It is important to state here that both formal, non-formal education are indispensable to changing people’s attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also important for attaining environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development and for effective public participation in decision making.

The role of education in the achievement of the SDGs cannot be over emphasised. According to Jorby (2002), Agenda 21 was the first official document to identify and acknowledge education as an essential tool for achieving sustainable development.

As validated by Belay (2017), this led to coinage of terms often used interchangeably in describing the practice of teaching so as to ingrain sustainability. These terms include Sustainability Education (SE), Education of Sustainability (EfS) and Education for Sustainably Development (ESD).

Education for sustainable development according to UNESCO (2015) integrates and incorporates issues regarding sustainable development into teaching and learning. This is expected to culminate in desirable outcomes such as behavioural changes that take action for sustainable development.
This is a participatory teaching and learning technique that stimulates and empowers learners with critical thinking, imaginative and decision making skills to solve problems in a collaborative manner. Jones et al. (2010) holds that education for sustainability may contain instructions about climate change, sustainable consumption patterns, disaster risk reduction, and biodiversity. Practices including unsustainable patterns of economic production and consumption which contribute to global warming, environmental degradation and upsurge in natural disasters would be shunned. This is because, the philosophy of education for sustainability is that learners acquire and develop cross-cutting sustainable competencies enabling them to contribute meaningfully to achieving the sustainable development goals.

The philosophy would transform their behaviour. Tilbury and Wortman (2010) conclude that education for sustainability can produce specific cognitive and behavioural learning outcomes that equip individuals to deal with certain challenges of each SDG, thereby facilitating achievement. Education for sustainability helps individuals to contribute to achieving the SDGs by equipping them with knowledge and competencies they need, not only to understand what the SDGs are about but to engage as informed citizens in bringing about the desired transformation that can guaranty lives in the now and future.

Libraries and Quality Education
Quality education is one that provides all learners with the capabilities they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being. Libraries play pivotal role in the acquisition, maintenance and development of literacy skill and this skill is critical to imbibing the culture of life-long learning. Libraries realise this through
offering access to reading resources that are relevant, stimulating, entertaining and useful.

It is this pleasure in reading that unconsciously foist and turn to foster the habit of life-long learning, is often experienced in the library in which readers gain their first opportunity to pick a book of their own choice (Edoka, 2000; Abadzi, 2004, Akintunde, 2004). Moreover, Mchombu (2014) holds that libraries are important for providing practical information that can be used to facilitate quality education at all levels. Even in the era of ICT, there is the need to equip learners with a skill and means to become information-literate which is very important in locating, accessing and evaluating information.

The goal of quality education is to achieve academic excellence, improved academic standards, applied learning and lifelong academic skills. By this, reducing abject poverty and enhancing sustainable development requires arming the generality of the citizenry with basic capabilities that enables them to develop.

These capabilities help develop to the full potential of individuals to enable them lead productive and creative lives. Of these capabilities, long and healthy lives as well as to be knowledgeable are rank the topmost (United Nations Development Programme (UNDP), 2006).

Library infrastructure is of utmost importance to achieving quality education. The success of any institution, country, and society rests squarely on the adequacy of its library collection because it’s also seen as an agency for findings, discovery, innovation, vocational skills repository, scholarship and research (Dada, 2016 & Mkumbo, 2016). Libraries are gateways to knowledge of all forms and in all formats. Information and knowledge can be acquired from libraries to help people become literate, be able to numerate, solve problems, and achieve self-actualisation,
economic sufficiency, civic responsibility and satisfactory human relationships. Information and knowledge are at the heart of achieving the SDGs since they were at the core of achieving the MDGs.

This is based on the fact that the MDGs gave birth to the SDGs (UN, 2015). Makotsi (1999) reinforced an earlier study conducted by Zapata in 1994 that access to information through libraries empowers every individual and also embrace the nation of social inclusion and the library agent in society.

Makotsi (1999) shares the view that this aids quality education. The World Bank (2008) concluded that at every level of education, there should effective library services to foster literacy, numeracy and a culture of reading. In their view, Agbo and Onyekweodiri (2014) posit quality education starts at primary level and all the way through to the tertiary so is important that libraries at all these levels of the educational ladder have functional libraries. School libraries are so critical to inculcating early literacy, reading culture and life-long learning among people in society and they impact directly on their academic performance as they ascend academically. School libraries provide resources in a wider and deeper understanding to students in various subjects in the school; promotes reading habits among successive generations.

The Role of Libraries in Achieving Sustainable Development Goal 4
Generally, there is a belief that libraries and the services they offer can contribute to the yield of positive outcomes across the SDGs. Dinesh (2016) advances those services may include the following:
- Encouraging universal literacy, which entails media and information literacy;
- Shrinking gaps in access to information and helping governments, civil society and business to better understand local information needs;
- Providing a network of delivery sites for government programmes and services
- Advancing digital inclusion through access to Information and Communication Technologies (ICT), and dedicated staff to help people develop new digital skills;
- Serving as the heart of research and academic community; and
- Preserving and providing access to the world’s culture and heritage.

Again, Bradley (2016) contends that other initiatives of library support to SDGs may include:

- UN Depository Libraries that support dissemination of information and research to help decision makers achieve the SDGs;
- Access to health, environmental, and agricultural information that are target of the SDGs, including Open Access Resources; and
- Media and information literacy programmes for marginalized populations to make an important contribution to achieve universal literacy.

Indeed, libraries and information centres have important functions to play in tackling the existing information gap, inequalities which have emerged as results of the digital divided which could jeopardize the achievement the sustainable development (Ukachi, 2016). The library’s role as creators and transmitters of knowledge, information literacy education, information packaging and digitization make the library a critical player in realizing sustainable development (WISIS, 2003).

At the 75th Anniversary of International Federation of Library Associations and Institutions (IFLA) in Glasgow in 2003, it averred that libraries and information services promote sustainable development by ensuring freedom of access to information. IFLA (2003), advanced
libraries and information centres act as gateways to knowledge and culture.

They afford access to information, thoughts and works of imagination in several formats, encouraging personal development of all age categories and thereby churning out dynamic participants in society and decision-making processes. Libraries and information professionals recognize the place of education in various forms for all. Intricately associated to this, is the provision of essential support service for life long and independent learning, independent decision-making and cultural development for all. Per the vastness of its collection and diversity of media, they make available guidance and learning opportunities.

They aid in the provision educational and social skills, which are must haves in promoting information societies and sustainable development. IFLA (2003) further assert that libraries contribute to development and maintenance of intellectual freedom and help safeguard basic democratic values and universal civil rights. They reverence the identity, independent choice, and privacy of their patrons without any discrimination. The library responses to acquiring, preserving and making available to all without discrimination the widest variety of materials, reflecting the plurality and cultural diversity of society and the richness of our environments.

The main thrust of this paper hinges on the fact that libraries are necessary for achieving the SDG 4. They are effective apparatus for the realization of knowledge creation and sustainable development as the current level of development could not have been achieved without libraries (Ukachi, 2016). Libraries are recognised as active intermediaries in the transmission of knowledge and guarantors of access to all source of knowledge in all formats within the info-sphere. It is generally regarded as a repository of knowledge for users to utilise in satisfying their information needs.
Access to opportunity starts with access to unfettered information and knowledge. Public access to information empowers people to make informed decisions that can improve their lives. Communities that have access to timely and relevant information for all are better positioned to eradicate poverty and inequalities, improved agriculture, improved quality education and support people’s health, culture, research and innovation (IFLA, 2014). As stated by target 16.10: a well-informed society contribute significantly to the development of the nation as the availability of information resources would promote peaceful and inclusive societies for sustainable development, providing access to justice for all and effective, accountable and inclusive institutions at all levels (Bradley, 2014).

According Onyeyan & Odunola (2014), the SDGs recognises the interdependence between growth, poverty reduction and sustainable development so that achieving one of them can be expected to contribute to achieve others, for example, reducing the share of people living in extreme poverty would certainly help to deal with the health and education challenges but achieving health and education goals would also contribute to the fight against poverty (Soubbtina, 2004).

Information or education is a critical tool to development. The development of any nation hinges the availability of relevant, updated and adequate information on food security, democracy, health, education, gender equality etc. Libraries can provide such access to information that would enable people lead gainful lives as they are skilled at acquiring, organising, offering for use and publicly preserving materials irrespective of the form in which it is packaged in such a way that when it is needed it can be found and put to use (Karki, 2006).

Olanilokun & Salisu (1993) posit that a library is an agency which participates in the collection, processing, preservation and dissemination
of recorded information in the various formats most suitable to its target users.

Highlighting the purposes of libraries, Saliu (1999) emphasises that libraries assemble information from plethora of sources and places them at the command of individual user, and supports and sustains individual freedom of enquiry and opinion. Libraries satisfy a basic human right and precondition to a development: the need to have the society’s record readily accessible to the populace, and society continues to need access to organised information more than ever before (Rubin, 2000).

Just as the MDGs, the SDGs provide the link between local and international actions towards human centred, holistic development. Bradley (2016) intimates the SDGs entail working closely together at a global level to achieve a common vision and libraries play a significant role in increasing access to information in support of the inclusion process by building bridges between individuals at the local level and the global level.

Information is an essential factor for achieving inclusive and equitable education. For any nation to develop, it needs to have and provide relevant and adequate information and access to information on every issue. According to Forsyth (2005), libraries can offer such access to information that would enable people enjoy gainful lives as they are skilled at acquiring, organizing, disseminating and preserving materials in diverse forms so that when they are required, they can be quickly located and utilized. Libraries over the years have been influential in community and national development, and the SDGs is about development on a global scale, the roles of libraries in achieving these goals are crucial.
Conclusion
The SDGs are collective agenda for changing our world and to attain this change, we must reconsider the approaches that have left libraries out of national planning, implementation and decision, and monitoring process. They are effective apparatus for the realisation of knowledge creation and sustainable development as the current level of development could not have been achieved without libraries (Ukachi, 2016).

Libraries are gateways to knowledge of all forms and formats. Information and knowledge can be acquired from libraries to help people become literate, be able to numerate, solve problems, and achieve self-actualisation, economic sufficiency, civic responsibility and satisfactory human relationships. Information and knowledge are at the heart of achieving the SDGs since they were at the core of achieving the MDGs.

Recommendations
From the foregoing, the following recommendations are made:

- Examining the critical role libraries play, the government should ensure that relevant legislations and policies such as building and resourcing libraries at regional, district, and community levels are enacted. The libraries should have adequate information resources, qualified library personnel and good library building, enough reading space, furniture, lighting etc. Continuous teaching of information literacy (IL) which enables patrons to acquire the skills in locating, searching, retrieving, and evaluating relevant information should be encouraged;

- Incorporate the concept of sustainability into the school curriculum. This would yield a lot of dividends. This would mean, the teaching of sustainability would equip pupils/students with the knowledge and skill devise and embrace sustainable practices while at the same time flagging practices deemed as threats to sustainability. This in the long run would churn out citizens who
are endowed with sustainable competencies. Sustainable competencies are the knowledge, skills, attitudes and values necessary to shape a sustainable future;

- Introduction of service learning is an educational approach that embraces learning objectives with community service in order to provide a pragmatic, progressive learning experience while meeting societal needs;

- There is the need to reorient education and learning so everyone has the opportunity to acquire the values, skills and knowledge that empowers them to contribute to sustainable development. This is because achieving the SDGs is a collective responsibility and irresponsible use of the environment in one area affects other areas; and

- It is about time we enhanced the role of education and learning in all relevant agendas, programmes and activities that promote sustainable development.

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