EFFECT OF LEARNER AUTONOMY TEACHING STRATEGY ON SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN SOCIAL STUDIES IN ENUGU STATE.

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Abstract

This study was designed to investigate the effect of Self Regulated Learning Strategy (a learner autonomy strategy) on junior secondary school student's Achievement in Social studies in Enugu State. It was a quasi-experimental study, pretest-posttest, non equivalent control group design was used. A total of 140 JSSII students were drawn from two secondary schools in Enugu Education Zone. Intact classes were randomly assigned experimental and control groups. Social Studies Achievement Test (SSAT) was used for data collection. The instrument was validated by three research experts. SSAT achieved a reliability of .71 calculated using Kuder Richardson 20 (KR-20) formula. Two research Questions and three hypotheses guided the study. Mean and standard deviation were used to answer the research questions while the hypotheses were tested at .05 level of significance using Analysis of Covariance (ANCOVA). Major findings of the study revealed that students taught social studies withSelf Regulated Learning Strategy, achieved higher than their counterparts taught with expository method. There was no significant difference between the achievement scores of private and public school students taught social studies with Self Regulated Learning Strategy. Similarly there was no significant interaction effect between teaching strategy and school ownership on students' achievement in social studies. It was recommended that social studies teachers should adopt Self Regulated Learning Strategy for teaching social studies.

Introduction

In specific terms, the broad goals of secondary education, according to the National policy on Education are to prepare the individual for useful living within the society and high education. Hence, secondary education among other things, is expected to provide trained man

power in the applied sciences, technology and commerce at sub-professional graves; foster national unity with an emphasis on the common ties that unite us in our diversity; raise a generation of people who can think for themselves, respect the views and feelings of others, respect the dignity of labor, appreciate those values specified under our board national goals and live as good citizens and provides technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development, (FRN, 2013).

Unarguably, one of the ways of achieving these laudable goals of secondary education is by teaching and learning of social studies. According to Mbu(2012), social studies is an area of school curriculum designed specifically for the study of man and how his problems are solved. Mbu argued further that social studies is not geography; it is neither history nor government. It is not economics; it is not an amalgam of the social sciences rather social studies borrows ideas from all social science subjects to understand, analyze and react to situations. Social studies deals with how man can fit into the society by utilizing the necessary attitudes, values and skills. Social studies focuses on the use of critical and reflective thinking to solve man's problems.

Njor (2013) adviced that it is very necessary to include social studies in the school curriculum because of its general importance in the development of citizens. This according to Njor is because social studies is concerned with the development of skills with which man equips himself in solving problems in a rational manner. It also promotes the ability to think creatively and productively. Social studies by its nature carters for the training or teaching concepts dealing, with citizenship education in schools. Through citizenship education, a good citizen, expected to play his role for effective participation in the development of the society is made. Ika (2013) submitted that it is only innovative subjects such as social studies that can carter for the complexity and diversity of the Nigerian society with over 300 ethnic groups, multi-religious groups and over 180 million people. Social studies serve as a tool for fostering unity in diversity. Through social studies, students learn to be tolerant. As students are exposed to the learning of people far and near, they appreciate other people's cultures. This helps in minimizing the negative feelings, misconceptions and prejudices about other people.

Unfortunately, research evidences such as Mbu (2012), Njor (2013) and Al-Gazir (2013) report that secondary school students do not achieve satisfactorily in this all-important subject, social studies. The challenge of this study therefore, was to profer possible ways of enhancing secondary school student's achievement in social studies. Al-Gazir (2013) averred that academic achievement generally suggest an achievement relating to education and scholarship. Achievement in this study refers to achievement in secondary school social studies as measured with Social Studies Achievement Test (SSAT). Research evidences have consistently identified a strong relationship between students' achievement and teaching methods.

In their separate studies, Mbu (2012), Pedro (2013) and Ika (2013) all implicated teaching methods as a major factor that can enhance or inhibit secondary school students' achievement in social studies. In specific terms, these research experts blamed students' poor achievement in social studies on teachers' use of ineffective and non efficient teaching methods. Perhaps the most popular method of teaching in secondary school today is the expository or lecture method.

Making case for active learning in social studies classroom. Bell (2012) noted that learning is not a spectator sport. Students do not learn just listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write reflectively about it, relate it to the past experience and apply it to their daily lives. They must make what they learn part of themselves. Bell therefore recommended the use of Learner Autonomy Strategies for secondary school students.

Njor (2013) reported that the term "learner autonomy" was first coined in 1981 by Henri holec the "father" of learner autonomy. Henri holec, according to Njor defined autonomy as the ability to take charge of one's own learning while Leslie Dickson defined autonomy as a situation in which a learner is totally responsible for all the decisions concerned with his (or her) learning and the implementation of those decisions. Al-Gazir (2013) posits that one of the most effective and efficient learner autonomy strategy is Self-Regulated Learning Strategy (SRLS). Consequently, self-regulated learning strategy was adopted for this study. In other words, the study determined the effects of self regulated learning strategy on secondary school students' achievement in social studies. Pintrich (2000) in Al-Gazir (2013) described self regulated learning strategy as an active constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation and behaviour, guided and constrained by their goals and the contextual features in the environment. Hence, in self regulated learning, students are actively involved and have clear intentions to be engaged in learning.

There is no doubt that self-regulated learning strategy can facilitate learning and enhance secondary school students' academic achievement. However, research evidences have reported conflicting findings on the effect of self-regulated learning on students' achievement in secondary school subject. While Mbu (2012) and Al-Gazir (2013) found that self-regulated learning strategy promoted secondary school students' achievement. Bell (2012) and Ika (2013) found the contrary. This gap of no definitive conclusion justifies the need for more studies such as this present work.

Another variable of interest of this study was the influence of school ownership on the achievement of secondary school students' in social studies when taught with self regulated learning strategy. This is because research experts vary in their findings on this issue. While Clauss (2012) and Njor (2013) found higher achievement among public secondary school students', Ika (2013) and Al-Gazir (2013) reported higher achievement among private secondary school students' trained in self regulated learning. Once again, these conflicting findings justifies the need for more studies such as this present one.

Purpose of the Study

The purpose of this study was to investigate the effects of Leaner Autonomy Strategy on Secondary School students' achievement in social studies. Specifically, the study aimed at investigating the effects of Self Regulated Learning Strategy, (a Learner Autonomy Strategy) on Junior secondary school two (JSS2) students';

1. Achievement in social studies
2. Achievement in social studies with regard to their schools' ownership

Research Questions

The following research questions guided the study

1. What are the mean social studies achievement scores of the students in both experimental and control groups both in pretest and posttest?
2. What are the mean social studies achievement scores of public and private schools' students in both experimental and control group both in pretest and posttest?

Hypotheses

The following research hypotheses were tested at .05 level of significance

1. There is no significant difference between the mean social studies achievement scores of students in the experimental and control groups.
2. There is no significant difference between the mean social studies achievement scores of public and private school students in the experimental and control groups.
3. There is no significant interaction between teaching strategy and school ownership on students' mean achievement scores in social studies.

Methodology
Research Design

The research design adopted in the conduct of this investigation was quasi-experimental design. Specifically the design was a pretest –posttest, non equivalent control group design. The area covered in this study was Enugu Education Zone of Enugu State consisting of Enugu East, Enugu North and Isi Uzo Local Government Areas. The population for the study consisted of all junior secondary two (JSSII) students in the sixty four (64) secondary schools in Enugu Education Zone of Enugu State, numbering nineteen thousand, three hundred and fifty eight (19,358) students as at the time of this study.

A sample of one hundred and fourty (140) junior secondary school II (JSII) students was used in the study. The sample was made up of seventy six (76) students in the experimental group and sixty four (64) students in the control Group. The sample also composed of 60 students from private school and 80 students from public school. This sample was obtained from four intact classes randomly drawn from two schools (one private and one public).

Social studies Achievement Test (SSAT) was used for data collection. SSAT was developed by the researcher. It is made up of Thirty (30) multiple choice questions with four options each. The items were drawn using a table of specification to ensure adequate coverage of the content area covered in the study as well as maintain even spread across the different levels of the cognitive domain tested. SSAT was validated by three research experts. After necessary corrections as directed by the experts, SSAT was confirmed to have face validity. Since the items of SSAT are dichotomously scored, Kuder-Richardson's formula 20 (KR-20)

was used to determine the reliability. A reliability coefficient of .71 was obtained for the instrument.

Experimental Procedures

The researcher trained the two regular mathematics teachers in the two secondary schools used in the study for a period of two weeks on the use of the Self Regulated Learning Strategy used in this study. Fore-most, the SSAT was administered to all the subjects of the study as pretest. Thereafter, the treatment was administered for a period of six weeks. The experimental groups in each school were taught the selected social studies topics using Self Regulated Learning Strategy while the control groups in each school were taught the same topics using expository method. At the expiration of the treatment period, the SSAT was re-arranged and administered to all the subjects as posttest. Research Questions were answered using means statistics and standard deviation. Test of hypotheses were done with Analysis of Covariance (ANCOVA) at .05 level of significance.

Results
Research Question One:

1. What are the mean social studies achievement scores of the students in both experimental and control groups both in pretest and posttest?

Table 1: Pretest and Posttest achievement scores of the experimental and control groups.

Group	N	Pretest Mean	Standard Deviation	Posttest Mean	Standard Deviation
Experimental	76	19.8	10.2	83.7	7.03
Control	64	21.1	9.8	52.4	39.15

The pretest mean achievement score and standard deviation of the experimental group were 19.8 and 10.2 respectively while those of the control group were 21.1 and 9.8 respectively. However, the posttest mean achievement scores and standard deviation were 83.7 and 7.03 respectively for experimental group while 52.4 and 39.15 were those of control group. Apparently both groups scored poorly in the pretest and the standard deviations of 10.2 and 9.8 for both groups were high showing that there were more extreme values, only a few scores clustered around the mean, therefore the means for both groups in the pretest were not very reliable. However, in the posttest, experimental group achieved higher with a mean of 83.7 and lower standard deviation of 7.03 unlike the control group which achieved lower with a mean of 52.4 and a higher standard deviation value of 39.15. Comparing with the pretest data, learning took place in both groups but better in experimental group. Also the mean score for experimental

group was more reliable than that of control group as revealed by the standard deviation values of both groups. There were more extreme scores in the control group.

Research Question Two:
What are the mean social studies achievement scores of public and private schools' students in both experimental and control group both in pretest and posttest?

Table 2: Pretest and Posttest achievement scores of male and Female students.

Group	N	Pretest Mean	Std.Dev.	Posttest Mean	Std.Dev.
Private (Experimental)	33	18.6	6.11	72.5	4.01
Private (Control)	27	19.1	5.07	42.3	18.44
Public (Experimental)	43	18.1	6.06	73.1	4.20
Public (Control)	37	18.42	6.14	40.11	14.32

In the experimental group, the pretest mean achievement scores and standard deviations were 18.6 and 6.11 for private students and 18.1 and 6.06 for public students respectively. Similarly, the posttest mean achievement scores and standard deviations were 72.5 and 4.01 for private students and 73.1 and 4.20 for public students. Apparently there was no tangible difference, the standard deviations were very low for both groups, and hence both means were reliable.In the control group, the pretest mean achievement scores and standard deviations were 19.1 and 5.07 for private students and 18.42 and 6.14 for public students respectively. The posttest mean achievement scores and standard deviations were 42.3 and 18.44 for private students and 40.11 and 14.32 for public students. Apparently there was no tangible difference in their performances.

Hypotheses
1. There is no significant difference between the mean social studies achievement scores of students in the experimental and control groups.
2. There is no significant difference between the mean social studies achievement scores of public and private school students in the experimental and control groups.
3. There is no significant interaction between teaching strategy and school ownership on students' mean achievement scores in social studies.

Table 3: ANCOVA Analysis of students' achievement scores.

Source of Variance	Sum of squares	Df	Mean squares	F-calc.	Level of significance	Decision
C0-variates	21671.411	1	21671.411	189.212	0.000	S
Pretest	21671.411	1	21671.411	189.212	0.000	S
Main effects	66142.334	2	33071.167	191.332	0.000	S
Methods	59441.716	1	5944.716	662.14	0.000	S
Ownership	5227.853	1	5227.853	32.114	0.000	S
2-Way interaction	119.213	1	119.213	0.128	0.357	NS
Methods/ownership	119.213	1	119.213	0.128	0.357	NS
Explained	85349.601	4	21337.400	157.362	0.000	S
Residual	18654.911	261	71.475			
Total	104004.512	265	392.469			

S = significant, NS = Not significant at 0.05 level of probability

The result above shows f-calculated of 189.212 for pretest, f-calculated of 191.332, 662.14 and 32.114 for main effects, methods and ownership respectively all these indicate significant effects. However with an f-calculated of 0.128 for interactions between methods and ownership, there is no significant effect. Hence, hypothesis one is rejected because the difference between the mean social studies achievements scores of students in the experimental and control groups is significant. On the other hand, hypothesis two is not rejected because there is no significant difference between the mean achievement scores of private and public schools' students in both experimental and control groups. In like manner, hypothesis three is not rejected because there is no significant interaction between teaching method and students' ownership on students' achievement in mathematics.

Summary of Findings
The results presented revealed the following:
1. The student taught social studies with Self Regulated Learning Strategy achieved higher than those taught with expository method.
2. There is no significant difference between the mean social studies achievement scores of private and public schools' students taught social studies with Self Regulated Learning Strategy.
3. There is no significant interaction between teaching strategy and schools' ownership on students' achievement in social studies.

Discussion

Results presented in table one showed that both groups of students had close mean and standard deviation scores in the pretest, apparently showing that they had chances of achieving equally. However, after treatment, the experimental group achieved far higher, with a lower standard deviation. The findings further revealed a significant difference in the achievement of students in both groups in favour of the experimental group. Evidently, these results implicated method of teaching as a major factor affecting students' achievement in social studies. This finding supports the findings of Mbu (2012) and Al-Gazir (2013) who reported the usefulness of Self Regulated Learning Strategy in teaching and learning. Conversely, this finding contradicts the findings of Bell (2012) as well as Ika (2013) who reported in their separate studies that Self Regulated Learning Strategy hindered and restricted students' learning. The design and effective use of Self Regulated Learning Strategy in each study cited above may have accounted for the conflicting result.

There existed no significant interaction between method of teaching and school ownership on students' achievement in social studies. Ownership did not affect students' achievement in social studies significantly. These results agree with the findings of Bell (2012), and Pedro (2013). Conversely, the results contradicted the findings of Clauss (2012), Njor (2013), Ika (2013) and Al-Gazir (2013). Clauss (2012) and Njor (2013) reported that public schools' students taught social studies with Self Regulated Learning Strategy achieved higher than their counterparts in the private schools. Whereas Ika (2013) and Al-Gazir (2013) found in their separate studies that private schools' students taught social studies with Self Regulated Learning Strategy achieved higher than their counterparts in the public schools. It is therefore necessary to advise social studies teachers should master the use of Self Regulated Learning Strategy before applying it in their secondary schools.

Conclusions

Based on the findings of this study, the following conclusions were made;

1. Self Regulated Learning Strategy enhances secondary school students' achievement in social studies.
2. School ownership does not affect students' achievement in social studies when taught with Self Regulated Learning Strategy.

Recommendations

Consequent upon the findings of this study, the following recommendations are made;

1. Self Regulated Learning Strategy should be used in teaching social studies in junior secondary schools.
2. Social studies teachers should be trained through intensive seminars, workshops and in-service trainings on the use of Self Regulated Learning Strategy.

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SEX DIFFERENTIALS IN STUDENTS' ACHIEVEMENT AND INTEREST IN TRIGONOMETRY USING INQUIRY TEACHING METHOD (ITM)

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Abstract

The study determined differentials in students' achievement and interest in trigonometry using Inquiry Teaching Method (ITM) (ITM). The study was guided by two (2) research questions and four (4) research hypotheses. The design of this study was non-equivalent control quasi-experimental research. The sample size of the study was four hundred and fifty-six (456) Senior Secondary School Students One (SSS 1) in the three (3) sampled coeducational secondary schools in Enugu Education zone. Hence, the researcher sampled two hundred and forty-seven (247) male Senior Secondary School Students One (SSS 1) and two hundred and nine (209) female Senior Secondary School Students One (SSS 1). Trigonometry Achievement Test (TAT) and Trigonometry Interest Scale (TIS) were the instruments that were used for data collection, which underwent face validation only and were reliable with the K-R20 coefficient of 0.78 and Cronbach Alpha of 0.74 respectively. Mean ($\bar{x}$) and standard deviation (s) were used in answering the research questions. Analysis of Covariance (ANCOVA) was used in testing the research hypotheses at 0.05 alpha level. The study discovered the female students that taught trigonometry using the Inquiry Teaching Method (ITM)had the higher posttest mean achievement and interest scores than their male counterparts and the differences were significant. Secondly, the study discovered that there were significant interactions between gender of students and the methods on students' achievement and interest scores in Trigonometry. The study recommended that parents and mathematics teachers should ensure that the male students are given equal functions with their female counterparts both at home and in school to do so that it won't be difficult for the male students to transfer the knowledge learnt at home to school Mathematics (trigonometry).

Introduction

Mathematics is defined as a science of numbers, quantities, shapes and spaces (Chukwu, 2010). Mathematics is a physical science that is practically and activity oriented which uses abstract symbols, axioms and facts to deal with numbers, shapes and equally solve day to day

problems (Albert, 2017). Mathematics has generally been accepted as the foundation of science and technology and it is a very important subject in school curriculum (Udousoro, 2011). According to Anibueze (2018), mathematics is a vital gateway for students to triumph over the other subjects particularly for science subjects. This is because mathematics enables students to grasp fundamental knowledge, basic skills, and basic ideas in mathematics, as well as develop students to express clearly and think systematically, so as to enable students to possess realistic and practical attitudes, and spirit of perseverance. Students learn how to deploy mathematics thinking methods to solve problems and know the world they live in.

Mathematics is a science subject that is bedeviled with a lot of controversies over gender performance (Anibueze, 2018). While some mathematics educators/scholars believed that male students achieved better and had more interest in mathematics than their female counters, others are with contrarily opinions/findings. Harbor-Peters (2001) pointed out that gender issue in mathematics has been a source of aversion. Gender has become a contemporary variable for mathematics educators and researchers because of its effect on mathematics teaching, learning, achievement and interest (Anibueze, 2018). Gender is a cultural construct that distinguishes the roles, behaviour, mental and emotional characteristics between male and female, developed by a society (Udousoro, 2011). Umoh (2003) defined gender as psychological term used in describing behaviours and attributes expected of individuals of a basis of being born as either male or female. Njoku (2013) stated that in Nigerian cultural setting, gender had strongly affected sex role, especially in choice of school subjects. Njoku (2013) pointed out that sex role stereotype and expectation had unduly influenced the attitude of males and females to many things, especially subjects in schools and in particular mathematics.

Kolawale and Ogini (2008) reported that male superiority over female counterparts in geometry aspect of mathematics was significant. According to Asiegbu (2000), mathematics has been male stereotype, especially as mathematics is regarded as abstract and difficult, and has attributes which boys are attracted to. Boys are good at handling of difficult situations. Some teachers even feel more comfortable making a boy than a girl understand mathematics. Hydea and Mertzb (2009) observed that females have reached parity with male. Asoegwu (2008) revealed that female students achieved better in mathematics when they were taught using effective modern instructional approaches. According to Ahmed (2008), the female aremore prone to express interest in mathematics than their male counterparts. In most secondary schools, especially at the mixed schools, the number of female students that passed mathematics is more than their male counterparts. This is because, since it is the female students that do domestic chores more than their male counterparts and mathematics plays a significant role in domestic chores, so it won't be difficult for the female students to transcend their passive mathematical domestic knowledge to active mathematical classroom knowledge.

Pinder (1987) viewed that both males and females compete favorably in mathematics and stressed that it is a misconception to think that males achieve higher than females in mathematics. More so, Ukeje (1979) stressed that neither males nor females are superior in general intelligence. This suggests that both males and females have the same ability even in

understanding mathematics if it is taught meaningfully. Ozomadu (2006) revealed that there was no significant difference between the mean achievement of male and female students in mathematics and there was no significant interaction of gender and teaching method. According to Bassey, Joshua and Asim (2010), if males and females are given the same opportunity in scientific inquiry, they will produce exactly the same result in mathematics. Ogunkunle (2017) established significant difference in favour of male Mathematics students and another part in favour of females. Based on these contradicting results, this study seeks to examine if there issex differentials in students' achievement and interest in trigonometry using Inquiry Teaching Method (ITM). The essence of determining the sex differential in trigonometry is because trigonometry is an important topic in the secondary school mathematics curriculum that is taught early and that links algebraic, geometric, and graphical reasoning (Vajiac& Snow, 2019). Trigonometry can serve as an important precursor to calculus as well as college/university level courses (Weber, Knott, & Evitts, 2008). It gives students good practice in employing the algebraic skills and most importantly, it benefits students' thinking processes (Gurat& Sagun, 2018).

Unfortunately, many students do not experience the richness, connections or creativity that trigonometry allows, instead they often perceive it as another memory exercise where rules and formulae must be learnt by rote, along with methods for working out problems (Umar & Ibrahim, 2018). Gurat& Sagun (2018) reported that students are having difficulties in solving trigonometry. Since students cannot get the topic, they do not have any time as the teacher moves on the next topic (Gallup, 2005). One factor that could affect the students in learning trigonometry is the instructional method used by the mathematics teacher (Andaya, 2014; Gurat& Sagun, 2018). One of the methods that the researchers want to determine its efficacy in the teaching of trigonometry is Inquiry Teaching Method (ITM). The choice of Inquiry Teaching Method (ITM) was based on the fact that among all innovative teaching methods, Inquiry Teaching Method (ITM) is the type of teaching method whose philosophy is heavily rooted in the works of some cognitive theorists like Jean Piaget, John Dewey, Vygotsky and Preire, Immanuel Kant, John Locke, among others (Kirshner, Sweller& Clark, 2006; Aniaku, 2012; Shittu, 2013; Omokaadejo, 2015).

The Inquiry Teaching Method (ITM) is a learning process which seems to increase students' level of involvement in the teaching and learning of Trigonometry. It may also expose the students to the multiple ways of learning the concepts in Trigonometry and enable the students to pass through the sequential phases of cognition which seems to accommodate learning and cognition differences among students. Aniaku (2012) revealed that this method is a teaching method that encourages learners to apply scientific process to explore and construct meaningful knowledge and skills. Cheval and Hart (2015) classified Inquiry Teaching Method (ITM) into three (3) classes, namely: structured inquiry, guided inquiry and unguided/open inquiry. All these types of inquiry can be useful to students to learn science when taught appropriately. Hence, this study shall use the three classes of Inquiry Teaching Method (ITM) as outlined by Cheval and Hart (2015) in determining sex differentials in students' achievement and interest in trigonometry.

Purpose of the Study

The main aim of the study was to determine sex differentials in students' achievement and interest in trigonometry using Inquiry Teaching Method (ITM). Specifically, the study determined the mean;

1. Achievement scores of male and female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM).
2. Interest scores of male and female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM).

Research Questions

The following research questions guided the study

1. What are the mean achievement scores of male and female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM)?
2. What are the mean Interest scores of male and female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM)?

Research Hypotheses

The following research hypotheses were tested at 0.05 level of significance guided the study.

H0 1: There is no significant difference between the mean achievement scores of male and female students that are taught Trigonometry using Inquiry Teaching Method (ITM).

H0 2: There is no significant interaction between gender of students and the methods on students' achievement scores in Trigonometry.

H0 3: There is no significant difference between the mean interest scores of male and female students that are taught Trigonometry using Inquiry Teaching Method (ITM).

H0 4: There is no significant interaction between gender of students and the methods on students' interest scores in Trigonometry.

Methodology

The design of this study was non-equivalent control quasi-experimental research. This study was conducted in secondary schools in Enugu Education zone of Enugu State. The sample size of the study was Four hundred and fifty-six (456) Senior Secondary School Students One (SSS 1) in the three (3) sampled coeducational secondary schools in Enugu Education zone. Hence, the researcher sampled two hundred and forty-seven (247) male Senior Secondary School Students One (SSS 1) and two hundred and nine (209) female Senior Secondary School Students One (SSS 1). Trigonometry Achievement Test (TAT) and Trigonometry Interest Scale (TIS) were the instruments that were used for data collection, which underwent face validation only and were reliable with the K-R20 coefficient of 0.78 and Cronbach Alpha of 0.74 respectively. Mean ($\bar{x}$) and standard deviation (s) were used in answering the research questions. Analysis of Covariance (ANCOVA) was used in testing the research hypotheses at 0.05 alpha levels.

Results

Research Question 1: What are the mean achievement scores of male and female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM) (ITM)?

Table 1: **The Mean Achievement Scores of Male and Female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM)**

Gender	Number	Pretest		Post-test	
		Mean ($\bar{x}$)	Standard Deviation (s)	Mean ($\bar{x}$)	Standard Deviation (s)
Guided ITM	60	51.00	14.33	57.88	16.20
Unguided ITM	64	55.75	13.77	61.98	15.05
Structural ITM	62	54.53	15.21	63.15	17.33
Males	**186**	**53.76**	**14.44**	**61.00**	**16.19**
Guided ITM	51	55.27	14.71	65.94	16.38
Unguided ITM	54	52.89	14.41	59.98	15.91
Structural ITM	52	51.29	13.88	63.06	15.50
Females	**157**	**53.15**	**14.33**	**62.99**	**15.93**

Table 1 above displayed the Mean Achievement Scores of male and female students that were taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM). Table 1 revealed that the pretest mean achievement score of male students that were taught Trigonometry using Inquiry Teaching Method (ITM) was 53.76 with a standard deviation of 14.44 while the pretest mean achievement score of female students that were taught Trigonometry using Inquiry Teaching Method (ITM) was 53.15 with a standard deviation of 14.33. The posttest mean achievement score of male students that were taught Trigonometry using Inquiry Teaching Method (ITM) was 61.00 and a standard deviation of 16.19 while the posttest mean achievement score of female students that were taught Trigonometry using Inquiry Teaching Method (ITM) was 62.99 and a standard deviation of 15.93.

Table 1 revealed that at pretest, the male and female students that were taught Trigonometry using Inquiry Teaching Method (ITM) had equivalent mean achievement score but at posttest, the female students that were taught Trigonometry using Inquiry Teaching Method (ITM) had higher mean achievement score with a smaller standard deviation which means that the mean achievement score is homogenous.

Research Question 2: What are the mean interest scores of male and female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM) (ITM)?

Table 2: **The Mean Interest Scores of Male and Female students that are taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM)**

Gender	Number	Pretest		Post-test	
		Mean ($\bar{x}$)	Standard Deviation (s)	Mean ($\bar{x}$)	Standard Deviation (s)

Guided ITM	60	2.14	0.59	2.28	0.61
Unguided ITM	64	2.31	0.54	2.42	0.56
Structural ITM	62	2.13	0.55	2.32	0.59
Males	**186**	**2.19**	**0.56**	**2.34**	**0.59**
Guided ITM	51	2.18	0.59	2.57	0.62
Unguided ITM	54	2.21	0.60	2.51	0.62
Structural ITM	52	2.30	0.63	2.69	0.68
Females	**157**	**2.23**	**0.61**	**2.59**	**0.64**

Table 2 above displayed the Mean Interest Scores of male and female students that were taught Trigonometry using guided, unguided and structural Inquiry Teaching Method (ITM). Table 2 revealed that the pretest mean interest score of male students that were taught Trigonometry using Inquiry Teaching Method (ITM) was 2.19 with a standard deviation of 0.56 while the pretest mean interest score of female students that were taught Trigonometry using Inquiry Teaching Method (ITM)was 2.23 with a standard deviation of 0.61. The posttest mean interest score of male students that were taught Trigonometry using Inquiry Teaching Method (ITM)was 2.34 and a standard deviation of 0.59, the posttest interest mean score of female students that were taught Trigonometry using Inquiry Teaching Method (ITM)was 2.59 and a standard deviation of 0.64.

Table 2 revealed that both at pretest and posttest, the female students that were taught Trigonometry using Inquiry Teaching Method (ITM)had higher mean interest scores with higher standard deviation which means that the mean interest scores are not homogenous.

Analyses of the Research Hypotheses
The four (4) null hypotheses were tested at 0.05 level of significance using ANCOVA. Tables 3 and 4 below showed the Analysis of Covariance (ANCOVA) on the Mean Achievement and Interest Scores of Students respectively, which are used for testing the null hypotheses.

Table 4: <u>**Analysis of Covariance (ANCOVA) on the Mean Achievement Scores of Students**</u>

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision

Source		Df			
Corrected Model	118244.934[a]	8	14780.617	7349.113	.000
Intercept	146.116	1	146.116	72.651	.000
Preachievement	112210.420	1	112210.420	55792.466	.000
GROUPS	2120.605	3	706.868	351.464	.000
GENDER	739.042	1	739.042	367.461	.007 S
GROUPS * GENDER	102.730	3	34.243	17.026	.000 S
Error	899.011	447	2.011		
Total	1783019.000	456			
Corrected Total	119143.945	455			

a. R Squared = .992 (Adjusted R Squared = .992)

Table 3 above showed the Analysis of Covariance (ANCOVA) on the Mean Achievement Scores of male and female Students. The Table 3 is used to answer null hypotheses 1 and 2.

H0 1: There is no significant difference between the mean achievement scores of male and female students that are taught Trigonometry using Inquiry Teaching Method (ITM).

From the result of ANCOVA in table 3, it was observed that Group which was the main effect gave an f-value of 367.461 and was significant at 0.007. Since 0.007 was less than 0.05, this meant that at 0.05 level, the f-value was significant. Therefore, hypothesis 1 was rejected. Hence, the study concluded that there was significant difference between the mean achievement scores of male and female students that were taught Trigonometry using Inquiry Teaching Method (ITM).

H0 2: There is no significant interaction between gender of students and the methods on students' achievement scores in Trigonometry.

From the result of ANCOVA in table 3, it was observed that Group*Gender which gave an f-value of 17.026 and was significant at 0.000. Since 0.000 was less than 0.05, this meant that at 0.05 level, the f-value was significant. Therefore, hypothesis 2 was rejected. Hence, the study concluded that there was significant interaction between gender of students and the method on students' achievement scores in Trigonometry.

Table 4: **Analysis of Covariance (ANCOVA) on the Mean Interest Scores of Students**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision

Corrected Model	171.351^a	8	21.419	3574.001	.000
Intercept	.605	1	.605	100.970	.000
PreInterest	163.697	1	163.697	27314.773	.000
GROUPS	1.616	3	.539	89.855	.000
GENDER	4.495	1	4.495	749.967	.000 S
GROUPS * GENDER	.094	3	.031	5.251	.001 S
Error	2.679	447	.006		
Total	2882.195	456			
Corrected Total	174.030	455			

a. R Squared = .985 (Adjusted R Squared = .984)

Table 4 above showed the Analysis of Covariance (ANCOVA) on the Mean Interest Scores of male and female Students. Table 4 is used for testing of null hypotheses 3 and 4.

H0 3: There is no significant difference between the mean interest scores of male and female students that are taught Trigonometry using Inquiry Teaching Method (ITM).

From the result of ANCOVA in table 4, it was observed that Gender gave an f-value of 749.967 and was significant at 0.000. Since 0.000 was less than 0.05, this meant that at 0.05 level, the f-value was significant. Therefore, hypothesis 3 was rejected. Hence, the study concluded that there was significant difference between the mean interest scores of male and female students that were taught Trigonometry using Inquiry Teaching Method (ITM).

H0 4: There is no significant interaction between gender of students and the method on students' interest scores in Trigonometry.

From the result of ANCOVA in table 4, it was observed that Group*Gender gave an f-value of 5.251 and was significant at 0.001. Since 0.001 was less than 0.05, this meant that at 0.05 level, the f-value was significant. Therefore, hypothesis 4 was rejected. Hence, the study concluded that there was significant interaction between gender of students and the method on students' interest scores in Trigonometry.

Major Findings

The study discovered the followings:

1.   The female students that taught trigonometry using the Inquiry Teaching Method (ITM)had the higher posttest mean achievement and interest scores than their male counterparts and the differences were significant.

2.   There were significant interactions between gender of students and the methods on students' achievement and interest scores in Trigonometry.

Discussion of Findings

The study determined differentials in students' achievement and interest in trigonometry using Inquiry Teaching Method (ITM). The study was guided by two (2) research questions and four (4) research hypotheses. The study discovered that the female students that taught trigonometry using the Inquiry Teaching Method (ITM) had the higher posttest mean achievement and interest scores than their male counterparts and the differences were significant. This finding tallied with the assertions of Asoegwu (2008), Ahmed (2008) and Hydea&Mertzb (2009). Hydea and Mertzb (2009) observed that females have reached parity with male. Asoegwu (2008) revealed that female students achieved better in mathematics when they were taught using effective modern instructional approaches. According to Ahmed (2008), the females are more prone to express interest in mathematics than their male counterparts.

Secondly, the study discovered that there were significant interactions between gender of students and the method on students' achievement and interest scores in Trigonometry. The finding of this study is in contrary agreement with Abonyi (1998) and IIoputaife (2001) who found no interaction effect between gender and instructional model. However, the finding of the study agreed with assertions of Eze (1992) and Ezeudu (1995). The achievement of male and female students may vary due to variation in the instructional models, especially with the Inquiry Teaching Method (ITM) which are activity oriented and make the female students to be more prone than their male counterparts to learn at their own rate, offering the female students more unique opportunity to read, work, accept and internalize the Trigonometric concepts at their own pace, master the subject as indicated by the accuracy of their own responses. The approach equally allows both male and female students (particularly more for the female students) the knowledge of immediate feedback which serves as a great motivation propelling female learners to want to learn more. This is because it is the female students that do domestic chores more than their male counterparts and mathematics plays a significant role in domestic chores, so it won't be difficult for the female students to transcend their passive mathematical domestic knowledge to active mathematical classroom knowledge since that, according to Aniaku (2012), Inquiry Teaching Method (ITM) encourages students to apply scientific process, which they have previously learnt to explore and construct meaningful knowledge and skills. So, it won't be difficult for the female students to achieve better and show more interest than their male counterparts in Trigonometry.

Recommendations

Considering the findings in this study, the following recommendations are made:
1.   Parents and mathematics teachers should ensure that the male students are given equal functions with their female counterparts both at home and in school to do so that it won't be difficult for the male students to transfer the knowledge learnt at home to school Mathematics (trigonometry).

2. Mathematics teachers should not ignore the female students in the act of teaching Trigonometry.
3. Government, through the State and Federal ministries of education should encourage female students more to learn mathematics and should organize workshops and conferences for teachers and parents on the need to use Structured Inquiry Teaching Method (ITM) on their female students.
4. Government, through the State and Federal ministries of education should encourage the Mathematics textbook writers to write and publish Mathematics textbooks based on the Structured Inquiry Teaching Method (ITM).

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EFFECT OF MAPLE SKETCHPAD SOFTWARE ON SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN ALGEBRA IN ENUGU EDUCATION ZONE

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Abstract

The study investigated the effect of maple sketchpad software package on secondary school students' achievement in Algebra in Enugu Education Zone. two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. The design of the study was quasi-experimental design. The specific design was the pretest posttest non equivalent control group design. The study was carried out among secondary schools in Enugu Education Zone of Enugu State. The population for the study consisted of 1,643 Mathematics students in the senior secondary two in the study area. The sample size was 360 drawn from Enugu East Local Government Area. The instrument for data collection was Algebraic Achievement Test (AAT). AAT was face validated by three experts in the Department of Mathematics and Computer Education. The reliability coefficient of the instrument was determined to be 0.73 using Kuder – Richardson Formula (K-R 20). The subjects were pretested before the treatment and the posttest was administered after the treatment, while the achievement test was administered two weeks after the termination of the treatments. The data collected were analyzed using the mean, standard deviation and ANCOVA. The findings of the study showed that students who were instructed and taught using Maple sketchpad performed better and achieve more than those taught using conventional method. It was also discovered that no particular gender was favored more by the treatment. Based on the findings of the student, it was recommended that secondary school Mathematics teachers should be given training on maple sketchpad so that they can use it while teaching. Also, seminars and workshops should be organized for serving teachers so as to acquaint them with the skill of maple sketchpad.

Introduction

Mathematics is defined as the science of quality and space (Tella, 2012). It remains the centre that holds all facets of life. Mathematics is a branch of knowledge that deals with numbers, qualities and skills, and it is the bedrock of all societal transformation and transfer of ideas into reality (Otum, Obasi and Ukpebor, 2009). It involves logical reasoning, drawing

conclusion from assumed premises, systematized knowledge and or strategic reasoning based on accepted rules, laws or probabilities. It is the art which studies patterns for predictive purposes (Gilfeather and Regater, 2009).Mathematics as a school subject is recognized as the foundation of science and technology without which a nation could never become prosperous and economically independent (Mutari, 2013). Mathematics has continued to play central role in almost all sphere of life. It is generally utilized in the areas of medicine, engineering, Bio-sciences and other parameters for national development. Thus, mathematics is defined as the science of quality and space (Tella, 2012). It remains the centre that holds all facets of life.Due to the relevance of mathematics to National Development, the Federal Government of Nigeria made the teaching and learning of mathematics mandatory at all levels. For example, recently, the Federal Government of Nigeria presented a draft of mathematics education reform tagged "Mathematics Education for Change; Ministers Strategic Plan from 2015-2019". This is an attempt to improve the quality of mathematics education output. Article six (6) of the draft contains welfare for mathematics teachers and scholarships offer for exceptionally precocious students in mathematics for upper and lower basic classes. This is to enable Nigeria prepare secondary school students for responsibilities of citizenship, National development and radical change in mathematics education delivery which is imperative for 21st century knowledge-driven economy.

The school mathematics is basically made up of algebra, arithmetic and geometry at the secondary and tertiary levels. Algebra with its symbolic representation is the bedrock of all branches of mathematics. Algebra is a generalization of arithmetic in simple format using letters in symbols to represent numbers (Anyor, 2011). Mathematics process isproblem solving and all problems are involved into algebraic expressions and equations for a possible solution (Smith and Okoye, 2010). Algebra curriculum in secondary schools include (i) open sentences, (ii) simple equations in one variables, (iii) expansion of algebraic expression (iv) factorization (v) algebraic fractions (vi) word problems (vii) linear inequalities in one variable (viii) coordinate axis (ix) linear equations in two variables (x) linear graphs (xi) simultaneous linear equations (xii) change of subject (xiii) variation (Ogbu, 2011). Adeoye (2012) enumerated the objectives of algebraic expressions for teaching and learning to include (i) Hierarchy orderly approach (ii) creative imagination (tessellation) (iii) deductive thinking (extrapolation) and extension) (iv) problem solving (involving) (v) everyday arithmetic (existing).In general, the objectives of algebra in secondary schools are to: (i) introduce students to mathematical structure (orderly approach) (ii) introduce students to the understanding of the basic concepts (iii) evaluation of formulae and the solution of simple equations (involving) (iv) introduce students to the meaning of useful basic algebraic concepts such as literal numbers, formulas and symbolic language of algebra (tessellation) existing and extrapolation (Basic Education in Mathematics, 2012).

Despite the importance of algebra in mathematics and other sciences like engineering, physics, medicine and National Development (Tella, 2012), secondary School students have continued to perform poorly in mathematics in general and algebra in particular. Sulieman and Hammed (2019) stated that one of the major problems facing the educational system in Nigeria is the abysmal failure of students in public examination; particularly at the secondary level of

education. The situation is so pathetic that stakeholders keep on wondering why this level of education has persistently failed to meet the yearnings and aspirations of the society. Some researchers viewed strategy of teaching algebra as the problem of poor performance of algebra. A report from Ogunyemi and Adeoye in Okoro (2011) indicated that the four operations of addition, multiplication, subtraction and division and the failure to observe the rubrics, symbols, notations measurement units and inability to model mathematical word problems into algebraic expressions and equations for easy solution pose a problem to students' achievement in algebra.Challenged by the problem of improving students' achievement in algebra by ensuring sustainable scientific and technological development of the nation, mathematics educators have suggested various ways of improving the teaching and learning of algebra. Some of these researchers include Udeinya and Okabiach (2007) and Ekoya (2010). For example Johnson and Johnson in Anyor (2011) suggested cooperative and individualistic learning; Ogunyemi, (2012), algebra modeling. A comprehensive introduction Prentice Hall, Ibadan University Press in Popoola and Olarewaju (2010) suggested problem solving model as effective teaching and learning strategies. Odili in Smith (2014) stated that for mathematics students to perform well, he/she must be guided by psychological characteristics of how human beings learn.

These characteristics include cooperative attitudes, interest, hard work and commitment autonomous learning or independence and problem solving for students achievement.. Since the current paradigm shift is moving from teacher to learner-centered strategies, the above characteristics should guide the choice of teaching approach that will make success in algebra reach all students in Nigerian schools. Other researchers also noted that it is not certain whether mathematics teachers use effective teaching materials and instructional aids in the teaching of algebra in secondary schools.It is noted however that audio-visual aids may inspire students to exert maximal efforts toward achieving their goals (Egbo, Checko and Nwoke, 2011). This is because students learn more if they are engaged in significant and appealing activities (Joash, 2014). Regular instruction plus audio-visual aids resulted in more factual learning than those without audio-visual aids in mathematics (algebra) in secondary schools (Ogunyemi, 2012). Ogunyemi further stated that it is also noted that mathematics teachers who made use of appropriate instructional materials obtained higher mathematics scores.Instructional tools and materials are of immense importance to algebra achievement. The issue of motivation of students in the learning of algebra using tools like Geogebra software, Laser Scan and Maple Sketch pad has dominated many researchers. For instance, Abimbode (2017) opined that instructional tools like geogebra and Maple sketch pad in teaching and learning of algebra promotes and sustains student's interest and helps the students to discover themselves and their abilities, and thus suggest the maple sketchpad for the teaching and learning of algebra.

Maple sketch pad is a mathematics and research software that combines powerful mathematics engine with an interface that makes it extremely easy to analyze, explore, visualize and solve mathematical (algebra) problems (Joash, 2014). Maple sketch pad is mathematical software that can function as an enhanced calculator, a programming language or as a tool to produce diagrams and graphs. Maple sketchpad is designed to release the students from routine

work to allow them to focus on the essence of the student material at the moment consider more task to facilitate the understanding of algebra by other method of presentation. Maple sketchpad can facilitate the mathematical environment as it helps to relieve boredom and establish a friendly atmosphere which allows for growth of skills and knowledge (Joash, 2014). Many countries especially in West Africa have expended a lot of resources in the purchase of maple sketchpad for the teaching and learning of algebra. With maple sketchpad, students may be provided opportunities to see the algebra they have programmed in the sketchpad immediately and rapidly during instruction which will allow them to make immediate judgment and provide convincing argument about the validity of results in algebra for achievement and retention (Smith, 2014). With Maple sketchpad, students will find algebra as fun and interesting and teachers will find it easy to teach for students to achieve and retain. The pad allows students to manipulate objects and provides a visual model of conjectures or tests facilitating a search for pattern or generalization (Drier, 2010). Maple sketchpad in the teaching and learning of algebra will help to eliminate the major sources of frustration by students who do poorly because the subject requires a great deal of memorization regarding logical steps, sequences and number orders, those with bad memories often find themselves a loss when it comes to completing even the simplest algebra function.

Maple sketchpad is important in the teaching of algebra to secondary schools students and it helps both boys and girls who have phobia for algebra. Educators and researchers vary in their opinions as to whether gender affects students' achievement in secondary school mathematics (Algebra), or not. Gender is a cultural construct that distinguishes the roles, behaviours, mental and emotional characteristics between male and female developed by a society (Udousoro, 2011). Umoh (2003) defined gender as psychological term used in describing behaviours and attributes expected of individual. According to Nneji (2012), gender issues in sciences generally and mathematics in particular is indeed very vital. This becomes more obvious in societies such as ours where science is erroneously viewed as masculine and arts subject viewed as feminine. Abiam and Odok (2006) found no significant relationship between gender and teaching method on students' achievement in number and numeration, algebraic processes and statistics. Albert (2015) found that female students achieved higher than their male counterparts in mathematics. In view of these contradicting results, this study investigated the effect of Maple Sketchpad software package on secondary school students' achievement in algebra. This study seeks to find which of the gender male of female benefitted more than the other in achievement and retention.

Purpose of the Study

The purpose of this study was to investigate the effect of maple sketchpad software on secondary school students' achievement in algebra in Enugu Education Zone of Enugu State.

Research Questions

The following research questions guided the study:

i. What are the mean algebra achievement scores of students in the experimental and control groups?

ii. What are the mean algebra achievement scores of male and female students in the experimental group?

Research Hypotheses

The following null hypotheses guided the study and they were tested at 0.05 level of significance.

I. H_{O1}: There is no significant difference between the mean algebra achievement scores of students in the experimental and control groups.

II. H_{O3}: There is no significant difference between the mean algebra achievement scores of male and female students in the experimental group.

Methodology

This study adopted a quasi-experimental research design. Quasi experimental design specifically pretest-posttest non-equivalent control design was utilized. Nworgu (2015) defined quasi-experimental research design as one which 'random assignment of subjects to experiment and control groups is not possible. The choice of the design according to Nwogbo (2007) is because there was no randomization of research subject into groups. This was to avoid disorganization of the school arrangement. Thus intact classes were used for the study. However, the intact classes were randomly assigned to either experimental or control groups. According to Nworgu in Okoro (2015), an essential and indispensable feature of quasi experimental design is the use of control group. He opined that a control group is one to which experimental treatment was not administered. A control group therefore usually provides the baseline against which to compare the effect of the experimental treatment on the experimental group. Expository method was used on the control group because it is traditional method used in all schools.

The teaching was for six (4) weeks. Each week had one contact period of 40 minutes duration. At the start of the experiment, all the students in the experimental groups were exposed to instructional technology. During subsequent meetings with the students, the teacher also used instructional technology to teach them and each student was given a copy of the question stem, and the teacher encourages the students to write down questions relating to what they have been previously taught. For example, the topic is Algebraic Fraction (Algebraic process). Thus the use of Instructional technology can be used to teach.

Simplify $\dfrac{2}{x-1} = \dfrac{3}{x-2}$

Throughout the lesson for the experimental group questions were posed by the teacher at appropriate times (usually after sufficient content had been presented) for the students to consider. Later, the students also tried to answer the question by themselves. The students tried to solve some questions using Instructional technology devices which were used in the class to

teach them. The repeated practice of making weekly tutorial reflections using some instructional technology devices in mathematics is expected to help students gain a sense of mastery in their learning. Students in the control group did not receive any instruction with instructional technology devices. At the end of four weeks, all the students was be tested on achievement test will be given two weeks after termination of treatment. The materials for teaching the students were the questions. The experiment group students were told that the use of instructional technology (Maple Sketch pad) and asking question is a way of managing and checking their achievement and that monitoring their learning would make them perform better in mathematics. The practice question sample or the generic question stem adopted from some questions in WABD Essential Mathematics for Senior Secondary School II and WAEC questions and modified by the researcher were distributed to all the students in the experimental group at the start of their lesson using instructional technology device.

The teachers lead the students on how to solve the questions by using the instructional technology devices to solve specific content related questions using some of the questions stems several times throughout the lesson each week. The teachers lead the students to solve algebraic questions using different sets of instructional technology and write out the answers as well. At the beginning of each week's lesson, students practice and discuss their answers with members of their small group. These mathematical questions form the basis of the renew of content proceeding each week's lesson by the teacher. The instrument for data collection was Algebraic Achievement Test (AAT). The AAT was adapted from the West African Examination Council (WAEC) past question papers and the items covered the content (algebraic process to be taught based on the period of task coverage). Initially, AAT was made up of 50 multiple choice questions with four options each (A, B, C and D). The instrument was divided into two sections. Section "A" of the achievement test elicited personal information from the students while section "B" was based on the questions on algebra. The AAT was administered as the pretest and the items were rearranged and then re-administered to the students as posttest after the treatment. The achievement test in algebra with the marking scheme, were given to three experts in the for face and content validation. Two of the experts were from Mathematics Education and one expert was in Measurement and Evaluation.

The reliability of the instrument (AAT) was established through a pilot study on 42 SS 2 students of new Estate Boys Secondary School, Maryland. The researcher computed the internal consistency of the instrument (AAT) using Kuder-Richardson formula (20). The choice of K-R (20) is influence by the fact that it is best used on multiple choice questions with right or wrong answer (Peters, 2016). The reliability coefficient obtained for AAT is 0.73.

Experimental Procedure

The treatment was conducted in the school classroom at the normal mathematics period. The treatment and testing was done by their regular class teachers. The pretest was administered before the experimental treatment. The posttest was given immediately after the treatment. The researcher organized one week training programme for the teachers that trained the students at about one week before the commencement of the actual teaching of the students. The teachers

were involved in the study, that is, both control group and experimental group. Teachers were told to teach the same algebraic contents during the period.

Results

Research Question 1: What are the mean algebra achievement scores of students in the experimental and control groups?

Table 1: Mean Algebra Achievement Scores and Standard Deviations of students in the experimental and control groups in both Pre-test and Post-test

Groups	Number	Pre-test		Post-test	
		Mean ($\bar{x}$)	Standard Deviation (s)	Mean ($\bar{x}$)	Standard Deviation (s)
Experimental	174	26.24	4.88	38.37	5.91
Control	148	25.92	4.68	34.84	5.61

Data on Table 1 show that at pre-test, the achievement mean score for experimental group was 26.24 with a corresponding standard deviation of 4.88. After post-test, it was observed that for the experimental group, mean achievement score was 38.37. For the control group, at pre-test, the achievement mean score was 25.92 with a corresponding standard deviation of 4.68. After post-test, it was observed that for the control group, mean achievement score was 34.84. However, the standard deviation scores of the students in the Post test for the experimental group was 5.91 while for the control group it was 5.61, indicating that the students individual scores were more clustered around the mean with expository method than with the Maple Sketchpad. This implies that students in the experimental group achieved higher than those in the control group considering their higher mean achievement scores at posttest.

Research Question 2: What are the mean algebra achievement scores of male and female students in the experimental group?

Table 2: Mean Algebra Achievement Scores and Standard Deviations of male and female students in the experimental group

Groups	N	Pre-test		Post-test	
		($\bar{x}$)	(s)	($\bar{x}$)	(s)

Experimental (Male)	73	26.45	4.77	39.55	6.02
Experimental (Female)	101	26.09	4.97	38.25	5.31

Data on Table 2 revealed that at pre-test, the mean achievement score for male students was 26.45 with a corresponding standard deviation of 4.77. Also, the female students mean score at pre-test was 26.09 and a standard deviation of 4.97 respectively. After post-test, it was observed that the male students' mean achievement score was 39.55 with a standard deviation of 6.02 respectively. For the female students at post-test, their mean achievement score was 38.25 with a corresponding standard deviation of 5.31 respectively. Similarly, the standard deviations for the male and female students after post-test are 6.02 and 5.31, indicating that the individual scores of the female students are more clustered around the mean than those of their male counterparts that had more extreme scores. This implied that the male students in the experimental group achieved higher than their female counterparts considering their higher mean achievement score at post-test.

Hypotheses

H$_{O1}$: There is no significant difference between the mean algebra achievement scores of students in the experimental and control groups.

Table 3:ANCOVA on the mean achievement scores of students in experimental and control groups

Tests of Between-Subjects Effects

Dependent Variable: ACHIEVEMENT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	999.798[a]	1	999.798	30.249	.000
Intercept	428659.574	1	428659.574	12969.019	.000
GROUP	999.798	1	999.798	30.249	.000
Error	10576.826	320	33.053		
Total	446421.000	322			
Corrected Total	11576.624	321			

a. R Squared = .086 (Adjusted R Squared = .084)

Table 3 shows that the calculated F-value for the effect of treatment (method) on students' achievement in AAT is 30.249 significant at .000 level of significance, which is less than 0.05 set for the study. The null hypothesis is therefore rejected. This means that a significant difference exists in the mean achievement scores of mathematics students taught with maple sketchpad and those taught with expository method.

H$_{O2}$: There is no significant difference between the mean algebra retention scores of students in the experimental and control groups.

Table 4: ANCOVA on the mean achievement scores of male and female students in experimental group

Tests of Between-Subjects Effects

Dependent Variable: ACHIEVEMENT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.824[a]	1	3.824	.121	.728
Intercept	249899.962	1	249899.962	7914.497	.000
GENDER	3.824	1	3.824	.121	.728
Error	5430.894	172	31.575		
Total	261655.000	174			
Corrected Total	5434.718	173			

a. R Squared = .001 (Adjusted R Squared = -.005)

Table 4 shows that the calculated F-value for the effect of treatment (method) on gender in AAT is .121 significant at .728 level of significance, which is more than 0.05 set for the study. The null hypothesis is therefore not rejected. This means that a significant difference does not exist in the mean achievement scores of mathematics male and female students taught with maple sketchpad.

H_{O4}: There is no significant difference between the mean algebra achievement scores of male and female students in the experimental group.

Discussion

The discussion is presented under the following captions:

The findings of the study revealed that students in the experimental group achieved higher than those in the control group considering their higher mean achievement scores at posttest. Also, the students' individual scores were more clustered around the mean with expository method than with the Maple Sketchpad. The use of maple sketchpad in the classroom as a teaching method has a significant effect on student' achievement in the subject. The hypothesis revealed that there was a significant difference between the mean achievement scores of students in experimental group and those in control group. There was a difference between the post–test and pre-test scores for experimental and control groups respectively. This finding tends to suggest that the students trained in the use maple sketchpad as an instrumental technology did better than their counterparts. The summary of the result in table 1 reveal effect of maple sketchpad software on students in respect to experimental group achieved higher than those in the control group considering their higher mean achievement scores at posttest. Similarly in

table 2 the male students in the experimental group achieved higher than their female counterparts considering their higher mean achievement score at post-test. Jucas (2012); Ruddak (2021) and Olaniyi (2015) sufficiently emphasized the fact that students learn more if they are engaged in significant and appealing activities. Therefore, the teachers should be encouraged to use maple sketchpad in the classrooms for teaching Algebra and other topics alike.

Recommendations

Based on the result of the study, the following recommendations were made.

1. Since this study has established the imperativeness of maple sketchpad in enhancing achievement and retention in algebra among student, the use of instructional technology should be incorporated in Nigerian school curriculum by the government.

2. Seminars and workshops should be organized by educator's federal and state ministries of education and related professional association and agencies who are charged of education, especially at the secondary level, to enable serving teachers to familiarize themselves with the use of maple sketchpad. Presently, many of the serving teachers are not familiar with this instructional technology.

3. Government and other professional associations should sponsor further research on the use of maple sketchpad in the teaching and learning on other subject area like physics, chemistry, biology among others.

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EFFECT OF AUDIO ANIMATION INSTRUCTIONAL MEDIA ON MIDDLE BASIC EDUCATION PUPILS' ACHIEVEMENT IN LITERACY IN AGBANI EDUCATION ZONE

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Abstract

The purpose of this study was to investigate the Effect of Audio Animation Instructional Media on Middle Basic Education Pupils' Achievement in Literacy with particular reference on literacy. Quasi experimental research design was adopted in the study. Two research questions and three hypotheses guided the study. Area of the study was Agbani Education Zone of Enugu State. A sample of 485 Middle Basic II Pupils was used for the study. Purposive, cluster and simple random sampling techniques were used to draw the sample. Instrument used for data collection was Literacy Achievement Test (LAT). The instrument was constructed by the researcher and validated by three research experts. A reliability coefficient (Kendall's coefficient of concordance) of .75 was obtained for LAT. Experimental group was taught the selected literacy topics using Audio Animation Instructional Media while the control group was taught the same topics using charts. LAT was used to obtain the pupils' achievement scores at pretest and posttest levels. Mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 significance level.Major findings of the study showed that Middle Basic Education pupils achieve higher in literacy when taught with Audio Animation Instructional Media than when taught with charts. Consequently, it was recommended in this study that use of Audio Animation Instructional Media for teaching literacy at Middle Basic Education level should be adopted by all public and private schools in Enugu State and beyond.

Introduction

Literacy at middle basic education level, according to Akpan (2014) is the ability to read, write, handle information, express ideas and opinions, make decisions and solve problems in literacy. This was the focus of this study. George (2016) averred that teaching literacy to middle basic education pupils involves equipping them to communicate clearly and effectively and form the foundation for progress in the educational system. George further alleged that pupils that can't read effectively fail to grasp important concepts, score poorly on tests and ultimately, fail to meet educational milestones. Literacy skills allow pupils to seek out information, explore subjects in-depth and gain a deeper understanding of the world around them. Natshi (2016) observed that, when middle basic education pupils cannot read and write well, they may likely become discouraged and frustrated in school, resulting in increase school dropouts, poor

performance on standardized tests, increased truancy and other negative reactions. All of these can have major and long-lasting repercussions. Ajom (2019) submitted that through innovative strategies, the teacher can contribute meaningfully towards helping literacy learners to be active in class, get engaged and develop such interest that can improve their achievement in literacy. This is why it is so important to think about the strategies of teaching literacy skills in classroom to increase the pupils' achievement.

A major cause of middle basic education pupils' low achievement in literacy according to Olugu (2019) is teachers' non-use of appropriate instructional media for demonstrations and illustration of literacy concepts. Olugu defined Instructional media as the aggregate of all the materials and physical means on instructor (teacher) might use to implement instruction and facilitate learners' achievement of instructional objectives. Olugu listed Instructional media as the black board, the white board, audio and video conferencing, speaking-listening media, visual and observational media, reading-writing media, computer-based instruction, models, classroom technology, charts etc. Ramsey (2020) corroborated Olugu's views and found that the most common instructional media in use by teachers in middle basic education classes are charts. Ramsey described a chart as a graphical representation of data visualization, in which data are represented by symbols, such as bars in a bar chart, lines in a line chart, slices in a pie chart or pictures in a pictograph. Nuhu (2015) submitted that a chart is a sheet (of paper) or a cardboard on which diagrams or lists of figures that show information are presented. Use of chart may improve the understanding of a topic.

Leaner's tend to have a better understanding of topics taught with the use of charts as it's outcome steers them in the face, bringing to life their imaginations and clearing all doubts and misconception, (George, 2016). The visibility of teaching may be achieved through the use of charts consequently making teaching and learning process more interesting and understandable. With easy comprehension, retention and understanding of topics through the use of charts in teaching and learning process, it is expected to lead to an improved academic achievement and interest. However, research findings have shown conflicting results on the effect of use of charts on middle basic pupils' achievement and interest in literacy. While Baraje (2015), Buckie (2016) and Kennedy (2019) found charts to have increased pupils' Achievement and interest in literacy, Julius (2015), Natshi (2016), Agada (2018) and Nnamani (2018) found the contrary. Hence, justifying more investigations such as done in this study.

Interestingly, Ramsey (2020) recommended that literacy teachers should use instructional media that are in tune with contemporary technological development to improve pupils' achievement in vital topics such as literacy. No doubt, there is no instructional media that is in tune with contemporary technological development which are not Computer Based.The term "computer" will undoubtedly suggest a machine used for computations, that is, mathematical calculations. This is certainly one of the functions of a computer, but to think of computers only as rather powerful calculating machines would seriously under- estimate the

range of their possible applications. In addition to mathematical computations, computers today handle many tasks that involve little or no mathematical computations, and it is better to think of them as machines which handle information in logical ways. This fact about computer may have led to the various definitions of the term computer. For instance, Osaka (2017) defined computer as an electronic device which is capable of receiving information (data) and performing a sequence of logical operations in accordance with a predetermined but variable set of procedural instructions (program) to produce a result in the form of information or signals. Ezeliora (2017) described computer as an electronic machine which is capable of receiving, storing, recalling or retrieving information put in it.

Still on definitions of computer, Olinya (2018) defined computer as a device for storing large amount of information called data, and processing these data in specified ways in very short period of time. This implies that, computer is a machine specifically designed for the manipulation of coded information; an automatic electronic machine for performing simple and complex operation far beyond the capacities of man. Computer in its various forms has become an essential part of the learning process. Use of computer in education was broadly categorized into two by Buckie (2016) as; class use of computers and supportive use of computers. Class use of computers include computer as tool for presentation, encouraging pupils to train skills and instructing pupils on the possibilities of computers, while supportive use of computers include administration, preparing work sheet for the pupils, looking for information on the internet for lesson preparation. This study was based on class use of computers.

Computer in Education and computer through Education were differentiated by Onah (2019) as follows; computer in Education is about the use of computer or Information and Communication Technology (ICT) to facilitate education. This involves the application of computer into teaching and learning, from planning through implementation and up to the point of achieving learning objectives. Computer or ICT Education refers to computer or ICT as a subject of study. This requires proper planning for designing and implementing the curriculum that will have a broader perception of computer from the foundation to all levels of learners. Computer through Education refers to computer knowledge and skills acquired through education or acquiring computer knowledge and skills through the learning of other subjects. This work was based on computer in Education as described above. Specifically, the focus of this work was the use of computer-based audio animation as instructional media in the classroom.

Animation refers to the art of making inanimate objects appear to move. According to Kim, Jex and Mogul (2016), animation is the rapid display of a sequence of images of two-dimensional (2-D) or three-dimensional (3-D) artwork or model positions to create an illusion of movement. The effect is an optical illusion of motion due to the phenomenon of persistence of vision and can be created and demonstrated in several ways. Computer animation therefore involves generating animated images by using computer graphics. Stone (2017) added that computer animation is essentially a digital successor to the stop motion techniques used in traditional animation with 3-D models, and frame-by-frame animation of 2-D illustrations.

Audio animations are animations with audible sounds. Stone classified audio animations into two namely; programmed audio animations and repetitive audio animations.

Programmed audio animations refer to animations already programmed to read aloud or say what has been recorded as directed by the user. Repetitive audio animations are those programmed to repeat or echo whatever the user says, (Stone, 2017). Stone observed that repetitive audio animations are more suitable for classes within the first six years of basic education. Based on this, repetitive audio animation was used in this study. As an instructional media, the repetitive audio animation will assist the literacy teacher inculcate into the learners good hearing skills, pronunciation skills, reading skills and by extension good writing skills. Unfortunately, research evidence such as Derbuck (2014), Buckie (2016) and Kennedy (2019) reported that audio animation instructional media distracted middle basic pupils taught literacy. Conversely, Julius (2015), Wale (2016), Natshi (2016) and Ferdinand (2017) reported that audio animation instructional media enhanced middle basic pupils' achievement in literacy.

Still on conflicting findings, AL-Amin (2017) and Dante (2019) found that middle basic pupils taught literacy with audio animation and those taught with charts did not differ significantly in their achievement in literacy. These are just but few of the very many contradictory findings of researches on the effect of audio animation instructional media on pupils' achievement in literacy. Thus, this study is timely as it sought to bridge this gap thereby contributing to improve achievement of middle basic pupils in literacy.

Purpose of the Study

The purpose of this study was to investigate the Effect of Audio Animation Instructional Media on Middle Basic Education Pupils' Achievement in Literacy. Specifically, the study sought to:

  i. determine the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in Agbani Education Zone as measured with Literacy Achievement Test?

  ii. determine the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in public and private schools within Agbani Education Zone as measured with Literacy Achievement Test?

Research Questions

The following research questions guided the study

  1. What are the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in Agbani Education Zone as measured with Literacy Achievement Test?

  2. What are the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in public and private schools within Agbani Education Zone as measured with Literacy Achievement Test?

Hypotheses

The following hypotheses were tested at 0.05 level of significance;

1. There is no significant difference between the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in Agbani Education Zone as measured with Literacy Achievement Test.

2. There is no significant difference between the literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in public and private schools within Agbani Education Zone as measured with Literacy Achievement Test.

3. There is no significant interaction between the use of instructional media and school type on Middle Basic II pupils' achievement in English language.

Methodology

Quasi experimental research design was adopted in the study. Two research questions and three hypotheses guided the study. Area of the study was Agbani Education Zone of Enugu State. A sample of 485 Middle Basic II Pupils was used for the study. Purposive, cluster and simple random sampling techniques were used to draw the sample. Instrument used for data collection was Literacy Achievement Test (LAT). The instrument was constructed by the researcher and validated by three research experts. A reliability coefficient (Kendall's coefficient of concordance) of .75 was obtained for LAT. Experimental group was taught the selected literacy topics using Audio Animation Instructional Media while the control group was taught the same topics using charts. LAT was used to obtain the pupils' achievement scores at pretest and posttest levels. Mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 significance level.

Results

Research Question 1

What are the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in Agbani Education Zone as measured with Literacy Achievement Test?

Table 1: mean achievement scores and standard deviation of experimental and control groups in pretest and posttest.

Group	N	Pretest		Posttest	
		Mean	SD	Mean	SD

Experimental	249	35.54	4.11	76.23	0.57
Control	236	36.05	4.09	50.16	1.33

From table 1, the pretest mean achievement score and standard deviation of the experimental group were 35.54 and 4.11 respectively while the posttest scores were 76.23 and 0.57 for mean achievement score and standard deviation respectively. For the control group, the pretest mean achievement score and standard deviation were 36.05 and 4.09 respectively while the posttest were 50.16 and 1.33 for mean achievement score and standard deviation respectively. There was very little difference (0.51) between the two groups in the pretest but there was an appreciable difference (26.07) in the posttest. The experimental group exhibited higher achievement than their counterparts in the control group. The standard deviation values of both groups in pretest did not differ much however, the experimental group had lower standard deviation value than the control group in posttest, indicating that the mean achievement score for experimental group was more reliable.

Research Question 2
What are the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in public and private schools within Agbani Education Zone as measured with Literacy Achievement Test?

Table 2: mean achievement scores and standard deviation of public and private schools' students in pretest and posttest.

Group	n	Pretest		Posttest	
		Mean	SD	Mean	SD
Public (Experimental)	129	35.21	4.04	76.11	0.52
Private (Experimental)	120	35.87	4.18	76.35	0.62
Public (Control)	133	36.02	4.06	50.12	1.33
Private (Control)	103	36.08	4.12	50.20	1.33

From table 2, above the pretest mean achievement score of the public (experimental) was 35.21 while that of private (experimental) was 35.87. Similarly, the pretest mean score of the public (control) was 36.02 while that of private (control) was 36.08. The posttest mean achievement score of the public (experimental) was 76.11 while that of private (experimental) was 76.35. The posttest mean score of the public (control) was 50.12 while that of private (control) was 50.20. These results suggest that both groups (experimental and control) improved in their achievements in literacy in both public and private schools. Based on school ownership (public and private), it seemed that the achievement did not differ much. Rather, the experimental group in both public and private schools showed higher achievement than their counterparts in the control group. The standard deviation values followed the same pattern. The standard deviation

values for pretest were greater than those of posttest. In pretest, the standard deviation values did not differ much, however, in the posttest, the standard deviation values differed much based on groups (experimental and control) in favor of the experimental group which had lower standard deviation value. Based on school type (public and private) the standard deviation values did not differ much.

Hypothesis 1

There is no significant difference between the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in Agbani Education Zone as measured with Literacy Achievement Test.

Hypothesis 2

There is no significant difference between the literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterpart taught using charts in public and private schools within Agbani Education Zone as measured with Literacy Achievement Test.

Hypothesis 3

There is no significant interaction between the use of instructional media and school type on Middle Basic II pupils' achievement in Literacy.

Table 3: ANCOVA analyses of the pupils' achievement scores

Source	Type III sum of squares	DF	Mean Square	F	Sig.	Decision

Corrected Model	2011.291	3	670.430	4.623	.000	
Intercept	3018.297	1	3018.297	20.815	.000	
Instructional media	910.104	1	910.104	6.276	.000	Significant (Reject Hypothesis)
School type	880.691	1	880.691	6.074	1.171	Not Significant (Do not Reject Hypothesis)
Instructional media*School type	470.701	1	470.701	3.246	2.161	Not Significant (Do not Reject Hypothesis)
Error	69311.687	478	145.003			
Total	76602.771	485				

Table 3, shows ANCOVA analyses of the pupils'achievement scores. For Instructional media, the f-calculated value of 6.276 is significant at .000 significant level which is less than 0.05 level set for this study. Hence, instructional media had significant effect in the study. Consequently, hypothesis 1 is rejected as stated because there was significant difference between the mean literacy achievement scores of Middle Basic II pupils taught using audio animation instructional media and their counterparts taught using charts in Agbani Education zone as measured with Literacy Achievement Test. The pupils taught literacy with audio animation instructional media achieved higher than those taught the same topics with charts. For School type (public/private), the f-calculated value of 6.074 is significant at 1.171 significant level which is higher than 0.05 level set for this study. Thus, school type had no significant effect on pupils' achievement scores in this study. As a result of this, hypothesis 2 is not rejected as stated because there was no significant difference between the literacy achievement scores of Middle Basic II pupils' taught using audio animation instructional media and their counterpart taught using charts in public and private schools within Agbani Education zone as measured with Literacy Achievement Test. Simply put, school type (public and private) did not influence the achievement of the pupils when taught literacy with audio animation instructional media and when taught with charts. For interaction effect, (Instructional media*School type), the f-calculated value of 3.246 is significant at 2.161 which is higher than 0.05 level of significance set for this research. Thus, interaction effect is not significant that is no significant interaction between the use of instructional media and school type on Middle Basic II pupils' achievement in literacy. Hypothesis 3 is therefore not rejected as stated.

Summary of Findings
From the results presented above, findings of this study were summarized as follows;
1. Middle Basic Education pupils taught literacy with audio animation instructional media (experimental group) achieved higher in literacy than their counterparts taught same topics using charts (control group).
2. Middle Basic Education pupils in public and private schools achieved equally in literacy when taught with audio animation instructional media and when taught with charts.

3. There was no significant interaction between instructional media and school type on pupils' mean literacy achievement scores in the study.

Discussion of Findings

It was found in this study that Middle Basic Education pupils taught English language (literacy in particular) with audio animation instructional media (experimental group) achieved higher in literacy than their counterparts taught same topics using charts (control group). This finding agrees with the findings of Nnamani (2018), George (2016), Julius (2015) and Oluremi (2014) who in their separate studies found that audio animation instructional media enhanced basic education pupils' achievement in English language, particularly, literacy. Contrarily, the finding of this study in this regard disagrees with the findings of Kennedy (2019), Olayinka (2015) and Baraje (2015). Kennedy, Olayinka and Baraje in separate studies reported that audio animation instructional media inhibited basic education pupils' achievement by causing them some undesired distractions. Achievement, particularly academic achievement, is a major factor in the teaching and learning process. It is a result oriented construct.

At Basic Education level academic achievement shows the gain in knowledge of the pupils as a result of taking part in a learning activity or a programme. It shows the pupils' learning, that is, the changes in their behavioral repertoire, rather than just a change in behaviour. Use of instructional media has been implicated by researchers such as Hassan (2014), Julius (2015) and Justice (2017) as a major predictor of Basic Education pupils' achievement generally in literacy precisely. It is therefore interesting finding in this study that audio animation instructional media enhanced the pupils' achievement in literacy. Instructional media according to Ferdinand (2017) refers to materials that aid teaching and learning. These materials are of different kinds, modes and occur in different forms. In this computer age, these materials are seen in both hardware and softwares. Some of them combine different features while others are made of a specific feature. Audio animation instructional media use in this study combine both auditory and enticing visual features.

The findings of this study on effect of Audio Animation Instructional Media on Middle Basic Education Pupil's achievement in literacy have shown that conflicting findings made by researchers whose works were reviewed in this study may have resulted from researcher's competencies in manipulating the instructional media, control of extraneous variables or ability to determine which media to use for each topic. Also important is use of appropriate statistical tools, validity and reliability of the research instrument as well as conveniency of the learning environments. Consequently, the findings made in this study can provoke a probe into experimental procedures adopted by researchers with a view to improving the process.

It was also found in this study that Middle Basic Education pupils in public and private schools achieved equally in literacy when taught with audio animation instructional media. That is to say that there existed no significant interaction between school type and instructional media on the pupils' achievement in literacy in this study. This finding agrees with the findings of Al-Amin (2017) and Dante (2019) who separately found that Basic Education pupils in public and

private schools achieved equally when taught literacy with Audio Animation Instructional Media. This suggest that Audio Animation Instructional Media do not discriminate in school type, rather the media are school type friendly. From the findings of this study which affirmed that Middle Basic Education pupils from public and private schools achieved, it is important for researchers to see the need to apply caution in the design of various Audio Animation Instructional Media so as to accommodate every learner irrespective of their school type (public/private). Similarly, teachers in both public and private schools have no excuse not to maximize the potentials of Audio Animation Instructional Media in promoting their pupils' achievement in literacy.

Recommendations

From the finding of this study, the following recommendations were made:

1. Nigerian teacher education curriculum should emphasize use of Audio Animation Instructional Media in microteaching and teaching practice exercises to avail literacy teachers (especially the Primary Education Studies (PES) students) more practical knowledge during their training.
2. Computer sets, projectors, Audio Animation Instructional Media software, electricity generating sets, impress for petrol or diesel and fortified security networks should be provided for all Basic Education schools.
3. All public and private schools should either employ a computer programmer or sponsor their computer teachers on a mandatory computer programming course to enable design computer based instructional media that would suit their peculiarities.

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APPRAISAL OF RELIABILITY OF CRS MULTIPLE-CHOICE TEST ITEMS ADMINISTERED BY ENUGU STATE MINISTRY OF EDUCATION FOR BASIC EDUCATION CERTIFICATE EXAMINATION (BECE)

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Abstract

The study was designed to appraise the reliability of State Basic Education Certificate Examination Christian Religious Studies multiple-choice questions in Enugu State. Two research questions and one hypothesis was formulated for the study. Descriptive survey research design was adopted for the study. The population for the study consisted of Upper Basic 9 CRS students in all 291 secondary schools in Enugu State, who registered for BECE in 2015 and 2018. Three secondary schools were sampled from the three Local Government Areas that made up Enugu Education Zone. BECE question papers were administered to 300 students from the three schools drawn from the Enugu Education Zone. BECE question paper was the instrument used for data collection.Kuder-Richardson 20 (K-R 20) and simple linear regression were used to answer the research questions. The reliability coefficient of the CRS BECE multiple-choice test was tested for significance at an alpha level of 0.05 using simple regression procedure. Some of the major findings of the study indicated a low reliability of the test instrument to a great extent, and low stability of the test items.

Key Terms: Reliability, CRS Multiple-Choice Test Items and Basic Education Certificate Examination (BECE)

Introduction

The Basic Education Certificate Examination (BECE) is a mandatory examination for students in the ninth year of their basic education class and third year of the Junior Secondary School. It is the examination that aims at qualifying students for admission into senior secondary and vocational schools. BECE consists of multiple-choice, essay questions, and Continuous (Internal) Assessment marks provided by the schools. BECE is conducted by the Examination

Development Centres (EDC) of every State Ministry of Education and the National Examination Council (NECO) for unity schools and allied institutions. State BECE which is the researcher's area of interest conducts the BECE for all public state secondary schools and approved private secondary schools in Nigeria. Enugu State Ministry of Education, like any other State Ministry of Education through the examination development centre is responsible for the development and construction of tests with regards to BECE.

A glanced through the Enugu State BECE CRS results summary from 2010 to 2019 showed that the percentage of passes were on the high side. In 2010, the number of students that passed were 30680 (86.77%) out of 35355 that sat for the examination. In 2011, 33120 (96.45%) out of 34339 passed. In 2012, 24349 (83.93%) out of 29009 passed the examination. In 2013, 34400 (90.52) out of 38000 passed the examination. In 2014, 31112 (98.45%) out of 31600 passed. In 2014, 15654 (74.87%) out of 20907 passed the examination. In 2016, 19654 (85.77%) out of 22914 passed the examination (Enugu State Ministry of Education BECE Course Performance Sheet, 2010, 2011, 2012, 2013, 2014, 2015, 2016). It means that the mean percentage pass within the years under study is 88.11%. Nevertheless, a cursory look at students' achievement at Senior Secondary School Examination (SSCE) depicted low performance in Christian Religious Studies (WAEC Chief Examiner's Report 2018 and 2019).

Considering the discrepancy noted above, the reliability of the instruments for the test may be in doubt, hence the need for appraisal of the test standardization. Test standardization, therefore, is a process of providing a test with basic psychometric properties. One aspect of psychometric property that concerns this study is reliability. A test is reliable when it yields consistent results on repeated observations. Reliability is the degree of repeatability or consistency of empirical measurement (Anigbo, 2014). The reliability of a test could be expressed as a coefficient called the *coefficient of reliability*. It is generally obtained by correlating two sets of scores independently got by the test in the form of equivalent forms, test re-test or split-halves (Anigbo, 2014). Reliability can be estimated using three different methods. These methods include measure of stability (test-retest reliability), measure of equivalence (parallel/alternative reliability), and measures of internal consistency which involves split half and Kuder-Richardson estimates (Ebuoh, 2004). In this research work, the researcher will use Kuder-Richardson (K-R 20) to measure internal consistency and test-retest for measure of stability.

In reliability, we want to know the measure of consistency and measure of stability. Stability means administering items to have stable response in opinion test. Test-retest is therefore used to know the measure of stability. Test-retest involves administering an evaluation instrument to the same group of test takers at two different times. The two set of scores obtained are then correlated to obtain an estimate of reliability coefficient (Anigbo, 2014). This study is interested in measuring the reliability of Christian Religious Studies multiple-choice questions of Enugu State BECE.Christian Religious Studies is one of the core subjects in both primary and junior secondary schools in Christian dominated states in Nigeria like Enugu State. It is one of the subjects through which students are assessed in BECE. CRS at the upper basic school level is meant to prepare learners for useful living through inculcation of Christian attitudes and

values, and to prepare learners for higher education. It should be noted that every subject taught in basic and senior secondary school has its unique value and importance to the whole education process.

The uniqueness of Christian Religious Studies begins from its twofold function of synchronized development of the intellectual ability and moral character of the students. It also emphasizes the affective domain of education taxonomy - the domain which many seem to be silent about or sometimes even neglected (Ntama, Owulu and Monity, 2016). Since skills in affective domain describe the way people react emotionally and their ability to feel the pain and joy of others (Anigbo, 2014). Christian Religious Studies is a subject that helps to streamline the thought, character, moral and aspiration of the students. It also offers hope for the future, integrate, discipline, harmonious and progressive society (Ntama, Owulu and Monity, 2016).

The researcher is yet to come across researches carried out on the analysis of psychometric properties of BECE Christian Religious Studies (CRS) multiple choice questions. It becomes necessary that a study of the analysis of psychometric properties of State BECE CRS test items be conducted to ascertain the level of its reliability. From the inquiries made, items are gathered from different schools within Enugu State, generated by teachers in their subject areas. These items are then evaluated and administered by the Education Development Center (EDC). It has also been alleged that items are sometimes collected from some other sources apart from the ones generated by the teachers. This study therefore tries to examine the reliability of the BECE test items administered by the EDC.

Statement of the Problem

Recognizing the place of CRS in general attitude and character molding of students, it is important to know if the instrument used for test at BECE yields consistent result in terms of reliability and stability. It is laudable to note that research reports depicted that students' achievement in the subject is on the high side. In the course of this investigation, the researcher through a glance of Enugu State BECE CRS results summary from 2010 to 2019 discovered that the percentages of passes were on the high side. But a look at the WAEC Chief Examiner's Report of 2018 and 2019 showed that students' achievement in CRS is low. It leaves one to wonder what the reliability of the BECE test instruments could be. If the higher achievement at BECE level is real, it should translate to higher achievement at WAEC level. Hence, one is left with option of doubt if the instrument at BECE level is truly reliable to have produced higher achievers. The problem is to find out if it is possible that the instrument at BECE level is truly valid and reliable to have produced high percentages of passes of candidates who took part in the examination.

Purpose of the Study

The purpose of the study is to appraise the reliability of CRS multiple-choice test items administered by Enugu State Ministry of Education for Basic Education Certificate Examination (BECE).

Specifically, the study was designed to determine:

1. the level of internal consistency of Enugu State Ministry of Education BECE CRS multiple-choice test items
2. the level of stability of Enugu State Ministry of Education BECE CRS multiple-choice test items

Research Question

The following research questions guided the study:

1. what is the internal consistency of CRS BECE multiple-choice items administered by the Enugu State Ministry of Education as measured with Kuder-Richardson 20 (K-R 20)?
2. What is the stability index of CRS multiple-choice items administered by the Enugu State Ministry of Education?

Hypotheses

The null hypothesis below was formulated to guide the study at 0.05 significant level:

Ho   The reliability coefficient of the CRS BECE multiple-choice test will not be statistically significant.

Methodology

The research design for the study was a descriptive survey research design aimed at analyzing the psychometric properties of CRS multiple-choice test items administered by Enugu State Ministry of Education for Basic Education Certificate Examination (BECE). Descriptive research design, according to Idoko (2011) is concerned with the collection, collation, analysis, and interpretation of data the way they are or exist from relevant sources with appropriate tools and methods and afterward, using the result of the interpretation to describe existing situations, events, characters, and so on.The area of study was Enugu State. The State has six education zones namely: Agbani, Awgu, Enugu, Nsukka, Obollo-Afor and Udi education zones. There are many secondary schools in each of these education zones. The study was delimited to Enugu education zone which is made up of three Local Government Areas: Enugu East, Enugu North and Isi Uzo. In these three Local Government Areas, there are 31 secondary schools managed by Enugu State Ministry of Education. The population of the study consisted of 55,244 Upper Basic 9 CRS students in all the 291 secondary schools in Enugu State. These were the students who registered for BECE in 2015 and 2018.The sample of the study consisted of BECE CRS multiple-choice items for 2 years. Simple Random sampling technique was used to draw the sample size out of the BECE CRS question papers from the year of establishment of the examination body. To obtain the years to be used, balloting by replacement was used to select the 2 years for the study. The schools were stratified into schools that sat for BECE. On the other hand, 3 schools were obtained through simple random sampling from the 31 State BECE schools from which 100 students were randomly selected from each of the schools. This yielded 300 students for the state BECE school population.

The instrument for data collection was BECE Christian Religious Studies multiple-choice question papers which had undergone standardization process before being administered to the examinees. The question paper contained 60 multiple-choice objective items with four options lettered A, B, C, and D for each item. There was one correct answer and three distracters.Validation of the question paper was not necessary because the instrument was already a standardized test for CRS BECE. Since the instrument was a BECE standardized question paper, there was no need to determine its initial reliability before commencing study. However, the level of internal consistency was measured using Kuder-Richardson formula 20 (K-R 20) after the administration of the test which is the essence of this study. The researcher administered the BECE CRS question paper to the sample with the help of two research assistants. The research assistants were assigned to two Local Government Areas while the researcher handled the third one. The answer scripts were scored. One mark was awarded for each correct answer and zero (0) for each wrong answer. Research question 1 was answered using K-R20 procedure while research question 2 was answered using the Pearson Product Moment correlation procedure. Hypothesis was tested using the t-test of significance of 'r' at an alpha level of 0.05.

Data Analysis, Results and Discussion

Research Question 1

What is the internal consistency of CRS BECE multiple-choice items administered by the Enugu State Ministry of Education as measured with Kuder-Richardson 20 (K-R 20)?

Table1: Summary of test of internal consistency of the CRS BECE multiple-choice items of the Enugu State Ministry of Education using KR-20 approach

Number of items	SDt	SDt^2	$\sum Pq$	K-R 20
60	9.42	88.74	14.4	0.85

The data presented in table 1 show the extent of internal consistency of CRS BECE multiple-choice items of the Enugu State Ministry of Education. As shown on Table1 the internal consistency index is 0.85. This indicates that the test has an appreciable level of internal consistency.

Research Question 2

What is the stability index of CRS multiple-choice items administered by the Enugu State Ministry of Education?

Table 2: stability index of CRS multiple-choice items of the Enugu State Ministry of Education

Computed r	r. Square	Adjusted r Square	Standard Error
0.06631	.00440	.00106	10.64514

The data presented in Table 2 show the extent of the stability of CRS BECE multiple-choice items of the Enugu State Ministry of Education. Correlations with two sets of scores were determined and an index of 0.06631 was obtained. This low stability index suggests that the CRS BECE multiple-choice items could have been influenced by some external variables.

Hypothesis

Reliability coefficient of the CRS BECE multiple-choice test will not be statistically significant.

Table 3: Test of significance of the stability of the CRS BECE multiple-choice test

Computed r	r. Square	Adjusted r Square	Standard Error	Beta	T	Sig. of t
0.06631	.00440	.00106	10.64514	.066305	1.147	0.2422

Table 3 above presents the analysis of the test of significance of the stability index of the CRS BECE multiple-choice items. As shown in the Table, the alpha level (0.05) is less than the significance of t (0.2422). Based on the decision rule the researcher upholds the null hypothesis and concludes that stability coefficient of the CRS BECE multiple-choice test is not statistically significant.

Discussion

The following constitute the summary of the major findings of the study:

1. The items of the CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has high level of internal consistency
2. The items of the CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has low stability index

CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has high internal consistency

From the responses of the items administered to research subjects, it shows the BECE CRS multiple-choice items to a great extent established the reliability of the items. This is because internal consistency index of 0.85 depicts a very high level of internal consistent. This indicates that the test has an appreciable level of internal consistency. The findings agree with Anigbo (2014) who opined that test items are reliable when they produce the same result on repeated observations.

CRS BECE multiple-choice items administered by the Enugu State Ministry of Education has low stability index

The stability index of BECE CRS multiple-choice test items which were subjected to test retest approach could have been influenced by external factors and therefore did not yield good result. The findings agree with De Souza, Alexandre, Guirardello (2017) who said that in

carrying out test retest the factors to be measured remains the same but random error can cause any change in the scores. The above finding was buttressed by hypothesis two which showed that the stability coefficient of the CRS BECE multiple-choice test was not statistically significant.

Based on the findings, the following recommendations were proffered:

1. To test the stability of items, Enugu State Ministry of Education through EDC can conduct pilot test or pretesting exercise to test the ability of the examinees before administering the test items.
2. The Enugu Ministry of Education through EDC should sometimes subject the test items to the test of internal consistency for a reliable result
3. Conferences, workshops, seminars and other in-service programmes should be regularly organized for test constructors.

Conclusion

The study centered on the appraisal of reliability of State Basic Education Certificate Examination Christian Religious Studies multiple-choice questions in Enugu State. Two research questions and one hypothesis was formulated for the study. Descriptive survey research design was adopted for the study. The population for the study consisted of Upper Basic 9 CRS students in all 291 secondary schools in Enugu State, who registered for BECE in 2015 and 2018. Three secondary schools were sampled from the three Local Government Areas that made up Enugu Education Zone.BECE question papers were administered to 300 students from the three schools drawn from the Enugu Education Zone. BECE question paper was the instrument used for data collection.

Kuder-Richardson 20 (K-R 20*)* and simple linear regression were used to answer the research questions. The reliability coefficient of the CRS BECE multiple-choice test was tested for significance at an alpha level of 0.05 using simple regression procedure. Some of the major findings of the study indicated a low reliability of the test instrument to a great extent, and low stability of the test items.

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BASIC SKILLS NEEDED BY COMPUTER EDUCATION GRADUATES FOR SUSTAINABLE EMPLOYMENT IN ENUGU STATE: AN IMPLICATION FOR COUNSELLING.

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Abstract

The main purpose of the study was to ascertain the skills needed by Computer Education graduates for sustainable employment in Enugu State. Two research questions were formulated and guided the study, while two hypotheses were tested. Survey research design was used for the study. The population for the study was 100 which comprised 20 lecturers and 80 final year students in Department of Computer Education in the Federal and State universities in Enugu State. No sampling was made. A 13-itemed Questionnaire was used as the instrument for data collection. The instrument was face-validated by two experts in Science and Computer Education and an expert in Measurement and Evaluation, in the Department of Science and Computer Education, Enugu State University of Science and Technology (ESUT). The reliability of the instrument was ascertained using Cronbach Alpha and an overall reliability index of 0.97 was obtained. The researcher administered the instrument by hand. The research questions were answered with mean and standard deviation while the hypotheses were tested with t-test at .05 level of significance. The Statistical Package for Social Sciences (SPSS) was used for all the analyses. The results of the analyses revealed among others, that all the items under modern communication skills, adaptability skills and creative skills were highly required by computer education graduates for sustainable employment in Enugu State. The null hypotheses tested showed no significant difference in the mean ratings of lecturers and students of computer education in both variables. Based on the findings, some implications were deducted and it was recommended among others, that lecturers should adopt the adaptability skills and creative skills in teaching the students for easy transition and acquisition of the skills amongst the

students, government and school administrator should promote the teaching of the identified skills to the students.

Keywords: Skills, Computer Education, Graduate, Sustainable Employment and Counselling.

Introduction

The Nigerian educational system over the years laid emphasis on production of school leavers with employable skills. The philosophy and goals of education in Nigeria as stated in the National Policy on Education (2013) include the acquisition of appropriate skills, abilities and competencies both mental and physical, as equipment for the individual to line in and contribute to the development of the society. For this, to be gainfully employed one must acquire basic and appropriate skills.Skill is the ability to perform a task to a predetermined level of competence. Oluyomi and Adedeji (2012) defined skills as; ability to perform a task to a predefined level of competence. They identified two categories of skills; transferable or generic skills which can be used across large numbers of different occupations, and vocational skills which are specific occupational or technical skills needed to work within an occupation or occupational group. They identified analytical, critical thinking, communication, entrepreneurial, decision making, interpersonal, problem solving, self-directed and numeracy skills as generic. On the other hand, vocational skills depend on the occupation or vocation concerned. There are so many opportunities for lecturers to learn and acquire new skills over the internet, keep up with credentials and in turn help them improve their teaching abilities in computer education.Computer education can be looked at, as a process of educating the people on how to use a computer to run programs of diverse application including business, industry and commerce (Okorie, 2011). Computer education is a system of skills acquisition in the use of computer to solve problems (Odoh, 2020). Here computer is seen as a subject organized to enable people to understand the functions, uses and limitations of computer and to provide an opportunity for the study of modern methods of information processing. It is an academic subject because it encourages an understanding of the studies implications. Computer education is one of the programmes offered in tertiary institutions in Nigeria, to train students in skills to be self-reliant. Computer Education graduates need skills to make them competent in the world for sustainable employment as well as increase productivity. To be occupationally competent in the labour market, graduates must acquire proficiency in some basic skills for sustainable employment.

Sustainable employment is a way of building resilience to cope with future shocks and enable future transitions and advancement at work. An employee's level of job sustenance shows how relevant the person has been on the job. The ability to sustain an employment depends on the efficiency and quality of the competency skills set possessed by the employee. Sustainable employment depends on an employee's ability to meet the hard, business and soft competences of the employer. Sustainable employment addresses incompetency and low skills, facilitates career transitions, achievement of inclusive growth, and helps overcome poverty and

unemployment to be sustained for an indefinite period of time.In early sixties, competition for employment was not as stiff as is today. Young graduates in most fields did not face this type of competition. This is because the demand for labour was higher than the supply. Consequently, companies visited universities with great offers for graduates willing to take up appointment in their companies. However, with increasing population of school leavers specifically graduates of higher institutions without corresponding increase in job opportunities, the reverse became the situation. Supply of labour both skilled and unskilled is now more than the demand. A lot of factors came into play under the new situation. Employers are no longer willing to pay high wages, hiring and firing, less worker motivation among others became the order of the day in most organizations.

The problem of education in Nigeria include among others, lack of qualified personnel, poor and or inadequate infrastructure, inappropriate school curriculum for skills development and poor personnel motivation (Okorie, 2011). These factors negatively affect the quality of learning outcomes and thus job prospects of graduates. One thing that baffles many authorities especially researchers in education, is that education is yet to realize its objective of equipping graduates with needed skills for gainful employment or sustainable employment. The apparent population of idle graduates tends to substantiate this assertion. It has been suggested that the quality of education that is received in schools is unable to equip students with the skills needed for sustainable employment (Agomuo, (2015). Technology is increasingly being introduced into many offices in Nigeria, thus introducing changes in the office operations. Technology cannot do anything without human for information to be timely, accurate, complete, available and usable in the desired format; greater attention should be focused on the people component of the system. The ability to convert business information into sound judgment distinctively requires human efforts. People, technology, procedures and space as components of a system which are inter related, interacting, and interdependent. Trained manpower is needed since the adequate use of advanced technology is highly dependent on the general education and culture of labour, there is growing connection between the intellectual skills of the people and the development potential of a country. Through technological advancement, the distance over which humans can communicate has become greater. Modern technology society is constantly expanding intellectual and economic capabilities for achievement of more satisfactory results. Oduma and Ile (2012) noted that employers now emphasize the need for employees who have personal social skills, together with any technical know-how which may be required.

Among the core workers, there is an expectation that they will be able to work in a rapidly changing environment, engaging in "rule making" rather than rule following behaviour, work in project teams and share the same personal chemistry as others in the organization (Akinson, 2016). To acquire skills there must be some form of training. This is because modern office requires a higher degree of ability and operating skills. The emphasis on skills acquisition is due to the high rate of unemployment among graduates, high rate of crimes due to untrained youths in modern society and challenging economy. Skill development can be accomplished through work experience or through education in school, workshop or laboratories. The major objective

of skills is to have a successful life in which sustainable employment has a major role to play.Okoye and Pollard (2019) noted that employability is about work and the performance ability to be employed. It also refers to a person's performance capability in securing and maintaining an employment. In Computer Education, employment depends not only on whether one is able to fulfill the paper requirements of specific goals. It also connotes how one practically stands relative to others within a group of job seekers. Gore (2015) noted that graduates employability depends on their performance assets in terms of the knowledge, skills and attitudes they possess, the way they can use and deploy those assets, the way they present them to employers and the context (e.g. personal circumstances and the labour market environment within which they seek for employment). Furrier and Sels (2013) also noted that employability is perceived at individual levels as continuously fulfilling, acquiring or creating of employment through the optimal use of performance competences or basic skills.

Skills or employability skills are those general skills and knowledge needed by person to be effective in obtaining, retaining and progressing in sustainable employment. Employability skills enable an individual to acquire and keep a job. Employers of labour are forced with too many job applications for very few jobs. Therefore, apart from good educational qualifications, employers need creative, flexible and visionary workers who possess a broad range of interpersonal and management skills (Nyanabo and AhuKannah, 2018). Samson (2019) viewed employability skills as those skills needed by an individual to get a job and progress on the job such as verbal communication, willingness and ability to work with others, how to prepare resume, how to complete an application form, how to conduct interview, willingness to follow directions, initiative and ability to learn new tasks. The job for which employers are hiring workers in this modern world requires workers to have a wider range of skills than ever before (Odoh, 2020). Odufuwa (2012) stated that since no nation can boast of better development without the aid of computer skills in her educational programme, calculated effort should be made for citizens to achieve technological breakthrough through skill acquisition. Odoh (2020) stated that the skills that employers now demand for, in addition to academic skills are; adaptability skills and creative skills.

Adaptability skill is about having the ability to change or be changed to fit altered circumstances. There is need for adaptability because of instances such as advancement in technology, remote work team, and innovative practice among others. The changing world which makes employers sought for graduates who can adapt to changing circumstances. Fitting into the circumstances as a result of advancement in technology requires a creative based skill.Creative skill is the kind of thinking that leads to new insights, novel approaches, fresh perspectives, and whole new ways of understanding and conceiving of things. The product of creative thought include some obvious things like, music, poetry, dance, literature, inventions and technical innovations.Most graduates are unemployed due to inability to possess these skills (Samson (2019) This unfortunate situation, accounts for the increases in crime rate in Nigeria, however when a graduate is well knowledgeable in one or two skills, this will place him or her at an advantage over other employees by either establishing a business or getting a job with the skills. There are instances where the employees fail or perform poorly in their tasks, because

they are not knowledgeable in some needed skills they ought to possess as an employee to cope in the changing office. In Nigeria, the situation is alarming. Statistics, according to National Planning Commissions Performance Monitoring Report on Government's Ministries Department and Agencies (MDA's) indicated unemployment rate in 2010 was 21% which rose to 23.9% in 2011. A National Baseline Youth Survey Report by National Bureau of Statistics (NBS, 2012) reveals that 54% of Nigerian Youths are unemployed out of a total population of 64 million comprising youths aged between 15 and 35years out of this, 51.9% are females compared to 48.1% males (National Bureau of Statistics, 2012). It is on this note that the researchers carried out this research work on basic skills needed of computer Education graduates for sustainable employment in Enugu State.

Statement of the Problem

The introduction of computers, internet, facsimile, word processing equipment and other information communication facilities has greatly affected the increased succession of hardware and software. It is noted in this regard that the Nigeria education system has failed to cope with the current trend and changes in equipping her graduates with the requisite skills needed for effective job performance virtually in all fields. The Educational system has continued to send out graduates whose performance ability in employment is in heavy doubt. Experiences have shown that employers of labour have continued to prove this by rejecting most graduate job applicants during recruitment. Specifically, the skill needs of most Nigeria graduates are relatively very high. Most graduates do not possess the requisite skills needed for effective performance in employment setting. In view of these, it follows then, that the employees in an organization have to move with the trend of the changing technology and be able to perform their duties and make meaningful contributions to the success of the organizational goals, as well as to stay on their job. This situation is therefore questioning the quality of training given to these students while they are in school. The researchers are worried that if this condition should be allowed to continue, the products of computer education graduate from universities in Enugu State might not be relevant in todays' employment environment that are characterized by automation. This would result to a situation where graduates of computer education programme would not perform well or meet the employers demand and therefore rendered unemployed. The problem of the study posed as a question is, what are the basic skills needed by computer education graduates for sustainable employment in Enugu State?

Purpose of the Study

The main purpose of this study is to ascertain the basic skills needed by Computer Education graduates for sustainable employment in Enugu State. Specifically, the study sought to:
1. explore the adaptability skills needed by computer education graduates for sustainable employment.
2. ascertain the creative skills needed by computer education graduates for sustainable employment.

Research Questions

The following research questions guided the study:

1. What are the adaptability skills needed by computer education graduates for sustainable employment?
2. What are creative skills needed by computer education graduates for sustainable employment?

Hypotheses

The following hypotheses were tested at.05 level of significance

Ho_1 There is no significant difference in the mean ratings of lecturers and students of computer education on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State.

Ho_2 There is no significant difference between the mean ratings of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State.

Method

Census survey research design was adopted for the study. This implies that the entire respondents were involved. It was considered appropriate for the study following the description of census survey by Nworgu (2015) as the type of survey research design in which the entire population for the study is used. The population for the study is 100 Lecturers and Students, comprising 25 and 55 computer education final year students (2018/2019) session and 6 and 14 lecturers from Enugu State University of Science and Technology (ESUT) and University of Nigeria Nsukka (UNN) respectively. This is based on the data obtained from a preliminary survey conducted by the researcher in the Computer Education departments of Federal and State universities in Enugu State. The population size was manageable hence there was no sampling.A 13-itemed questionnaire developed by the researcher was used for data collection. The questionnaire titled; Basic Skills needed by Computer Education Graduates for Sustainable Employment is of two parts. Part 1 which concerned the personal data of the respondents and part II that consists of the items that addressed research questions which was pertinent to the variables of the study. The 13 items of the questionnaire that guided the study were arranged in two clusters in line with the two research questions that guided the study. Specifically, Cluster A has 6 items on the adaptability skills while Cluster B has 7 items on the creative skills needed by computer education graduates for sustainable employment. The items were structured on four-point rating scale with the following response options: of Highly Required (HR), Averagely Required (AR), Required (R), Not Required (NR). The Instrument Was validated by three research experts; two from Mathematics and Computer Education Department and one other expert from the field of Measurement and Evaluation, all from the Faculty of Education, Enugu State University of Science and Technology (ESUT).

The reliability of the instrument was determined using Cronbach Alpha Reliability Coefficient, overall reliability coefficient was 0.97, indicating that the instrument was reliable for use in data collection. The questionnaire were administered and retrieved by the researchers with the help of one research assistant that was properly trained on the content of the questionnaire and its administration to ensure that the questionnaire was properly administered.100 copies of the questionnaire was administered to the total population, and was retrieved and used for analysis.Data collected with the questionnaire was analyzed using Mean(x) with Standard Deviation (SD) to answer each of the research questions. However, each of the two hypotheses was tested using t-test statistics at .05 level of significance. The analysis was computer based with the use of the Statistical Package for Social Sciences (SPSS) to analyze the respondents' ratings. The decision rule for the Mean(x) was based on the principle of Mean, **2.50**

gotten by $\frac{4+3+2+1}{4} = 2.50$

<2.50 rejected or ≥2.50 accepted; any item with a mean score less than **2.50** was considered not required and any item mean of **2.50** and above was considered required. The null hypotheses were rejected when the significant level was less than and were not rejected when the significant level was more than 0.05 level of significance.

Results

Research Question 1**:**What are the adaptability skills needed by computer education graduates for sustainable employment in Enugu State?

Table 1: Mean responses and standard deviation of the respondents on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State

N=100

S/N	The adaptability skill needed are:	HR	AR	R	NR	X	SD	DEC
1.	Embrace change in work and work environment even when there are some ambiguities	29	24	23	24	2.58	1.15	Required
2.	Acquire new knowledge, skill and processes	49	18	16	17	2.99	1.16	Required
3.	Maintain or shift focus on operational goals in response to changing organizational priorities	50	16	19	15	3.01	1.14	Required

S/N		HR	AR	R	NR	X	SD	DEC
4.	Respond quickly to unexpected events	54	15	15	16	3.07	1.16	Required
5.	Contribute to innovative solutions.	55	16	15	14	3.12	1.12	Required
6.	Think creatively	41	17	20	22	2.77	1.21	Required
	GRAND MEAN					**2.92**	**1.16**	

Table 1 above presents the results of data analyses for research question one. All the items (1 to 6) had mean responses that were higher than the cut-off point of 2.50. The grand mean (2.92) was also high. This implies that items 1 to 6 constituted the adaptability skills needed by computer education graduates for sustainable employment in Enugu State.

Research Question 2**:**What are the creative skills needed by computer education graduates for sustainable employment in Enugu State?

Table 2: Mean responses and standard deviation of the respondents on the creative skills needed by computer education graduates for sustainable employment in Enugu State

N=100

S/N	The creative skills needed are:	HR	AR	R	NR	X	SD	DEC
7.	Explore new and different ways of accomplishing a task and processes involved in the tasks.	78	11	8	3	3.64	.76	Required
8.	Apply emotional intelligence to recognize, validate, harness and progress at work	59	31	6	4	3.45	.78	Required
9.	Use creative thinking skills and techniques to innovate processes, project and tasks to implement change to facilitate improvements	57	32	6	5	3.41	.82	Required
10.	Identify and implement new ideas	79	12	5	4	3.66	.76	Required
11.	Break down a subject into pasts, detect multiple views, question evidence, hypothesize alternatives and come to sound conclusions	61	34	1	4	3.52	.72	Required
12.	Explore alternatives, challenges assumptions, and examines accuracy of beliefs	76	19	1	4	3.67	.61	Required

13.	Seek out ways to learn more about effectively introducing change in the workplace.	76	19	1	4	3.67	.61	Required
						3.57	**.72**	
	GRAND MEAN							

From Table 2 above, the mean of items 7 to 13 were higher than the cut-off point of 2.50. The value of the grand mean (3.57) was also high. This implies that the respondents agreed that all the items constituted the creative skills needed by computer education graduates for sustainable employment in Enugu State.

Hypotheses

Hypothesis 1**:**There is no significant difference between the mean ratings of lecturers and students of computer education on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State.

Table 3: t-test on the mean ratings of lecturers and students of computer education on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State.

STATUS	N	Mean	Std. Deviation	T	Df	Sig.	Dec.
LECTURERS	20	2.05	1.099	-2.362	98	.762	NS
STUDENTS	80	2.71	1.127				

Table 3 shows that the t value for the difference in mean rating of lecturers and students of computer education on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State is -2.362, significant at 0.762 level of significance, which is higher than 0.05 set for the study. The null hypothesis is therefore not rejected. This means that there is no significant difference in the mean ratings of lecturers and students of computer education on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State.

Hypothesis 2**:**There is no significant difference in the mean ratings of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State.

Table 4: t-test on the mean ratings of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State.

STATUS	N	Mean	Std. Deviation	T	Df	Sig.	Dec.
LECTURERS	20	3.65	.875	.066	98	.742	NS
STUDENTS	80	3.64	.733				

Table 4 shows that the t value for the difference in mean rating of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State is .066, significant at 0.742 level of significance, which is higher than 0.05 set for the study. The null hypothesis is therefore not rejected. This means that there is no significant difference in the mean ratings of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State.

Summary of Findings

The results of data analyses for the study revealed the following:

1. Respondents responses indicated that adaptability skills are required by computer education graduates for sustainable employment in Enugu State, which include inter alia, contribute to innovative solution, respond quickly to unexpected events among others. There is no significant difference in the mean ratings of lecturers and students of computer education on the adaptability skills needed by computer education graduates for sustainable employment in Enugu State.

2. Respondents responses indicated that creative skills are required by computer education graduates for sustainable employment in Enugu State, which include inter alia, explore alternatives, challenges assumptions, and examines accuracy of beliefs, use creative thinking skills and techniques to innovate processes, project and tasks to implement change to facilitate improvements, identify and implement new ideas, break down a subject into pasts, detect multiple views, question evidence, hypothesize alternatives and come to sound conclusions. There is no significant difference in the mean ratings of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State.

Discussion of Findings

The findings of this study were discussed in line with the research questions that guided the study and hypotheses tested.

Adaptability Skills Needed by Computer Education Graduates for Sustainable Employment

The results of the study with regards to research question one indicated that adaptability skills is highly required for sustainable employment of computer education graduates, the adaptability skills include; embrace change in work and work environment even when there are some ambiguities, acquire new knowledge, skill and processes, maintain or shift focus on operational goals in response to changing organizational priorities, respond quickly to

unexpected events, contribute to innovative solutions, and think creatively identified as the adaptability skills needed by computer education graduates for sustainable employment.   This finding agree with Gore (2015) which noted that graduates employability depends on their performance assets in terms of the knowledge, skills and attitudes they possess, the way they can use and deploy those assets, the way they present them to employers and the context (e.g. personal circumstances and the labour market environment within which they seek for employment). This implies that adaptability skills are highly needed by computer education graduates for sustainable employment in Enugu State.

The test of hypothesis on the adaptability skills needed by computer education graduates showed no significant difference in the mean ratings of lecturers and students of computer education graduates on adaptability skill needed for sustainable employment in Enugu State. The implication of this finding was that the status of the respondent has no significant influence on the ratings to the itemized adaptability skills highly needed for computer education graduates for sustainable employment.

Creative Skills Needed by Computer education Graduates for Sustainable Employment

The result of the data analysis in research question two showed that creative skills are needed by the graduates for sustainable employment. The creative skills include; explore new and different ways of accomplishing a task and processes involved in the tasks, apply emotional intelligence to recognize, validate, harness and progress at work, use creative thinking skills and techniques to innovate processes, project and tasks to implement change to facilitate improvements, identify and implement new ideas, Break down a subject into parts, detect multiple views, question evidence, hypothesize alternatives and come to sound conclusions, explore alternatives, challenges assumptions, and examine accuracy of beliefs, Seek out ways to learn more about effectively introducing change in the workplace. This finding is in consonance with Oduma and Ile (2012) which noted that employers now emphasize the need for employees who have personal social skills, together with any technical know-how which may be required. Therefore, the creative skills are highly required by the graduates for sustainable employment and should be possessed by computer graduate and undergraduates alike for sustainable employment.

The test of hypothesis revealed that there is no significant difference in the mean ratings of lecturers and students of computer education on the creative skills needed by computer education graduates for sustainable employment in Enugu State. This implies that creative skills are indispensible for sustainable employment of computer education graduates in Enugu State.

Conclusion of the Study

Based on the findings of the study, the needed skills by computer education graduates for sustainable employment in Enugu state includes; adaptability skills and creative skills.It was found that these skills are highly needed by computer education graduates for sustainable employment in Enugu State. Based on the empirical findings of this study, it was therefore

concluded that the skills identified should be fully integrated into the curriculum used in training computer education students for sustainable employment upon graduation. The lecturers and students shared the same view that these skills were highly required by computer education graduates and cannot be neglected.

Counselling Implication of the Study

The findings of the study based on the result of data analysis had far reaching implications for the government, curriculum planners, universities, computer education programmes administrators, lecturers and students of computer education in universities and general public. The findings of the study have implication for the government in that these identified skills would help in training employable and responsive members of the society. This would reduce the level of unemployment in the society and provide enough tax for the government.The findings of the study would enable the curriculum planners in universities to integrate the much needed skills for successful and sustainable employment of the students after graduation. The result would enable them to conduct curriculum evaluation of computer education in universities. This would enhance the quality of education offered to the students which consequently would address the need of skill mismatch in the society.Furthermore, the findings will enable the administrators in universities to understand the needed skillsby computer education graduates for sustainable employment. This would enable them to conduct effective supervision and monitoring of instructional delivery approaches to the society.The lecturers of computer education having identified these skills would make sure that related instructional delivery approaches were used. This would help in inculcating the right skills, knowledge and perception to students during the instructional delivery approaches. The students at the receiving end of the teaching-learning process would be given the opportunity to learn new skills.

Furthermore, the findings of the study would have implication for general public. This is because it revealed needed skills by computer education graduates for sustainable employment, which would in turn reduce the level of unemployment and joblessness among the graduates. The findings of the study would enable the future researcher to have an empirical data on the skills needed by computer education graduates for sustainable employment. This would also add to the available literature in this field of study.

Recommendations of the Study

Based on the findings of the study, the researcher recommends as follows:

1. The identified skills for sustainable employment should be integrated into the curriculum of computer education programme by the curriculum planners.
2. Lecturers should adopt these skills and make it practically oriented instead of theoretical-based to enable computer education students acquire them for sustainable employment after graduation.
3. The computer equipment should be made available by the school administrator and the government in order to promote the teaching of the identified skills to the students.
4. The school administrators should supervise the teaching of the identified skills in order to promote quality in the mastery of the identified skills by the students.

5. Seminars and workshops should be organized by computer expert for students, to enlighten them on the importance of acquiring these identified skills.

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EFFECTS OF TYPING TUTOR SOFTWARE ON SECONDARY SCHOOL STUDENTS' ACCURACY IN COMPUTER KEYBOARDOPERATIONS IN ENUGU STATE

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Abstract

The purpose of this study was to determine the Effects of Typing Tutor Software on Secondary School Students' Accuracy in computer keyboard operations. Six research questions and nine hypotheses guided the study. Quasi experimental research design was adopted in the study. This study was carried out in Enugu State. The population for the study consisted of all senior secondary school two (SS2) students in all the 233 secondary schools in Enugu State. A sample of (287) Senior Secondary school two (SS2) students was used for the study. Based on gender, the sample consisted of (156) students from male schools and (131) students from female schools. Also, the sample was composed of (146) students in treatment group and (141) students in the control group. Purposive, stratified and random sampling techniques were used to draw two male and female students in secondary schools from the population. Instruments used for data collection is Computer Keyboard Operations Accuracy Test (COKOAT). The instruments were constructed by the researcher and validated by three research experts. The validated copies of the instruments were subjected to test of stability and internal consistency. Reliability coefficients of .71 and .68 were obtained for COKOIS and COKOSAT respectively using Cronbach Alpha method. Mean with standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 significance level. Major findings of the study revealed that students taught computer keyboard operations with typing tutor software exhibited higher accuracy than those taught with expository method. It was recommended among other things that use of typing tutor software for teaching secondary school computer keyboard operations should be adopted by all male and female students in secondary schools in Enugu State.

Introduction

Computer education, according to Gerald (2017) involves computer literacy and all processes of making a learner computer skilled. Computer literacy infers ability to tell the computer what you require it to do and fathom what the computer says. To be computer skilled means to have the ability to examine, create and talk the computer language. Computer education also represents computer training, Computer Assisted Instruction (CAI), and Computer Appreciation. Computer education plays a vital role not just in learning computer studies or computer science but also in learning every other subject.Ilyasu (2016) warned that to ignore computer education amounts to accepting to remain backward and obsolete. This is because the world is advancing at a quick rate. Events have moved to the electronic stage with

the computer at the center. This change has brought a lot of advancement and change into education/teaching and learning. The 3R's which structures the center of the old game plan of education has seen course of action of reform changes. The world is presently in the time of information development or Information Communication Technology age, thusly, there is a need to stay avant-garde with time. The computer can serve as an assiduous, consistent and evaluating teacher which has a couple of systems for instruction at its disposal. Ilyasu further hinted that a computer can show words to be spelled, sound to be made, instructions to be taken after, pictures and symbols to be responded to by touching. Computer can be brought into play to survey understudy's performance and direct understudy backward, forward and sideways to fit learning activities. Its understanding, memory and unending farthest point for unobtrusive components are assets that oppose contention from traditional educator.

Melky (2016) listed other values of computer education to include;

(i)   It lends a hand to students to learn at their own specific pace.

(ii)   It produces great time saving over conventional classroom instruction or   teaching.

(iii)   It consents to students control over their learning rate and progression.

(iv)   It bestows fitting feedback.

(v)   It progresses individualized instructions through personalized responses to learner's action to capitulate a high rate of stronghold.

(vi)   It bestows a more encouraging helpful environment particularly for slower learners.

(vii)   It bestows suitable record-keeping and along these lines screens progression of students.

(viii) It puts additional information in the hands of teachers.

(ix)   Peculiarity or innovation of working with a computer built up student's inspiration.

(x)   It grants tried and true rule from learner to learner in spite of instructor/learner at whatever point of the day and territory.

(xi)   It endows with instructions to learners at comparative expenses as compared to other media.

John (2017) averred that computer might be brought into play to handle the incredibly complex ventures that are keys for more individualized learning. The computer can present definite test, give extended programs to suit solitary needs, and outfit prescriptive assignments that may suggest the understudy/student to a course book, an examination of laboratory or an advice with the teacher. John added that the computer is determined and consistent in its strategy for operation, as it doesn't encounter the evil impacts of tiredness or nonappearance of attentiveness like people. Computer carries out multi-valuable parts in teaching and learning strategies at all levels. At the vital and higher levels of education, students can research and make learning through computer program. In schools, computer can be brought into play to store the step by step or week by week impression of examinations. It can be exercised to mix and separate shading or colors, scan, draw, layout diverse things and make graphs and outlines for instructional purposes. Information can be secured in manual records in the computer magnetic disks and recouped when required, (John, 2017).

Undoubtedly, secondary school students cannot harvest these benefits of computer except they master the computer keyboard operations. This is because the keyboard is the primary or most commonly available computer input device. A computer keyboardist a typewriter-style device which uses an arrangement of buttons or keys to act as mechanical levers or electronic switches. Neso (2015) narrated that following the decline of punch cards and paper tape, interaction via teleprinter-style keyboards became the main input method for computers. Keyboard keys (buttons) typically have characters engraved or printed on them, and each press of a key typically corresponds to a single written symbol. However, producing some symbols may require pressing and holding several keys simultaneously or in sequence. While most keyboard keys produce letters, numbers or signs (characters), other keys or simultaneous key presses can produce actions or execute computer commands.

Gbemisola (2016) stated that in normal usage, the keyboard is used as a text entry interface for typing text and numbers into a word processor, text editor or any other program. In a modern computer, the interpretation of key presses is generally left to the software. A computer keyboard distinguishes each physical key from every other key and reports all key presses to the controlling software. Keyboards are also used for computer gaming either regular keyboards or keyboards with special gaming features, which can expedite frequently used keystroke combinations. A keyboard is also used to give commands to the operating system of a computer, such as Windows' Control-Alt-Delete combination.

Mastery of computer keyboard operations according to Nuhu (2016), can be seen in a student's accuracy in handling the keyboard. This mastery, Nuhu argued is a predictor of students' accuracy in computer studies. Nuhu therefore alleged that students perform poorly in computer studies mainly because they lack adequate keyboard operational skills. Ilyasu (2016) further collaborated Nuhu's view and further blamed the problem of students' computer keyboard operations inefficiency to inadequate teaching strategies adopted by secondary school teachers. According to Ilyasu, most secondary school computer teachers adopt lecture method for teaching computer studies. Lecture method of teaching refers to that teaching method in which the teacher gives a comprehensive description or explanation of an idea or a topic to a listening audience (class).

Purpose of the Study
The purpose of this study was to determine the Effects of Typing Tutor Software on Secondary School Students' Accuracy in computer keyboard operations in Enugu State. Specifically, the study aimed at determining the effects of Typing Tutor software on Secondary Senior School Two (SS2) Students';
  i.   Accuracy in computer keyboard operations
  ii.   Accuracy in computer keyboard operations with regard to their gender (male/female)

Research Questions

The following research questions shall guide the study
1. What are the mean computer keyboard operations accuracy scores of the students in both treatment and control groups in pretest and posttest?
2. What are the mean computer keyboard operations accuracy scores of the students in male and female secondary schools in both treatment and control groups in pretest and posttest?

Hypotheses

The following research hypotheses shall be tested at .05 level of significance
1. There is no significant difference between the mean computer keyboard operations accuracy scores of students in the treatment and control groups.
2. There is no significant difference between the mean computer keyboard operations accuracy scores of students in male and female secondary school in treatment and control groups.
3. There is no significant interaction between teaching strategy and school ownership on students' mean accuracy scores in computer keyboard operations.

Methodology

Quasi experimental research design was adopted in the study. This study was carried out in Enugu State. The population for the study consisted of all senior secondary school two (SS2) students in all the 233 secondary schools in Enugu State. A sample of (287) Senior Secondary school two (SS2) students was used for the study. Based on school ownership, the sample consisted of (156) students from male schools and (131) students from female schools. Also, the sample was composed of (146) students in treatment group and (141) students in the control group. Purposive, stratified and random sampling techniques were used to draw two male and female secondary schools from the population. Instruments used for data collection is Computer Keyboard Operations Accuracy Test (COKOAT). The instruments were constructed by the researcher and validated by three research experts. The validated copies of the instruments were subjected to test of stability and internal consistency. Reliability coefficients of .71 and .68 were obtained for COKOIS and COKOSAT respectively using Cronbach Alpha method. Mean with standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 significance level.

Results

Hypothesis 1

There is no significant difference between the mean computer keyboard operations accuracy scores of students in the treatment and control groups.

Hypothesis 2

There is no significant difference between the mean computer keyboard operations accuracy scores of students in male and female secondary school in treatment and control groups.

Hypothesis 3

There is no significant interaction between teaching strategy and school ownership on students' mean accuracy scores in computer keyboard operations.

Table 9: ANCOVA analyses of the students' Accuracy scores

Source	Sum of Squares	DF	Mean Square	F	Sig.	Remark
Corrected Model	201.188	3	67.063	1.723	0.011	
Intercept	97.203	1	97.203	2.496	0.010	Significant
Method	79.111	1	79.111	2.032	0.010	Not
Gender	350.002	1	350.002	8.991	0.092	significant
Method*Gender	203.404	1	203.404	5.225	0.100	Not
Error	10900.011	280	38.929			significant
Total	11830.919	287				

Method (treatment and control) as main effect gave an f value of 2.032 and this significant at 0.010. Since 0.010 is less than .05, this means that at .05 significant level, the f value of 2.032 is significant. Therefore, hypothesis 1 is rejected as stated, indicating that there is a significant difference between the mean accuracy scores of students in the treatment and control groups.Gender as main effect gave an f value of 8.991 and this is significant at 0.092. Since 0.092 is greater than .05, this means that at .05 significant level, the f value of 8.991 is not significant. Therefore hypothesis 2 is not rejected as stated, indicating that there is no significant difference between the mean accuracy scores of male and female school students. The interaction effect (method*gender) gave an f value of 5.225 which is significant at 0.100. Since 0.100 is greater than .05, this means that at .05 significant level, the f value of 5.225 is not significant. Therefore, hypotheses 3 is not rejected as stated, indicating that there is no significant interaction effect between method and school ownership on students' accuracy in computer keyboard operations in this study.

Summary of Findings

The results presented above can be summarized thus:

1. Students taught computer keyboard operations with typing tutor software achieved higher accuracy than those taught with expository method.
2. Male and female secondary schools' students taught computer keyboard operations with typing tutor software did not differ significantly in their accuracy.
3. There was no significant interaction between teaching methods and school ownership on the student's accuracy in computer keyboard operations.

Discussion

According to the summary of findings, the difference between the mean accuracy scores of the groups was significant in favor of the experimental group. Simply put, the students who were taught computer keyboard operations with typing tutor software attained higher accuracy in keyboard operations than their counterparts who were taught same content without typing tutor software. This finding is in agreement with the findings of Audu (2015), Gbemisola (2016) and Hanks (2017). These researchers (Audu, Gbemisola and Hanks) found in their separate studies that typing tutor software excited the students thereby increasing their accuracy in keyboard operations. However, the finding made in this study is a sharp contrast with the findings of Adejumo (2012), Nuhu (2016), Byke (2017) and Rabbat (2017). Nuhu (2016) reported in his findings that animations in typing tutor software inhibited students' accuracy in computer keyboard operations. Adejumo (2012), Byke (2017) and Rabbat (2017) in their separate studies found no significant difference between the accuracy of students taught computer keyboard operations with typing tutor software and their counterparts taught without typing tutor software. Nuhu (2016) as reported above argued that animations in typing tutor software only produce emotional interest while expository method encourages cognitive interest.

Cognitive interest is produced by seeing relationship(s) between incoming information and background knowledge (Nneji, 2015). The truth remains that typing tutor software can elicit both emotional and cognitive interest. There must therefore be a problem somewhere that leads to variation in findings. In trying to proffer solution, Hanks (2017) advised that though play and amusement are necessary in teaching and learning, efforts should be made to ensure that play and amusement do not overshadow the intended lesson. Hanks further warned about use of seductive details in computer software. Such details are capable of seducing the learners and taking their attention out of the objectives of the lesson. This calls to mind the need to apply caution in the design of various typing tutor software. Also important is the need to improve experimenters' techniques of controlling extraneous variables.

Recommendations

From the finding of this study, the following recommendations are made:

1. Use of typing tutor software for teaching secondary school computer keyboard operations should be adopted by all male and female students in secondary schools in Enugu State.
2. Nigerian teacher education curriculum should emphasize use of typing tutor software in microteaching and teaching practice exercises to avail teachers more practical knowledge during their training.
3. Periodic practical oriented workshops and seminars should be organized for computer teachers on use of typing tutor software for teaching computer.
4. Computer sets, projectors, electricity generating sets, imp-rest for petrol or diesel and fortified security networks should be provided for all secondary schools.
5. Supervisors and other monitoring agents should ensure that computer sets provided in various secondary schools are put to use.

6. All male and female secondary schools should either employ a computer programmer or sponsor their computer teachers on a mandatory computer programming course.

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EFFECTIVENESS OF COMPUTER AIDED INSTRUCTION STRATEGY ON MIDDLE BASIC EDUCATION PUPILS' RETENTION IN QUANTITATIVE REASONING IN ENUGU STATE

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Abstract

The purpose of this study was to investigate the effectiveness of Computer Aided Instruction (CAI) strategy on middle basic education pupils' retention in quantitative reasoning. Two research questions and three hypotheses guided the study. Quasi experimental research design was adopted in the study. This study was conducted in Enugu Education Zone of Enugu State. The population for the study consisted of all middle basic two Pupils in the 98 public and private schools in Enugu Education Zone' numbering 8924 pupils in 2019/2020 academic session. The sample for the study consisted of 490 Middle Basic II (Primary Five) pupils. Stratified, purposive and simple random sampling techniques were adopted for the sampling. The instrument for data collection was Quantitative Reasoning Retention Test (QRRT). The instrument was constructed by the researcher and was validated by three research experts, two in mathematics education and one in measurement and evaluation. Kuder-Richardson 20 Formula was used to establish a reliability coefficient of .77 for QRRT. Data on retention was collected using QRRT. The treatment lasted for six weeks. Pretest score was collected before the treatment while posttest was administered after the treatment using QRRT. Research questions were answered using mean with standard deviations while the research hypotheses were tested using analysis of co-variance (ANCOVA). Mean and standard deviation were used to answer the research questions while test of hypotheses was done using Analysis of Covariance (ANCOVA) at 0.05 level of significance. Findings of the study showed among others that pupils taught quantitative reasoning with CAI retained more than their counterparts taught with expository method. School ownership did not significantly affect the retention of the students in quantitative reasoning. It was recommended among other things that use of CAI for teaching quantitative reasoning in middle basic education should be adopted by all public and private schools in Enugu State.

Keywords: Computer Aided Instruction (CAI), Retention, Quantitative Reasoning.

Introduction

Good education is very important for everyone, regardless of gender or race, as it enables high quality learning throughout life for people of all ages, shapes, beliefs, religions and regions. The Federal Republic of Nigeria (FRN, 2013) states in its national education policy that modern education technologies are increasingly used at all levels of the education system and should also be improved in the teaching and learning process. More importantly, the policy continues to suggest that educational activities are learner-centered for maximum self-development and self-actualization.The policy emphasizes that mathematics should be visualized as the vehicle to train a child to think, reason, analyze and articulate logically, apart from being a specific subject it should be treated as concomitant to any subject involving analysis and reasoning such as quantitative reasoning. It is good to note here, that strong foundational learning gives root to later learning as basic concepts create connections necessary for inquiry and growth. When children are allowed the time and space to build strong foundations, the skills built later on come more easily and solidly. Lack of foundational skills weakens the learners as they move on to more and more challenging work. The philosophy and structure of the 9-Year and the Revised 9-Year Basic Education Curricula (BEC) in Nigeria are categorized into Lower Basic (Primaries

1-3), Middle Basic (Primaries 4-6) and Upper Basic (Junior Secondary 1-3). Thus the 9-Year BEC addressed among other things, the issue of value re-orientation, poverty eradication, critical thinking, entrepreneurship and life skills and also the laying of a sound basis for scientific and reflective thinking, Federal Ministry of Education (FME, 2012). Quantitative reasoning as a subject in the early stage of learning is incorporated in mathematics. Reasoning is defined as the ability of deliberately making sense of things, applying logic and adapting or justifying practices, institutions and beliefs based on new or existing information. Quantitative reasoning simply refers to the application of basic mathematical skills to the analysis and interpretation of real life quantitative information (Imuno, 2015). According to Nwibo and Ngene (2020), quantitative reasoning is a scientific activity that stimulates cognitive reasoning via creative and innovative application of the problem solving techniques. Quantitative reasoning is basically hinged on mathematical operations as basic arithmetic concepts are explained and simple instructions for the exercises are given. Hence, like mathematics, quantitative reasoning is designed to help the learners learn perfect mathematical operations and see relationships between or among different quantities (numbers), thus improving the pupils' logical manipulations with numbers. The aim of quantitative reasoning at this early stage of Basic Education is to sharpen the skills of pupils in dealing with figures mentally. This is very necessary for understanding mathematics as a subject; therefore, the introduction of quantitative reasoning at these levels of education is no doubt, a step in the right direction. Hassan (2014) asserted that middle basic education plays the more important role of preparing the child for challenges by helping the child to engage his thinking faculty under any given circumstance. It also prepares the child to learn on reason before making a choice while also emphasizing how important it is to give attention to details.

Evidently, when pupils manipulate numbers logically, critical thinking, creative reasoning and innovative skills are gradually formed in them. Unfortunately, the academic performance of pupils in quantitative reasoning in basic education, tend to be on the decline as a result of the pupils' poor ability to retain what was taught. Retention is the act or process of holding what has been absorbed or assimilated. Oluremi (2018) defined retention as the act of "absorbing and holding" or to continue "having or holding". More worrisome, is the fact that research evidences such as Hassan (2014), Imuno (2015) and Julius (2015) have implicated teacher incompetency and use of unproductive teaching strategies as strong limiting factors to pupils' retention in quantitative reasoning. This calls for the need to promote activity-types and analytical kinds of teaching and learning such as Computer Aided Instruction (CAI) strategy. In order to overcome the difficulties faced by the students, teacher should adopt different methodology in teaching of mathematics like drill method, using different audio visual aids, computer aided instruction, mathematical club etc.CAI strategy refers to the use of computer to give course content instruction in the form of drill and practice, tutorials and simulations, (Sedega, Mishiwo, Fletcher, Kofi &Awudetsey, 2017). In the words of Suleman, Hussain, Din and Iqbal, (2017), CAI is an instructional strategy where a computer is used to communicate the instruction and also evaluate the learning outcomes. Gana (2013), noted that CAI refers to

virtually any sort of computer application in instructional settings comprising of information instruction, drill and practice, simulations, instructional exercises, instructional management, database development, programming, composing using word processors, and other different applications.

The type of CAI used by the researcher in the course of this work is the information instruction. This type of CAI helps the learner get the desired information needed. Hence, the computer can serve the role of an enquiry officer, to respond to the students' enquiry with answers it had stored. The sole purpose of this type of CAI is to provide essential information for the acquirement of concepts and skill. Computer Aided Instruction strategy in this context, refers to the use of computer by the teacher during instruction to help students learn the desired course contents and be able to develop achievable goals in the future. The CAI is not expected to do the teaching; rather it serves as an instructional aid with which the teacher shall drive home the required points to the learners.As interesting as Computer-Aided Instruction may sound, some researchers such as Akpan (2014), Baraje (2015) and Buckie (2016) reported in their separate studies that CAI inhibited pupils' learning. This, therefore, raises serious questions and worries, thus motivating a study of this nature aimed at investigating the effect of Computer Aided Instruction Strategy on Middle Basic Education pupils' retention in quantitative reasoning. Another variable of interest to the researcher in this study is influence of school ownership on middle basic education pupils' in quantitative reasoning when taught with Computer Aided Instruction. School ownership in this work is categorized into two viz; public and private schools. The public schools, also known as state/federal government schools refer to schools owned, funded and overseen by the state or federal government.

Nigerian public schools today are characterized by neglect and abandonment, dilapidated infrastructures, vandalization/looting of facilities and obsolete teaching aids. Teachers in public schools continue to allege ill-motivation, denial of incentives and poor condition of service. As the teachers resort to hassle for survival, absenteeism and truancy become the order of the day, (Agbo, 2014). The story seems not to be in any way better in the private schools. Private schools are schools owned by non-governmental organizations or individuals. Private schools are known for high cost, yet the proprietors seem to shy away from money demanding ventures such as employment of qualified teachers, provision of instructional materials and other infrastructures good for conducive teaching and learning. So many private schools allegedly use quacks to teach middle basic pupils (Nduka, 2011). This has created more and more unmanageable social problems that should worry well-meaning educators and researchers. Also expected to worry researchers are conflicting findings on influence of school ownership on basic education pupils' retention in quantitative reasoning. For instance, Imuno (2015), Buckie (2016) and Wale (2016) found in their separate studies that basic education pupils in public schools retained higher in quantitative reasoning when taught with Computer Aided Instruction. Contrarily, Hassan (2014), Derbuck (2014) and Nuhu (2015) reported in their separate studies that basic education pupils in private schools retained higher in quantitative reasoning when taught with Computer Aided Instruction. This study therefore sought to bridge this gap by investigating the

effectiveness of Computer Aided Instruction on middle basic education pupils' retention in Quantitative Reasoning with regard to their school ownership.

Problem Justification

Evidently, Computer Aided Instruction Strategy ranks very high among innovative teaching strategies that have received consistent and wide recommendations by modern educators. However, there are still conflicting reports on the effectiveness of Computer Aided Instruction on the entire teaching and learning process, especially, at the basic education levels. Since there is no definitive conclusion, there is need for more studies in this area. Furthermore, proliferation of private schools in Nigeria today has raised more questions than answers. Research evidences have no agreed stand regarding influence of school type (public/private) on basic education pupils' retention in various subjects including quantitative reasoning. These inconsistencies inform the choice of this study. The problem of this study, put in question form is: How does Computer Aided Instruction Strategy affect Middle Basic Education pupils' retention in quantitative reasoning with particular reference to their school type (public/private)?

Objectives of the Study

The purpose of this study was to determine the effectiveness of Computer Aided Instruction (CAI) on Middle Basic Education pupils' retention in quantitative reasoning. Specifically, the study sought to;

1. Determine pupils' retention in quantitative reasoning when taught with CAI strategy and expository method.
2. Find out the retention of public and private school pupils in quantitative reasoning when taught with CAI strategy and expository method.

Research Questions

The following two research questions guided the study.

1. What are the mean retention scores of pupils taught Quantitative Reasoning with Computer Aided Instruction strategy (experimental group) and their counterparts taught the same topics with expository method (control group)?
2. What are the mean retention scores of public and private schools' pupils taught Quantitative Reasoning with Computer Aided Instruction strategy (experimental group) and their counterparts taught the same topics with expository method (control group)?

Hypotheses

The following research hypotheses were tested at 0.05 level of significance.

1. There is no significant difference between the mean Quantitative Reasoning retention scores of pupils in the experimental and control groups.
2. There is no significant difference between the mean Quantitative Reasoning retention scores of public and private schools' pupils in the experimental and control groups.

3. There is no interaction effect of teaching methods and school type on Middle Basic Education pupils' retention in Quantitative Reasoning.

Research Methodology

The research design adopted in the conduct of this investigation is quasi-experimental design where a pretest–posttest, non-equivalent groups were used. Intact classes were randomly assigned to experimental and control groups which was used in this study. Though the groups may not be equivalent, the researcher has the advantage of knowing the pretest scores. Changes in scores from pretest to posttest can be used to determine the effect of the independent variable. This study was conducted in Enugu Education Zone in Enugu State. Stratified, Purposive and simple random sampling techniques were adopted for the sampling. The population for the study consisted of all Middle Basic Two Education Pupils in the 98 public and private (registered) schools in Enugu Education Zone of Enugu State, numbering 8924 pupils. The population comprises of 6763 pupils in public and 2161 pupils in private schools. A sample of 490 Middle Basic II (Primary Five) Education Pupils was used for the study. The sample consisted of 244 public schools' pupils and 246 private schools' pupils. Also the sample was made up of 255 pupils in experimental group and 235 pupils in the control group. The sample was drawn from 12 intact classes in three public and three private schools randomly drawn from the three Local Government Areas in Enugu Education Zone. The instrument used for data collection was Quantitative Reasoning Retention Test (QRRT). Quantitative Reasoning Retention Test (QRRT) constructed by the researcher, is made up of 40 multiple choice items (questions) drawn from quantitative reasoning content area that was covered in this study. Each question had four options (letters A to D). Three of the options were distractors and only one option was the correct answer. QRRT was subjected to both face and content validity. A reliability powerof of .77 using Kuder- Richardson 20 Formula method.

At the beginning of the experiment both groups were giving the pretest. After the administration of the pretest, the quantitative reasoning teachers in the sampled schools conducted the experiment. The experimental group was taught quantitative reasoning using CAI while the control was taught same topic using expository method. The experiment was conducted during the normal school hours using the school time table for classes. The experiment was done for two weeks. At the end of the experiment, the post test was administered to the two groups by the teachers. The data collected from the pretest and post test were all marked and recorded accordingly. Research questions were answered using mean and standard deviation while test of hypotheses were done with Analysis of Covariance (ANCOVA) at 0.05 level of significance.

Results

Research Question 1

What are the mean retention scores of pupils taught quantitative reasoning with Computer Aided Instruction strategy (experimental group) and their counterparts taught the same topics with expository method (control group)?

Table 1: Mean Retention Scores and Standard Deviation of Treatment and Control Groups.

Group	N	Mean	SD	Mean Difference
Experimental	255	67.71	0.14	
				28.2
Control	235	39.51	2.01	

From table 1, the mean retention score and standard deviation of the experimental group were 67.71 and 0.14. For the control group, the mean retention score and standard deviation were 39.51 and 2.01 respectively. The experimental group has more retention than their counterparts in the control group. The standard deviation value of the experimental group was less than that of the control group, indicating that the mean retention score for experimental group was more reliable. Also the mean difference in retention scores for the two groups was 28.2.

Research Question 2

What are the mean retention scores of public and private schools' pupils taught Quantitative Reasoning with Computer Aided Instruction strategy (experimental group) and their counterparts taught the same topics with lecture method (control group)?

Table 2: Mean Retention and Standard Deviation of Public and Private Schools' Students

Group	N	Mean	SD	Mean Difference
Public (Expt.)	130	58.04	0.21	9.91
Private (Expt.)	125	67.95	0.09	
Public (Control)	114	39.11	1.32	
Private (Control)	121	40.02	1.01	0.91

From table 2 above the mean retention score and standard deviation of the public (experimental) were 58.04 and 0.21 respectively while that of private (experimental) were 67.95 and 0.09 respectively. Similarly, public (control) were 39.11 and 1.32 while that of private (control) 40.02 and 1.01 respectively. These results indicate that both groups (experimental and control) improved in their retention in both public and private schools. Based on school ownership (public and private), it seems that the retention did not differ much. Rather, the experimental

group in both public and private schools retained higher than their counterparts in the control group.

Hypothesis 1

There is no significant difference between the mean quantitative reasoning retention scores of pupils in the experimental and control groups.

Hypothesis 2

There is no significant difference between the mean quantitative reasoning retention scores of public and private schools' pupils in the experimental and control groups.

Hypothesis 3

There is no significant interaction between teaching method and school type on Middle Basic Education pupils' retention in quantitative reasoning.

Table 3: ANCOVA analyses of the students' Retention scores

Source	Type III sum of squares	DF	Mean Square	F	Sig.	Decision
Corrected Model	1309.220	3	436.41	3.512	.000	S
Intercept	102713.044	1	102713.044	826.68	.000	
Teaching Strategy	1129.005	1	1129.005	9.09	.000	S
School ownership	930.606	1	930.606	7.49	1.433	S
		1				
Strategy*School ownership	890.406		890.406	7.166	2.110	NS
						NS
Error	60011.699	483	124.248			
Total	166983.98	490				

Table 3 shows ANCOVA analyses of the students' retention scores. For teaching strategy, the f-calculated value of 9.09 is significant at .000 significant level which is less than 0.05 level set for this study. Thus, teaching strategy had significant effect on retention of the pupils in this study. Consequently, hypothesis 1 is rejected as stated because there was significant difference between the mean quantitative reasoning retention scores of pupils in the experimental and control groups. For School ownership (public/private), the f-calculated value of 7.49 is significant at 1.433 significant level which is higher than 0.05 level set for this study.

Hence, school ownership had no significant effect on students' retention scores in this study. As a result of this, hypothesis 2 is not rejected as stated because there was no significant difference between the mean quantitative reasoning retention scores of public and private schools' pupils in the experimental and control groups.For interaction (Teaching Strategy*School ownership), the f-calculated value of 7.166 is significant at 2.110 which is higher than 0.05 level of significance set for this research. Thus, interaction effect is not significant i.e. there was no interaction effect of teaching methods and school type on Middle Basic Education pupils' retention in quantitative reasoning. Hypothesis 3 is therefore not rejected as stated.

Major Findings

From the results presented above, the findings of this study can be summarized as follows;

1. Middle Basic Education pupils taught quantitative reasoning with CAI (experimental group) retained more than their counterparts taught same topics with expository method (control group).
2. The mean quantitative reasoning retention scores of public and private Middle Basic Education school pupils taught with CAI (experimental group) and those taught same topics with expository method (control group) did not differ significantly in the study.
3. There was no interaction effect of teaching strategies and school ownership on pupils' mean quantitative reasoning retention scores of pupils.

Discussion of Findings

Findings made in this study indicated that CAI promoted higher retention in quantitative reasoning than expository method. The standard deviation values further implied that experimental group had lower number of extreme scores than the control group. This finding agrees with those of Oluremi (2014), Julius (2015), Wale (2016) and Nwibo and Ngene (2020) who affirmed the efficacy of CAI in promoting more retention than expository method. Contrarily, Deburck (2014) and Buckie (2016) reported that CAI inhibited students' retention in the various branches of quantitative reasoning they studied. Obviously, people who retain poorly are usually judged as poor learners.Learning as defined by Julius (2015) is a relatively permanent change in potential behavior which is acquired through practice or experience. Julius argue that "relatively permanent" in the definition connotes something stored or locked up somewhere, in other words, something retained. Furthermore, "potential behavior" in the definition implies something for a later use and this is the retrieval of something retained.

It is therefore interesting to find in this study that CAI enhanced the retention of the pupils in quantitative reasoning.

Conclusion

The study concluded that Computer Aided Instruction strategy was more effective than the expository method in teaching quantitative reasoning amongst middle basic education pupils based on method and school ownership.

Recommendations

From the finding of this study, the following recommendations are made:

1. Use of CAI for teaching quantitative reasoning in middle basic education should be adopted by teachers in all the public and private schools in Enugu State.

2. Nigerian teacher education curriculum should emphasize use of CAI in microteaching and teaching practice exercises to avail pre-service teachers more practical knowledge during their training.

3. All public and private schools should either employ a computer programmer or sponsor their computer teachers on a mandatory computer programming course.

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APPRAISAL OF AUTONOMY STATUS ON PUBLIC UNIVERSITIES IN SOUTH EAST NIGERIA

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Abstract

The main purpose of this study was to appraise the Autonomy Status of Public Universities in South East Nigeria. Design adopted for the study was descriptive survey design. Two research questions and two hypotheses guided the study. This study was carried out in South East geo-political zone of Nigeria. The population for the study consisted of all the 39,385 university staff

in public universities in South East Nigeria as at the time of the study. The sample for the study consisted of 1,970 university staff drawn from four public universities in two states of South East Nigeria. Stratified, proportionate and simple random sampling techniques were applied in drawing the sample. The instrument used for data collection was a questionnaire on Appraisal of Autonomy Status of Public Universities in South East Nigeria (QAAPUSEN). It is a 82-item structured questionnaire. The instrument was constructed by the researcher and validated by three research experts. The questionnaire yielded an overall reliability coefficient of .78 obtained through Cronbach's alpha method. Copies of the questionnaire were administered to the respondents by the researcher and three briefed research assistants. Direct delivery and retrieval system was used. Mean and standard deviation were used to answer the research questions while ANOVA was used to test the hypotheses at 0.05 significant level. Major findings of the study revealed that the level of administrative autonomy existing in public universities in South East Nigeria is low. Consequently, it was recommended among other things, that the strict implementation of existing laws/policies on public universities autonomy by National Universities Commission, Federal and State ministries of education and other relevant authorities. Also, National Universities Commission and other relevant authorities should enforce adequate sanctions against individuals or agencies hampering the autonomy of public universities.

Introduction

Development generally refers to the process of both economic and social transformation based on complex, cultural and environmental factors and their interaction. Ituma (2010) highlighted some indices that determine a developed nation. These, include what Ituma described as increased capacity of people to have control over material assets, intellectual resource and ideology, physical necessities of life (food, clothing and shelters), Employment, and equity, participation in government, political and economic independence, adequate education, gender equality, sustainable development and peace. The above indicators no doubt, show how people are at the center of all development processes. According to the United Nations Human Development Report (UNHDR) (2009), human development is all about putting people at the center of development. It is all about realizing their potential, increasing their choices and enjoying their freedom to live the lives they value.

This new approach to development focuses more attention to measures and strategies to reduce poverty and inequality and to the realization of the potentials of human personality. Thus, human development agenda have become a development paradigm which focus on empowering the individual with the knowledge and skill to face the social challenges that may hinder his/her productivity. Undoubtedly, human resource is the most essential and vital of the major resources for development because with it in place, financial, physical, information and other resources can be substantially harnessed. As Rahji (2010) puts it, the human resources of a nation are considered to be the engine of growth of the country.

Harrison (2011) defined human resource development as the process of increasing the knowledge, the skills and the capacity of all the people in the society for promoting its economic, political and social growth. Evidently, the greatest tool for human development is education.

The role of education in bringing about human development cannot be over-emphasized. This is because education embraces all processes by which a person acquires knowledge and skills to live well in his society. Education is a tool with which people, using the human ability to respond to, and interact with the environment, pass on from generation to generation, those aspects of their -culture and values which they consider to be worthwhile. It remains an undisputable fact that no society or nation can rise above its educational level. Okeke (2013) averred that, education is the aggregate of all the processes by which a child or young adult develops the abilities, attitudes and other forms of behavior which are of positive value to the society in which he lives, in other words, it is a process for transmitting culture in terms of continuity and growth and for disseminating knowledge either to ensure social control or to guarantee rational direction of the society or both. Uchendu, (2013) defined education as a social process designed to induct the rising generation into the membership of their society. The Federal Republic of Nigeria recognizes the importance of education generally and university education in particular in attaining her national goals. The five main national goals of Nigeria are to build; a free and democratic society, a just and egalitarian society; a united, strong and self reliant nation; a great and dynamic economy and a land full of bright opportunities for all citizens (Federal Republic of Nigeria (FRN), 2013).

Consequently, the Federal Republic of Nigeria (2013) in the National Policy on Education seeks to inculcate national consciousness and national unity; the right type of values and attitudes for the survival of the individual and the Nigerian society; the training of the mind in understanding of the world around; and the acquisition of appropriate skills, abilities and competence both mental and physical as equipment for the individual to live in and contribute to the development of his society. To achieve these laudable objectives, the nation cannot underrate the indispensable role of university education. University education is the education given after secondary education in universities. According to Federal Republic of Nigeria (FRN) (2013) the goals of university education include;

a. contribute to national development through high level relevant manpower training
b. develop and inculcate proper values for the survival of the individual and society
c. develop the intellectual capability of individuals to understand and appreciate their local and external environment
d. acquire both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society
e. promote and encourage scholarship and community service
f. forge and cement national unity and promote national and international understanding and interaction.

University is expected to pursue these goals through; teaching, research, staff development programmes, generation and dissemination of knowledge, a variety of modes of programmes including full-time, part-time, block-release, day-release, sandwich, access to training funds such as those provided by the Industrial Training Fund (ITF), Students Industrial Work Experience Scheme (SIWES), maintenance of minimum educational standards through

appropriate agencies, inter-institutional cooperation and dedicated services to the community through extra-mural and extension services. In pursuant of these laudable objectives no doubt, the university deserves reasonable level of autonomy.

Alexander (2018) submitted that in administration or management, autonomy refers to the freedom and capacity of a head (leader) to operate and take decisions without the interference of other (usually unwanted) persons or organs. Alexander, hence, described autonomy as a situation where the leader has freedom to bring together people, material, money and machines and intentionally dividing tasks to be performed so as to achieve the objectives of the organization. The terms University Autonomy was explained by Hung (2019) as the freedom of university administrators to independently control, direct, plan and coordinate the human and material resources of the university. Yong (2017) gave other areas the university administrator can exercise independence as budgeting for expenses, inspection of records, monitoring of labor hours lost, verifying that everything occurs in accordance with plans, instructions and established principles and expressed command, ensuring that the university is achieving what it set out to accomplish, comparing performance with desired results and providing the feedback necessary for management to evaluate results and take corrective actions as needed. Williams (2020) asserted that a good appraisal of the autonomy status of public universities must take into account six fundamental indices. Williams enumerated these indices as administrative autonomy, financial autonomy, academic autonomy, internal and external interferences as well as strategies for enhancing public university's autonomy.

Zeph (2019) explained that administrative autonomy in universities refers to the freedom enjoyed by University administrators in carrying out their managerial functions other than financial and academic functions. Zeph argued that though the university administrator is in charge of the whole institution, his autonomy cannot be properly and precisely appraised if distinctions are not made with regard to areas where he (the administrator) is given free land to operate. Thus, his financial and academic autonomy should be separated from his administrative autonomy. Specific areas Zeph enumerated as administrative functions include; employment of staff, selection of management staff, staff discipline, staff promotions, staff training, staff welfare and staff postings. Financial autonomy of universities refers to the freedom of university administrators to carry out financial managerial functions without undue interferences. For proper appraisal of the financial autonomy of a university, Yong (2017) recommended that indices to consider include, the university administrator's freedom with regards to Access to statutory subventions, Use of statutory subventions as desired by the university management, Generation of Internal Revenue, Use of Internally Generated Revenue as desired by the university management, Preparation of the university annual budget, Payment of staff salaries and payment of staff entitlements other than salaries.

Staff status in universities can be broadly categorized into academic and non-academic staff. The academic staff are usually the teachers (lectures) while the non-academic staff comprise all other staff other than the teaching staff, (Nwosu, 2018). In Nigerian peculiar instance, Ajomiwe (2018) hinted that in most public universities, non-academic staff view the

academic staff as enemies, claiming that governments (both federal and state) are always concerned about meeting the demands of the academic staff only. This feeling, according to Ajomiwe is capable of causing significant difference in the responses of the academic and non-academic staff on university autonomy. Ajomiwe feared that the non-academic staff may see autonomy as a way of lifting the academic staff above them as the vice chancellor is usually an academic staff. But Guppeh (2020) argued that since the registrar (a non-academic staff) is statutorily, the chief administrative officer of the university, autonomy will eventually benefit non-academic staff more than their academic counterparts. Pandre (2020) supported Guppeh's argument, stating that both the university Bursar and Librarian (all non-academic staff) are part of the university management team. The above highlighted controversies constitute one of the major gaps the researcher wishes to fill through this study.

Purpose of the Study
The purpose of this study was to Appraise the Autonomy Status of Public Universities in South East Nigeria. Specifically, the study will;
1. investigate the level of administrative autonomy existing in public universities in South East Nigeria
2. determine the level of financial autonomy existing in public universities in South East Nigeria

Research Questions
The following research questions guided the study;
1. What is the level of administrative autonomy existing in public universities in South East Nigeria?
2. What is the level of financial autonomy existing in public universities in South East Nigeria?

Hypotheses
The following null hypotheses were tested at .05 level of significance
1. Public universities' staff in South East Nigeria do not differ significantly in their ratings on the level of administrative autonomy existing in their universities based on their gender (male/female) and status (academic/ non-academic).
2. Public universities' staff in South East Nigeria do not differ significantly in their ratings on the level of financial autonomy existing in their universities based on their gender (male/female) and status (academic/ non-academic).

Methodology
Design adopted for the study was descriptive survey design. Two research questions and two hypotheses guided the study. This study was carried out in South East geo-political zone of Nigeria. The population for the study consisted of all the 39,385 university staff in public universities in South East Nigeria as at the time of the study. The sample for the study consisted of 1,970 university staff drawn from four public universities in two states of South East Nigeria.

Stratified, proportionate and simple random sampling techniques were applied in drawing the sample. The instrument used for data collection was a questionnaire on Appraisal of Autonomy Status of Public Universities in South East Nigeria (QAAPUSEN). It is a 82-item structured questionnaire. The instrument was constructed by the researcher and validated by three research experts. The questionnaire yielded an overall reliability coefficient of .78 obtained through Cronbach's alpha method. Copies of the questionnaire were administered to the respondents by the researcher and three briefed research assistants. Direct delivery and retrieval system were used. Mean and standard deviation were used to answer the research questions while ANOVA was used to test the hypotheses at 0.05 significant level.

Results

Research Question 1

What is the level of administrative autonomy existing in public universities in South East Nigeria?

Table 1: mean and standard deviation on research question 1 items

S/N	What is the level to which your university exercise autonomy in the following administrative functions;	Male			Female			Academic			Non-Academic			Aggregate		
		Mean	SD	Rmk	Mean	SD	Rmk	Mean	SD	Rmk	Mean	SD	Rmk	Mean	SD	Rmk
1	Employments of staff	1.50	0.13	LL	2.60	0.91	HL	1.60	0.13	LL	2.50	0.15	HL	2.05	0.15	LL
2	Selection of management staff	1.90	0.25	LL	2.55	0.04	HL	1.95	0.21	LL	2.50	0.05	HL	2.23	0.98	LL
3	Staff discipline	1.95	0.11	LL	2.50	0.43	HL	1.90	0.05	LL	2.55	0.11	HL	2.23	0.75	LL
4	Staff promotions	1.20	0.19	VLL	2.80	0.25	HL	1.25	0.21	VLL	2.75	0.19	HL	2.00	0.13	LL
5	Staff training	1.35	0.25	VLL	2.70	0.35	HL	1.20	0.11	VLL	2.85	0.21	HL	2.03	0.26	LL
6	Staff welfare	1.05	0.05	VLL	2.65	0.14	HL	1.20	0.12	VLL	2.50	0.25	HL	1.85	0.95	LL
7	Staff postings	1.85	0.29	LL	2.75	0.09	HL	1.65	0.20	LL	2.95	0.05	HL	2.30	0.14	LL
8	Appointments of Directors	1.95	0.11	LL	2.50	0.43	HL	1.90	0.05	LL	2.55	0.11	HL	2.23	0.75	LL
9	Appointments of Heads of departments	1.80	0.21	LL	2.30	0.13	LL	1.60	0.29	LL	2.50	0.21	HL	2.05	0.35	LL
10	Selection of Deans of faculties	1.25	0.04	VLL	2.75	0.95	HL	1.20	0.11	VLL	2.80	0.21	HL	2.00	0.14	LL
11	Constituting of committees	1.45	0.15	LL	2.65	0.04	HL	1.40	0.12	VLL	2.70	0.21	HL	2.05	0.95	LL

S/N		Male			Female			Academic			Non-Academic			Aggregate		
12	Prioritization of projects in the university	1.50	0.13	LL	2.60	0.91	HL	1.60	0.13	LL	2.50	0.15	HL	2.05	0.15	LL
13	Award of contracts for projects in the university	1.90	0.25	LL	2.55	0.04	HL	1.95	0.21	LL	2.50	0.05	HL	2.23	0.98	LL
14	Supervision/monitoring of on-going projects in the university	1.80	0.23	LL	2.40	0.44	LL	1.85	0.10	LL	2.35	0.29	LL	2.10	0.85	LL
	GRAND	1.60	0.17	LL	2.59	0.36	HL	1.58	0.14	LL	2.60	0.16	LL	2.10	0.53	LL

From table 1 the grand mean values for male and female respondents were 1.60 and 2.59 respectively. This shows that male university staff (with grand mean of 1.60) opined that the level of administrative autonomy existing in public universities in South East Nigeria is low. On the other hand, female university staff (with grand mean of 2.59) opined that the level of administrative autonomy existing in public universities in South East Nigeria is High. Similarly, the sampled university academic staff (with grand mean of 1.58) opined that the level of administrative autonomy existing in public universities in South East Nigeria is low while the non-academic university staff (with grand mean of 2.60) opined that the level of administrative autonomy existing in public universities in South East Nigeria is High. When treated jointly, the overall grand mean value was 2.10, indicating that, the university staff opined that the level of administrative autonomy existing in public universities in South East Nigeria is low. Also, the standard deviation value for the overall (0.53) is small, indicating that there were little or no extreme values. Hence, the mean values so obtained represent the actual opinions of the respondents.

Research Question 2
What is the level of financial autonomy existing in public universities in South East Nigeria?

Table 2: mean and standard deviation on research question 2 items

S/N	What is the level to which your university exercise autonomy in the following academic issues;	Male			Female			Academic			Non-Academic			Aggregate		
		Mean	SD	Rmk	Mean	SD	Rmk	Mean	SD	Rmk	Mean	SD	Rmk	Mean	SD	Rmk
15	Access to statutory subventions	1.80	0.23	LL	2.40	0.44	LL	1.85	0.29	LL	2.35	0.10	LL	2.10	0.85	LL
16	Use of statutory subventions as desired by the university management	1.40	0.11	VLL	2.00	0.35	LL	1.40	0.11	VLL	2.00	0.05	LL	1.70	0.99	LL

#	Description														
17	Generation of Internal Revenue	1.20	0.19	VLL	2.80	0.25	HL	1.25	0.19	VLL	2.75	0.21	HL	2.00	0.13	LL
18	Use of Internally Generated Revenue as desired by the university management	1.20	0.19	VLL	2.80	0.11	HL	1.25	0.28	VLL	2.75	0.13	HL	2.00	0.22	LL
19	Preparation of the university annual budget	1.40	0.15	VLL	2.70	0.21	HL	1.45	0.25	VL	2.65	0.14	HL	2.05	0.05	LL
20	Payment of staff salaries	1.40	0.13	VLL	2.00	0.01	LL	1.40	0.13	VL	2.00	0.22	LL	1.70	0.25	LL
21	payment of staff entitlements other than salaries	1.20	0.14	VLL	2.85	0.31	HL	1.35	0.13	VL	2.70	0.05	HL	2.03	0.21	LL
22	Funding of staff training	1.20	0.19	VLL	2.50	0.28	HL	1.05	0.12	VL	2.65	0.13	HL	1.85	0.22	LL
23	Funding of staff welfare programmes	1.65	0.15	LL	2.95	0.25	HL	1.85	0.25	LL	2.75	0.14	HL	2.30	0.22	LL
24	Control of projects' funds in the university	1.90	0.13	LL	2.55	0.13	HL	1.95	0.28	LL	2.50	0.19	HL	2.23	0.05	LL
25	Access to credit facilities	1.50	0.13	LL	2.60	0.91	HL	1.60	0.15	LL	2.50	0.13	HL	2.05	0.15	LL
26	Regular audit of the university accounts	1.90	0.25	LL	2.55	0.04	HL	1.95	0.05	LL	2.50	0.21	HL	2.23	0.98	LL
27	Determination of school fees payable in the university	1.80	0.23	LL	2.40	0.44	LL	1.85	0.29	LL	2.35	0.10	LL	2.10	0.85	LL
28	Determination of sundry fees payable in the university	1.85	0.29	LL	2.75	0.09	HL	1.65	0.05	LL	2.95	0.20	HL	2.30	0.14	LL
29	Remittance of check-off dues to university-based unions as due	1.95	0.1	LL	2.50	0.43	HL	1.90	0.11	LL	2.55	0.05	HL	2.23	0.75	LL
30	Remittance of check-off dues to university-based unions when due	1.80	0.21	LL	2.30	0.13	LL	1.60	0.21	LL	2.50	0.29	HL	2.05	0.35	LL
	GRAND	**1.57**	**0.17**	**LL**	**2.54**	**0.27**	**HL**	**1.58**	**0.18**	**LL**	**2.52**	**0.14**	**HL**	**2.05**	**0.40**	**LL**

From table 2 the grand mean values for male and female respondents were 1.57 and 2.54 respectively. Hence, male university staff (with grand mean of 1.57) were of the view that the level of financial autonomy existing in public universities in South East Nigeria is low. Contrarily, female university staff (with grand mean of 2.54) were of the view that the level of financial autonomy existing in public universities in South East Nigeria is High. similarly, the sampled university academic staff (with grand mean of 1.58) were of the view that the level of financial autonomy existing in public universities in South East Nigeria is low while the non-academic university staff (with grand mean of 2.52) were of the view that the level of financial autonomy existing in public universities in South East Nigeria is High. When treated jointly, the overall grand mean value was 2.05, indicating that, the university staff were of the view that the level of financial autonomy existing in public universities in South East Nigeria is low. Also, the standard deviation value for the overall (0.40) is small, indicating that there were little or no extreme values. Hence, the mean values so obtained represent the actual opinions of the respondents.

Hypothesis 1

Public universities' staff in South East Nigeria do not differ significantly in their ratings on the level of administrative autonomy existing in their universities based on their gender (male/female) and status (academic/ non-academic).

Table 3: ANOVA analyses for hypothesis 1

Source of Variation	Sum of Squares	DF	Mean Squares	F-ratio	Sig (.05)	Remark
Between staff status	182.11	1	182.11	1.1189	.000	Significant (Reject Hypothesis)
Between Gender	121.08	1	121.08	.7439	.001	Significant (Reject Hypothesis)
Interaction (staff status *Gender)	201.32	1	201.32	1.2369	.001	Significant (Reject Hypothesis)
Within samples (Error)	320131.30	1967	162.75			Significant (Reject Hypothesis)
Total	**320635.81**	**1970**				

From table 3 above, staff status (academic/non-academic) as main effect yielded an f-value of 1.1189. This is significant at .000 level. Since .000 is less than .05 level set for this study, it can be concluded that the f-ratio (1.1189) is significant at .05 level of significance. Similarly, gender (male/female) as main effect gave an f-value of .7439. This is significant at .001 level. Since .001 is less than .05 level set for this study, it can be concluded that the f-ratio (.7439) is significant at .05 level of significance. The interaction effect (staff status *Gender) yielded an f-value of 1.2369. This is significant at .001 level. Since .001 is less than .05 level set for this

study, it can be concluded that the f-ratio (1.2369) is significant at .05 level of significance. As a result of these, hypothesis one is rejected as stated indicating that public universities' staff in South East Nigeria differed significantly in their ratings on the level of administrative autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic). Precisely, male staff and academic staff opined that the level of administrative autonomy existing in public universities in South East Nigeria is low while female staff 011and non-academic staff opined that the level of administrative autonomy existing in public universities in South East Nigeria is high.

Hypothesis 2

Public universities' staff in South East Nigeria do not differ significantly in their ratings on the level of financial autonomy existing in their universities based on their gender (male/female) and status (academic/ non-academic).

Table 4: ANOVA analyses for hypothesis 2

Source of Variation	Sum of Squares	DF	Mean Squares	F-ratio	Sig (.05)	Remark
Between staff status	106.90	1	106.90	.7505	.011	Significant (Reject Hypothesis)
Between Gender	122.16	1	122.16	.8573	.000	Significant (Reject Hypothesis)
Interaction (staff status *Gender)	118.38	1	118.38	.8311	.010	Significant (Reject Hypothesis)
Within samples (Error)	280171.00	1967	142.435			
Total	**280518.44**	**1970**				

From table 4 above, staff status (academic/non-academic) as main effect yielded an f-value of .7505. This is significant at .011 level. Since .011 is less than .05 level set for this study, it can be concluded that the f-ratio (.7505) is significant at .05 level of significance. Gender (male/female) as main effect gave an f-value of .8573. This is significant at .000 level. Since .000 is less than .05 level set for this study, it can be conclude that the f-ratio (.8573) is significant at .05 level of significance. The interaction effect (staff status*Gender) yielded an f-value of .8311 This is significant at .010 level. Since .010 is less than .05 level set for this study, it can be concluded that the f-ratio (.8311) is significant at .05 level of significance. Therefore, hypothesis two is rejected as stated showing that public universities' staff in South East Nigeria

differed significantly in their ratings on the level of financial autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic). Precisely, male staff and academic staff opined that the level of financial autonomy existing in public universities in South East Nigeria is low while female staff and non-academic staff opined that the level of financial autonomy existing in public universities in South East Nigeria is high.

Summary of Findings

Findings made in this study can be summarized thus;

1. The university staff sampled in this study opined that the level of administrative autonomy existing in public universities in South East Nigeria is low.

2. The university staff sampled in this study were of the view that the level of financial autonomy existing in public universities in South East Nigeria is low.

3. Public universities' staff in South East Nigeria differed significantly in their ratings on the level of administrative autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic), male staff and academic staff rated the level of administrative autonomy low while female staff and non-academic staff rated it high.

4. Public universities' staff in South East Nigeria differed significantly in their ratings on the level of financial autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic), male staff and academic staff rated the level of financial autonomy low while female staff and non-academic staff rated it high.

Discussion of Findings

On the level of administrative autonomy existing in public universities in South East Nigeria, the university staff sampled in this study opined that the level of administrative autonomy existing in public universities in South East Nigeria is low. This finding is in agreement with the findings of Udida (2017), Usman (2018), Nwosu (2018) and Obeten (2020) who found their separate studies that public universities had low level of administrative autonomy. Contrarily, the finding made in this study with regard to level of administrative autonomy existing in public universities in South East Nigeria, disagrees with those of Zeph (2019) and Guppeh (2020) who reported separately that public universities had high level of administrative autonomy. This study further investigated whether or not public universities' staff in South East Nigeria will differ significantly in their ratings on the level of administrative autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic). In this regard, it was found that public universities' staff in South East Nigeria differed significantly in their ratings on the level of administrative autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic), male staff and academic staff rated the level of administrative autonomy low while female staff and non-academic staff rated it high. Zeph (2019) made similar finding where male and female as well as academic and non-academic staff differ significantly in their ratings. But

Udida (2017), Usman (2018), Nwosu (2018), Obeten (2020) and Guppeh (2020) all found no significant difference between the ratings of male and female as well as academic and non-academic staff in their universities sampled in their separate studies.

The finding made in this study showing low level of administrative autonomy of public universities is very worrisome. This is because in the university, administrative autonomy, describes the administrator's freedom to act in his official capacity without undue interference from a set of actors within or outside the university, (Udida, 2017). According to Udida, university administrative autonomy can be visible in the extent to which the university administrator exercises freedom in appointments of directors, appointments of heads of departments, deans of faculties, constituting of committees, prioritization of projects in the university, award of contracts for projects in the university and supervision/monitoring of on-going projects in the university. Consequently, when public universities administrators are denied autonomy, they are bound to be influenced rightly or wrongly in carrying out their functions. Of course, this practice will spell doom for the Ivory Towers.

On the level of financial autonomy existing in public universities in South East Nigeria, the university staff sampled in this study opined that the level of financial autonomy existing in public universities in South East Nigeria is low. This finding is in agreement with the findings of Yong (2017), Adekunle (2019) and Gidado (2019) who found their separate studies that public universities had low level of financial autonomy. But the finding disagrees with that of Williams (2020) who reported that public universities had high level of financial autonomy. This study further investigated whether or not public universities' staff in South East Nigeria will differ significantly in their ratings on the level of financial autonomy existing in their universities based on their gender (male/female) and status (academic/ non-academic). In this regard, it was found that public universities' staff in South East Nigeria differed significantly in their ratings on the level of financial autonomy existing in their universities based on their gender (male/female) and status (academic/non-academic), male staff and academic staff rated the level of financial autonomy low while female staff and non-academic staff rated it high. Williams (2020) made similar finding where male and female as well as academic and non-academic staff differ significantly in their ratings. In contrast, Yong (2017), Adekunle (2019) and Gidado (2019) all found no significant difference between the ratings of male and female as well as academic and non-academic staff in their universities sampled in their separate studies.

Financial autonomy encompasses vital issues such as; the university administrator's freedom with regards to access to statutory subventions, use of statutory subventions as desired by the university management, generation of internal revenue, use of internally generated revenue as desired by the university management, preparation of the university annual budget, payment of staff salaries and payment of staff entitlements other than salaries. In the Nigerian setting, Gidado (2019) alleged that most federal and state universities' administrators do not freely access their statutory subvention. Even when the subventions are released, the administrators are sometimes, forced to appropriate such funds as desired by those exercising

influences on them. Adekunle (2018) hinted that some public university administrators cannot decide how and when to pay staff salaries and other entitlement without recourse to agents and agencies of federal or state government as the case may be. Also endangered include; the university administrator's freedom to fund staff training, fund staff welfare programmes, control projects' funds in the university and access credit facilities, (Williams, 2020). According to Williams, a financially autonomous university administrator should freely audit the university accounts, determine school fees payable in the university, determine sundry fees payable in the university, remit check-off dues to university- based unions as and when due, among other financial functions. Until these happen in public universities, the future of university education remains threatened in Nigeria.

Recommendations

Consequent upon the findings of this study, the following recommendations were made;

1. Strict implementation of existing laws/policies on public universities autonomy by National Universities Commission, Federal and State ministries of education and other relevant authorities.

2. The National Universities Commission and other relevant authorities should enforce adequate sanctions against individuals or agencies hampering the autonomy of public universities.

3. National Universities Commission and Federal/State ministries of education should ensure that public universities access their due statutory subventions directly from federation/state accounts as applicable.

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UNDERGRADUATE STUDENTS PERCEPTION ABOUT THE IMPERATIVENESS OF MATHEMATICS EDUCATION IN EMPLOYMENT GENERATION

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Abstract

This study was an attempt to empirically analyse undergraduate students' perception about the imperativeness of mathematics education in employment generation. The sample of this study included a total of 300 undergraduate students (150 science and 150 non - science) randomly sampled from universities (2 affiliate and one main in Enugu Metropolis. The research design adopted for the study was a descriptive survey design. The research instrument was a self-designed questionnaire on undergraduate students' perception on imperativeness of mathematics education for employment generation. One research question and one hypothesis were formulated. The research questions were answered using percentage and one hypothesis was tested using t-test analysis. The result respectively indicated no significant difference between undergraduate science and undergraduate non- science students' perception about importance of mathematics education for employment generation. It was concluded that

undergraduate science and undergraduate non –science student perceive equally that mathematics education is a window to employment opportunities. The paper recommended among other things, the need for sensitization of mathematics education and its immense practical values for employment generation.

Introduction

Mathematics is an integral part on the total education process which is very useful to mankind. The most obvious reason, to us for teaching and learning mathematics is that it is necessary for a person to have some knowledge of mathematics in order to live as a useful man and effective member of the society.Ukeje (1997) while writing on the important role played by mathematics in social, economic and technological development of any country, emphasized that without mathematics, there is no science and without science there is no modern technology and without modern technology, there is no modern society. According to him, mathematics education is, therefore, essential in the technological development of Nigeria. Furthermore, mathematical skills are crucial for a wide array of analytical, technological, scientific, security and economic applications.Therefore mathematics education is a necessary ingredient for employment generation and sustainability in Nigeria. Consequently, based on the foregoing, the basic problem of this study was on mathematics education for employment generation and sustainability.Mathematics education in the contemporary education is the practice of teaching and learning mathematics. In Federal Republic of Nigeria (2014), the importance of mathematics education were clearly stated. There include among others, preparation for useful living in the society, and preparation for higher education.Odilli (1986) summarized the importance of mathematics education thus:

1. Preparing individuals for life. The power of mathematics in character building, throughactive involvement, personal success, works with others self-expression and self-criticism cannot be over looked.

2. A necessary condition for a happy life. This is the act of economic living, not only on terms of money economy, but in the economy of every single act of life-Like the economy of time which is most valuable asset of man.

3. Mathematics helps to raise a generation of people who can think for themselves, respect the views and feeling of others through the application of the four main mathematics methods of scientific, intuitive, deductive and inventivetechniques used in investigating interpreting and making decisions.

4. Preparation of people for a useful living: Knowledge of counting, viz addition, subtraction, multiplication, division, weighing measuring, selling, buying are process of mathematics that have practical value in life.

5. Mathematics serves as a language: Mathematics involves the use of carefully defined terms and concise symbolic representation and precision to communication, e.g. 5+4=9, means the same thing for everybody, no matter your tribe or race. Furthermore, a survey of the relationship between mathematics and other subjects show that anyone who wants to pursue

these subjects should have a clear understanding of mathematics. Employment generation is the creation of activities which fall under therubric of job creation which includes short term opportunities that yield quick impact, sustainability, long term impact and the development or more enduring livelihood in the public and private sectors through education and training focused on relevant skills and competences.

Ukadike (1997), shared the view that mathematics is indispensable because it has application in all other human activities including schools, science and technology based subjects. It has become the central intellectual discipline of the technological society. As such mathematics is one of the most important subjects in Nigeria which is made compulsory because of the contemporary challenges, it poses in society and human needs in this present era of technological advancement and in the realization of Nigerian vision of the year 2020. Mathematics education has helped in no small measure to the generation of employment in Nigeria of present. The teaching and learning of mathematics and its branch statistics have provided a wide variety of career because mathematics education have provided individuals with the problem solving technique, computing and communication skills which employers want. Mathematics education has generated employment in various areas of endeavour. The knowledge of mathematics has created job opportunities in areas as diverse as banking, insurance, investment, environment modeling, and metrology, computinginformation, education or research. In the finance industry, positions like portfolio optimization, option pricing and stock market prediction require mathematical calculation.

Mathematics education has generated employment opportunities for those that are competent. This is so because the handling of large amount of money requires the use of sophisticated mathematics techniques to limit risk. Other areas mathematics education has generated employment are in the electricity industry where the present deregulation of the electricity industry has created a high demand for mathematics and environmental systems. Mathematics education has equally generated employment in the areas of communication which involves interpreting complex financial information for company report and the perspectives, in the areas of designing television and newspaper weather predictions, the design of fuel-efficient automobiles and airplanes. All these require mathematics education.Hence mathematics is the ultimate portable skill for employment generation. The efforts towards employment generation in Nigeria can be traced back to the early 1980s. It is on recorded history that the Banbagida led government (1983-1993) initiated the National Directorate of Employment (NDE), the Obasanjo led third Republic (1999-2007) came up with the National Economic Empowerment and Development Strategy(NEEDS) and the government of Goodluck Jonathan led government of vision 20:2020 also had employment generation as the major focus. It is a well-recognized and accepted fact that successive governments have made concerted efforts to initiate programmes and policies or employment generation in order to reduce poverty and improve the lives of people.

Despite the efforts of the various governments towards employment generation, employment has remained one of the most politically pressing challenges of Nigeria. It is disheartening that

Nigeria's unemployment rate is spiraling upwards year in year out and this has been a significant contributor to the dramatic rise in social unrest and sophisticated crimes (Bakare,2013). Reasons for the scenario of unemployment in Nigeria have been attributed to the rising population growth rate (Agada, 2011).Olagunju (2009) observed that mathematics education at all levels is voted for National Development and employment generation in the 21st century. Realizing the imperativeness of mathematics education, Mustapha(2002) opined that a combination of physics and other science subjects is the driving force for engineering and industrialization which have capacity for employment generation. In a related study, Yusuf (2005) observed that a combination of mathematics and chemistry is the driving force for chemical industries that can create employment opportunities for people. Therefore, the overwhelming conclusion of most research studies is that mathematics education is a window of opportunities for employment generation for the teeming population youth in Nigeria. Due to the above important reasons, efforts have been vigorously geared towards equipping the critical mass of Nigerian youths with functional mathematics education.

Research studies conducted by Gears (2011) and Rothwell (2012) on online analysis of perception about importance of mathematics education for job creation among students in mathematics education fields and non mathematics education fields find no significant difference. Concomitantly, Olaniyan and Opayinka (2012) document A.O significant difference in teachers' perception about importance of mathematics education as a key driver of employment generation. Thus, the point of concordance of the research studies is that there is a general consensus among student's professionals that a large number of public career opportunities exist in mathematics education fields. But normally, the results of public school examination such as WAEC and NECO is mathematics education subjects have been dismally poor. (chukwusa and Udoye, 2011;Olaniyan and Olosunde 2012). This situation as described above is capable of circumventing all efforts aimed at generating employment through mathematics education.

Statement of the Problem
The high rate of unemployment amongst youths in Nigeria is an issue of national concern. Research studies have consistently indicated that unemployment can be generated if appropriate mathematics education knowledge and skills are acquired. However, research studies have not focused on perception of undergraduate students about the importance of contributions of mathematics education in generating employment opportunities. This is a disturbing scenario to which experts and experienced educators in the field of science education must be sensitive to. It is against this background, therefore, that the study was motivated to investigate perception of undergraduate students on the imperativeness of mathematics education in generating sustainable employment.

Purpose of Study

The purpose of study was to investigate undergraduate science and undergraduate non- science student's perception about importance of mathematics education in sustainable employment for teeming population of youths in Nigeria. It is hoped that findings from this study would be significant for governments to be sensitive to popularizing the study of mathematics education subjects in the school systems.

Research Question

Is there any difference between undergraduate science and undergraduate non-science students' perception about importance of mathematics education in generating employment opportunities?

Hypothesis

There is no significant difference between undergraduate science and undergraduate non-science students' perception about importance of mathematics education in generating employment opportunities.

Methodology

Research Design: The research design adopted for the study was a survey design.The population for this study consisted of all undergraduate students of Enugu State University of Science and Technology (ESUT). The sample comprised 300 undergraduate students in the Department of Science and Computer Education, ESUT,Agbani this was sampled. Randomly sampled from1,060 students in the department. By using stratified random sampling techniques, 300 undergraduate students (150 science and 150 non-science) were sampled from each of the university to give a total of 150 undergraduate science students. The instrument for data collection in this study was a self-designed questionnaire on undergraduate student's perception about importance of mathematics education and Employment Generation tagged(USPMEG). The instrument had two sections: Section A requested for the demographic data of the respondentswhile section B contained item questions on which respondents were required to tick against the 20 item questionnaire.

To ensure face validity of the instrument, the draft questionnaire was subject to vetting by two experts in the field of measurement and evaluation. The experts suggestions were included in the final draft of the instrument. The reliability index of the instrument was found to be 0.83 using Cronbach Alpha.The researcher with help of some lecturers and participants administered the questionnaire to the sampled respondents. Instruction were given to the respondents and the questionnaire copies were retrieved by the researcher. The return rate was 100% and was found very satisfactory.The data collected was subjected to percentage and the research hypothesis was tested using t-test statistical analysis.

Results

Research Question: is there any difference between undergraduate science student and undergraduate non-science students' perception about importance of mathematics education in generating employment?

Table: Results for Research Question 1.

SN	Task Items	Total	Science Students undergraduate		Non Science Students Undergraduate	
		No	No	%	%	%
1	Mathematics education is a window of opportunities for employment generation.	270	140	51.9	130	48.1
2	Mathematics education is a strong force for employment generation.	268	145	54.1	123	45.9
3	Mathematics education is the driving force for industrialization that engenders job opportunities.	283	150	53.0	133	47.0
4	Mathematics education prepares individuals for Care in adverse range areas.	224	124	55.4	100	44.6
5	Mathematics education is essential for a variety of career opportunities.	240	128	53.3	112	46.7
6	Mathematics education facilitates the establishment of medium and small scale industries that engenders employment	265	138	52.1	127	47.9
7	Mathematics education contains necessary information to generate employment.	265	152	53.3	133	46.7
8	Mathematics education is the key driver of employment generation.	272	146	53.7	126	46.3
9	Mathematics education is a leading provider of employment.	255	153	60.0	102	40.0

No.	Statement					
10	Mathematics education is essential to achieve sustainable employment generation.	246	128	52.0	118	48.0
11	Mathematics education has immense practical values in generating employment.	190	100	52.6	90	47.4
12	A large number of employers are seeking individuals with mathematics education background.	284	154	54.2	130	45.8
13	The More students we train in mathematics education, the more jobs will be created.	276	150	54.3	125	45.7
14	Mathematics education develops creative problem solving and technical skills that will help employment generation.	262	136	51.9	126	48.1
15	It is important for every individual to have access to mathematics education since it generates employment.	240	128	53.3	112	46.7
16	Mathematics education plays a vital role in generating employment.	261	138	52.9	123	47.1
17	If every individual is mathematics education minded, unemployment would not have assumed the worrisome dimension in Nigeria.	226	121	53.5	105	46.5
18	A workforce with sufficient mathematics education knowledge and skills would generate employment.	250	130	52.0	120	48.1
19	Appropriate mathematics education would be needed to generate employment.	285	148	51.9	137	48.1

| 20 | There is need to inspire young people to take an interest in mathematics education. | 268 | 142 | 51.9 123 | 45.9 |

Table 1 showed slight differences and deviations in responses to items (1-20) from the analysis of the percentage recorded. The implication of the questions raised above revealed that undergraduate students' perception about importance of mathematics education for employment generation differ and generally higher for undergraduate science students in the sampled schools.

Hypothesis: There is no significant difference between undergraduate science and undergraduate non-science students' perception about importance of mathematics education in generating opportunities.

Table 2: t-test Result between undergraduate science and undergraduate non-science students' perception about importance of mathematics education for employment generation.

Group	N	X	SD	Df	Calculated value	Critical t-value
Undergraduate science students	150	7.11	2.5			
				19		
Undergraduate Non-science students	150	6.22	2.1		0.2564	1.96

From table 2 above, the calculated t-value of 0.2564 is less than the critical value of 1.96 at 0.05 level of significance with 19 degreesof freedom. This is the evidence to accept the hypothesis that there is no significant difference between undergraduate science students and undergraduate Non-science students' perception about importance of mathematics education in generating employment opportunities.

Discussion

The findings of the study have shown that undergraduate science students have a higher perception about importance and contributions of mathematics education in generating employment opportunities as evidenced by the results in table 1. However, on the whole, the differences in mean perception scores between undergraduate science and undergraduate Non-science are not statistically significant. Therefore by implication this means that irrespective of academic discipline students are generally sensitive to the fact that mathematics education is the

pivotal for employment generation. The findings of this study corresponds with the findings of the previous research studies (Gears 2011; Rothwell 2012).It also been seen from table 2 that there is no significant difference in perception of undergraduate science and undergraduate non-science students about importance of mathematics education for employment generation. By implication, this means that the two groups perceived on equal level the importance and contributions of mathematics education for employment generation. However, the result of the test of the hypothesis seems to have corroborated the findings of the previous research studies (Olaniyan and Opayinka 2012) that found no significant difference in teachers' perception about importance of mathematics education as a driving force for employment generation. Many reasons may account for this result. The major factors might be due to the influence of Mathematics education in the contemporary society that affect what we often take for granted.

Conclusion

The findings from this study showed that undergraduate science and undergraduate non-science students perceived the importance Mathematics education on equal level for employment generation in the march towards sustainable employment generation, Mathematics education is a pre-requisite for the employment generation.

Recommendations

1. Capacity building workshops should be organized for students to upgrade their Mathematics education quality learning and provide job creation interventions.
2. Tertiary institutions should provide functional Mathematics education and training that would lead to employment generation.

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AVAILABILITY AND UTILIZATION OF INTERNET SERVICES AMONG UNDERGRADUATES IN ENUGU STATE OWNED TERTIARY INSTITUTIONS

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Abstract

The introduction of ICT in Nigerian tertiary institutions is a remarkable step that will contribute to knowledge production, communication and information sharing among students and teachers in the school system. At present, many public tertiary institutions in Nigeria can now boast of computer laboratories through which students are gaining basic computer literacy, however, the commitment of government to the provision of infrastructure for ICT policy implementation seem not to be enough. This study therefore aimed at determining the Availability and utilization of internet services among undergraduates in Enugu state owned tertiary Institutions. This was done by reviewing literature on related concepts.It was therefore suggested that strategies unveiled in the study be adopted to enhance Availability and utilization of internet services among undergraduates in Enugu state owned tertiary Institutions. It was recommended that to improve the availability and utilization of internet services by undergraduates in government owned tertiary institutions, the government should subsidize the cost of computers and internet facilities, reduce of tariffs on data subscription and sponsor free computer trainings by the government.

Introduction

The use of the internet has become a central part of the developed and developing societies around the world. The internet is more than just a means of seeking information. people

have discovered that the internet can be used to connect with other people for business or commercial purpose, to make new or to reawaken old friends and long lost relatives (Anderson,2001).the internet is an integral part of most students with more than 90 percent of the students have access to the internet (Anderson,2001).Computer is now easily found in our offices, homes industries, where they perform different tasks like data processing, mass storage sector and business analysis. It is also applied in school, bank, and agricultural sector, management companies for data processing and money transactions with the help of spreadsheet and area network, it is also use in school as a supplement to traditional instructional of teaching and learning. Computers have been used to create electronic libraries and catalogues to enhance academic research work.

According to Heeks (1999), many libraries now provide online resources to facilitate learning and research electronically. Communication technology (ICT) is a transformative tool and its full integration into the school systems is necessary to prepare students for the information society they will inherit. Currently ICT has been incorporated into the school curriculum, beginning with the pre-tertiary institutions. The internet allows cost-effective information delivery services, collaborative and distance education, more than has ever been imagined(Clyde,2002,Toddd,2007) The internet has myriad (a countless number or multitude) websites to help teachers develop or improve lesson plans exchange ideas, obtain information, and find free animations and simulations to enliven their lessons.

According to Awotua-Efebo (2000), most internet-based collaborative learning projects include teacher support and training, and conference proceedings are published regularly on the web. Chat rooms or forums may become a laboratory for new ideas. Online study resources can also provide interactive tools for teachers to access feedback from students, computer-based assignments are an effective way of ascertaining students understanding of concepts. Students also learn more quickly, demonstrate greater retention, and are better motivated to learn when they work with computers. From the early 1990s education stakeholders in Nigeria have been concerned about how teachers and students use computers in schools and how their use supports learning and Teaching. Teachers use computers to write lesson plans prepare materials for teaching, record and calculate students' grades, and communicate with other teachers as such, computers have become a routine tool for helping teachers accomplish their professional work". However, many teachers do not facilitate substantial student use of computers for learning activities computer-based test are easier to administer and are quicker to mark. Research findings have shown that the use of computers for drill and practice, and for instructional delivery yields positives results. However, the computers must be available in order to be used.

Availability means suitable/capable or ready for use to accomplish a purpose (new English dictionary version 2.8). ICT availability means suitable or ready for use. ICT availability means the level to which ICT tools is ready for users to use. ICT has become the talk of the moment in global socio-economic affairs. It has become so important that every country organization, institution, no matter how highly or lowly placed want to identify and embrace it. The world at present is knowledge-driven and information age has taken the center stage in

virtually everything. Utilization and improving of ICT facilities are therefore a sine qua-non for qualitative instructional service delivery in technical colleges. According to Ajayi (2008), the use of these ICT Facilities involves various methods which include, systemized feedback system, computer-based operation network, internet website and computer assisted instruction. It must however be stressed that effective use of the various internet services in teaching and learning depends on the availability of these facilities and teacher's competence in using them.

Utilization simply means "to put use" (oxford dictionary, 5th edition). internet utilization is a term used to describe the level to which internet is used and controlled. Utilization of internet services in involves to put to use or making use of the internet services and facilities. Availability of internet services and facilities in computer Education involves where the internet and facilities are ready or suitable and facilities should be available before it can be used by learners and teachers. With the of internet services/ICT in ESUT and other tertiary institution in Enugu metropolis, computer student can participate and excel in their chosen careers in future endeavor and teachers can take students beyond traditional limits, ensure their adequate participation in teaching and learning process and also crate vital environment to experiment and explore. The factors that can affect or influence availability and utilization of internet services by computer students are: finance, government, policy, level of computer literacy, power supply, internet by the teachers and students, hardware, software, personal access for teachers etc.
Therefore, this study was set to find out the availability and utilization of internet services in tertiary institutions in Enugu metropolis.

Review of Related Literature

Computer Network as Internet Facilities
A computer network is a group of devices connected with each other through a transmission medium such as wires, cables etc. These devices can be computers, printers, scanners, Fax machines etc.

Types of computer network

LAN (Local Area Network) - Can go up to 1 KM radius. A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a distinct geographic area such as an office or a commercial establishment.

WAN (Wide Area Network) - No Limit. A wide area network (WAN) is a network that exists over a large-scale geographical area. A WAN connects different smaller networks, including local area networks (LANs) and metro area networks (MANs). This ensures that computers and users in one location can communicate with computers and users in other locations. WAN implementation can be done either with the help of the public transmission system or a private network.

WLAN (Wireless Local Area Network) - A wireless local area network (WLAN) is a wireless computer network that links two or more devices using wireless communication within a limited area such as a home, school, computer laboratory, or office building. This gives users the ability to move around within a local coverage area and yet still be connected to the network. Through a gateway, a WLAN can also provide a connection to the wider Internet. Most modern WLANs are based on IEEE 802.11 standards and are marketed under the Wi-Fi brand name.

MAN (Metropolitan Area Network) - A metropolitan area network is a computer network that interconnects users with computer resources in a geographic area or region larger than that covered by even a large local area network (LAN) but smaller than the area covered by a wide area network (WAN). The term is applied to the interconnection of networks in a city into a single larger network (which may then also offer efficient connection to a wide area network). It is also used to mean the interconnection of several local area networks by bridging them with backbone lines. The latter usage is also sometimes referred to as a campus network.

CAN (Campus Area Network) - A campus area network is a computer network made up of an interconnection of local area networks (LANs) within a limited geographical area. The networking equipment (switches, routers) and transmission media (optical fiber, copper plant, Cat5 cabling etc.) are almost entirely owned by the campus tenant / owner: an enterprise, university, government etc.

SAN (Storage Area Network or System Area Network) - For storage area network, as a dedicated high-speed network that connects shared pools of storage devices to several servers, these types of networks don't rely on a LAN or WAN. Instead, they move storage resources away from the network and place them into their own high-performance network. SANs can be accessed in the same fashion as a drive attached to a server. Types of storage-area networks include converged, virtual and unified SANs.

Then for system area network, it is used to explain a relatively local network that is designed to provide high-speed connection in server-to-server applications (cluster environments), storage area networks (called "SANs" as well) and processor-to-processor applications. The computers connected on a SAN operate as a single system at very high speeds.

PAN (Personal Area Network) - The smallest and most basic type of network, a PAN is made up of a wireless modem, a computer or two, phones, printers, tablets, etc., and revolves around one person in one building. These types of networks are typically found in small offices or residences, and are managed by one person or organization from a single device.

POLAN (Passive Optical Local Area Network) - As an alternative to traditional switch-based Ethernet LANs, POLAN technology can be integrated into structured cabling to overcome concerns about supporting traditional Ethernet protocols and network applications such as PoE

(Power over Ethernet). A point-to-multipoint LAN architecture, POLAN uses optical splitters to split an optical signal from one strand of single-mode optical fiber into multiple signals to serve users and devices.

EPN (Enterprise Private Network) - These types of networks are built and owned by businesses that want to securely connect its various locations to share computer resources.

VPN(Virtual Private Network) - A virtual private network extends a private network across a public network, and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network. Applications running across the VPN may therefore benefit from the functionality, security, and management of the private network.
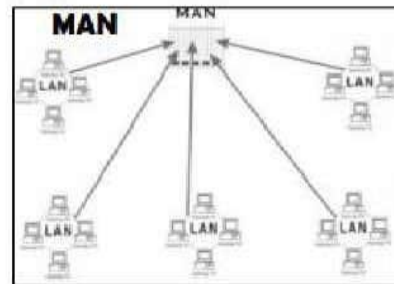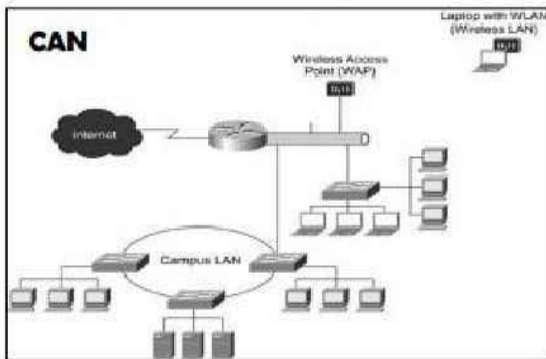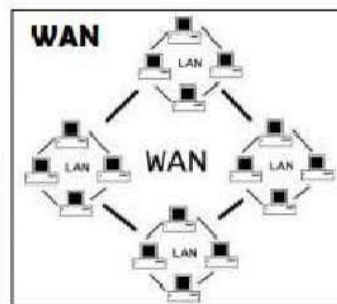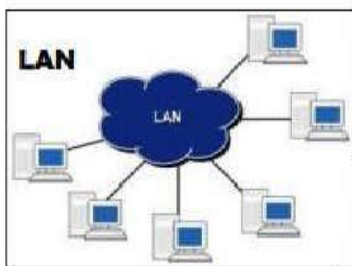
PARAMETERS	LAN	WAN	MAN
Ownership of network	Private	Private or public	Private or public
Geographical area covered	Small	Very large	Moderate
Design and maintenance	Easy	Not easy	Not easy
Communication medium	Coaxial cable	PSTN or satellite links	Coaxial cables, PSTN, optical fibre, cables, wireless
Bandwidth	Low	High	moderate
Data rates(speed)	High	Low	moderate

The purpose of having computer network is to send and receive data stored in other devices over the network. These devices are often referred as nodes.

There are **five basic components** of a computer network
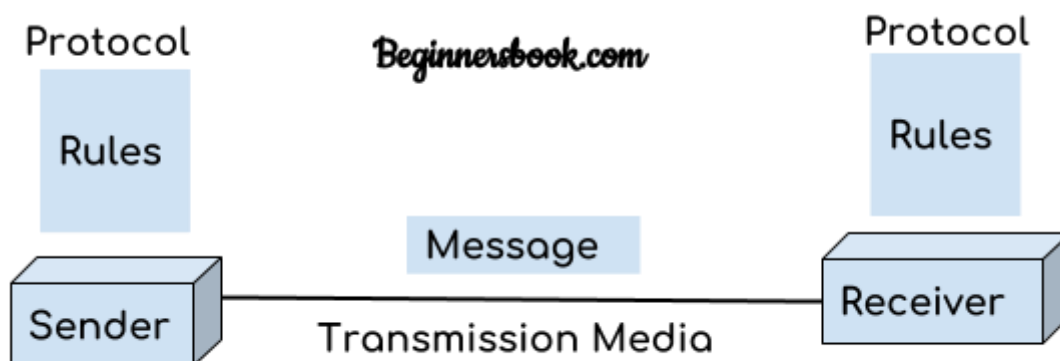
Message: It is the data or information which needs to be transferred from one device to another device over a computer network.

Sender: Sender is the device that has the data and needs to send the data to another device connected to the network.

Receiver: A receiver is the device which is expecting the data from other device on the network.

Transmission media: In order to transfer data from one device to another device we need a transmission media such as wires, cables, radio waves etc.

Protocol: A protocol is a set of rules that are agreed by both sender and receiver, without a protocol two devices can be connected to each other but they cannot communicate. In order to establish a reliable communication or data sharing between two different devices we need set of rules that are called protocol. For example, http and https are the two protocols used by web browsers to get and post the data to internet, similarly smtp protocol is used by email services connected to the internet.

Features of a Computer Network
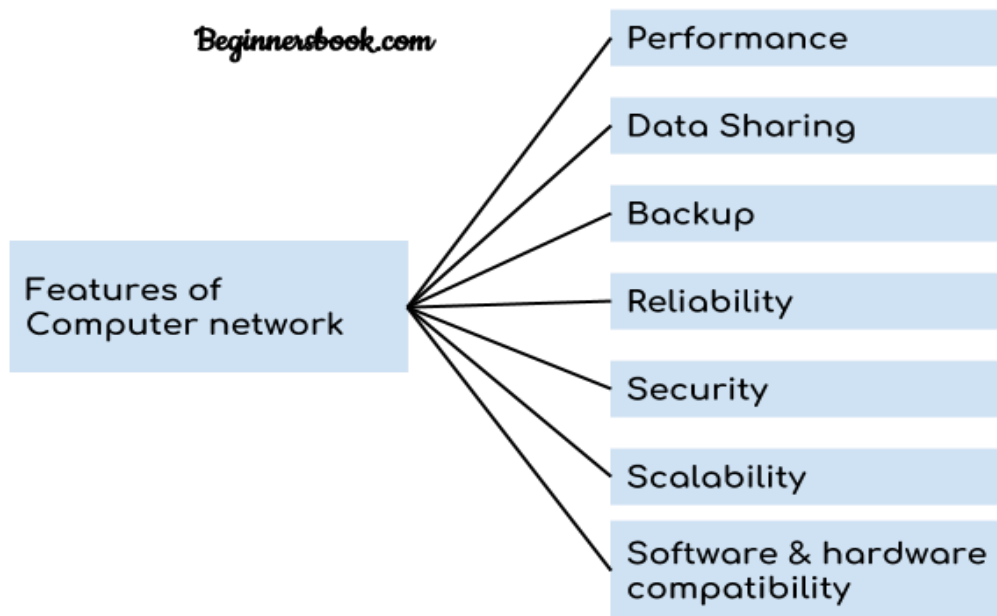
A computer network has following features: by Explanations

Performance: Performance of a computer network is measured in terms of response time. The response time of sending and receiving data from one node (computer in a computer network are often referred as node) to another should be minimal.

Data Sharing: One of the reasons why we use a computer network is to share the data between different systems connected with each other through a transmission media.

Backup: A computer network must have a central server that keeps the backup of all the data that is to be shared over a network so that in case of a failure it should be able to recover the data faster.

Software and hardware compatibility: A computer network must not limit all the computers in a computer network to use same software and hardware; instead it should allow the better compatibility between the different software and hardware configuration.

Reliability: There should not be any failure in the network or if it occurs the recovery from a failure should be fast.

Security: A computer network should be secure so that the data transmitting over a network should be safe from unauthorized access. Also, the sent data should be received as it is at the receiving node, which means there should not be any loss of data during transmission.

Scalability: A computer network should be scalable which means it should always allow adding new computers (or nodes) to the already existing computer network. For example, a company runs 100 computers over a computer network for their 100 employees, let's say they hire another 100 employees and want to add new 100 computers to the already existing LAN then in that case the local area computer network should allow this.

A **Computer Architecture** is a design in which all computers in a computer network are organized. An architecture defines how the computers should get connected to get the maximum advantages of a computer network such as better response time, security, scalability etc. The two most popular computer architectures are **P2P (Peer to Peer)** and

Utilization of Internet in Tertiary Institutions
The need for utilization of Internet in tertiary institutions has been viewed by many authors like Haag (2004) as inevitable and something that could be used in all sphere of life to improve the Lives of people and solve societal problems. Laudon and Laudon (2002) stressing the need for Internet use in tertiary institutions said that Internet is a very fast method of communication, with messages arising anywhere in the world within seconds or a minute or two at most. Thelen (2002) in appraising the current which Internet plays in the life of students concluded that Internet plays a very crucial role in the attitude of students. Thelen further stated that coming from school that does not have Internet access, creates much complexity that going through the information resources on the Internet is definitely faster than reading an entire book.
Hobson (2007) opined that, the Internet and use of personal computers have altered many students and teachers well established habits like the way the media is used. Today students and teachers are more likely to read the morning headlines online than in the newspaper on the breakfast table. This shows that the utilization of Internet is for both teachers and students to broaden their knowledge. Fatoki (2004) in his own view posited that, Internet is an upcoming tool with a. very high potential for students if only they can be guided in the use of the web resources in academic purposes. Fatoki further stressed that, the Internet provides improved information on current events and the latest opinions since it is timely, interesting and exposes students to a greater variety of materials.

Leroy (2005) stressed that the Internet is only a part of the school library which helps in liberating the students from the bonds of educational entrenchment as well as quicken all learning activities. LeRoy further stressed that policy makers need to demonstrate the alternative

means to antiquated and dominant paradigm of teachers as disseminators and student as receptors. Internet offers students the opportunity to learn at their own pace. Onwumbiko (2004) in his own view says that Internet. is fast becoming the perceived place to find all the information students want and is frequently used by library clients.Libraries and their catalogues are locked up as antiquated, not keeping up with the minute information users now demand. The best any tertiary institution can do for its students is to provide them with well-connected Internet facilities and teach them how to access it to retrieve information and other sundry sources.Mbachu (2007) stressed that the impact of Internet in the total operation of the school libraries connote that Internet is now a global tool for information acquisition, processing, storage, retrieval and dissemination. Daramola (2004), also remarks that the use of Internet in technological education programmes is an important step as it provides fast and easy transfer of skills in the exchange of Information.

Ebifung (2000) listed some of the factors that are essential, for successful use of the Internet. These include knowledge and usage of the Internet services; training on a continual basis; availability of equipment and technical assistance; supportive administration; collaboration with other teachers; collaboration with other students; and advanced planning. He gave a summary of some key reasons why students should be encouraged to use the Internet in their learning. These are motivating factors; fast communication; access to information; interactive activities; cooperative learning; locating research materials; acquiring varied writing skills.The Internet in all its ramifications has revolutionized community and information service the world over in the. Last decade, It has equally opened a new vista in the world of library and information service as it has generally enhanced scholarly communication and research in all fields of human endeavors. Rainer, Potter and Turban (2007), stressed that Internet also provides a true democratic communications forum and has produced a democratization of information. That is, the Internet handles everyone's communications the same way, whether secondary school student or the university student. It is the worth what we say that determines who is willing to listen, not your title or academic qualifications. In most, cases, users are free to say what they want on the Internet, and when. The Internet is an open sharing environment that is remarkably free of censorship, a tribute to its roots in the academic and research communities.Allen (2001) emphasized on the two basic ways through which students can find information on the web via Internet: searching and browsing. He stressed that the searcher should use the brute force of computers to dig up information and that the computer applications designed to do this sort of works on the web are called search engines. He further explained that browsing requires that the searcher should do a lot of the work herself.In the light of all these, the need for this study is obvious as n9ost experts have rightly pointed out that the Internet is very much important in our schools, yet, amazingly, has remained neglected. Thus; the utilization of internet services among the students of tertiary institutions is assessed.

Factors Militating Against the Utilization of Internet Services

Many factors militate against the use of Internet in school library. Among these factors is the absence of well-trained personnel known as teacher librarian who should organize and render services to users. Daramola (2004) said that; Internet in school library is militated against by lack of skilled manpower.Without the qualified personnel to handle the affairs of the internet. in the school library, there is bound to be set back in the process of school library development and utilization. The untrained school librarian without adequate knowledge of the new trend. cannot perform the function of teaching the student the methodology of using the Internet. Badu (2004) stated that; several factors inhibit the successful implementation of Internet such. as lack of skilled personnel, coupled with lack of training culture in Internet skills, intermittent electric power cuts. He further observed that trained personnel are so crucial for the effective performance of Internet in school library. A trained school librarian is very important without which the school library cannot function effectively.

Mbachu (2007) commenting on the problem of fund, stressed that fund will be required for training and retraining of specialist staff, who will man the media centers. Assistance from government, some social clubs together with the Association of old students could be great help towards achieving a reasonable fund To equip the Internet in the school library. Teachers on their own part should always use the Internet so that they can be in the position to encourage the students to use the library by giving them assignments to do with the use of Internet in the school library.Okeke, Orakpor and Ezejiofor (2007) commenting on the problem of the use of Internet by students' state that the major problems are fund, computer phobia, changes in the role of school librarian, pornography and misinformation. Others include change in library arrangement, installation and repairs. If challenges of this magnitude persist, it might hamper the utilization of internet services in tertiary institutions. Hence, the extent of utilization of internet services among students in Enugu State owned tertiary institutions.

Strategies for overcoming the problems of the utilization of internet services

Owing to the numerous problems facing the utilization of internet services, Ajayi and Adetayo (2005) posited that there are various ways by which the problems affecting the utilization of internet can be reduced to enhance its use by the students. Echezona (2005) opined that both availability and utilization of internet services would be enhanced if the following were taken into consideration:

- Provision of both printed and electronic information resources.
- Provision of need based education programme by the library for easier exploitation of available resources.
- Provision of on-line materials in electronic format.
- Updating the skills of the staff to enable them to help users. Improving the funding of the school to enable it to purchase and maintain needed information technology, books, journals and audio-visual resources.

Another strategy is on the area of awareness. The problem of inadequate awareness was addressed by Popoola (2008) who posited that awareness could be done through planned public relations programmes, study tours, user education programmes, organization of seminars, symposia and workshops are ways to encourage the utilization of internet services among students in Enugu State owned tertiary institutions.

Recommendations

To improve the availability and utilization of internet services by undergraduates in government owned tertiary institutions, the government should;

1. Subsidize the cost of computers and internet facilities
2. Reduce of tariffs on data subscription
3. Sponsor free computer trainings by the government

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INTEGRATING CURRENT COMPUTER SOFTWARE APPLICATION INTO EDUCATIONALSYSTEM

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Abstract

This paper is aimed at showcasing the importance of software applications in computer studies. Software enables computer to perform a specific task. Application software are installed to perform specific task. There are different types of application software such as: word processing, database, excel spread sheet, multimedia software, presentation software, simulation software etc. All these and more are application software which are used to perform a particular task as it may be assigned to it by the programmer. Basic features of the different software application are equally discussed. Some wares are negative and also have adverse effect on the computer system or on the application itself.

Introduction

In as much as we are faced with the challenges of insecurity all over the nation threatening our lives and means of livelihood we are not relenting in trying to proffer solution to some of the challenges. We have witnessed a lot of killings and maiming and destructive desires in some youths and trending technologies has helped in recent times which includes mobile banking, E-commerce, online learning, online booking etc. these are APPs developed to ease some challenges encountered in those areas and more. In this vein computer application software is poised to solve more problem to reduce much travelling and gathering and carrying of huge sum around. Educationists are equally queuing into the trend by developing educational APPs that distance students can use and access information. These may have its challenges but the struggle to better the lives of users and ease our struggle will continue.Software is a program that enables a computer to perform a specific task, as opposed to the physical components of the system (hardware).This includes application software such as a word processor, which enables a user to perform a task, and system software such as an operating system, which enables other

software to run properly, by interfacing with hardware and with other software.Practical computer systems divide software into three major classes: system software, programming software and application software, although the distinction is arbitrary, and often blurred.Computer software has to be "loaded" into the computer's storage (such as a hard drive, memory, or RAM).Once the software is loaded, the computer is able to execute the software.Computers operate by executing the computer program.

This involves passing instructions from the application software, through the system software, to the hardware which ultimately receives the instruction as machine code.

Each instruction causes the computer to carry out an operation -- moving data, carrying out a computation, or altering the control flow of instructions.

Application Software

While system software comprises device drivers, OS, servers, and software components, programming software helps in writing programs through tools such as editors, linkers, debuggers, compilers/interpreters and ore. Application software, in contrast to these two, is used for attaining specific tasks.

Application software uses the capacity of a computer directly for specific tasks and are used to manipulate text, graphics and numbers.

The different types of application software include the following:

Application Software Type	Examples
Word processing software	MS Word, WordPad and Notepad
Database software	Oracle, MS Access etc
Spreadsheet software	Apple Numbers, Microsoft Excel
Multimedia software	Real Player, Media Player
Presentation Software	Microsoft Power Point, Keynotes
Enterprise Software	Customer relationship management system
Information Worker Software	Documentation tools, resource management tools
Educational Software	Dictionaries: Encarta, Britannica Mathematical: MATLAB Others: Google Earth, NASA World Wind
Simulation Software	Flight and scientific simulators
Content Access Software	Accessing content through media players, web browsers
Application Suites	Open Office, Microsoft Office

Application Software Type	Examples
Software for Engineering and Product Development	**IDE** or Integrated Development Environments

There are various types of application software such as licensed, sold, freeware, shareware, and, open source.

Application software either need to be installed or can run online. Application software can also be distinguished on the basis of usage into the following:

- Utility programs
- Generic programs
- Integrated programs
- Specific software
- Bespoke software
- Word processing software
- Desktop publishing software
- Spreadsheet software
- Database software
- Presentation software
- Internet Browsers
- Email Programs
- Graphic Programs (Pixel based)
- Graphic Programs (vector based)
- Communication software: Communication through audio, video or chat based means

The following table describes different kinds of software applications that would be suitable for different tasks:

Word Processing software - Use this kind of tool to create worksheets, type letters, type papers, etc.

MS Word, WordPerfect, MS Works, AppleWorks,

Desktop Publishing software - Use this software to make signs, banners, greeting cards, illustrative worksheets, newsletters, etc.

Adobe PageMaker, MS Word, MS Publisher, AppleWorks, MS Works, Quark Express,

Spreadsheet software - Use this kind of tool to compute number-intensive problems such as budgeting, forecasting, etc. A spreadsheet will plot nice graphs very easily.

MS Excel, Quattro Pro, Lotus 1-2-3, MS Works, AppleWorks, ...

Database software - Use this software to store data such as address, membership and other text information. A database can be used to easily sort and organize records.

Presentation software - Use this software to create multimedia stacks of cards/screens that can effectively present a lesson or a sales pitch. The user often clicks on buttons to advance to the next screen in a sequence.

MS PowerPoint, AppleWorks (slideshows), Hyper Studio, Flash, Director, Hype Card, Digital Chisel, Super Card, Corel Envoy.

Internet Browsers - This software allows one to surf the Web. Often they can read email and create Web pages too.
Netscape Navigator (or Netscape Communicator), MS Internet Explorer, AOL Browser....

Email programs - These programs send and receive email.
Netscape Messenger (part of Netscape Communicator), MS Outlook Express, MS Outlook, Eudora, AOL browser (has email built in)....

Graphics Programs (pixel-based) - This software allows one to touch up photographs and create graphics from scratch.
Adobe Photoshop, Paint Shop Pro, AppleWorks, MS Works, MS Paint (comes free on Windows PC's), Painter,

Graphics Programs (vector-based) - This software creates graphics that are similar to illustrations or cartoon drawings.
Adobe Illustrator, Corel Draw, AppleWorks, MS Works, MS Word,

Communications software - This software allows two computers with modems to communicate through audio, video, and/or chat-based means.
MS NetMeeting, AOL Instant Messenger, IRC, ICQ, CU.

Basic Features:
Word Processing Software
- Word processors have word wrap which move the insertion point to the next line when the current line is complete. This saves time and effort.
- Editing precision and efficiency is also offered by this software. Consider the Thesaurus which provides synonyms, antonyms and related words for chosen word or phrase. Find and replace feature enables users to scan and replace selected words or phrases.
- There are inbuilt spelling and grammar checkers which make it easy to locate words with spelling issues or capitalization, sentence structure or punctuation problems.
- AutoCorrect feature can be used to make corrections in a thrice of a second. AutoText inserts words or sentences into the document at the exact point one wants.
- AutoComplete even ensures the user does not even have to type the complete word to include it in the document.

- If looks matter, can your word processor be far behind? Numerous features within the word processor can improve the format or appearance of any document in seconds. This includes font appearance, font size, character effects such as bold, italic, colors and shadow, alignment and lists.
- Allowing multiple users to edit the same document using a feature called collaboration is another beneficial feature of word processors.
- Another feature is tracking changes which lets you identify modifications to an original document made by others, whereby their changes and comments are visible.
- Word processing software involves creation of text based documents which can be stored, edited and formatted with ease.
- Additional word processing features include WordArt to modify titles, hyphens, columns and text boxes for critical information
- Most word processing software also generates reports and comes equipped with tools to create figure captions, tables, headers, footers, endnotes and more.
- For web pages, word processors include predefined templates, hypertext links and support for Web pages.

USP of ASPs:

Special web sites referred to as application service providers or ASPs enable users to access their application programs. Access is generally provided for a nominal fee.

Web applications: provide a collection of graphic illustrations including clip art drawings, diagrams and photos. One can also select items or portions of documents which can be removed from one item to another. From handwriting recognition to spelling checker and task panes, templates as well as Wizards for specific tasks and voice recognition, web based applications provide everything needed to make creating documents an easy process.

The ASP downloads or sends across a copy or part of the application onto the user where it is stored in his or her hard disk drive ready to be run. Copy remains there for some time until the program is run and exited. There are even fee- free ASPs.

Web Based Applications

Free general purpose applications can be accessed from any point in the globe. Another added benefit? You can access data files from any location. Web based applications include notes, calendars and personal information managers as well as numerous games. Web based applications may even outperform traditional application software as time goes by. The only drawback? Well, privacy and security of personal data stored at the ASP is a concern. So is the rapid rate at which the Web changes. But an advantage is that users no longer need to upgrade software on hard disks with the availability of newer versions.

Spreadsheets: Organizing Digits in the Digital World
1. Spreadsheets are used to create documents and perform calculations for example Excel, Lotus 1-2-3 and more.
2. Spreadsheets were initially only used by accountants; now they are used by marketing professionals, students, teachers and <u>financial analysts</u>.
3. Most common spreadsheet programs used include Lotus 1-2-3, <u>Microsoft Excel</u> and Corel Quattro Pro.

Spreadsheet: IT Figures
1. Spreadsheets organize, analyze and <u>chart/graph</u> numerical data such as <u>financial reports</u> and <u>budgets</u>.
2. Spreadsheet programs are responsible for manipulation of data and creation of workbook files comprise one/more related worksheets
3. A worksheet or spreadsheet is a rectangle grid of rows and columns intersecting to create cells
4. Text entries or labels provide a structure to the worksheet through descriptions
5. Numeric entries can be a number or a formula for calculating and processing information; functions are prewritten formulas to perform calculations.
6. Spreadsheets involve ranges, text and numeric entries, functions, formulas, charts, calculations and what if analysis. There are different chart types including line, pie, column and bar which form part of the spreadsheet. They also provide other benefits like titles, legends and data labels.

<u>Database</u> is a collection of relational data, which is an electronic equivalent of a filing cabinet.

A DBMS or <u>database management system</u> is a program for setting up or structuring database. Databases are used in offices, educational settings and organizations of different types. 3 of the most widely used DBMS designed for microcomputers include Corel Paradox, <u>Microsoft Access</u> and Lotus Approach. Relational database is used most widely as a database structure. Every field in the database is assigned a field size and data type. <u>DBMS offers numerous tools</u> to create and use databases such as filter or criteria.

Features include tools for sorting, <u>filtering</u>, <u>creating forms</u>, defining criteria and authoring reports. DBMS is able to bring information stored in separate tables through queries, forms and reports.

Query is a question or request for certain data contained in the database while queries are used for viewing data in differing ways to analyze and change existing data. Database forms replicate traditional print forms. DBMS are used chiefly for listing reports such as sales summaries, mailing labels and phone lists.

DBMS is created through a plan where you design the basic structure of the system and employees can create table structure through specification of fields, data types as well as primary key fields.

Presentation: Pixel Perfect Picture Information is presented visually through presentation graphics that combine numerous visual objects for creating interesting and attractive presentations. These tools are also used for communicating persuasive messages.

Slides are used for electronic presentation and there are layout, normal and slide show views. You can choose color schemes, slide layouts, special effects, animation, transitions and builds.

Integrated Packages: All in One Program

An integrated package provides the functionality of a word processor, database manager, spreadsheet and much more. The drawback is that capabilities of each function are not as extensive as individual programs. An integrated package is a single program and using and switching between functions is quite convenient. Most common integrated packages are Microsoft and Apple Works.

Software Suite: Application Software in a Group

1. Software suite is a group of application programs and the 4 different types are productivity, specialized, utility and personal.
2. Software suite is a collection of separate application programs bundled and sold as a group.

Types of software suite

Productivity Suite

Productivity or business suites contain professional grade app programs such as spreadsheet, DBMS, word processors and more. Best known productivity suites are Lotus Smart Suite and Corel WordPerfect Office Suite.

Personal Suite

Personal or home suites contain personal software applications, programs intended for domestic or personal use. Some of the best known home suites include Microsoft Works Suite.

Specialized Suites

These suites focus on specific applications including graphic suites,financial planning suites and much more.

Utility Suite

This suites are designed to make computing safer. It includes the Norton Antivirus System and Norton Internet Security Suite.

Multimedia Software: One of a Kind

Multimedia software allow users to create images, audios and videos. Examples of these include Media Player.

II. Ownership Rights and Delivery Methods: Another Criteria for Distinguishing Application Software

Commercial Software: This has been installed in numerous computers by software vendors and providers. Only license is to be purchased for using it. Software is generally installed in more than one machine. Demo versions of software may also exist.

Shareware: This is either free of charge or a nominal fee is charged. This type of software can be downloaded from online sources Example: MP3 player.

III. The Many Different Wares: Where Application Software is Negative

Just like there are positive software, there are also negative forms of application software used for nefarious purposes. Applications software can carry the following hidden programs or utilities:

Malware: This stands for malicious software. Most common forms of malware are Trojan horses, worms and viruses.

Adware and Spyware: Adware and spyware are other common types of software. Adware includes sponsored freeware available when you register. Sometimes, adware tracks internet surfing habits to become intrusive and change into spyware. It then keeps a record of all the sites you have surfed and comes up with ads which it feels are relevant to you. Unlike adware, spyware has a negative connotation.

Greyware: This is a term used to categories all the software falling between malicious software and other codes including track-ware and spyware.

Nagware: This refers to software that comes in the form of pop ups asking users to register for a product or purchase an app

Bloatware: Software which has so many different features that it requires considerable disk space and memory resources to run

Slime ware: This refers to software which interfere with user experience by changing principal settings.

Abandonware: Software which is no longer sold or supported by publishers.

Dribble ware: Software which has too many updates and patches.

Computer Software Defined

Computer software is programming code executed on a computer processor. The code can be machine-level code, or code written for an operating system. An **operating system** is software intended to provide a predictable and dependable layer for other programmers to build other software on, which are known as **applications**. It also provides a dependable layer for hardware manufacturers. This standardization creates an efficient environment for programmers to create smaller programs, which can be run by millions of computers. Software can also be thought of as an expression that contrasts with hardware. The physical components of a computer are the hardware; the digital programs running on the hardware are the software. Software can also be updated or replaced much easier than hardware. Additionally, software can be distributed to a number of hardware receivers. Basically, software is the computer logic computer users interact with.

Two Basic Examples
A machine-level example of software is Basic Input/Output System, or **BIOS**. When you start the computer, the BIOS loads and runs before your hard drive even connects. The BIOS checks connection to hardware and looks for the operating system to load. You can upgrade the BIOS by flashing, which is when you replace machine-level software stored on the main board of your computer.
A familiar example of application software is Notepad. Notepad runs when the user activates it and it has certain requirements. You need an operating system and hardware processor. The programmers of Notepad wrote software for a specific environment. Once the software is loaded into the computer's memory, the processor is able to read it. The program then becomes a process, and the user can interact with it.

Types of Computer Software

System Software

Boot Code
Boot code is used to create a working environment for the operating system. The term, "boot" is a shortening of the term, "bootstrapping" which answers the problem of a computer needing itself to be in a running state in order to start itself. Early computers required a complicated series of commands entered by hand on a switch panel followed by an "execute" command to create the system environment. Modern computers make use of boot code saved on semi-permanent memory.
A very small program, the code examines the system hardware; initializes environment variables such as date, time and device start order; identifies and starts the internal peripheral devices the

computer uses, such as hard drives and video processors; enables the various communication ports and executes the operating system. Booting

Starting a computer from a powered-off state is called, "cold-booting." If the computer is already running and is being restarted, it already has the environment parameters and settings loaded and will skip the initialization routines and perform a "warm boot" by only restarting the operating system.

Operating System

DOS, an operating system

An operating system is a master program that a computer uses to execute both user-level programs as well as the environment routines and drivers necessary for the computer to run. Thus, on a standard personal computer an operating system handles signals from input and output devices, manages memory usage and controls peripherals. Therefore, the operating system is the most important program a computer must run.

DOS, Microsoft Windows XP and Mac OS are some examples of personal computer operating systems. Server-level computers use operating systems such as UNIX and Microsoft Windows Server. LINUX and BSD are versatile enough to be used either in a personal computer or as an operating system in a server, depending on which components are installed.

With the size of most present operating systems a hard disk is required to store the necessary files and programs. Should the operating system become inoperable, many offer a "boot disk" option where a simpler version of the operating system with only the necessary drivers and files is stored on removable devices, usually a CD/DVD-ROM, USB flash drive or floppy disk. Booting the computer with the boot disk allows the system to be accessed and repaired.

Portable devices, such as cellular phones and personal data assistants use specialized, "embedded" operating systems that enable them to do many tasks once only found in "platform" computers, such as email transactions, document operations and database management.

Examples of Personal Computer/Server Operating Systems
PC/Microsoft DOS

A command-line operating system, MS/PC DOS helped usher in the microcomputer age by providing an operating system that would run on the limited resources of the 8086/8088-based personal computer. Ms-dos

Microsoft Windows

Despite its numerous problems and irritations, Microsoft Windows is rightly credited with enabling the non-technical user to operate a computer without having to learn too many complicated commands and settings and has been instrumental to the increased popularity of the personal computer.

MS Windows versions 1.0 and 2.x
MS Windows version 3.x
MS Windows 9x
MS Windows NT
MS Windows XP
MS Windows Vista
MS Windows 7

Examples of Embedded Operating Systems

Palm OS
The Palm OS was preceded by the Japanese company PalmSource, and is the dominant operating system for hand-helds. Over 30.1 million Palm OS units (including licensees), according to Sept 2003 Palm Inc. financial reports; with over 22 million total USR/3Com/Palm or Palm Solutions Group branded units shipped (over 4 million per year). Palm has many security concerns due to it's mobility, such as if lost or stolen palms may have data that can retrieved by others. Also if Palm passwords are interconnected to your PC passwords, anyone has access to personal files on your PC.

Symbian OS
Symbian is the operating software which is mostly used by the mobile phones. Symbian is the biggest software producers for smart phones. There are the Symbian codes used by different companies as well, Mika Raento has huge examples of symbian codes. There are different companies that owns Symbian software: examples are Sony Ericsson, Ericsson and Nokia has the highest percentage (47.9%)

MS Windows CE
Though most versions of Microsoft Windows were developed for desktop applications, a simpler version was created for hand-held devices called, "Windows CE."

Files
A file is one of two things: 1) data file, or a named collection of data or 2) program file, or a program that exists in the secondary storage of a computer.
Computer files make it easier for the user to find and save their data. Computer files are like paper documents that used to be kept in libraries and offices.

Files

Exporting a file puts it in a format that many programs can read. Importing a file gets data from another source and converts it to a compatible format. **Example**: Creating a spreadsheet in Google Docs, *exporting* the file to CSV (comma separated value) format, opening Microsoft Excel, *importing* the CSV file, saving the spreadsheet as an excel file.

Example: Certain networks are created to allow users to share files, such as audio, video and pictorial images. Networks like Limewire use a peer-to-peer file sharing method.

podcast

Tasks

Multitasking

A computer may perform many different tasks at the same time. Tasks include storing, printing, and calculating. Multitasking is when a computer operates more than one task at a time with one central processor.

A task is a set of instructions (like a plan) that is brought out from memory to execute certain functions.

In order to allow your computer to multi-task quicker the processor should have high speed (frequency). This will allow you to run more applications at once without affecting your computers performance. Nowadays multicore processors which combines two(dual core) or four(quad core) are coming which have more speed than ordinary ones.

Task is a real time application which is the study of hardware and software that are subject to real time constraint.

Security

Trojan Invasion Security could mean confidentiality, integrity or availability of electronic information that is processed by or stored on computer systems. "The only truly secure system

is one that is powered off, cast in a block of concrete and sealed in a lead-lined room with armed guards - and even then I have my doubts. ”
Eugene H. Spafford, director of the Purdue Center for Education and Research in Information Assurance and Security.

EXAMPLE:
 FIREWALL A system that prevents unauthorized access to/from a private network. Can be implemented in both hardware and software, or both. This form of security can be used to prevent unauthorized Internet users from accessing private networks connected to the Internet/inappropriate networks.

Applications
Applications are referred to as a type of computer software where the computer's capabilities directly reflect that of the task.

Custom

Custom software is under the category of application software. The word custom means that the software is specially made for the individual and/or company needs. This software is created by the programmers and software engineers. Custom software can be very expensive since it is only developed on demand. A very good example of a custom soft ware is the application of it in space crafts, ATM'S, and super market checkout machines. Custom software, which can also be called bespoke software, is only created for individual companies to be used for research and other things. It is also a risk for a company to develop custom software since it is very expensive or demands huge sums of money to develop

Commercial
Commercial Software, also known as Proprietary Software or Packaged Software, is software that can be bought and sold. Commercial Software is copyrighted, so you must pay for it in some respect. Examples of this are Microsoft Excel or Adobe Photoshop.

Commercial software is generally bought in retails stores in a physical form. However, in some cases you can download the program you desire over the internet for a lesser fee. Commercial software programs uses things such as passwords and user registrations to make sure only paid

customers are using the program. Commercial software such as Norton AntiVirus uses thirty day free trials to familiarize the user with the product before they purchase it.

Shareware: is shareware or application software Shareware is basically "try before you buy" software. Unlike most software where you have to buy the software before you can actually use it, the concept of Shareware lets you try a program for a short period of time before you buy it. This gives the consumer an opportunity to test out the software and see if it suits his needs or not. This not only helps the consumer get a feel for the product but is also beneficial to the company providing the Shareware Software to market their product. Shareware has the ultimate money-back guarantee - if you don't use the product, you don't pay for it!

Examples of shareware software would be a trial version of Fracture. It is a screensaver software for the Mac Os-X. In order to use the full version of the software.
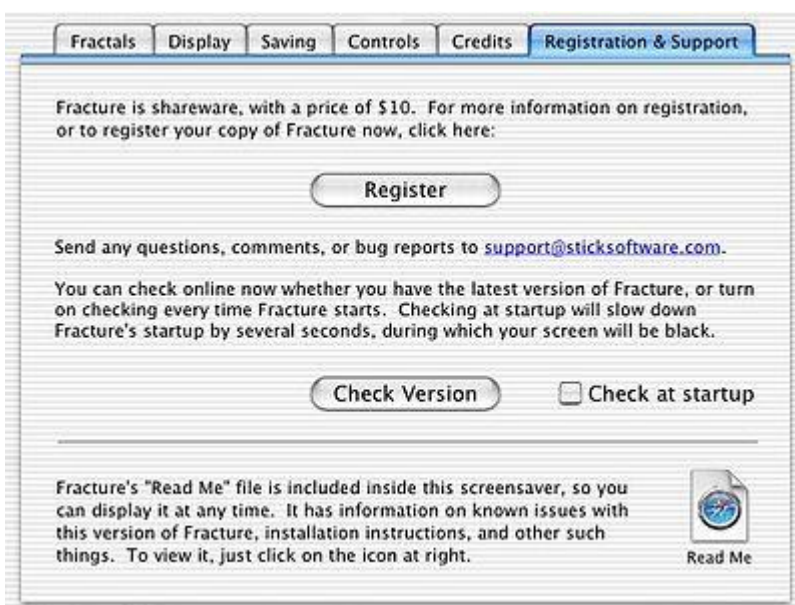
Open Source

Software that has released the files it was written in, usually free, so you can download and change the original code, therefore changing the program.

Viro has contributed 1,571 changes to the kernel, which sits at the core of the Linux operating system, over the past three years, according to a new report from the Linux Foundation. That's more than any other individual developer, the report states. In contrast, Torvalds, the kernel's creator and steward, contributed 495 changes. Viro couldn't be reached for comment about the report.

During the past three years, the top 10 individual developers have contributed nearly 15 percent of the changes to the kernel, while the top 30 developers have submitted 30 percent, the report states.

OS

An operating system has two jobs: to coordinate the computers resources and to service applications. Operating Systems were introduced in the 1950's.

Utilities

Also known as service programs. Utilities perform a variety of functions like disk defragmenting or data compression. When utilities become popular they are usually incorporated into the operating system.

Driver

A printer needs a driver

A computer driver is a program that controls a device. There are device drivers for printers, displays, CD-ROM readers, diskette drives, and so on. For other devices, you may need to install a new driver when you connect the device to your computer. In DOS systems, drivers are files with a .SYS extension. In Windows environments, drivers often have a .DRV extension.

A driver acts like a *translator* between the device and programs that use the device. Each device has its own set of specialized commands that only its driver knows. In contrast, most programs access devices by using generic commands. The driver, therefore, accepts generic commands from a program and then translates them into specialized commands for the device.

Backup

Making copies of data in case the original data is lost or destroyed.

The two reasons for backing up your files are; a) disaster recovery - to restore the files to an operational state following a disaster, and b) to restore small numbers of files after they have been corrupted or accidentally deleted.

Do not confuse backups with archives or fault-tolerant systems. Archives are the first copy of data and backups are a second copy of data. Also back up systems assume that fault will cause data loss and fault-tolerant systems will not assume fault.

A popular backup utility is Norton ghost, where a user can make an image copy of their files in case of a system crash.

A common method of backup for isolated systems without high-speed network or backup devices is to maintain the system and applications software installation disks locally, near the system, and backup only user data. In the event of a crash one then reinstalls system and application software from scratch and then restores the user data. When using this method one should not neglect to make off-site backups of the commercial software and user data so that in

the event of a local disaster such as fire, flood, or earthquake that crunches the system, rapid recovery is still possible if desirable.

A backup allows the user to make a duplicate copy in case the hard-disk drive fails.

Virus

A virus is a program that can destroy and corrupt data on a computer. It can come through a floppy disk, CD, or USB, but now usually comes through email.

Virus are programs that can copy themselves and create problems in one computer without the user ever knowing or authorizing it. Virus can only be spread when they are taken to an uninfected computer. Viruses are commonly confused with computer worms and Trojan horses. A worm has the capabilities to spread itself to other computers without needing to be transferred as part of a host. Trojan horses are files that appear to be harmless until they are executed. [4]

Antivirus software is a computer program that attempts to identify and eliminate computer viruses. There are two different techniques to accomplish this, examining (scanning) and identifying suspicious behavior

An example of an antivirus software program is Norton antivirus. Norton antivirus (NAV) is a popular product of Symantec Corporation and is one of the most widely used antivirus programs. It is aimed at a centrally managed corporate environment and has different features not present in the traditional retail version of the software. Symantec's Live Update provides virus definition updates, which enable Norton antivirus to detect viruses known to Symantec; a total of 73,660 viruses as of September 6, 2007. In order to receive updates, a valid subscription is required; an initial subscription good for one year (or 90 days for OEM copies) is included with the purchase.

Defrag

The hard drive is divided into sectors that can hold files. If a file is bigger than a section (which it usually is) it is stored on the next sector. If the next sector is already being used, then it has to store it on a sector farther away, but the address of the new sector is stored so that the computer knows where all the parts of the file are. But if parts of the file are ALL OVER THE PLACE (aka "fragmented") then it takes a long time to find and make changes to it.

That's where defragmenting can help. It dutifully finds sectors that are next to each other big enough to hold a file and copies the file there, then deleting it form the fragmented sectors where it used to be.

Defragmentation reduces the amount of space or "fragmentation" in a file space. By using compaction, it creates larger regions of free space. The image to the side of the text represents the allocation of the free space as well as the combining of the files in order to defragment the hard drive.

F (Second Allocation)

defragmenting

Fragmentation occurs when the operating system cannot or will not allocate enough contiguous space to store a complete file as a unit, but instead puts parts of it in gaps between other files (usually those gaps exist because they formerly held a file that the operating system has subsequently deleted or because the operating system allocated excess space for the file in the first place). Larger files and greater numbers of files also contribute to fragmentation and consequent performance loss. Defragmentation attempts to alleviate these problems.

Scandisk
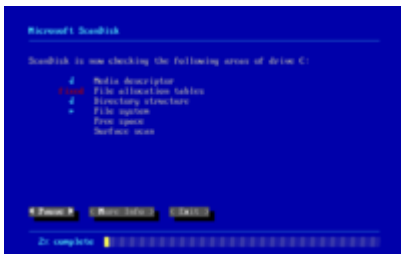
Microsoft Scan Disk

This is a utility program originally used by DOS and Microsoft Windows that checks and repairs file systems and bad clusters within the system. Previous versions were simple text-based program called CHKDSK. Subsequent versions of the scandisk were still referred to as CHKDSK, but different from the earlier version. The recent versions are now integrated in Disk Properties as "error-checking." [5]

One of the main functions with scandisk is that it can identify and repair physically damaged hard drives by quarantining the damaged area, to avoid files being written in that area, thus avoiding damaged and lost data.

Interfaces

Interfaces and Widgets

How you work with the computer...

Interfaces is the functioning of two things, ex the way software and hardware interacts or how either would interact with a person is the user.

CUI
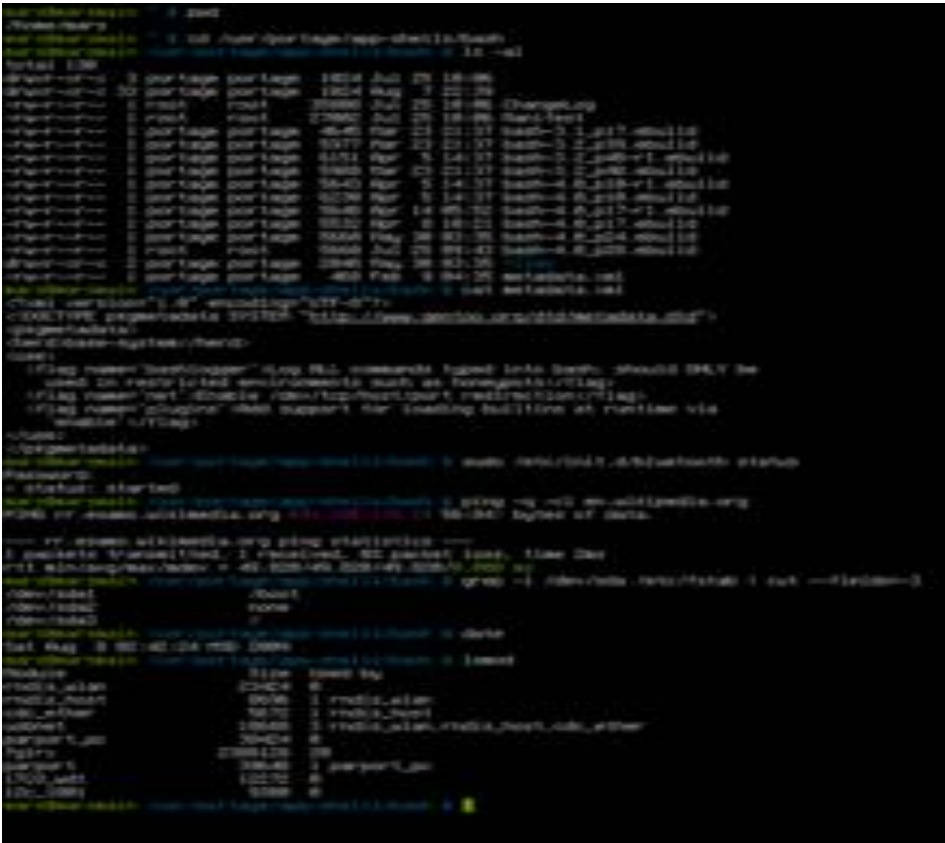
CUI using Linux

Character user interface. You type commands into the computer. It's not easy to remember all the commands, and it looks less exciting than a GUI, but it works faster because you're not making the computer waste time showing pretty icons and background images.

This is the precursor to GUI (graphical user interface).

GUI

Mac OS X Leopard GUI

GUI is an acronym for "graphical user interface". It allows people to interact with a computer and computer-controlled devices using graphical icons, visual indicators or special graphical

elements called "widgets". These icons are used in conjunction with text, labels or text navigation.

The history of the graphical user interfaces came from the Xerox 8010 Star Information System in 1981 from PARC. GUI's are familiar to most people today using Microsoft Windows and Mac OS X.

GUI's are important because they are easier to use than command driven interfaces.

GUI shell

GUI shell Linux

Graphical user interface (GUI) shells build on top of CUI. The GUI instructs the CUI, and the CUI sends messages to the hardware.GUI shells are very replaceable and software often allows users to create their own GUI to suit their personal need. The most active user generated GUI can be seen in games where users replace the original image with another GUI overlay to suit their personal style. A GUI is a type of user interface which allows people to interact with a computer and computer-controlled devices.

DOS Shell
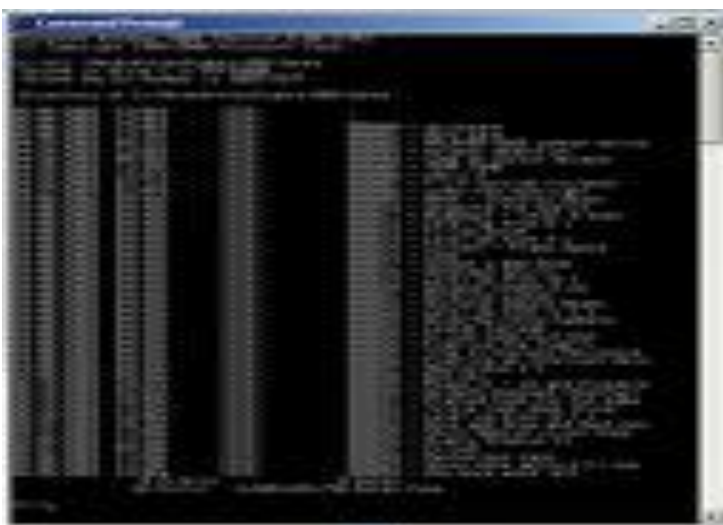
dos shell

This shell was one of the first successful attempts to create a basic graphical user interface (GUI) type file manager in DOS.

DOS Shell enables the user to type prompts and commands within a user interface.

No longer in use, the DOS shell, stands for Microsoft disc operating system. Microsoft set up this 'shell'(program software), to enhance features of their system. Some of these features include: double clicking to open a file on the computer and copying, moving, and renaming files. Some of the benefits of the dos shell is that it did not require long file names to run and it could be used with Microsoft windows. One of the drawbacks to the dos shell was that it could not multi task and so it was replaced when more efficient programs were created.

Widgets

A widget is an interface that a computer user uses such as window or text box. Programmers use widgets to build GUIs (graphical user interfaces). A widget engine is a host software system for running and displaying desktop widgets.

Widgets are also downloadable interactive virtual tools. They help to show users things such as the latest news, time or weather among a variety of other things.

LIMITATION OF STUDY

1) Lack of competent persons to develop and train the users
2) Network issues
3) Limited Resources

Conclusion

With the increasing role of software in the daily lives of the people, full stack web development services are now offering the latest software to fulfil their demands. As we know, there are various types of software where the market of system software is already saturated with big players like Microsoft, Apple etc. while application software have stiff competition with established players and new players competing to gain the extra edge. Mentioned above is the explanation of what a software is and the types of software. A software development company can venture into the development of any of these software to earn big profits

From numbers to text, this software has a wide scope of application. Action oriented application software carries out specific tasks intended to make the complex into something very simple. Application software comes in many types which will go on increasing as technology and users evolve. The different types of application software mirror the massive changes in computer technology and terminology that have come about. With changing technology, application software too has undergone modifications for the better. Application software involves performing virtual tasks to solve problems in the real world.

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APPLICATION OF SOCIAL MEDIA AND ITS PERCIEVED INFLUENCE ON SECONDARY SCHOOL STUDENTS STUDY HABIT IN ENUGU STATE

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Abstract

This study aimed at determining the application of social media and perceived influence on secondary school students study habit in Enugu state. 386 SSII students in six secondary schools in Agbani education zone were sampled using multi-stage sampling technique. Structured questionnaire titled Application of Social Media Questionnaire (ASMQ) was the instrument for data collection. The instrument was validated by three experts from Department of Science and Computer Education, Faculty of Education, ESUT. The overall reliability index of the instrument is 0.69 which was determined using Cronbach alpha formula. The research questions were answered using mean and standard deviation, while hypotheses were tested using t-test. Findings of the study revealed that students use social media to make new friends, keep in touch with family and friends, posting of pictures and videos, passing information to friends, playing game, watching and downloading movies, downloading latest songs, discuss difficult topics with mates after school hours, to seek for professional advice on personal matters, searching for political news and sports news. It was found that the application differs significantly with gender. Social media have negative influence on the study habit of students in Agbani education zone. Based on the findings of the study some recommendations were made which include that government and its agents should pass a law that will prohibit the use of certain devices by students in secondary schools and that parents should not provide their children with phones with internet access as it makes them to access social media platforms which distract them from studying their books. Educational implications for this study were outlined.

Introduction

Internet is the highest information resource and most rapid means of communication in the world today. As a vast source of information it is constantly changing and expanding (Bakpo&Ukekwe (2014) and it has improved life globally due to its dynamic ability to facilitate instant distribution and access to information and communication worldwide (Otchere, 2006). In Nigeria, Internet access and use among Nigerian secondary school students have grown exponentially over the past decade (Beck, 2010). Reports has it that more than 48% of Nigerian youth 12 to 17 years of age use the internet, and more than half of them log onto their social media accounts on daily basis. Social media a web-based technology to create highly interactive platforms via which individuals and communities share, co-create, discuss and modify users generated content through mobile phone (Kietzmannn, 2012). Roberts, Foehr, and Rideout, (2005) noted that students engage in a wide variety of activities on social media such as doing schoolwork, playing games, shopping, downloading music, text messaging, chatting etc. Social media has become a virtual meeting place where secondary school students hang out with their peers to pass time. Muritala, Makama and Godwin (2014) stated that the closeness of students to the social media site has made them exhibit different kinds of bad behaviours which can be as a result of peers and groups they formed online. Social media allow students to easily form and sustain friendships most especially romantic attachments which may derail their attitude and change their behavior toward their school activities.

It has been found that secondary school students spend much of their hours hanging out with friends on social media sites and spend less time studying, thus explaining their lower academic performance. According to Al-Sharqi, Hashim and Kutbi (2015) social media can provide flexibility in learning, stimulate innovative ideas, and increase interpersonal relationships among students and instructors. But these media can as well have negative impacts on students as they might distract their attention from the learning process, reduce their physical social interaction and make them potentially addictive. The frequent use of Facebook could cause addiction toward the site and negatively influence students' daily life at large. In a study exploring how students use social media, Wang, Chen and Liang (2011) found out that most college students spent vast number of hours accessing social media sites. Ninety percent of students surveyed spent their time on entertainment, while eighty percent of the sample admitted that they post or responded to posts or comment while completing homework. This shows that students who use social media are distracted while doing their homework.

The WAEC and NECO results of the senior secondary school students from 2010-2013 in Kwara State show that the students themselves have a good share of the blame for the woeful performances recorded in WAEC and Senior School Certificate Examinations, (Muritala&Anyio, 2014). Since the advent of the social media like Facebook, Twitter, Youtube, Instagram, Whatsapp among others, Nigerian youth have become so addicted to these platforms that they no longer have time for reading and preparing for their examinations. Also the use of the social media short messaging system or texting language which permits all kinds of

acronyms or abbreviated words has corrupted many that they sometimes assume that it is normal to use such forms of expression in real situations like examination.

The most important factors in education is the ability of learners to be able to read and understand the text presented to them. For students to be capable of doing these, they must develop their study habits on daily basis. Reading is the bedrock to most forms of learning activities. Reading enlightens the mind, makes the intellect sharper and makes the individual travel far without motion (Braunger and Lewis, 2006). Generally speaking, reading as an aspect of study habits has been accepted as an interactive process, a communication process, an active process and a meaning-inducing process in which the learner interacts with the material to understand and interpret its content.

Study habits, are the behaviours exhibited by learners. According to Ugboduma (2011) who defined study habits as behaviours exhibited by students in the mental process of acquiring knowledge, ideas and competence, skills such as reading, note-taking during lectures, concentration, time scheduling and teacher consultation. A good study habit is an enviable virtue which is to be emulated by the learners for academic growth and development. In contrast to this, many researchers have bemoaned the increasing incidence of non-challant attitude to reading among youths in Nigeria. Ofodu (2012) noted that many people have attributed this to the use of the internet (social media) because it has revolutionized the study habits of young people, especially in tertiary institutions around the world over and Nigeria in particular. Sturm (2010) is of the view that youths who use computers and other IT gadgets have shown a higher propensity for distractions from studies. In support of this, a research carried out by Higher Education Research Institute (HERI) USA (2007) reported that students who use social networking sites have more difficulty managing their time and developing effective study habit skills, especially those who spent more time on social media socializing. This is because attending to social media interferes with their school work occasionally or frequently and this somehow makes it difficult for them to develop effective study habits and time management skills. Therefore, it becomes important to find out the areas of application of social media and its perceived influence on students study habits in secondary schools in Enugu state.

Research Questions

The following research questions were formulated to guide the study:
1. What are the areas of applications of social media among secondary school students?
2. What is the influence of social media on students' study habit?

Research hypotheses

The following null hypotheses were formulated to guide the study and were tested at $p < 05$:

$H0_1$: There is no significant difference in the mean rating of male and female students on the areas of application of the social media among secondary school students.

$H0_2$: There is no significant difference in the mean rating of male and female students on the influence of social media on students study habit.

Methodology

The researcher adopted the descriptive survey research design for the study. The study was carried out in Agbani Education Zone of Enugu State, Nigeria. There are 3860 senior secondary school class two (SS2) students in 41 secondary schools in the area of the study (PPSMB, 2015). Multistage sampling was used to arrive at the sample size of 386 SS II students in secondary schools in Agbani Education Zone in Enugu state, which is 10% of the students' population. Proportionately 220 SS II students made up of 135 males and 85 females were drawn from the urban area and 166 SS II students which are made up of 76 males and 90 females were drawn from the rural area. The instrument used for data collection is a 83-items structured questionnaire developed by the researcher, titled Application of Social Media Questionnaire (ASMQ). The ASMQ is arranged in five sections identified with letters A to C. Section A is concerned with the bio-data of the respondents, sections B to C are concerned with the data required for arriving at the answers to the research questions and testing the hypotheses. Section B and C has 30, 17 items respectively. The initial draft of the questionnaire was validated by three experts from Enugu state university of science and Technology. One of the validators is in measurement and evaluation option, one in computer Education option and one in Mathematics Education option all from the Department of Science and Computer Education, Faculty of Education ESUT. 386 copies of the questionnaire were administered personally by the researcher and three research assistants. The researcher and one research assistant covered the three schools in one local government area in Agbani Education Zone while the other two covered the three schools in the other local government area. These research assistants were duly trained on the administration and retrieval of the questionnaire. There was on-the-spot administration and collection of the instrument in each school visited. There was 100% return rate as the entire 386 copies of distributed questionnaires were returned. For data analysis, descriptive statistics of percentage mean and standard deviation were employed to answer the research questions, while ANOVA was employed in testing the null hypotheses at 0.05, level of significance at the appropriate degree of freedom.

Results

Research question one: What are the areas of application of the social media among secondary school students?

Table 1: Mean score responses of students on the application of the social media among secondary school students

SN	I use social media for;	x̄	SD	DECI.
1	Making new friends	2.75	1.06	**Agree**
2	Keeping in touch with family and friends	2.58	1.17	**Agree**
3	Posting of pictures and videos	2.73	1.14	**Agree**
4	Passing information to friends	2.63	1.07	**Agree**
5	Playing game	2.59	1.16	**Agree**
6	Watching and downloading pornography	2.35	1.13	**Disagree**
7	Watching and downloading movies	2.55	1.12	**Agree**
8	Downloading latest songs	2.72	1.10	**Agree**
9	Watching and downloading tutorial videos	2.37	1.09	**Disagree**
10	Downloading educational books	2.47	1.14	**Disagree**
11	Engaging in internet fraud	2.42	1.09	**Disagree**
12	Discuss difficult topics with mates after school hours	2.51	1.10	**Agree**
13	To seek professional advice on personal matters	2.60	1.12	**Agree**
14	Search for political news	2.54	1.10	**Agree**
15	Search for sports news	2.53	1.10	**Agree**
16	Search for latest fashion	2.42	1.15	**Disagree**
17	Posting of seducing pictures and videos	2.40	1.12	**Disagree**
	Grand Mean	**2.54**	**1.12**	**Agree**

Data in table 1 shows the mean response score of students the application of the social media among secondary school students. From the table, the students agreed to all the items except for items 6, 9, 10, 11, 16 and 17 which had mean score less than 2.50 set for the study. This indicates that the students don't use social media for watching and downloading pornography, tutorial videos and educational books. More so, they don't engaging in internet fraud, search for latest fashion and posting of seducing pictures and videos respectively. However, this shows that the students uses social media to make new friends, keep in touch with family and friends, posting of pictures and videos, passing information to friends, playing game, watching and downloading movies, downloading latest songs, discuss difficult topics with mates after school hours, to seek for professional advice on personal matters, searching for political news and sports news.

Research question two: what is the influence of social media on students' study habit?

Table 2: mean responses score of students on the influence of social media on their study habit

	Social media influences study habits as follows;	x̄	SD	Dec.
18	Social media distract me from studying my books	2.71	1.09	**Agree**
19	There is no improvement in my grades since I started using social media	2.61	1.12	**Agree**

20	I use social media to engage in academic discussion and this has improved my academic performance	2.23	1.05	**Disagree**
21	Information gotten from social media helps me to do my assignment	2.24	1.07	**Disagree**
22	Using social media for research has improved my academic performance	2.21	1.10	**Disagree**
23	Engaging in academic forum in social media has increase my rate of understanding	2.15	1.08	**Disagree**
24	I use materials gotten from social media to compliments what i have been taught in the class	2.27	1.13	**Disagree**
25	I will not perform well in my academics if i stop using social media	2.22	1.07	**Disagree**
26	I use social media to get useful information which improves my academics performance	2.28	1.09	**Disagree**
27	I cannot concentrate on my studies because of social media	2.71	1.14	**Agree**
28	I cannot study without social media	2.33	1.22	**Disagree**
29	Time spent on social media have prevented me from completing my homework/assignment	2.74	1.03	**Agree**
30	I spend much time chatting with friends, family members than i have for my studies	2.75	1.05	**Agree**
31	Activity in social media such as (chatting, playing games etc) make me to have difficulty planning my study schedule	2.64	1.10	**Agree**
32	I am not able to cover enough material as a result of activities i engage in social media	2.73	1.15	**Agree**
33	I take short brake to chat or attend to alert on social media while studying	2.82	1.11	**Agree**
34	I regularly switch from social media to my reading materials while studying	2.79	1.11	**Agree**
35	I regularly skip my study schedule as a result of activities on social media	2.65	1.06	**Agree**
36	I study books in haste to enable me attend to alerts on social media	2.62	1.08	**Agree**
37	Activities on social media have made me to lose interest in my studies	2.31	1.12	**Disagree**
	Grand Mean	**2.50**	**1.10**	**Agree**

Data in table 2 shows the mean response score of the respondents on the influence of social media on their study habit. From the table, the students agreed to items 18, 19, 27, 29, 30, 31, 32, 33, 34, 35 and 36 with mean score greater than 2.50 set for the study. This shows that social media distract students from studying their books, there is no improvement in their grades since using social media, time spent on social media prevented them from completing their homework/assignment, activity on social media such as (chatting, playing games etc) make them to have difficulty planning their study schedule, they don't cover enough material as a result of activities they engaged on in social media among other things. However, the implication is that social media have negative influence on the study habit of students in Agbani education zone. Also, the overall standard deviations between the range of 1.00 to 1.50 indicate low standard deviation, this means that the response score of the students clustered around the mean response. This shows that the students responses are of the same opinions.

H0$_1$: There is no significant difference in the mean rating of male and female students on the areas of application of the social media among secondary students.

Table 3: t-test on the mean ratings of male and female students on the areas of application of the social media among secondary students

Group	N	Mean	SD	T	df	Sig	Dec.
Male	211	2.64	0.43	4.66	384	0.007	S
Female	175	2.46	0.29				

Table 3 shows that the t-value on the mean rating of male and female students on the application of the social media among secondary school students is 4.66, significant at 0.007 level of significance, which is less than 0.05 level of significance set for the study and therefore, the null hypotheses is rejected. This means that there is a significant difference between the mean rating of male and female students on the areas of application of social among secondary school students.

H0$_2$: There is no significant difference in the mean rating of male and female students on the influence of social media on students study habit.

Table 4: t-test on the mean ratings of male and female students on the influence of social media on students study habit

Group	N	Mean	SD	T	Df	Sig	Dec.
Male	211	2.53	0.29	1.77	384	0.078	NS
Female	175	2.48	0.25				

Table 4 shows that t-value on the mean rating of male and female students on the influence of social media on students study habit is 1.77, not significant at 0.078 level of significance, which is greater than 0.05 level of significance set for the study and therefore the null hypotheses is not rejected. This means that there is no significant difference between the mean rating of male and female students on the influence of social media on students study habit.

Discussion of findings

In table 1, data that yielded the answer to research question one which sought to find out the areas of application of the social media among secondary school students is presented. The findings revealed that secondary school students use social media to make new friends, keep in touch with family and friends, posting of pictures and videos, passing information to friends, playing game, watching and downloading movies, downloading latest songs, discuss difficult topics with mates after school hours, to seek for professional advice on personal matters, searching for political news and sports news. This finding agrees with the findings of Omekwu, Eke and Odoh (2014) that students use social networking sites for interaction with friends,

connecting to their class mates for online study and for discussing serious national issues and watching movies among other things. Also with the findings of study carried out by Ezeah, Asogwa and Obiorah (2013), which revealed that students use social media for purposes of entertainment, education/information and discussing national issues. But disagrees with the findings of Ezeah, Asogwa and Obiorah (2013), that they use it to engage in cybercrimes and expose themselves to pornography. This shows that social media are channels through which students build relationship, get entertained, get news update and pass information to friends and family easily.

Data in table three indicate that there is no significant difference between the mean response score of male and female students on the area of application of the social media among secondary school students. This difference may be as a result that male students uses social media for playing games, watching and downloading movies, downloading educational books, engaging in cybercrimes, searching for political news and sports news while the female students use it for most especially searching for latest fashion and posting of seducing pictures and videos. This shows that the two groups apply them significantly for different things. This agree with the assertion of Rafferty (2009) that girls are also more likely than boys to post sexually explicit pictures of themselves, and to talk about sexual activity in public forums whereas, boys are more likely to create an account simply because they are trying to meet a significant other, or because they are already in a relationship with someone who has requested them to join. And alsoLiaw and Fluang (2011), Giles and Price (2008) and Bonds-Raacke and Raacke (2008) who asserted that social media usage varies among students based on their gender, that is to say that gender of students influence social media usage. This may be as a result that boys have been online earlier than girls in the earlier forms of technology such as video and computer games.

Result in table 2, shows that Social media negatively influence students' study habit, this confirms the findings of Judilla and Gemora (2015) that significant relationship existed between the extent of influence of social networking and the status of the study habits of the respondents. This also agrees with the report of Higher Education Research Institute (1-IERI) USA (2007) that students who use social networking sites have more difficulty managing their time and developing effective study habit skills, especially those who spent more time on social media socializing. According to findings of Chen and Liang (2011) that social media use negatively influence study habits of student which lead to poor academic performance. This influence is as a result of regular switch from social media to reading such as taking short breaks to chat to attend to alerts on social media while studying.

Table four shows that there is no significant difference between the mean response score of male and female students on the influence of social media on students study habit which agree with the findings of Olutola, Olatoye and Olatoye (2016), that there is no significant difference in the study habit of male and female students of tertiary institutions in Katsina State. This shows that social media have the same effect on both male and female students.

Conclusion

The purpose of this study is to determine the application of social media and its perceived influence on secondary school students study habit in Enugu state. Findings made from the analysis of data indicate that students use the social media for making new friends, keeping in touch with family and friends, posting of pictures and videos, passing information to friends, playing game, watching and downloading movies, downloading latest songs, discuss difficult topics with mates after school hours, to seek for professional advice on personal matters, searching for political news and sports news. But, the areas of application differ among male and female students. Whereas male students use social media especially for playing games, watching and downloading movies, downloading educational books, engaging in cybercrimes, searching for political news and sports news, female students use it for most especially searching for latest fashion and posting of seducing pictures and videos. It was revealed that social media usage among secondary students in enugu state negatively influences their study habit as shown by the result.

Educational implication

From the findings of the study, secondary school students in enugu sate use social media for different purposes which negatively influence their study habits. This negative influence on students' study habit such as taking short brake to chat or attend to alert on social media while studying, switch from social media to reading materials, studying in haste to attend to alerts on social media causing, distraction from studying. This will cause them to lose concentration and focus in their study, thereby affecting their academic performance. This implies that if this is left unchecked, the generation of youth to come will be youth with high level of moral decadence and lack of academic virtue. This calls for government, school stakeholders and parents to monitor and control students use of social media and devise means to regulate students' use of the media.

Recommendations

Based on the findings of the study the following recommendations are made;

1. Government and its agents should pass a law that will prohibit the use of certain devices by students in secondary schools and the inclusion of certain types of content that will influence the students negatively in the social media sites.
2. Principals and teachers should monitor their students' activities on the social media by joining and becoming their friends on social media, so that they will better guide the students in using social media in promoting their performance.
3. Parents should not provide their children with phones with internet access as it makes them access social media platforms which distract them from studying their books.
4. Parents should monitor the kind of social media sties students participate in and the kind of friends they have online. So that they will better guide the students in the kind of friends they should keep and social media sites they should visit.

5. Since social media usage negatively influences students' study habit, students should try and discipline themselves by switching off their phones while studying so that it will not distract them from studying.

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IMPACT OF CONTINUOUS ASSESSMENT ON STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS IN SECONDARY SCHOOLS IN ENUGU STATE

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Abstract

The main purpose of the study was to investigate the Impact of Continuous Assessment on Students' Academic Performance in Mathematics in Secondary Schools in Enugu State. Two research questions and one hypothesis guided the study. Survey research design was adopted for the study. The population of the students was all mathematics teachers in public secondary schools in Enugu State, out of which a sample size of two hundred and fifty two (252) mathematics teachers were drawn using stratified sampling technique. Data was collected using well-structured questionnaire. The validity of the instrument was done by three experts in Mathematics and Computer Education Department, while Cronbach's Alpha (α) was used to carry out the reliability of the instrument, and the reliability co-efficient obtained was 0.84. Data were analyzed using mean, standard deviation and t-test statistics. The findings of the study revealed among others that Continuous assessments were frequently administered in secondary schools in Enugu State and affect the performance of the students. There was a significant relationship between continuous assessment scores and academic performance of students in mathematics. It was concluded that continuous assessment has major impact on academic performance of secondary school students in mathematics. It was recommended that mathematics teachers should be educated and encouraged on the need to involve continuous assessment in the teaching process since continuous assessment helps to increase the performance of students in mathematics.

Keywords: Mathematics; Impact; Assessment; Continuous Assessment; Academic Performance; Evaluation; Teachers; Secondary School.

Introduction

Mathematics is a science of magnitude and number as well as the science that sustains the daily practices of man. Alechenu (2012), described mathematics as the "queen" of the sciences without which it would be difficult for people to study other sciences like physics, chemistry, biology and computer science/information technology. Despite its utility, mathematics has been one of the subjects which Nigerian students especially at secondary schools level develop dislike for and likewise achieve poorly (Odili, 2006). Ajogbeje (2012) revealed that one of the key factors which seems to contribute more to the problem of poor students' achievement in Mathematics is the essence of using test and other evaluation instruments during the instructional process which is to guide, direct and monitor students' learning and progress towards attainment of course objectives. According to Fajemidagba (2001), effective teaching has three components: preparation, execution and assessment. Preparation phase is the planning stage at which instructional objectives and suitable instructional materials are selected. The planned lesson is actually delivered using relevant instructional strategies at the execution stage. At the assessment stage, the teacher determined the achievement of the intended objectives. From the discussion, it can be deduced that effective teaching cannot be separated from assessment. In other words, assessment and instructional strategies are integral part of teaching and learning process. This is because there is no effective teaching without assessment just like there would not be any assessment without teaching. Johnson (2019) defined assessment as the use of a variety of procedures to collect information about learning and instruction.

The review of the nature of learning and educational practice have led to reappraisal of teaching and learning in schools, so there has been a need for an examination of how these are assessment help in improving the academic performance of students. Adeyemi (2008) view the increasing importance of assessment not only for students, but for the educational system as whole.' Assessment may be defined as any method used to better understand the current knowledge that a student possesses. This implies that assessment can be as simple as a teacher's subjective judgment based on a single observation of student performance, or as complex as a five-hour standardized test. The idea of current knowledge implies that what a student knows is always changing and that we can make judgment about student achievement through comparisons over a period of time. Assessment may affect decisions about grades, advancement, placement, instructional needs, and curriculum. Assessment is often seen as serving three purposes for the teacher: measuring attainment, identifying strengths and weaknesses, and indicating progress or deterioration. However, assessment is also one way by which injustice can be avoided in education. The function of a school is the certification of individual learner under its embrace (Idowu &Esere, 2009).To effectively carry out this role, assessment of one

kind or the other is a prerequisite. Assessment is a means whereby the teacher obtains information about knowledge gains, behavioural changes and other aspects of the development of learners (Oguneye as cited in Faleye&Adefisoye, 2016). It involves the deliberate effort of the teacher to measure the effort of the instructional process as well as the overall effort of school learning on the behaviour of students. Assessment covers all aspects of school experience both within and outside the classroom. It covers the cognitive as well as the affective and psychomotor aspects of learning. In Nigeria, educational planners and administrators are now more conscious than ever before of their role in the nationwide scheme of curriculum innovation.

Assessment is a process through which the quality of an individual's work or performance is judged. Assessment of students' level of academic performance is vital to teaching and learning process as it provides the necessary feedback about the outcome of educational goals and objectives. The assessment of learning outcomes provides objective evidences necessary in the decision making process in education. As pointed out by Bassavanthappa (2009), good measurement resulting in accurate data is the foundation of sound decision making about educational endeavor. In education, assessment aims at determining the level of students' mastery of a body of knowledge and skills in a subject (Airasian, 2006). Assessment of learning is not one time movement, it is a progressing process. It includes the procedure of checking on, reflecting and modifying the learning techniques in an arranged and cautious way. When carried out as an on-going process, assessment is known as Continuous Assessment (CA) (Samiullah & Anjum, 2017).

In the past, the educational systems of many African nations were dominated by the one-short summative type of assessment (Alausa, 2005). Students were trained to pass examinations so as to move up the education ladder; in order to stop this, suggestions for a broader approach to assessment, which would be flexible and also provide valid and reliable results were made (Federal Government of Nigeria, 2004). In the light of this, CA was introduced to find ways in which academic evaluation impacts on the way teaching occurred and learners learnt; hence, the significance of teachers' understanding of relevance of continuous assessment to students' academic success. It is when people know about innovation they are to adopt that they are motivated to embrace its practices.Continuous Assessment is a formative evaluation procedure concerned with finding out, in a systematic manner, the over -all gains that a student has made in terms of knowledge, attitudes and skills after a given set of learning experience. In this process, observations are made time to time to collect data to determine the level of students' knowledge, understanding and performance. CA is done by giving particular tasks to students based on their previous achievement in classroom. CA helps them to find out what the learners have learnt. Continuous assessment is part and parcel of instructional process that has to be taken as a key tool in educational quality assurance endeavor (Abejehu, 2016). Samiullah and Anjum (2017) reported that continuous assessment as an approach should present the complete number of sources and methods that teacher can apply to collect, interpret and synthesize information

about students. The use of this information also helps teachers to understand their students, plan and monitor their teaching to create a feasible culture. Baker and Stets as cited in Samiullah and Anjum, (2017) stated that continuous assessment should include a regular assessment of students' affective structures and motivation in which they will need to express their determination intensely, their work force readiness and their skills in team or group performance background.

Continuous assessment (CA) does not solely depend on formal tests. CA is more than giving a test, it involves every decision made by the teacher in class to improve students' achievement. CA may take different forms such as formal questions given to students during class, take-home assignments/exercises and recapitulation exercises. Assessment is either internal or external. Internal assessment refers to school-based assessment, which includes class assignments, teacher-made tests, recap exercises, projects, field studies and all these tools form part of the classroom continuous assessment strategies. External assessment refers to tests that are produced by examining bodies away from school. Continuous assessment strategy refers to the different tools/procedures used in the classroom to understand the academic achievement levels of learners in terms of their knowledge, attitudes and values. One of the most important and significant developments in Nigerian educational system was the introduction of the use of Continuous Assessment in evaluation of students at all levels of schooling. By implication, every teacher from primary to secondary level of education should understand and practice Continuous Assessment.

Continuous assessment is a classroom strategy implemented by teachers to ascertain the knowledge, skills and understanding attained by students at a particular point in time. Teachers administer assessments in a variety of ways in order to observe multiple tasks and information about what students know, understand and can do. The assessments are curriculum based tasks previously taught in classroom. Continuous assessment is a method of evaluation carried out periodically or at a predetermined interval of the school year. It is aimed at finding out how much students have acquired in a subject matter. It is a consistence monitoring of students' progress in school. It involves collecting data with a view to making value judgement about the quality of a person, object, group or event (Ajuonuma, 2007).

The continuous assessment grading system requires the assessment of the change in behaviours, in terms of cognitive, affective and psychomotor domains. The students are evaluated from one stage to the other through tests, assignments, projects and other school activities. Race (2007) stated that continuous assessment is more useful to the students, as it provides them with on-going feedback on their performance, helps them to become more self-critical, and encourages them to attempt mastering material as they actually work through a course, thus, achieving success in their academic goals. According to Adegbeye (2003), CA is more relevant as it allows students to demonstrate their ability and development on a periodical basis, so that students who have studied hard but is not very good at sitting for examinations is not placed at a disadvantage compared with lazy students who engage in minimum amount of

work needed to pass such examinations. A fundamental change in the system of assessment of students' performance has emerged through the formalization of Continuous Assessment as a major component of evaluation process (Idowu &Esere, 2009). The comprehensive nature of continuous assessment is in four folds; firstly, the teacher has to ensure that different assessment techniques are employed at different times in the quest for continuous assessment system. This will take care of whatever inadequacy that could have been accessioned by the students' inability to maximally express their prowess when a particular assessment technique (e.g. test) is used. The comprehensive nature in this strand implies that the teacher will have to conduct series of assessment activities at different stages of teaching and learning in the classroom. Secondly, the comprehensive nature of continuous assessment also demands that the assessment activity of the teacher is expected to cover the cognitive, affective and psychomotor domains of the students' behaviour. This means that the teacher should not narrow assessment activity to issues relating to paper and pencil method of assessing the students' achievement in a subject, but should also extend such subject's assessment to such activities like the use of hand and brain (through the coordination of muscles and bones) to produce things that are observable (Faleye& Afolabi, 2007). The affective activities that can be included in to assessment include class attendance, punctuality, attitude to school work/subject activities, neatness, respect for rules and regulation, cooperation with colleagues ,leadership qualities, courage, perseverance comportment, effort at knowing etc. Examples of psychomotor activities include drawing, painting, running jumping, dancing, typing, titration etc.

The third of the characteristics of continuous assessment is its cumulative nature. The cumulative nature of continuous assessment necessitates that the average continuous assessment system of every student in a particular session is carried over to the next class level till the last class of the school level. This is to ensure that the students are not put under the challenge of any teacher who may not be forthright in the administration of continuous assessment for any particular school term. The performance of any student could vary overtime due to some reasons, this can be overcome by the determination of average continuous assessment system of other terms or session since the intention of assessment is not to make students fail but to have a valid basis for the classification of students into various ability levels (Faleye and Afolabi, 2007). The fourth nature of continuous assessment is that it is guidance oriented. It is expected that feedback is obtained after every assessment activity in the school. This feedback is to guide the learner in identifying the areas where the students' needs to try more so as to improve the students' performance. The feedback also serves as 'eye-opener' to the parents or guardians if the concerned students in terms of students' progress in the school. Feedback is an important tool for the sustenance of good performance as well as a veritable instrument for the improvement of poor performance. The teacher is expected to give prompt feedback to students whenever any assessment activity is conducted. If and when the teacher will be unable to give feedback, it is important that students are not given any assessment task because once students discover that the teacher will not mark the test, assignment or class work given to them, the

tendency is for them not to take the teacher serious again. When the students are sure that their teacher will mark any assessment task given to them and report same to them on time, and when they are also made to realize that every assessment task counts, then, they would always want to prepare ahead for any task to be given by the teacher (Faleye&Adefisoye, 2015). If the teacher could not help the students in there are as of weaknesses, the students concerned are expected to be referred to the school counselor for help or even to the parents or guardians for assistance. When these are done, then, continuous assessment is guidance oriented.

On the review of studies carried out in continuous assessment, Kanno (2006) carried out a research work on the relevance of continuous assessment test to students' cognitive development in elementary schools in Ilorin metropolis. Dekaiye (2011) conduct a research on the influence of school population on the implement of continuous assessment in secondary schools in Lokoja metropolis, Kogi State. Yakub (2009) carried out his own study on the problem of continuous assessment implementation in secondary schools in Sokoto State. Few studies were conducted on the impact of continuous assessment to student's academic performance in mathematics in Enugu State. The study therefore examined the impact of continuous assessment on students' academic performance in secondary schools in Enugu State.

Statement of the Problem

The importance of mathematics to an individual and society is acknowledged worldwide. Unfortunately, learners' performance in the subject at national examinations at the secondary school level is worrying all over the globe. Performance of mathematics subject in most students in secondary schools in national examination in Nigeria has been very poor. Since the introduction of continuous assessment system by National Policy on Education in early 1980s, there are many challenges associated with its use in practice and implementation. In almost every year during processing of the Secondary Schools examination results, NECO and WAEC have identified an aspect of schools turning in high continuous assessment marks of their students which does not correlate at all with their respective final examination subjects marks. One would wonder why continuous assessment scores do not predict senior school certificate if continuous assessment is effectively conducted. Common to all these studies is the fact that continuous assessment allows for a diagnosis of the learners' learning difficulties. The purpose of continuous assessment is to assist in improving learning through administering of assignments and tests as the learning experiences increase before the end of term examination is taken. As good as the purpose for which continuous assessment was initiated, some teachers and students see the conduct of so many tests as extra work and burden. As a result, the main purpose of continuous assessment is gradually being lost. It is in the light of this the researcher investigated on the impact of continuous assessment on students' academic performance in mathematics in secondary schools in Enugu State.

Purpose of the Study

This study examined the impact of continuous assessment on students' academic performance

in mathematics in secondary schools in Enugu State. Specifically, the study determined;
1. The extent of administering continuous assessment in mathematics in secondary schools
2. The extent to which continuous assessment affect students' academic performance in mathematics in secondary schools

Research Questions

The following research questions were formulated to guide this study
1. To what extent is continuous assessment administered in mathematics in secondary schools
2. To what extent does Continuous Assessment affect students' academic performance in mathematics in secondary schools.

Research Hypothesis

The null hypothesis was formulated to guide the study at 0.05 level of significance.
1. There is no significant difference between the mean rating of continuous assessment scores and academic performance of students in Mathematics.

Methodology

This is discussed under the following subheadings: design of the study, area of the study, population for the study, sample and sampling techniques, instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection and method of data analysis.

The research design of this study was a descriptive survey research design. The descriptive survey research design is considered appropriate for use in this study because the sample population is the representative of the entire population and was used for the study. The study was carried out in Enugu State. There are six Education zones in Enugu State.The population comprised of all the mathematics teachers from the 295 secondary schools in Enugu State. The schools in Enugu Education zone having 31 secondary schools, Agbani Education zone having 45 secondary schools, Awgu Education zone having 54 secondary schools, Udi Education zone having 55 secondary schools, Nsukka Education zone having 60 secondary schools and Obollo-Afor Education zone having 50 secondary schools. The sample size of two hundred and fifty two mathematics teachers was drawn through stratified sampling technique.Data was collected using a well-structured questionnaire. The questionnaire consists of 23 items divided in three sections. Section A comprised of demographic characteristics of teachers as respondents. Section B comprised 10 items on frequency of administering continuous assessment, section C comprised 10 items on the extent to which Continuous Assessment affect students' academic performance in mathematics in secondary schools. Records of continuous assessment of students were also used. Sections B and C will have response option of a 4 point scale of SA= Strongly Agree (4 points), A= Agree (3 points), D= Disagree (2 points), SD= Strongly Disagree (1 point).

The validity of an instrument is the degree of accuracy with which the instrument measures what it is intended to measure.The instrument was presented to three experts in mathematics and computer education for validation. Necessary modifications were suggested. The items of the instrument were judged on their extent to which it measured what was intended. The education experts critically examined the instrument and made useful suggestions that helped to improve the quality of the instrument. The instrument was first be trial tested using twenty (20) mathematics teachers in private secondary schools in Enugu State, which are not part of the study. The reliability of the instrument was determined using Cronbach Alpha Model with cluster one yielding 0.85, cluster two yielded 0.89 and the total reliability index of 0.84 was obtained indicating that the instrument was very highly reliable for the study.The completed questionnaires collected by the researcher was analyzed using mean, standard deviation and t-test. Thus Mean of the 4-point response scale was $(4+3+2+1)/4 = 10/4 = 2.5$. This implies that the cutoff point is 2.5.

Results

Research Question 1: To what extent is continuous assessment administered in mathematics in secondary schools

Table 1: Mean responses to the extent of administering continuous assessment in mathematics in secondary schools.

(N=252).

S/N	Items	$\bar{x}$	SD	DEC
1	I regularly score students on punctuality at school, personality, behaviour, assignment and test.	2.95	0.91	A
2	I always draw test from the topics that I have taught the students.	3.03	0.88	A
3	I do correction of the continuous assessment with the students.	2.79	1.07	A
4	School management regularly invites parents concerning the performance of their children	2.34	1.10	D
5	I often conduct class test for the students	2.74	0.79	A
6	I have time table for continuous assessment for the students	2.86	1.01	A
7	I regularly give students assignment	2.43	1.08	D
8	I mark and return the students scripts to them to identify areas of weaknesses and strength	2.12	0.98	D
9	I often draw students attention to their performance in continuous assessment	2.43	0.75	D
10	I often give students continuous assessment before terminal examination	3.34	0.91	A
	Grand Mean	**2.73**	**0.86**	**A**

Table 1 shows that majority of the respondents agreed that they often conduct class test for the students and they regularly give students assignment. While majority of the respondents disagreed with the statement that I often draw students' attention to their performance in Continuous Assessment and the school management regularly invites parents concerning the performance of their children From the result of the above it can be established that continuous assessment are frequently administered in senior secondary schools in Enugu State. Although, school management does not regularly invite parents concerning the performance of their children.

Research Question 2: To what extent does Continuous Assessment affect students' academic performance in mathematics in secondary schools.

Table 2: The extent to which Continuous Assessment affect students' academic performance in mathematics in secondary schools

(N=252)

S/N	Items	$\bar{x}$	SD	DEC
11	Continuous assessment is a crucial tool for simultaneously improving classroom practice	3.13	0.63	A
12	Continuous assessment is a tool for improving students' performance	2.65	0.83	A
13	Frequent assessment of students' performance has demonstrated to improve student outcomes	2.73	0.45	A
14	Continuous assessments have proved to help students understand the teacher's learning intentions	2.90	0.31	A
15	Continuous assessments does not provide students with opportunities to revise and improve their thinking	2.10	0.56	D
16	Continuous assessment help students monitor their own progress over time	2.72	0.91	A
17	I use assessments frequently which are modified to improve learning outcomes of the students	2.83	0.79	A
18	Continuous assessment tests provide evidence concerning students' achievements, which when interpreted helps the teachers to take measures for further improvements	2.71	0.75	A
19	Continuous assessment tests cannot enhance teaching and learning by providing a more focused application for learners	2.07	0.68	D
20	Continuous assessment is not used to evaluate progress and achievement, assign grades and appraise programs	2.13	0.38	D
21	Frequency formative assessment of progress monitoring has proved to have positive impact on student outcomes	3.21	0.81	A
22	I actively involve students in the process of helping them to develop skills that enable them to learn better	2.77	0.43	A

23	Administering weekly or biweekly assessments in mathematics progress together with instructional recommendations		A
		2.90	0.31
	Grand Mean		**A**
		2.83	**0.38**

From table 2, the respondents agreed that continuous assessment have positive impact on students' outcome in mathematics since it improves students' performance in mathematics

Hypothesis 1: There is no significant difference between the mean ratings of continuous assessment scores and academic performance of students in Mathematics.

Table 3: t-test analysis of the difference between continuous assessment scores and academic performance of students in mathematics.

Variables	N	Means	SD	DF	t	Level of Sig	Sig of P
Continuous Assessment	252	3.07	0.87	230	2.54	0.05	0.13
Exam Scores		2.89	0.71				

Table 3 shows that the r-calculated (2.54) is greater than critical value (0.13) at 0.05 level of significance. The null hypothesis, which states that there is no significant difference between continuous assessment scores and academic performance of students in Mathematics, is therefore rejected. This implies that there is significant difference between continuous assessment scores and academic performance of students in Mathematics.

Discussion

The findings of the study revealed that continuous assessments are frequently administered in senior secondary schools in Enugu State. Although, school management do not regularly invite parents concerning the performance of their children. This findings agrees with Hooge (2016) who stated that teachers do not involved parents into their children education because they feel most of those parents are illiterate. Assessment is an important element in mathematics teaching and learning. Aina (2010) opines that teacher must regularly assess the effectiveness of the learning experiences which they have organized to enable the students achieve the stated objectives. Abbas (2009) stated that continuous assessment is an ongoing test device which is comprehensive and include the three domains of learning. The result further revealed that senior secondary schools students in Enugu State improve in their performance using continuous assessment. Despite the fact that the students are not happy to hear the news of conducting continues assessment from their teachers.

This finding agrees with Taylor and Parsons (2011) who stated that continuous assessment is a better way of assessing student's performance. Test of hypothesis one revealed that, there is significant difference between continuous assessment scores and academic

performance of students in mathematics. This findings agrees with Ahukanna, Onu and Ukah (2007) who stated that continuous assessment is of advantageous to the learner because it reveals the ability of the learner early enough to make necessary adjustment for improved performance on the part of the teacher. Alausa (2005) said that continuous assessment is places at the center of all performance assessment activities. Kenni (2011) further affirms that Continuous Assessment is a mechanism whereby the final score of a student in the cognitive, effective and psychomotor domains of leaning systematically takes accounts of all performance during a period of schooling. Aina (2014) agreed that, it could be inferred that there is significant relationship between students' score in continuous assessment and final grade in electromagnetism Physics. Cola (2013) reported a strong correlation between continuous assessment and students' scores in examination and also in student final grade in electromagnetism. Cola concluded that continuous assessment influenced students' performance in physics. This indicates that continuous assessment should be adopted by mathematics teachers in teaching and learning process in order to help reduce the fear and failure of students in mathematics.

Conclusion

It was concluded that the continuous assessment had critical impact on academic performance of secondary school students in mathematics It is also apparent that it has important implications for understanding how students perceive the feedback they obtain from teachers for their learning. Continuous assessment improved students' efficacy and confidence about their ability to do well in academic work. When students become confident in their ability to succeed, they become more involved and learn more. On the other hand, students are more likely to attempt educational tasks when the feedback from learning indicates that they can succeed.

Recommendations

In the light of findings and conclusions of the study, the following recommendations are made:
1. Teachers should be educated and encouraged on the need to involve continuous assessment in their teaching and learning process.
2. Workshops should be conducted to provide practical training in using continuous assessments.
3. The Curriculum Planners and the Government should involve continuous assessment into the school curriculum for developing assessment techniques in our existing educational environment.
4. In-service teachers should be given training in developing and using continuous assessments through refresher courses. It is the need of the day to develop a new culture for enhancing continuous assessment in teaching.
5. Parents should be involved and aware of their children's academic progress and should also be aware of different assessment techniques and help their children in this respect.

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EXTENT OF APPLICATION OF COST BENEFIT ANALYSIS MODEL BY SECONDARY SCHOOL PRINCIPALS IN AGBANI EDUCATION ZONE

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Abstract

The main purpose of this study was to ascertain the extent of application of cost benefit analysis by secondary school's principals in Agbani Education zone. Design adopted for the study was descriptive survey design. Two research questions and Two hypotheses guided the study. This study was carried out in Agbani Education zone. The population for the study consisted of all the 63 secondary school principals in Agbani Education zone as at the time of the study. Due to the manageable size of the population for this study, the entire population, 63 secondary school principals was used as sample for the study. The instrument used for data collection was a questionnaire on Application of Cost Benefit Analysis by Secondary School Principals in Agbani Education Zone (QACBAP). It is a 61-item structured questionnaire. The instrument was constructed by the researcher and validated by three research experts. The questionnaire yielded an overall reliability coefficient of .69 obtained through Cronbach's alpha method. Copies of the questionnaire were administered to the respondents by the researcher and five briefed research assistants. Direct delivery and retrieval system was used. Mean and standard deviation were used to answer the research questions while z-test was used to test the hypotheses at 0.05 significant level. Major findings of the study revealed that principals' in urban and rural secondary schools in Agbani Education zone assessed the social benefits and appraised desirability of projects in their schools to a Great Extent. Consequently, it was recommended among other things, that the good understanding and skills on Cost Benefit Analysis Model should form a measurable aspect of screening for principals before appointment.

Introduction

Undoubtedly, the functions of secondary school principals can be enhanced through the application of innovative strategies, one of which is Cost Benefit Analysis (CBA). Cost Benefit Analysis, according to Becker (2016) is one of the techniques for deciding which organizational

project or infrastructure to embark on in the fiscal year. Every project decided on, was included in the capital budget in the fiscal year in which it would commence. CBA, sometimes called "Benefit Cost Analysis" (BCA), is a systematic approach to estimating the strengths and weaknesses of alternatives in project execution. It is used to determine options that provide the best approach to achieve benefits or cost savings. TheCBA is also defined as a systematic process for calculating and comparing benefits and costs of a decision, policy (with particular reference to organizational policy) or (in general) project, (Ahmed, 2016). The prime basis for use of CBA by organizations is to appraise the desirability of a given policy which parastatals have to implement. It is an analysis of the expected balance of benefits and cost, including an account of foregone alternatives and the status quo(the existing infrastructure). CBA is supportive for predicting whether the benefits of a policy by any organization outweighs its costs and by how much, relative to other alternatives, so that one can rank alternative policies in terms of cost-benefit ratio (Gbenga and Dayo, 2016). At the end, accurate cost-benefit analysis identifies choices that increase public utility from a utilitarian perspective, (McMahon, 2015).

McMahon held that cost benefit analysis is a useful tool in the hands of administrators of educational organizations such as secondary school principals. McMahon identified two applications of cost benefit analysis suitable for secondary school setting. They include; assessment of the social benefits of projects and appraisal of the desirability of projects. McMahon described social benefit as a consequence or effect of decisions or interventions which lead to development of the people and the society. Social benefits are the sum total of gains accruing to the society and people meeting to connecting with each other for pleasure, (Putin, 2018). To assess the social benefits of projects in secondary schools, McMahon (2015) suggested that the principals should assess the socio-economic benefits of projects, assess the socio-cultural benefits of projects, consider effects of projects on teachers, consider effects of projects on students, consider effects of projects on school administrators, consider effects of projects on other critical stakeholders of the school, encourage civic activism in project selection, consider gender equity in project selection, consider project users with special needs and consider potentials of projects to enhance unity in diversity among users. From the foregoings, it is obvious that assessment of the social benefit of school projects is very vital. However, there is still no definitive conclusion on the extent to which secondary school principals apply these all important index of Cost Benefit Analysis in carrying out their managerial duties especially in Enugu state. This gap justifies the researcher's choice to embark on the present study.

Desirability of a project involves determining whether the intended outcomes (i.e. the changes that the project will make to people's lives, such as improved awareness, better health or changed behaviours) are suitable and worth to be desired, (McMahon, 2015). Schults (2016) opined that the employment potentiality of a project is an important consideration while determining the desirability of a project. The project which is labor intensive and has higher employment potential is preferred over the project having lower opportunities to generate employment. Schults argued that in secondary school system, constructing a laboratory, library

or clinic may result to employing laboratory attendants, librarians or some health workers respectively. As a consequence, such projects (laboratory, library or clinics) maybe more desirable than constructing additional classroom when the desire of the stakeholders is to create employment.

Furthermore, Ahmed (2016) suggested that capital output ratio should be an important factor in determining the desirability of a project. According to Ahmed, the project which gives a higher output per unit of capital employed should be given preference over a project which gives lower output per unit of capital employed. Another factor to consider in appraisal of desirability of projects is Value Added Criterion. The value added criterion is similar to the capital output ratio except that the estimated value added by a project is considered in place of the total value of the output, (Todaro and Smith, 2016). Also important for appraisal of the desirability of project is the impact of the project on the foreign exchange reserves of the country. This criterion affects mainly the government. Gbenga and Dayo (2016) hinted that since there is scarcity and constraint of foreign exchange in Nigeria, the project which has higher potential of net benefits in foreign exchange is given preference over other projects. As a result, a secondary school principal who fails to consider this criterion while choosing a project may lose the support of the government who incidentally is the main financier of projects in public secondary schools.

To appraise the desirability of projects in secondary schools, McMahon (2015) suggested that the principals should appraise the social desirability, economic desirability, cultural desirability, desirability by students, desirability by teachers, desirability by school administrators, desirability by parents, desirability by host community, desirability by the government, desirability by school management board, desirability by donors and other project financiers. Regrettably, there are conflicting findings on the extent to which secondary school principals appraise the desirability of projects in their schools especially in Enugu sate. This calls for more investigations, thus, justifying the researcher's choice to embark on the present study.

No doubt, these goals of secondary education are laudable. However, they cannot be achieved without innovative and pragmatic leadership. It is therefore expected that in managing secondary schools, strategies such as Cost Benefit Analysis will be very useful. However, the extent to which CBA is applied by principals in the management of secondary schools is a subject of debate. This study is a deliberate attempt to explore the extent of application of CBA by principals in management of secondary school in Enugu State. In Enugu state, Secondary Education is presently managed by the Post Primary Schools Management Board (PPSMB). The board is organized into six Education Zones. Enugu state is among the states of the Nigerian federation crying fowl over non availability of sufficient funds to sponsor Education and other vital sectors. Hence, secondary education in Enugu state is presently grossly underfunded. Principals are consequently expected to innovate and apply pragmatic management techniques in order to make meaningful impact.

Another variable of interest to the researcher in this study is influence of school location on the extent to which principals apply Cost Benefit Analysis to management of secondary schools in Agbani Education zone. Researchers such as Gbenga And Dayo (2016), Ahmed, (2016) Becker (2016) and Wordhall (2017) vary in their findings and opinions as to whether or not school location influences the extent to which principals apply Cost Benefit Analysis to management of secondary schools. Gbenga and Dayo, (2016) reported that urban schools' principals apply Cost Benefit Analysis to a great extent while their counterparts in rural schools apply Cost Benefit Analysis to a low extent in management of secondary schools. Ahmed, (2016) found in another study that principals in rural schools apply Cost Benefit Analysis more than principals in urban schools in the area of his study. Becker (2016) and Wordhall (2017) in their separate studies found that school location did not have significant influence on the extent to which secondary school principals apply Cost Benefit Analysis in the management of their schools. School location in the context of this study would be categorized into two viz; urban and rural. Undoubtedly, urbanization and rural development still pose great challenges to the government of the third world countries such as Nigeria. In the urban areas, barely all the basic infrastructures are inadequate in supply, hence, the struggle for and consequent over stretching of the available few. Therefore, in the school system, the story has remained that of over-crowded classrooms, insufficient and obsolete equipment, absenteeism occasioned by the use of school children for street trading even during the school hours, truancy on the part of the teachers as they hassle to survive the high cost of living, etc.

The emergence of urban congestion has worsened things and created more unmanageable social problems. The problems of urbanization are many and they constitute a big threat to school administration and management as well as teaching and learning. This is because learning must take place in a very conducive environment. Also, innovative management is required so as to provide a conducive environment amidst scarce resources and other inhibiting factors. On the other hand, the situation in the rural areas is not in any way better. Although the rural locations may never be known for over-population, they have definitely suffered neglect and abandonment. Hence, schools in the rural areas are marked by dilapidated buildings, where they even exist at all and lack of necessary equipment to enhance teaching and learning. Many rural schools have been deserted by teachers who usually seek transfers to urban areas. All these largely tell on the school administrators (principals) who are expected by other staff, student and parents to provide a friendly and enabling teaching/learning environment at all times. Thus, a study of this nature is most timely as it also seeks to investigate whether or not school location will influence secondary school principals' application of Cost Benefit Analysis to school management

Purpose of the Study

The main purpose of this study was to ascertain the extent of application of cost benefit analysis by secondary school principals in Enugu State. In specific terms, the study sought to;

i. examine the extent to which principals assess the social benefits of projects in secondary schools in Enugu State
ii. investigate the extent to which principals appraise the desirability of projects in secondary schools in Enugu State

Research Questions
The following research questions were formulated to guide the study;
1. What is the extent to which principals assess the social benefits of projects in secondary schools in Agbani Education zone?
2. To what extent do principals appraise the desirability of projects in secondary schools in Agbani Education zone?

Hypotheses
The following hypotheses were tested at 0.05 level of significance;
1. There is no significant difference between the extent to which principals assess the social benefits of projects in urban and rural secondary schools in Agbani Education zone.
2. There is no significant difference between the extent to which principals appraise the desirability of projects in urban and rural secondary schools in Agbani Education zone.

Methodology
Design adopted for the study was descriptive survey design. Two research questions and Two hypotheses guided the study. This study was carried out in Agbani Education zone. The population for the study consisted of all the 63 secondary school principals in Agbani Education zone as at the time of the study. Due to the manageable size of the population for this study, the entire population, 63 secondary school principals was used as sample for the study. The instrument used for data collection was a questionnaire on Application of Cost Benefit Analysis by Secondary School Principals in Agbani Education Zone (QACBAP). It is a 61-item structured questionnaire. The instrument was constructed by the researcher and validated by three research experts. The questionnaire yielded an overall reliability coefficient of .69 obtained through Cronbach's alpha method. Copies of the questionnaire were administered to the respondents by the researcher and five briefed research assistants. Direct delivery and retrieval system was used. Mean and standard deviation were used to answer the research questions while z-test was used to test the hypotheses at 0.05 significant level.

Results
Research Question 1
To what extent do principals assess the social benefits of projects in secondary schools in Agbani Education zone?

Table 1: mean and standard deviation scores on research question 1 items

S/N		Urban	Rural	Overall

		Mean	SD	Remark	Mean	SD	Remark	Mean	SD	Remark
1	Assess the socio-economic benefits of projects	2.69	0.19	GE	2.93	0.25	GE	2.80	0.13	GE
2	Assess the socio-cultural benefits of projects	2.93	0.15	GE	2.18	0.13	GE	2.79	0.13	GE
3	Consider effects of projects on teachers	3.21	0.13	GE	3.16	0.13	GE	3.11	0.12	GE
4	Consider effects of projects on students	3.14	0.14	GE	3.22	0.12	GE	3.08	0.25	GE
5	Consider effects of projects on school administrators	2.93	0.19	GE	2.75	0.25	GE	2.82	0.13	GE
6	Consider effects of projects on other critical stakeholders of the school	2.96	0.15	GE	3.15	0.13	GE	3.04	0.13	GE
7	Consider effects of projects on other critical host communities of the school	2.69	0.13	GE	2.93	0.13	GE	2.80	0.12	GE
8	Encourage civic activism in project selection	2.93	0.14	GE	2.18	0.12	GE	2.79	0.25	GE
9	Consider gender equity in project selection	3.11	0.14	GE	3.25	0.06	GE	3.05	0.12	GE
10	Consider project users with special needs	2.73	0.06	GE	3.16	0.15	GE	3.01	0.28	GE
11	Consider potentials of projects to enhance unity in diversity among users	3.06	0.14	GE	3.22	0.12	GE	3.15	0.25	GE
	GRAND	**2.94**	**0.14**	**GE**	**2.92**	**0.14**	**GE**	**2.94**	**0.17**	**GE**

From table 1 the grand means for urban and rural were 2.94 and 2.92 respectively while the overall grand mean was 2.94. This result indicated that principals in urban and rural secondary schools in Agbani Education zone assessed the social benefits of projects in their schools to a Great Extent. Also, the standard deviation value for the overall (0.17) is small, indicating that there were little or no extreme values. Hence, the mean values so obtained represented the actual views of the respondents.

Research Question 2

To what extent do principals appraise the desirability of projects in secondary schools in Enugu State?

Table 2: mean and standard deviation scores on research question 2 items

S/N		Urban			Rural			Overall		
		Mean	SD	Remark	Mean	SD	Remark	Mean	SD	Remark
12	Social desirability of projects in your school	3.55	0.21	GE	3.59	0.13	GE	3.58	0.35	VGE
13	Economic desirability of projects in your school	3.62	0.04	GE	3.57	0.95	GE	3.59	0.14	VGE
14	Cultural desirability of projects in your school	3.54	0.34	GE	3.61	0.93	GE	3.62	0.09	VGE
15	Desirability of projects in your school by students	2.93	0.13	GE	2.75	0.91	GE	2.82	0.15	VGE
16	Desirability of projects in your school by teachers	2.93	0.25	GE	2.18	0.04	GE	2.79	0.98	VGE
17	Desirability of projects in your school by school administrators	3.06	0.23	GE	3.22	0.44	GE	3.15	0.85	VGE
18	Desirability of projects in your school by parents	2.69	0.11	GE	2.93	0.35	GE	2.80	0.99	VGE
19	Desirability of projects in your school by host community	2.93	0.25	GE	2.18	0.35	GE	2.79	0.26	VGE
20	Desirability of projects in your school by the government	3.21	0.05	GE	3.16	0.14	GE	3.11	0.95	VGE
21	Desirability of projects in your school by school management board	3.14	0.29	GE	3.22	0.09	GE	3.08	0.14	VGE
22	Desirability of projects in your school by donors and other project financiers	3.61	0.11	GE	3.58	0.43	GE	3.62	0.75	VGE
	GRAND	**3.20**	**0.18**	**GE**	**3.09**	**0.43**	**GE**	**3.20**	**0.51**	**GE**

From table 2 the grand means for urban and rural were 3.20 and 3.09 respectively while the overall grand mean was 3.20. This result indicated that principals in urban and rural secondary schools in Agbani Education zone appraised the desirability of projects in their schools to a Great Extent. Also, the standard deviation value for the overall (0.51) is small, indicating that there were little or no extreme values. Hence, the mean values so obtained represented the actual ratings of the respondents.

Hypothesis 1

There is no significant difference between the extent to which principals assess the social benefits of projects in urban and rural secondary schools in Agbani Education zone.

Table 3: z-test analyses for hypothesis 1

Group	n	x̄	SD	z-calculated	z-critical	Remark
Urban		2.94	0.14			Not significant
				0.62	1.96	(Do not reject
Rural		2.92	0.14			hypothesis)

From table 3, z-calculated (0.62) is less than z-critical (1.96). Hence, at .05 significant level, the mean ratings of the two groups (urban and rural) do not differ significantly. Consequently, hypothesis one is not rejected as stated, implying that there was no significant difference between the extent to which principals assess the social benefits of projects in urban and rural secondary schools in Agbani Education zone

Hypothesis 2
There is no significant difference between the extent to which principals appraise the desirability of projects in urban and rural secondary schools in Agbani Education zone.

Table 4: z-test analyses for hypothesis 2

Group	n	x̄	SD	z-calculated	z-critical	Remark
Urban		3.20	0.18			Not significant
				0.81	1.96	(Do not reject
Rural		3.09	0.43			hypothesis)

From table 4, z-calculated (0.81) is less than z-critical (1.96). Hence, at .05 significant level, the mean ratings of the two groups (urban and rural) do not differ significantly. Consequently, hypothesis two is not rejected as stated, indicating that there was no significant difference between the extent to which principals appraise the desirability of projects in urban and rural secondary schools in Agbani Education zone.

Summary of Findings
Findings based on this study can be summarized thus;

1. Principals in urban and rural secondary schools in Agbani Education zone assessed the social benefits of projects in their schools to a Great Extent.
2. Principals in urban and rural secondary schools in Agbani Education zone appraised the desirability of projects in their schools to a Great Extent.

Discussion of Findings

Cost Benefit Analysis (CBA) involves the application of rationality to decision making, as opposed to relying entirely on intuition and "seat- of- the- pants" judgments. Considering education as an investment, all form of investment involve a sacrifice of present consumption in order to secure future benefit in the form of higher level of output or income in the future. Cost Benefit Analysis may be considered to be a sophisticated, quantitative technique for applying rational analysis to decision- making. It tries to answer the practical question of whether an educational programme is worthwhile from economic, social and cultural standpoints. Cost Benefit Analysis assesses the merits of school projects (investments) in terms of "how, when, and where," they should be carried out. It also assesses the desirability and acceptability of the projects by relevant stakeholders. The purpose of the Cost Benefit Analysis is to provide the measure of the expected yield of the projects as a guide to rational allocation of resources. Through objective evaluation, Cost Benefit Analysis makes a comparison of the economic costs and benefit of the educational programme or project. Cost Benefit Analysis is used to conduct a systematic comparison of the magnitude of the cost and benefit of school projects in order to assess their economic profitability, social benefits, desirability and extent of involvement of relevant stakeholders.

Consequently, through Cost Benefit Analysis, the school in general and secondary school in particular will attain her major objective of improving the society. This improvement results from meaningful development of recipients of the education. Of course, the recipients of education (students) can be meaningfully developed only when there exists an enabling environment. Arguably, school projects are meant to provide enabling environment but the projects must be economically profitable, socially beneficial and desirable (acceptable by relevant stakeholders). These and more can be determined through Cost Benefit Analysis which facilitates the process of rational decision making. Since Cost Benefit Analysis is a systematic approach to estimating the strengths and weaknesses of alternatives, it can therefore be used to determine options that provide the best approach to achieve benefits or cost savings. The theoretical basis for use of Cost Benefit Analysis by educational organizations is to appraise the desirability of a given project, objectively evaluate the cost and processes of implementation of the projects in order to assess both the economic profitability and social benefits of such projects to the society at large. Cost Benefit Analysis is therefore an analysis of the expected balance of benefits and cost, including an account of foregone alternatives and the *status quo*(the existing infrastructure).

The foregoings therefore, imply that secondary school principals who apply some Cost Benefit Analysis indices to a low extent (as found in this study) must be trained and charged to improve in their adoption or application of Cost Benefit Analysis. On the otherhand, secondary school principals who apply some Cost Benefit Analysis indices to a great extent (as found in this study) must be helped and encouraged to do it the more. Else, the chances of attaining the objectives of secondary education will be threatened. When the objectives of secondary education are not attained, the implications on the general public can be better imagined than experienced. This is because school dropouts will rise exponentially resulting to exponential

increase in social vices and all sorts of crimes. Accurate cost-benefit analysis identifies choices that increase public utility from a utilitarian perspective. Cost Benefit Analysis is supportive for predicting whether benefits of a school project, outweighs its costs, and by how much relative to other alternatives. It thus imply that secondary school principals who apply Cost Benefit Analysis can rank alternative projects in terms of cost-benefit ratio. CBA can offer a well-articulated estimate of the best alternative.

Recommendations

Based on the findings, the researcher made the following recommendations:
1.   Ministry of Education should reward principals for applying some indices of Cost Benefit Analysis Model in their schools through awards and commendations.
2.   Ministry of Education should organize seminars, conferences and workshops for principals with emphasis on those indices of Cost Benefit Analysis Model which they apply to a low extent.
3.   Good understanding and skills on Cost Benefit Analysis Model should form a measurable aspect of screening for principals before appointment.

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INFLUENCE OF STUDENTS' ENGAGEMENT IN SOCIAL NETWORKS ON THEIR STUDY HABITS IN SCIENCE CLASSROOMS IN ENUGU STATE: AN IMPLICATION FOR COUNSELLING

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Abstract

The main purpose of the study was to investigate the influence of students' engagement in social networks on their study habits in science classroom in government owned universities in Enugu State. Specifically, the study sought to find out the social network sites frequently used by undergraduates and the influence of social network engagements on the study habits of undergraduates in science classroom in government owned university in Enugu State. Two research questions were formulated to guide the study, while two hypotheses were tested at $p <$

0.05. Census survey research design was adopted for the study. The population for the study comprised 165 computer education students from Enugu State University of Science and Technology (ESUT) and University of Nigeria Nsukka (UNN). The population was small and manageable therefore no sampling was done. A structured questionnaire was used for data collection. It had 44 items, divided into two sections. The instrument was validated by three experts, two in Mathematics and Computer Education Department and one other expert in the field of Measurement and Evaluation, all from the Faculty of Education, Enugu State University of Science and Technology (ESUT). The reliability of the instrument was ascertained using Crombach's Alpha, and the overall reliability index stood at .78. The instrument was administered and retrieved directly by the researchers. The research questions were answered using mean with standard deviation while the hypotheses were tested with t-test at 0.05 level of significance. The decision rule for interpreting the results was based on the values of the calculated means. Responses on each of the research questions were considered agreed when the mean is 2.50 and above, and disagreed when less than 2.50. The interpretation of the test of hypotheses was based on the significance (sig.) values from the SPSS output. The null hypotheses were rejected when the significance value is less than 0.05, but were not rejected when greater than 0.05. The results of data analyses for the study revealed that: The type of social networking sites frequently used by undergraduate in the university were Facebook, WhatsApp, Twitter, Instagram, Snapchat, Telegram, Messenger and there was no significant difference in the mean ratings of male and female undergraduates with respect to the types of social network sites frequently used by undergraduates in the public universities in Enugu State. The influence of social network engagement on the study habits of undergraduates in science classrooms in the university indicated negative, while mean rating of male and female undergraduates did not differ significantly with respect to the influences of social network engagement on their study habits. Based on the findings of the study, the researchers recommended among others prohibition of the use of mobile devices in the classrooms, laboratories and libraries in universities in Enugu State as well as effective provision of educational guidance and counselling experts to enlighten undergraduates on the negative effect of social networking on their study habits and future.

KEYWORDS: UNDERGRADUATES, SOCIAL NETWORKS, STUDY HABITS, SCIENCE AND COUNSELLING

Introduction

The use of social media applications has become a widespread phenomenon among all age groups. This appears more widely among teenagers and young adults. Within these categories are found students in the government owned universities in Enugu State. Social media has been defined as 'a collection of internet websites, services and practices that support collaboration, community building, participation and sharing' (Adeboye, 2012). It has attracted the interest of different people including educators who desire to engage their students.

Social media is more often a two way conversation. It has been used prolifically in all areas of the societies like; business, politics, advertising, policing and emergency services. It has also become a key tool for provoking thought, dialogue around particular social issues. Following this pervasive presence and hence the potential for influence, many corporate bodies invest time and money in creating social network sites (SNS), while others go to great lengths to block their employees' access to these sites. The US military, for example, banned soldiers from accessing MySpace SNS, the Canadian government prohibited employees from Facebook and the US congress proposed legislation to ban youths from accessing SNS in schools and libraries. This was apparently based on the belief that their interaction with these media impacted negatively on their times in those locations associated with study. There has been considerable anxiety that social media distracts from education and reduces the social skills of young people. Social media encompasses technologies that facilitate social interaction, make possible collaboration, and enable deliberation across stakeholders. This is a more elaborate definition because it captures the function and examples of social media. These technologies now include blogs, wikis, media (audio, photo, video, text) sharing tools, virtual world, and social networking platforms.

Social networks are the main application under the umbrella of social media, which come with the Web 2.0 era. They cover all about engagement, creating relationship, communicating with one's readers, building the following and connecting with online audiences. Social networking started in the 90s, where Chat Rooms and Bulletin Board System (BBS) were forms of connecting with one another and to share interest. The first recognizable social network site which was launched in 1997, "sixegrees.com" allows users to create profile, list their friends and beginning in 1998, surf the friend list. Between this period and 2004, many social network sites came into existence such as Friendster, Myspace, Facebook and so on but Facebook emerged and grew rapidly in 2007. At first Facebook was solely for college and high school students but in recent time we have witnessed the development of more social media platforms for online social networking like twitter, Google+, Instagram, Whatsapp, Messenger, Tango and others and this has expanded the level of networking and increased the use of social media for both private and corporate purposes.

Social network is a social structure made up of individuals or organizations called "nodes", which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships or relationships of beliefs, knowledge or prestige (Asemah and Edegoh,2012). Social network can

also be referred to as a map of specified ties, such as friendship, between the nodes being studied. The nodes, to which an individual is thus connected, are the social contacts of that individual; the network can also be used to measure social capital such as; the value that an individual gets from the social network. Social networking sites include: Yahoo Messenger, Facebook Messenger, Blackberry Messenger (BBM), Google talk, Google+ Messenger, Instagram and among others. These networking sites are used by most people to interact with old and new friends, physical or internet friends (Adeboye, 2012). The expansion in technology has also affected internet software, thus leading to chatting sites known by the name "social media". With social networking sites, one can send and receive messages almost immediately. However, lack of regulation of the internet has led to its excessive use. McQuail (2018) avers that the internet penetrates more homes.

Social networking has only one goal, which is to encourage new ways to communicate and share information. Observations showed, however, that many students have been blaming various social networks for their negative influence on the students' study habits and steady decrease in their grade point averages. Today teenagers show very much interest in using all these social networks for different purposes such as access to information, group discussion, resource sharing and entertainment. As several studies like Adeboye(2012) and McQuail (2018) demonstrate, social media interaction could have both positive and negative influence on students. In spite of the opportunities social networking has for mankind, it is observed that the total attention and concentration of students have been diverted towards non education, unethical and inappropriate actions such as useless chatting through the use of mobile phones and other devices within the school premises. The negative impact of social networking on the students is also being traced to the fact that students make use of these devices when teaching is going on. Also at their respective homes, they spend great deal of time on social networking activities leaving their studies to a deterring state which may have adverse effect on their study habit.

Study habits are mainly external factors that facilitate the study process such as sound study routines that include how often a student engage in studying sessions, review the material, self-evaluate and studying in a conducive environment (Credé, 2018). Aleke (2016) stated that how a student takes his or her studies, greatly determines his/her level of academic achievements. The level of preparation and learning strategies developed and employed consciously by students, go a long way to influence their level of academic performance. Thus, study habit is one of the greatest students' learning factors that hugely influence students' classroom performance. If undermined by students at all levels, teachers, administrators, parents and guardians, school counselors and the government, then, the trend and menace of students' abysmal performance in both internal and external examinations would continue to boom and become more devastating and alarming. Mark and Howard (2019) opined that the most common challenge to the success of students in all ramifications is a lack of effective or positive (good) study habit. They further maintain that if students can develop good study habits with good discipline, they are bound to perform remarkably well in their academic pursuit. Husain (2012) stresses that lack of effective or positive (good) study habits is a critical study problem among students at all levels. Husain (2020) observes that good study habits are essential to educational

success; as they contribute to a successful academic future. Good study habits lead to good grades while good grades will in turn, lead to a great career. Developing good study habits is very crucial for every student irrespective of the level of education. It boosts students' ability to be self-disciplined, self-directed and ultimately successful in their academic pursuit.

The sooner a student starts practicing and developing good habits, the better chance to continue with them. Ugwu (2013) asserted that with the rapid changes in this generation, youths are now more demanding in acquiring technologies that will suit their needs, especially in their studies. Certainly, the access to Internet or to the World Wide Web is easy and there are many benefits which can be gained. Udoka (2016) noted that the use of this accessibility is applied mostly on the professionals such as medical practitioners, business tycoons, and even government officials. The purpose of their usage of the Internet is different in terms of their needs and various marketers also apply their expertise on it. Apparently, the growing numbers of users are members of different social networking sites and most of them are students. Social networking such as Facebook which is one of the largest social networking sites, Twitter, Google+, and many others have plagued the websites of the Internet accessibility. Many individuals, mostly students and their friends are engaged in social networking. Now, ask every student and they will definitely tell you that they had accounts ranging from 1 to 3 in different social networking sites. With this fact, the networking site is a subject for scrutiny because they can contribute and influence the individuals, especially students yet they are unconscious that these social networking can gradually affect their studies that will reflect on their grades and future. The fusion of study and Internet sites opened the doors for positive and negative results. Almost 80% of the students said that the use of social networking sites such as Facebook does not affect their grades. This idea brought out the issues about the study habits of the students. The effect of social networking on the student's study habits results in different ranges. Many studies show different results about the students who use social networking. There are instances that the student who uses Facebook often has consistently lower grades, which on the other study's result is different.

The higher-education officials and social networking experts revealed that there is a long-term research about the determination of the social networking sites on the academics of the students and on their grades. There is a majority numbers among the student's population who uses social networking sites that received grades according to their performance. The academic performance of the students is different from the other that suggests the idea that there is, somehow, an impact of social networking over the academics and their study habits. However, it is logical to think that the students who used to view their network account more than necessary in a day is highly risky in failing grades, than the one who can manage her or his time and maintaining the routine to finish all his assignments before clicking the icons on his homepage.

Students who organize their lives and stick to the established study schedules are confident and relaxed at test-taking time (Marc, 2011). In the view of Agba (2013), unserious students do study anyhow without specific techniques. Agba submits that such students are most

likely to perform below average. Thus, Agba concludes that good study habits help students to attend classes very often and do so on time. It also helps them to submit their assignment on time, read or prepare very well for tests and examination, take down notes and develop the points independently, ask relevant questions in class; thereby having good grades at the end of the semester, however, it is very important to note that students who show little or no attention to social networking sites while lectures are going on, are likely to understand the concept which the lecturer is teaching. This will enable the students to develop good study habits in school, help students succeed in classroom and achieve educational goals especiall in sciences.

Science is a method of investigating nature, a way of knowing about nature and discovering reliable knowledge about it. Every person has knowledge or beliefs, but not all of each person's knowledge is reliably true and justified. Science uses empirical tests to develop, discover, and explain systematic frameworks within which relationships can be explored (Guellec, 2011). Science is a knowledge generating activity which is based on systematically organized bodies of accumulated knowledge obtained through objective observations (Godin, 2016). Science is not so much concerned with accumulating highly precise and specific data (although it is necessary) but rather science seeks to discover uniformities and to formulate statements of uniformities and consistencies of relationship between natural phenomena (Udoka, 2016). Science is to understand, explain, and predict by specifying the systematic relationships among empirical variables. It must be valid and general. It must not be on authority, sloppy, or simply to "better" mankind. Science can also be defined in terms of the activities of its practitioners (Guellec, 2011). These activities and their explanatory system differ somewhat depending on the stage of maturity of the research area. However, these activities are usually carried out in science classroom.

Science classroom is a key area of academic activity internationally. Science classroom is a major field of practice, with science (and individual science disciplines) being taught and learnt at various levels, both formally (for example in schools) and through more informal approaches (such as the learning that takes place when people visit science museums) all around the world. In most countries, science classroom is seen as a key area where a high level of academic discipline is upheld and these classrooms are usually considered a major important field for meeting societal needs such as ensuring the 'supply' of scientists, engineers and other professionals working in scientific fields and for ensuring sustainable economic development. This major field of practice is supported and explored through the academic study of science education. According to Fensham (2014) science is a common sight to see a youth use social networking facilities like mobile phone in sensitive and highly organized places like church, mosque and lecture venues. Some are so carried away that even as they are walking along the high way, they keep on using them. The manufacturing and distribution of equally sophisticated cellular phones has complicated the situation, as youths no longer need to visit a cybercafé before they send and receive messages. Attention has been shifted from visible to invisible friends, while important ventures like study and writing are affected in the process. This phenomenon has become a source of worry to many who believe in knowledge and skill acquisition of the both male and female gender.

Gender issues and study habit has become a very important issue among researchers. Some studies are of a view that boys study better than girls and vice versa. Females and males could do well in science if exposed to similar conditions (Nsofor, 2011). According to this view, sex difference has little or no influence on study habit in science classroom. In regards to use of social networking sites, students see social network sites as platforms to make friends who can always take them out of boredom. So instead of using social network sites to source for relevant information that will help them in their studies, they just pay attention to their chats and while away their time. Most importantly, a change in the social life of male and female students which is caused by social networks, help those who do not have the confidence to speak in front of anyone to feel free to interact confidently in their virtual life. When they use these social networks, they feel like in heaven but this addiction kills their inner self confidence forever. Becoming addicted to social networks make them feel like they have so many friends but in real, all of the contacts they communicate with are virtual contacts. The frequent use of these social networks could cause addiction toward the site and influence students' daily life at large. It is against this background that this study investigated the influence of students' engagement with social networks on their study habits, time management and cognitive skills in science classroom.

Statement of the Problem

Social networks have become increasingly popular in recent years providing a user-friendly way to maintain social connections and share information. This sharing of information at times has both positive and negative influences. It is sad to observe that the undergraduates constitute the greater number of social network users but with little or no positive influence on their study habit and academic performance especially among the science students. Instead of using social network sites to source for relevant information that will help them in their studies, they just pay attention to their chats and while away their time. This is a source of worry to both the school and the society at large and thus, calls for proper investigation into the influence of social networking and some academic activities by the science students of universities. Hence, this study is to find out the influence of students' engagement in social networks on the study habits of the university undergraduate in Enugu State.

Purpose of the Study

The study intends to find out the Influence of Students' engagement in social networks on undergraduates study habits in Science Classrooms in public universities in Enugu State. Specifically, the study sought to:

1. ascertain the social network sites frequently used by undergraduate in public universities in Enugu State.
2. investigate the influence of social network engagement on the study habits of undergraduates in science classroom in the public universities in Enugu State.

Research Questions

To guide the study, the following research questions were raised;

1. What are the social network sites frequently used by undergraduate in public university in Enugu State?
2. What is the influence of social network engagement on the study habits of undergraduates in science classroom in the public universities in Enugu State?

Hypotheses

The following hypotheses were formulated to guide the study at 0.05 level of significant.

Ho1: There is no significant difference in the mean ratings of male and female undergraduates with respect to the social network sites frequently used in the public universities in Enugu State**.**

Ho2: There is no significant difference in the mean ratings of male and female undrgraduates with respect to the influence of social network engagement on their study habits in the public universities in Enugu State.

Method

Census survey design was adopted for the study. A survey research design, according to Nworgu (2015) is a type of survey research in which the entire populations are used for the study. This design was adopted meaning that the entire populations of the respondents were involved in the study. The population for the study is 165 computer education students in Enugu State University of Science and Technology (ESUT) and University of Nigeria Nsukka (UNN). This was based on the data obtained from a preliminary survey by the researchers in the public universities in Enugu State. The entire population of 165 computer education undergraduates' was used in the study thus, no sampling was done because the population is small and manageable. A structured questionnaire was used as instrument for data collection. The instrument is made up of two parts. Part 1, contains the bio-data of the respondents, while part 2 is made up of two sections, each dealing with an aspect of the research questions posed. The questionnaire was based on four point response scale of: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was validated by three experts, two in Mathematics and Computer Education and one other expert in the field of Measurement and Evaluation, all in the Faculty of Education, Enugu State University of Science and Technology (ESUT). Their comments, corrections and constructive criticisms guided the researcher towards reframing and reconstructing the final instrument that was used for data collection. The reliability of the instrument was ascertained using Cronbach's Alpha and the overall reliability index stood at .78, indicating that the instrument was highly reliable for use in the study. The researchers administered the copies of questionnaire directly to the respondents and retrieved them on the same day. Responses from the research questions were answered using mean with standard deviation while the hypotheses were tested with t-test at .05 level of significance. The decision rule for interpreting the results were based on the values of the calculated means. Responses on each of the research questions were considered high and agreed when the mean is 2.50 and above, and low and not agreed when less than 2.50. The null hypothesis was rejected

when the significant level is less than .05 and was not rejected when the significant level is more than.05 level of significance.

Results

Research Question 1: What are the social network sites frequently used by undergraduate in public university in Enugu State?

Table 1: Mean Response on the Social Network Sites Frequently Used by Undergraduate in public University in Enugu State

N=165

SN	ITEMS	SA	A	D	SD	MEAN	S.D	DECISION
1	Facebook	35	41	42	47	2.61	1.11	AGREE
2	Whatsapp	46	50	33	36	3.01	1.16	AGREE
3	Twitter	39	42	35	49	2.57	1.15	AGREE
4	Snapchat	41	37	38	49	2.58	1.16	AGREE
5	Telegram	41	39	41	44	2.53	1.13	AGREE
6	Instagram	37	45	37	46	2.56	1.12	AGREE
7	Nextdoor	52	40	44	29	2.30	1.10	DISAGREE
8	Youtube	37	52	43	33	2.44	1.05	DISAGREE
9	Messanger	49	44	42	30	3.10	1.19	AGREE
10	Hangout	39	38	51	37	2.52	1.09	AGREE
11	Wechart	40	41	38	46	2.55	1.14	AGREE
12	Qzone	49	41	43	32	2.35	1.10	DISAGREE
13	Google +	42	43	50	30	2.41	1.06	DISAGREE
14	Viber	37	45	43	40	2.52	1.09	AGREE
15	Reddit	42	41	38	44	2.51	1.14	AGREE
16	Tagged	39	43	41	42	2.52	1.11	AGREE
17	Flixster	39	37	44	45	2.58	1.13	AGREE
18	Xing	34	37	48	46	2.64	1.09	AGREE
	GRAND MEAN					2.57		

From Table 1 above, the results of data analysis for research question 1 indicated that items (1, 2, 3, 4, 5, 6, 9, 10, 11, 14, 15, 16, 17 and 18) had mean responses that were higher than the cut-off point of 2.50 while items (7, 8, 12, and 13) had mean responses that were lower than the cut-off point of 2.50. The value of the grand mean was also high. This implied that the respondents agreed that items (1, 2, 3, 4, 5, 6, 9, 10, 11, 14, 15, 16, 17 and 18) were social networking sites frequently used by undergraduate students in public universities in Enugu State.

Research Question 2: What is the influence of social network engagement on the study habits of undergraduates in science classroom in public universities in Enugu State?

Table 2: Mean Response on the Influences of Social Network Engagement on the Study Habits of Undergraduates in Science Classroom in Public Universities in Enugu State.

N=165

SN	ITEMS	SA	A	D	SD	MEAN	S.D	DECISION
19	Students find it difficult to study with the internet as a result of social networking sites distractions.	47	39	44	35	2.41	1.12	DISAGREE
20	Students regularly switch from reading materials to social networking sites while studying.	44	36	42	43	2.51	1.15	AGREE
21	Students regularly skip their reading schedules	43	44	40	38	2.44	1.11	DISAGREE
22	Student's attention is often drawn to notifications and alerts from social networks while studying	38	45	32	50	2.57	1.15	AGREE
23	Students take short break to chat or attend to alerts while studying	50	40	35	40	3.13	1.16	AGREE
24	Students usually study for sometimes, then visit social networking sites before going back to their studies	50	45	31	39	2.36	1.15	DISAGREE
25	Students struggle to get off social networking sites and do their assignments	44	31	50	40	2.52	1.13	AGREE
26	Students find their studies less interesting as a result of social networking sites.	32	47	39	47	2.61	1.09	AGREE
	GRAND MEAN					2.60		

From Table 2 above, the results of data analysis for research question 2 indicated that items (20, 22, 23, 25 and 26) had mean responses that were higher than the cut-off point of 2.50 while items (19, 21 and 24) had mean responses that were lower than the cut-off point of 2.50. The value of the grand mean was also high. This implied that the respondents agreed that items (20, 22, 23, 25 and 26) are the influences of social network engagement on the study habits of undergraduates in science classroom in public universities in Enugu State.

Hypothesis 1: There is no significant difference in the mean ratings of male and female undergraduates with respect to the social network sites frequently used by in public universities in Enugu State.

Table 3: t-test on the mean ratings of male and female students with respect to the social network sites frequently used by undergraduate students in public universities in Enugu State

GENDER	N	Mean	Std. Deviation	t	df	Sig.	Dec.
MALE	65	44.4308	4.92116	-.927	163	.708	NS
FEMALE	100	45.1500	4.83333				

Table 3 shows that the t value for the difference in mean rating of male and female undergraduates with respect to the types of social network sites frequently used in public university is -.927, which is not significant at 0.708 level of significance, which is higher than 0.05 set for the study. The null hypothesis is therefore not rejected. This means that there is no significant difference in the mean ratings of male and female undergraduates with respect to the social network sites frequently used by undergraduate in public universities in Enugu State.

Hypothesis 2: There is no significant difference in the mean ratings of male and female undergraduates with respect to the influences of social network engagement on their study habits

Table 4: t-test on the mean ratings of male and female undergraduate with respect to the influences of social network engagement on their study habits

GENDER	N	Mean	Std. Deviation	t	df	Sig.	Dec.
MALE	65	19.5385	3.51371	-.833	163	.557	NS
FEMALE	100	19.9900	3.32573				

Table 4 shows that the t value for the difference in mean rating of male and female undergraduates with respect to the influences of social network engagement on their study habits is -.833, which is not significant at 0.557 level of significance, which is higher than 0.05 set for the study. The null hypothesis is therefore not rejected. This means that there is no significant difference between the mean ratings of male and female undergraduates with respect to the influences of social network engagement on their study habits.

Summary of Findings

The results of data analyses for the study revealed the following:

1. The social networking sites frequently used by undergraduate students in the university was high, and they include Facebook, WhatsApp, Twitter, Instagram, Snapchat, Telegram and Messenger. There is no significant difference in the mean ratings of male and female undergraduates with respect to the social network sites popularly used by undergraduates in public universities in Enugu States.

2. The influence of social network engagement on the study habits of undergraduates in science classroom in public universities in Enugu State indicated negative. The mean rating of male and female undergraduates did not differ significantly with respect to the influences of social network engagement on their study habits.

Discussion of Findings

The result revealed that the social network sites frequently used by undergraduates in public universities in Enugu State include inter alia, facebook, whatsapp, twitter, Instagram, snapchat, telegram, and messenger. This finding agrees with the submission of Aleke (2016), who revealed that students constantly check their facebook pages and other social networking sites while in the classroom. He concluded thus "the more media they consumed per day, the worse students they were". Further investigation with t-test revealed that there is no significant difference in the mean ratings of male and female undergraduates with respect to the social network sites frequently used by undergraduate undergraduates in public universities in Enugu State.

The results of the analyses on the second research question revealed that social network engagement had negative influence on the study habits of undergraduates in science classroom in public universities in Enugu State. This agrees with the opinion of Udoka (2016) which stated that the students combine the usage of the sites with study periods, thereby resulting to multi-tasking. According to Aleke, this will further lead the students to study in unconventional manners. Further investigation also revealed that there is no significant difference in the mean ratings of male and female undergraduates with respect to the influence of social network engagement on the study habits in science classroom in public universities in Enugu State. The respondents particularly agreed that they don't get enough hours to rest before studying. This is probably because the times they were supposed to use for rest were rather used for social networking.

Conclusion of the Study

Given that the engagement in Social Networking Sites is becoming increasingly popular among undergraduates in public universities in Enugu State. The social networking sites frequently used by undergraduates in public universities in Enugu State, include Facebook, WhatsApp, Twitter, Instagram, Snapchat, Telegram and Messenger. This social network engagement had negative influence on the study habits of undergraduates in science classroom in public universities in Enugu State. There is therefore an urgent need to curtail this trend; otherwise the quality of the products of university education will be short of expectations, a situation which will pose great economic and social risk to the country.

Counselling Implications of the Study
The implications of the findings of this study include:

1. The engagement of students in social networks in the universities has negative influences on their study habits. This poses a great threat to the education sector, as well as the economy of the nation, in the nearest future.
2. Internet technology is rather threatening education than boosting it thus the need to curb students' usage in classrooms and university environment.
3. Students are using internet devices mostly to the detriment of their education than as a tool for self-development and advancement which calls a reorientation of the university undergraduates on social network usage.

Recommendations of the Study

Based on the findings of the study, the researchers recommends as follows:
6. Use of mobile devices in the classrooms, laboratories and libraries should be prohibited by the university authority.
7. Librarians should strictly monitor the activities of students in virtual libraries with internet connections
8. Effective provision of educational guidance and counselling experts to enlighten undergraduates on the negative effects of social networking on their study habits and future.
9. Where and when possible, schools should ban the use of internet-enabled mobile phones among undergraduates, especially freshmen.
10. Seminars and workshops should be organized for undergraduates, by the university management to enlighten them on the dangers of Social Networking Sites, especially as it affects their studies.

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